

Is That a Wiki in Your Classroom?

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Background

A wiki was defined as “the simplest online database that could possibly work” by Ward Cunningham, who is credited with coining the term and creating the first wiki, The Portland Pattern Repository, in 1995. Ward chose the Hawaiian name Wiki Wiki Web, which means “very quick” or “quick quick”. Wikis are accessed via a web site, thus providing access to everyone. Wikis stand apart from other Web 2.0 tools such as blogging, as they are developed collaboratively by many authors. Wiki users can create, modify and delete the content of the wiki.

The creation of these open source, moderated, web based documents started with a few small wikis and expanded into larger concepts, including Wikipedia, MeatballWiki, and MetaWiki. Today wikis have experienced a high rate of growth with many specialized applications. Using wikis in the classroom provides students with exposure to this important collaboration tool. As Tapscott and Williams, the authors of Wikinomics (2008) note:

A power shift is underway and a tough new business rule is emerging: Harness the new collaboration or perish. Those who fail to grasp this will find themselves ever more isolated - cut off from the networks that are sharing, adapting, and updating knowledge to create value (p. 268-271).

Wikis have made the transition from stand-alone online databases, to being components of other applications, such as content management systems. Many commercial and open source content management systems exist. Some popular commercially available content management systems include Blackboard, eCollege, Desire2Learn and CyberExtension; while, some common open source content management systems such as Moodle, Dokeos, and Sakai are very popular. Other popular packages included WebCT and Angel, however, these were recently acquired by Blackboard. Whether a commercial or open source content management system is implemented, most share similar functionality, including wikis.

Wiki Project Goals

Wikis used in the classroom usually support a teaching objective, and Phillipson (2008) classified instructional uses of wikis into “five stages of inquiry”. These included: 1) a resource wiki, a knowledge form that is created collectively; 2) a presentation wiki, or using a wiki to communicate an individual's work to a group; 3) a gateway wiki, or using a wiki to develop a discussion of data; 4) a simulation wiki, or using a wiki to simulate an environment for exploration; and 5) an illuminated wiki, the use of a wiki to jointly develop a group document including print, graphic, audio and video hyperlinks. Nielsen (2009) suggests other reasons to use wikis in teaching, including: 1) decrease disruptions of instructional time, 2) make meetings more efficient, 3) collaborate on important documents, 4) enhance professional development; 5) share and collaborate on curriculum maps; 6) save trees and time; and 7) a portal for collaborative teaching. Ferriter's (2009) research also supported these collaborative uses of wikis for educators.

The wikis presented could be classified as either resource or presentation wikis. The importance of using technology effectively in the support of instructional goals should be recognized. The primary teaching objective was to further enhance the learning process by using wikis as an auxiliary teaching tool in a face-to-face class environment. Using a wiki: 1) provided a tool to reinforce basic skills, 2) promoted student responsibility for their own learning via collaborative learning techniques, and 3) taught students peer review concepts.

Reinforcing basic skills included these goals: 1) develop student research skills; and 2) enhance student technology skills. Engstrom and Jewett's (2005) research noted that developing students thinking and decision making skills with the use of information literacy skills was a key benefit of using wikis collaboratively. They further recommend that teachers participate in professional development to provide them with the resources and practice in prompting students critical thinking. (Mackenzie's Questioning Toolkit is recommended as a resource (<http://questioning.org/Q7/toolkit.html>; Engstrom and Jewett, 2005, p. 15). Student technology skills were enhanced through the use of a wiki to develop materials that could benefit their own study objectives as well as those of their peers. Students learned what a wiki was; how to develop a wiki, rather than just use a wiki; and how to effectively add to or correct other student postings.

The wikis presented here promoted student responsibility for their own learning via collaborative learning techniques. Students were charged with the responsibility to develop a student maintained resource via the use of wikis. Students were provided with the opportunity to work with others in a collaborative written forum, and to benefit from the results of this work through their study and ultimate understanding of the material. Ajjan & Hartshorne (2008) note that researchers have documented the value of this type of collaborative writing in terms of increased motivation, positive attitudes, and greater achievement.

The final goal of this project was to teach students peer review concepts. Wikis are by definition a user developed resource; other users must review the information posted for reliability. Students may not be familiar with the concept of peer review. A definition of peer review is to “referee: evaluate professionally a colleague's work” (Princeton, 2010). Peer review in this learning environment included students reviewing postings on the wikis; determining if the posting was accurate, and making corrections or additions to the wiki.

Implementation

The wikis were designed to have three levels of user access. First the instructor, or wiki designer, has complete access to the entire wiki. The role of the designer is to create the wiki hierarchy and templates that could be implemented by the wiki moderator, or builder. Once the moderator has received training from the designer, the role of the moderator is to implement the wiki design and to then moderate the content posted. The wiki designer may also function as a moderator for the wiki; however, the moderator is typically a student worker or research associate that has previous knowledge of the wiki design concepts. Like the wiki designer, the wiki moderator also has complete access to the wiki pages. Finally, the current students supply the information to the wiki and perform peer review on wiki concepts and course content. Students only have limited access to the wiki and can only modify certain portions as specified by the designer or moderator.

The main entry page to the wiki mimics a table of contents to provide a top-level access to the rest of the wiki. The moderator or wiki designer provided the names of topics on this page for the students. The entries to this page serve as links to secondary pages within the wiki that contain further, more specific information on each particular topic. Students do not directly edit this page

The next page provides further, more specific information on the topic chosen. This is essentially the second tier in the hierarchical structure of the wiki. As with the top page in the wiki, each entry is a link that will navigate to the third level of the wiki. Only the wiki designer and moderator have full access to this page, students cannot edit the links on this page.

The final level of the wiki, the third level, contains the pages that are editable by the students directly. Because of this, the moderator must strictly monitor these pages for accuracy. This page contains very specific information that each student can acquire through a number of different sources and post their findings. Students are free and encouraged to verify and re-verify the postings on the wiki with their own information. When discrepancies are identified, students are encouraged to post the differing findings and a discussion typically takes place as a result. This process has the added benefit of teaching the students the necessity and value of reproducibility and validation of work. Data posted on this section of the wiki is validated three ways: 1) by peer review; 2) moderator review and 3) if necessary, review by the designer. The most effective validation technique is peer review. Here students are encouraged to review the current postings to check for discrepancies. When a discrepancy is identified, discussion can ensue and if necessary, the moderator or wiki designer can provide final approval. When students post their information in this section of the wiki, they are required to cite a reference where they found their information so that the moderator may quickly eliminate inconsistencies. By default, students do not have the ability to delete or modify other student's posts, but they do have sufficient privileges to delete or modify their own posts. As with other pages in the wiki, the designer and moderator have complete access to this wiki page.

This hierarchy approach has proven to be very effective, allowing students a consistent method to access specific information stored within the wiki.

Business Wikis

Wikis were used in two different business courses at the university: 1) a traditional classroom course, business management, and 2) a service learning course in entrepreneurship, Students in Free Enterprise. The wikis differed in that the former was a very basic addition to the learning process, while the later wiki was critical to sharing and developing information for the class activities.

The wikis used in the business management course were used to study the new vocabulary in each chapter. The wikis were organized in a hierarchical manner as described previously. A table of contents for the wiki guided students to a wiki for each chapter. Students were encouraged to add “terms to know” identified in each chapter to the wiki every week. Students were also encouraged to review other student entries on the wiki vocabulary page and make additions or suggest corrections. This encouragement was provided in a class participation grade that included a review of student wiki contributions.

In contrast, the wikis used in the service learning course, Students in Free Enterprise, were critical to the development of each service learning project. This course worked on eight projects in the community that involved discovering, teaching others, and practicing free enterprise in the community. Students developed the projects based on needs identified in the community. They then used technology tools and community resources to develop the project. The use of wikis facilitated students collaborative work on different projects that made it easy to share files. The instructor developed a template wiki as described previously. Students used this template to add their own project material. The wikis were organized by project, and project material included the following: 1) project needs analysis, 2) project target audience, 3) learning objectives, 4) project goals, and 5) identified project resources. Students also used the wikis to share and jointly develop project documents such as: 1) publicity documents using Publisher, 2) Power Points used to facilitate delivery of projects, 3) pre and post quizzes used to measure increases in learning; 4) Excel worksheets develop to measure project effectiveness and attendance and 5) Word documents that documented and summarized the projects.

Organic Chemistry Wiki

To prepare the moderator, the instructor (designer) created a template for a sample molecule. The wiki designer then instructed the moderator to build a skeleton for each molecule that included: 1) the molecule name entry on the main wiki page that linked to the second page; 2) the second page that contains a skeleton for the Material Safety Data Sheet information that links to the final pages; and 3) the final pages that contain the information that students update.

The main wiki page consisted of each molecule’s name that only served as a link to the molecule’s second page. The second page for each molecule was identical. It contained links to pages for: 1) Identity and Physical Properties, 2) Hazards, 3) National Fire Protection (NFPA) Codes, 4) Handling and Storage, and 5) Toxicological Information. Students then update the pages for each of the above sections as shown in Figure 1.

For example, from the main wiki page, the entry 1-Propanol linked to a table of contents page for 1-Propanol that contained links to the five sections above, as shown in Figure 1. Each of the 5 links from the previous page linked to a unique MSDS section for 1-Propanol that students

updated with information gathered from external sources. Section 1 for 1-Propanol contained information on the Identity and Physical Properties of 1-Propanol. Students updated this wiki page by adding a Description, Synonyms, CAS Number, Molecular Formula, Molecular Weight, Boiling Point, Melting Point, Vapor Pressure, and Specific Gravity. Section 2 for 1-Propanol contained information on the Hazards for 1-Propanol. Students updated this page by adding 10 laboratory hazards for 1-Propanol which included first aid measures. Section 3 for 1-Propanol contained information on the NFPA codes for 1-Propanol. Students found that 1-Propanol was highly flammable but had very little other health risks. Section 4 for 1-Propanol contained information on the Handling and Storage of 1-Propanol. Students found that since 1-Propanol is highly flammable it should be stored, both long and short term, in fire retardant containers inside of appropriate cabinets with proper ventilation. Finally, section 5 for 1-Propanol contained Toxicology Information for 1-Propanol. Students gathered exposure limits and organs targeted by both acute and chronic exposure to 1-Propanol.

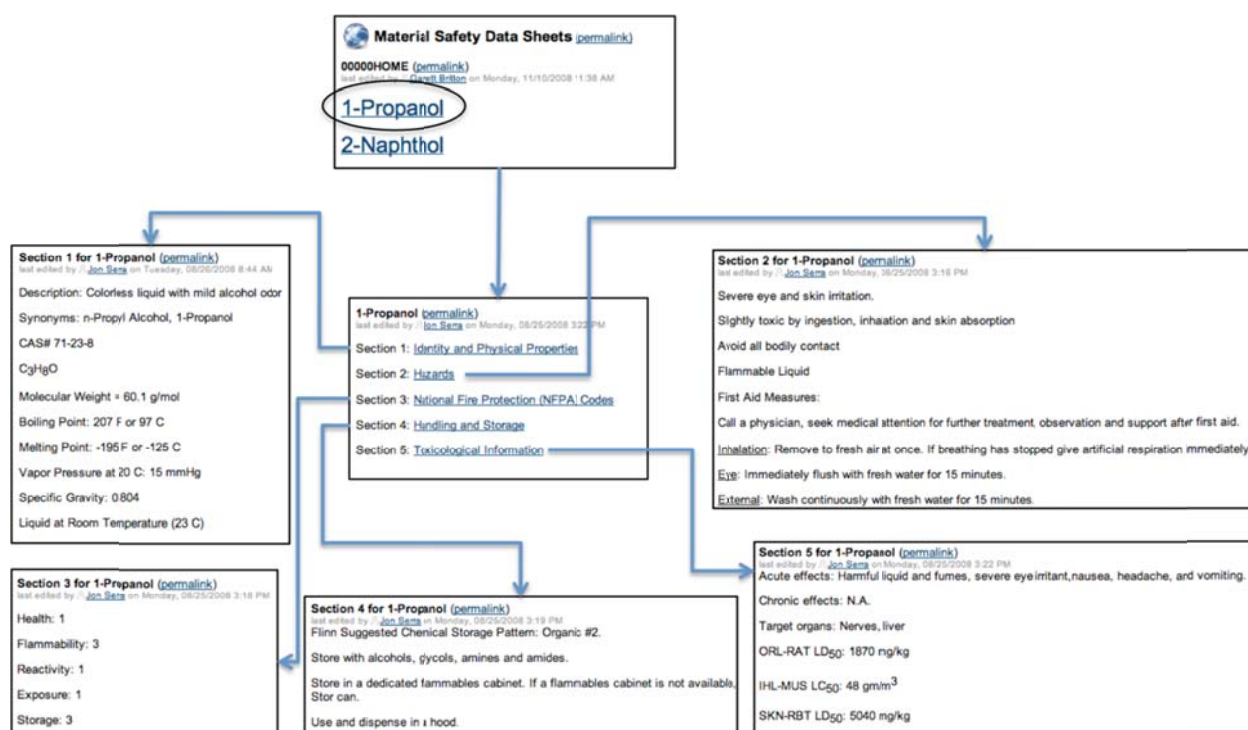


Figure 1. Example wiki pages for 1-Propanol for the Organic Chemistry Laboratory Wiki.

Conclusion

The business wikis have proven to be a useful reference tool for the management class. The Students in Free Enterprise course found wikis to be an invaluable collaborative tool for their projects. The Organic Chemistry Wiki has also proven to be quite effective for students both prior to and during the laboratory session. Students maintain a comprehensive, consistent wiki for the major safety information for all chemicals used in the organic chemistry laboratory sessions. Informal feedback from students confirms that once the wiki structure is learned, it is “a very handy place to find safety information when preparing for lab” (student comment, 2009). Overall, the laboratory wiki has proven to be very effective as a student maintained receptacle for organized safety information on each chemical used in the laboratory.

References

- Ajjan, H., & Hartshorne, R. (2008). Investigating faculty decisions to adopt Web 2.0 technologies: Theory and empirical tests. *Internet and Higher Education*, 11(2), 71-80.
- Engstrom, M.E. & Jewett, D. (2005), Collaborative Learning the Wiki Way. *TechTrends*, 49(6), 12-15.
- Ferriter, B. (2009). Learning with Blogs and Wikis. *Educational Leadership*, 66(5), 34-38.
- Nielsen, L. (2009). Eight Ways to Use School Wikis. *Tech & Learning*, 30(1), 32-33.
- Phillipson, M. (2008). Wikis in the classroom: A taxonomy. In R.E. Cummings & M. Barton (Eds.), *Wiki writing: Collaborative learning in the college classroom* (pp. 19-43). Ann Arbor, MI: University of Michigan Press.
- Princeton web site. (2010). *Wordnet Search*. Retrieved March 1, 2010 from <http://wordnetweb.princeton.edu/perl/webwn?s=peer%20review> .
- Student comment. (2009). *Organic Chemistry Laboratory*. Informal conversation.
- Tapscott, D., & Williams, A. (2008). *Wikinomics: How mass collaboration changes everything*. New York: Penguin Books.