Exploiting the potential of wikis to support collaborative and cooperative learning activities in the online environment

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Introduction

The word wiki comes from Hawaiian for quick and has been use as a name for a particular type of web site. A wiki web site allows any visitor to easily contribute to and edit that web site using nothing more than their Internet browser (e.g., Internet Explorer). Wiki systems are particularly suited to collaborative group authoring of documents and websites.

This article focuses on wiki technology, assesses the potential and considers any possible problems to enable teachers to make wise choices in relation to the use of wikis in learning. It will consider how wiki technology can be used to improve learning and how a teacher can transform their pedagogy and teaching practice to best exploit the opportunities for collaboration and cooperative learning offered by the wiki.

Zhao, Pugh, Sheldon and Byers (2002) suggest that successful implementation of technological innovations in the classroom "... [is] more likely to occur when teachers view... technology as the means to an end, rather than an end itself, and when they [see] an intimate connection between technology and the curriculum” (p. 492). With that in mind, this article aims to focus on the educational need for collaborative and cooperative learning. “Cooperative learning is a teaching procedure that enhances both academic and social skills. It provides a platform for students to develop effective learning strategies” (Brown & Thomson, 2000, p. 11). This article establishes a connection between the need to provide
opportunities for collaborative and cooperative learning and the ability of a wiki to provide a facility to deliver it.

**Why should educators consider using wiki technology?**

Wikis provide an online space for collaborative authorship that is easy to use. They fulfil a need for people to communicate, collaborate and share information. It can be used to incorporate group work, cooperative learning and collaboration into face-to-face or online learning environments. The space can be used for everything from brainstorming to writing the final presentation. It can be easy to use and is readily available. So what is it that wiki technology offers which is different from other tools that are available? Detailed below is a list of the strengths and positive features of wiki technology:

- Users of the wiki can read, visit, re-organize and update structure and content.
- Most wikis keep track of changes and maintain a number of versions providing an edit trail (version control system) of every change made to every wiki page.
- Really Simple Syndication (RSS) can be set up on the wiki to alert users to new postings and changes via email.
- Many wikis enable images, videos and multimedia presentations to be embedded directly in the wiki pages. If this facility is not available many wikis provide a way to link to web sites, images, videos and multimedia presentations.
- Blogs tend to be developed for one to many communication where aswikis facilitate many to many communication. The key difference is that a wiki allows any users with the correct permissions to update the content as well as to make a comment in the comment facility. Blogs allow users other than the author to use the comment facility only.
- Any individual who has access to the wiki can make a comment. This is a great way for a teacher to provide feedback to the students on a task and point them in the right direction if they need help. It can also be used for student peers and parents to provide feedback.
• Wikis are generally organised by content where as blogs are generally chronologically organised.
• A wiki allows a teacher to see the evolution of a written task. The edit trail enables the teacher to see who has made additions, changes and deletions and when the change occurred.
• In group work, a teacher can see who has contributed and who has not.
• Wikis enable students to create a document or presentation which reflect the shared knowledge of the learning group.
• Wikis can be used to facilitate the dissemination of information and enable the exchange of ideas. For this reason wikis are often used by ‘communities of practice’ to facilitate group interaction.
• Because wikis can be available on the internet they can be used collaboratively across countries and age groups facilitating the “any learning, anytime, anyplace to anyone “ potential of education. (Mann, 2001, p.247 cited in Brown & Cross 2005, p. 45)
• Many wikis have built in safeguards against malicious behaviour: - page changes are logged and page deletions may require authorization by a moderator to take effect.

How can a wiki be used?

The most exciting opportunity offered by wikis in teaching and learning is in the provision of a shared learning space that can be added to and modified by many users, in many different physical locations, at different times. The availability of this space enables collaborative and cooperative learning opportunities to be offered to students who are working in distance learning environment. The availability of this space can also be explored by students in face to face schools to collaborate with students.

Collaboration and cooperative learning provides students with the opportunity to develop skills to enable them to get along with each other while completing a task. This skill has
been highlighted by Brown and Thomson (2000), who argue the ability to be able to work with others in a group is a skill that is increasingly demanded by industry and society generally.

Wikis can also be used by teachers and other educators for professional and curriculum development enabling teachers and learning advisors to share knowledge and skills and to develop policy documents even when they are in different geographic locations. Waters (2007) describes the use of a wiki as a collaboration tool for curriculum development. He claims “the use of wikis has made collecting and utilising input from teachers more convenient, but more inclusive” (p. 41). Having more teachers able to contribute to the discussion can bring about a culture change involving more collaboration with colleagues on curriculum development and sharing lesson plans.

*Examples of the use of wikis in teaching and learning*

Hetherington (2007) describes a one-year project which used a wiki to create a virtual newsroom for journalism students. The idea was to replicate a professional newsroom and to provide a “... space for student peer editing of news and feature stories enhancing the collaborative, creative and critical literacies of those involved” (p. 76).

The Missouri river project described by Engstrom and Jewett (2005) involved the use of a wiki in critical inquiry and collaborative problem solving project in which students collaboratively researched and analysed divergent points of view around contemporary Missouri River issues. The students involved came from eleven geographically dispersed classrooms and worked together to develop a policy statement for the rivers management. Groups were mixed geographically, culturally and economically to promote the ability to view and discuss river issues from more than one perspective. Four hundred students and eleven teachers were involved in this project.
Hauser (2007) suggests using Wikipedia to demonstrate exactly how a wiki works and encourages people to ask students to write a Wikipedia entry about their school or hometown.

Duffy and Bruns (2006) suggest several ways in which wikis can be used to enhance learning opportunities for students:

- Wikis can be used for students to add summaries of their thoughts from the prescribed readings, building a collaborative annotated bibliography.
- In distance learning environments, the tutor can publish course resources like syllabus and handouts, and students can edit and comment on these directly (for all to see).
- Wikis can be used as a knowledge base for teachers, enabling them to share reflections and thoughts regarding teaching practice and allowing for versioning and documentation; essential to the usability of such a resource is that it is searchable, has easy navigation and categorization, and file management, all of which current wiki environments provide (p. 6).

Listed below are some of the other classroom activities and interactions wikis have been used for:

- collaborative icebreaker activities to get students talking online and to enhance and promote student interaction;
- to map concepts and to brainstorm ideas;
- course evaluation by students;
- e-portfolios – wikis work well as an e-portfolio tool, providing flexibility in layout and structure, can include images, animations, video and sound. The wiki comment facility can be used by peers, parents and teachers to provide feedback;
- book discussions, poetry anthologies and a place to write reactions to readings;
- to draft classroom policies and contracts of acceptable classroom behaviour;
• to simulate the development of peace treaties or legislation;
• to develop recipe collections and record comments on the recipes;
• in junior school, students can develop class wikidictionaries where new words learnt are added in alphabetical order;
• to develop meeting and conference agencies, participants adding items as required.
• “Brain drain” activity as described by Henderson (2006), where everyone posts 2-3 of their expectations/facts/opinions regarding a topic;
• to record field trip observations and reactions;
• to facilitate student debates;
• disseminate/share information with students, staff and parents; and
• to provide a place to ask questions.

What are the weaknesses of wiki technology?

Wiki technologies are not without their weaknesses. As Choy and Ng (2007) explain “The wiki technologies have expanded the opportunities for distance educators, but also bring new challenges to the process of teaching and learning” (p. 209). It has also been suggested by Valenza (2006) that “there are some downsides to wiki use. They are by nature a bit chaotic, vulnerable to hacking and have the potential to inspire editing quarrels as groups negotiate content” (¶ 10).

There are also technical challenges presented by wikis. These include the need for teacher and students to have frequent access to high speed internet, a lack of predefined structure to guide new users in some wikis and difficult navigation for visitors. Large projects require an organizational structure to the wiki. There are page editing constraints with large group collaborative projects, like the Missouri River project described by Engstrom and Jewett (2005). In this project there was a need to keep groups small (four to six students) to minimize the number of user attempts to edit a given wiki page at the same time, which causes problems with page locking.
Lack of provision for adequate training and support for teachers and students is a concern. Training, professional development and ongoing support of teachers and students is raised by Choy and Ng (2007, pp. 222-223) who state: “the technical challenges of using the wiki as new learning tools should not be overlooked . . . Allowing more time for participants to become proficient users of the system and strengthening the provision of technical guidance and support can improve participants’ experience”. Teachers and students need to be allowed time to become comfortable with the wiki environment and any planned projects before they begin. Using icebreaker and group starter activities is perhaps a way to provide this familiarization experience.

Issues of cybersafety needed to be considered when using wikis. Klobas (2006) discusses safety issues and suggests that “…there is debate about whether educational wiki installations, particularly those in schools, should be restricted to internal use to minimize access to undesirable content and behaviour”. There are a variety of ways of reducing cyber safety risks. These include:

- Using private wikis where only invited users can add, change and delete content.
- Providing students with school email addresses for use in online learning, wikis and other social software to separate their schoolwork from personal email and online activities.
- Having students use initials rather than names on wikis sites to protect their identity.

Jefferies (2007) raises the issue of students creating a ‘digital footprint’, an online identity which may not be easily edited or erased and could attract unwelcome attention and or repercussions. She goes on to suggest that teachers could become involved in social networks and communities of practice with students and as such provide students with “roles models of what it means to be a responsible digital citizen” and “giving students a better understanding of what it means to be a networked learner” (p. 28).
Wikis can be vulnerable to manual and automated spamming where inappropriate content is added to the pages. This can be dealt with by restricting editing access, careful monitoring of pages or by manually approving pages before publishing and the selection of wiki sites which provide ‘captcha’\(^1\) testing to prevent automated spam.

Klobas (2006) also raises the issue of intellectual property, and suggests that wikis represent a major shift in the concept of personal ownership of ideas and that educators will have to consider what content from a wiki is acceptable to be handed in for assessment. Copyright issues need to be considered also when adding and linking content to wikis. Students need to make accurate acknowledgment of their sources and they may need to be taught how to do this. Students may also require support and facilitation in the inquiry process to promote critical thinking and thinking from multiple perspectives to make the most of opportunities for collaboration.

Managing a wiki requires a significant time commitment from the teacher or learning advisor, page edits should be monitored and appropriate feedback should be given during the activity and not just at its conclusion. Using a wiki does involve learning about acceptable editing practices and how to deal with conflicting opinions. Students can overwrite other students work in an aggressive way, in an ‘edit war’. This requires teacher or learning instructor intervention. There is a need for teachers to model or facilitate an exchange of ideas, sharing, questions, feedback and prompt responses.

Some of the normal problems that occur in any group work occur. Brown and Thomson (2000, p.123) suggest that “assigning roles is one way of ensuring that students work well together”. Engstrom and Jewett (2005) describe how students worked in “cooperative

\(^{1}\) ‘Captcha’ testing is where a user reads and enters some distorted letters or content. Spam is avoided because the spam software cannot respond correctly to the captcha test.
groups with self as-assigned roles such as wiki recorder, research note taker, and discussion facilitator” (p. 15).

Perhaps the critical weakness of wikis is a student’s reluctance to contribute. Some students need encouragement to use a wiki. Just making a tool like a wiki available does not automatically cause the desired change to occur in the learning environment. In the case of wikis and collaborative learning the teacher may need to change their practice and pedagogy. The students need to be already working in an active online learning community where they are happy to contribute and are well supported by the group. These learning communities do not develop over night and students will not immediately start sharing ideas and working together just because a wiki is introduced. The value really depends on how the students and teachers use them. The Staff And Departmental Development Unit at the University of Leeds (2006) suggests several complementary ways to encourage student participation in a class wiki:

- assign specific authoring/editing responsibilities to individual students or small groups of students;
- use the students’ interactions with the wiki participation as part of the summative assessment of the course and
- integrate the wiki closely into the rest of the course. For example:
  - refer to or use the wiki in face-to-face teaching sessions;
  - provide key information via the wiki (details of assignments, marking schemes, revision notes)
(http://www.sddu.leeds.ac.uk/online_resources/wikis/planning.html).

Selecting a wiki for use

A good place to start if you wish develop a wiki for use in your classroom is to look at some already established wikis. Finding wikis for similar organization and projects to yours can be helpful. Look at how the wiki is organized and structured, how page navigation is handled, who is able to edit the content, whether images and web links are embedded in the
pages and how the wiki handles spam. You may even be able to send an email to individuals involved in the wiki and seek their advice.

There are a range of ways in which you can create a wiki, with Klobas (2006) listing six paths to wiki creation. The degree of technical support available and cost will determine which of these six paths listed below is suitable for an organisation.

- **Web hosting.** Wikis that are available on the World Wide Web. A simple and fast way to be up and running. Technical issues are dealt with by the service provider. There are many wikis which are free but have a limited range of services. A charge may be necessary to gain additional features. Some service providers offer free service to education providers like schools. Some examples are wetpaint (http://www.wetpaint.com) and wikispaces for teachers (http://www.wikispaces.com/site/for/teachers).
- **Application service provider (ASP).** The ASP maintains the hardware, software and network considerations for the wiki at their own site. A cost is involved for this service.
- **Appliance.** This involves buying a wiki appliance that is configured to run in a specific network environment. A cost is involved.
- **Simple installation.** This involves loading wiki software on to your own server and network. Some free wiki software is available to be downloaded from the web, however, technical skill is required to install and maintain.
- **Advanced installation.** Similar to simple installation, but requires a skilled network administer or systems administrator to install and manage.
- **Embedded wiki.** This is particularly common with learning management systems like Moodle (http://moodle.org/) and Blackboard (http://www.blackboard.com/). A cost is involved and technical skill is required to install and maintain.

When choosing a wiki you also need to consider the features available to you. Examples of features and issues to consider are listed below:
• Ease of use. The availability of an editing toolbar is desirable. Consider what formatting is available: bold and italic text, bullet and numbered lists, horizontal lines, tables and headings. A wiki that provides templates and style sheets with colours and basic layouts for can make initial wiki development easier.

• Media and file support. It is desirable to be able to embed images/video and other media directly into wiki pages. If this is not available look for a wiki which can support linking to these features.

• Hyperlinks to web pages and email address.

• Automated page edit alerts (using RSS).

• Update conflict handling - Page locking to avoid wiki page update conflicts.

• A search function will be useful on large wikis.

• Spam handling – captcha testing helps to avoid spam.

• History and page version rollback can be useful if you wish to revert back to a previous version of a page.

• Language support. This may be important for language courses and wikis that are to be used in an international context.

• The support of mathematical notation and formulae.

• Integration with other social software tools such as weblogs, polls for online voting, shared whiteboards and mind mapping software.

• Some of the wikis that are provided free for educational use are advertisement free, while other wikis have advertisements.

How can teachers and students best interact when wiki technology is being used?

How can the teacher best exploit the opportunities for collaboration and cooperative learning offered by the wiki? The need for a teacher to cultivate a healthy online culture for collaboration and cooperative learning to be successful has been highlighted in the literature. Henderson (2006) suggests that “the biggest threat to online collaboration is for teachers to forget to cultivate a healthy online culture for their class” (p.12). So how does a teacher develop this kind of climate? Palloff and Pratt (2005, cited in Choy & Ng, 2007)
believed that using wikis in a collaborative approach to learning required “the transformation of the role of teachers from authoritative instructors into mediated facilitators”.

Henderson (2006) suggested that teaching online is all about group collaboration, and goes on to suggest “that teaching online has a lot of similarities to teaching in the classroom, namely, they both involve pedagogical, social, managerial and technical roles” (p. 10). In his discussion of the e-facilitator, he adapts and summarises the work of Bonk and Denennen (2003, cited in Henderson, 2006) to identify four key roles as shown in Figure 1.

<table>
<thead>
<tr>
<th><strong>Pedagogical role:</strong></th>
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<tr>
<td>Ask questions, encourage student knowledge building, weave or summaries discussions and offer constructive criticism. In activities such as problem based learning, peer feedback tools, electronic cases, team activities, field reflections and online debates to name a few.</td>
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<tr>
<th><strong>Social role:</strong></th>
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<tr>
<td>Create a friendly and nurturing environment or community feel, exhibit a generally positive tone, foster some humour, personalize in messages, display empathy and interpersonal outreach and create community feel.</td>
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<th><strong>Managerial role:</strong></th>
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<tr>
<td>Coordinate assignments with set due dates and extensions, assign groups and partners, present clear expectations, set office hours, grading and feedback, and overall course structuring.</td>
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<tr>
<th><strong>Technical role:</strong></th>
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<tr>
<td>Assist participants with technology issues, clarify problems encountered.</td>
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Figure 1: Key roles of e-facilitator (Henderson, 2006).
Cultivating an online learning environment climate that is conducive to learning, collaborating and sharing can sometimes be difficult and it is not possible to provide a quick fix solution. It relies on relationships build up between the participants. Henderson (2006, p.16) has provided a list of several strategies that can be used to help to develop a suitable learning culture and for managing online behaviour. His ideas have been summarised below.

Developing a suitable learning culture:

- Break the ice – find ways to get students interacting in a supportive and welcoming atmosphere.
- Develop a forum for resolving problems with a wiki or joint blog.
- Set the standard – share with your users your expectations for the activity. Set rules and standards for good “netiquette”, make a certain level of participation mandatory, for example, two messages per week.
- Quality not quantity – evaluation should be based on the quality of posting, not the length and number.
- Take advantage of small group synergy – groups of 4 to 6 students.
- Keep forums active – check sites regularly, respond regularly, offer advice and suggestions. “A good rule of thumb is to keep your posts to less than 20% of the total in the discussion.”
- Provide opportunities for contribution, communication and collaboration – focus group activities on specific topics or tasks, share student contributions with others outside the group and request feedback on the group’s contributions.
- Weaving – when other messages are quoted to help support your point or summarize the discussion. (Salmon, 2002, cited in Henderson, 2006). It is a way to acknowledge participants’ contributions and should be taught to students.
- Summarising – to refocus the discussion, signal closure, provide a platform for deeper discussion and can be assigned to individual students to develop skills.
- Archiving – removing out of date content to keep content current.
Managing online behaviour:

- Clear expectations.
- Clear purpose and objectives.
- Frequent monitor – let your presence be known by posting, commenting or making changes.
- “Whispers” private emails sent directly to students who have done something unexpected, wrong or literally nothing all.
- Don’t get provoked. Students can demonstrate similar attention seeking and disruptive behaviours as they do in the classroom.
- Monitor students who are quiet.
- Provide shy students with direct email support where they can test questions on you before they submit it to a forum. Use small groups.

Conclusion

The opportunities offered by wiki technology to enhance student learning by being able to incorporate collaborative and cooperative learning activities into online learning environments are vast. The technical aspects of selecting a wiki, setting it up, organizing the page layout and navigation may present a teacher with some challenge, but by far the biggest challenge will be that of creating a culture of sharing and contribution. A teacher may need to transform their pedagogy and teaching practice to best exploit the opportunities for collaboration and cooperative learning offered by the wiki.

References


