Collaborative Learning the Wiki Way

By Mary E. Engstrom and Dusty Jewett

Today's tech-savvy students are ahead of many of their teachers when it comes to using technology to support learning. This situation is creating a “digital disconnect” between students’ use of technology in and out of school (Levin, Arafeh, Lenhart & Rainie, 2002; NetDay, 2004). Students in grades 6-12, dubbed “the great communicators” because of their reliance on and comfort with electronic communication tools, report learning about technology on their own or through informal networks outside of school (NetDay, 2004). Calls for new models of education that incorporate the use of information and communication technologies as part of the basics of a 21st century education address this disconnect (Learning for the 21st Century, 2002).

One such model, Under Control: The Damming of the Missouri River, was designed to engage middle school students in a real-world geographic issue: investigating the long term environmental, economic and cultural impacts of the 1944 Pick-Sloan Plan, which resulted in the construction of six dams on the Missouri River during the mid-1900s. This topic was selected because the Missouri River is one of the most important physical geographic features in South Dakota and the region. A wiki, a set of expandable web pages that can be edited by anyone within the learning community, was used in the Under Control project to promote critical inquiry and collaborative problem solving across the eleven geographically dispersed classrooms that participated in the curriculum project.

This article describes (a) the rationale for using a wiki, (b) the organizational and managerial structure employed, and (c) the professional development program provided to teachers preceding and during project implementation. Finally, lessons learned are presented along with recommendations for using a wiki in a large, student-centered curriculum project.

Why wiki?

A central goal of the Under Control project was to engage students in inquiry-based learning, whereby they would collaboratively research and analyze divergent points of view around contemporary Missouri River issues and then craft a policy statement for river management. To promote students’ ability to view and discuss river issues from more than one perspective, schools were grouped into teams that represented a mix of geographic, cultural and economic diversity. A communication and knowledge building tool was needed that could serve this purpose with relative ease of use by teachers and students.

Wikis are collaborative environments by design, and can serve a variety of purposes for collaborative online projects. Wikis are commonly used as personal information managers (PIMs), knowledge bases or knowledge management systems, content for academic instruction, sites for collaborative authoring of a document or project development, and collaborative communication forums (Mattison, 2003; Thoeny, 2005). Webopedia (n.d.) defines “wiki” as follows:

A collaborative Web site comprised of the perpetual collective work of many authors. Similar to a blog in structure and logic, a wiki allows anyone to edit, delete or modify content that has been placed on the website using a browser interface, including the work of previous authors. In contrast, a blog, typically authored by an individual, does not allow visitors to change the original posted material, only add comments to the original content.

Because they are organized by content, rather than chronology, wikis are often used to promote collaborative content creation and editing (Goodwin-Jones, 2005; Tonkin, 2005). One feature of most wikis is the edit trail built into their structure, referred to as a version control system, which creates a complete log of every change made to every wiki page. Thus if a student inadvertently deletes the content on a wiki page, that content is saved as an edited version along with a user identifier, date and time stamp. Some wikis also allow for limited access or membership through a registration process. The Twiki software program (Theony, 2003) was selected for use in the Under Control project because it offered the features mentioned above, which allowed us to limit access to the site to only those students and teachers participating in the project. This ensured that the privacy of
the middle school students would be protected. In addition, the teachers were given editing access to all wiki pages, but students' editing access was limited to their small group page(s). Another feature of wikis is that they do not allow multiple users to edit the same page at the same time. If that happens, one user's edits will be deleted. Twiki employs a page locking system, so a notice appears if another user is editing the page when you select the "Edit" button on that same page. This feature also played into the selection of Twiki for the Under Control project. This project represented the initial use of a wiki for both the project developers and the teacher and student participants.

Organizing and managing the wiki

Prior to focusing on how best to organize the wiki users, there was a need to ensure that student use of a wiki was permissible according to the terms of any Acceptable Use Policy that might be in place in any of the 11 school districts. Teachers were instructed to visit with their building principals about the use of the wiki in the project and verify that this type of online collaboration was acceptable. Secondly, there was a need to make sure that project participants had adequate access to computers with high-speed internet connectivity. To that end, teachers were also instructed to let their principals know that the three-week unit would require them to have frequent, if not daily, access to the internet. Once those assurances were in place, the focus shifted to organizing and managing the wiki users.

Several things needed to be taken into consideration in determining how to organize the wiki users. With 11 teachers and nearly 400 students participating in the project, there was a need to organize the students into small research groups of four to six students each in order to minimize the number of users attempting to edit a given wiki page at the same time. In other words, it was determined that if a research group was kept small and was also given its own wiki page(s), the likelihood that each of the four to six geographically dispersed students in that group would attempt to access the same wiki page at the same exact time would be minimized. This reasoning would not have held if all of the participating schools had identical class schedules, as some K-12 distance consortiums do, or if all of the students in a given class elected to investigate the same river issue (described later). Fortunately, those issues didn't present themselves.

First, each teacher was placed into one of four school teams. School teams were purposely formed to encourage students to consider the river issues from multiple perspectives, while also striving to maintain a fairly consistent student population across each team. After students determined the river issue that they wanted to investigate (River Flow, Natural Habitat, Conservation, or Sedimentation), teachers emailed that information to the project developers who then created the small research groups. Figure 1 illustrates this organizational structure. Because students were allowed to self-select one of four river issues to investigate, there was some variation in the number of small research groups for each of these four topics. The two largest school teams, which were comprised of approximately 140 students each, had a range of six to eight small research groups per river issue. Thus the teachers in these two school teams needed to supervise 24 to 32 wiki pages. Project developers also assumed the role of managing all of the small research group wiki pages. Students' editing access was limited to their small group page(s). In other words, if students navigated to the wrong school team and/or the wrong small group, they would not be allowed to edit that page. Teachers, however, were given editing access to all wiki pages.

Organizing the content of the wiki pages for each small research group was a fairly easy process. An environmental problem solving process, adapted from Heathcote (1997), was embedded into the research and inquiry process utilized in the Under Control unit through the prompts placed on each small research group's wiki page(s). One set of critical inquiry prompts was used for all river issues. An example of the prompts used in the second week of the project is as follows:

Week Two Research Findings:

1. How do different beliefs and values lead to different views toward the managing the Missouri River?
2. In what ways has human alteration of the Missouri River system changed the environment along this major waterway?
3. What economic influences are evident in this issue?
4. How does culture and experience influence people's perception of the Missouri River system and its resources?
5. How have problems related to this issue developed over time?

Figure 2 (see next page) is a screen capture of one small research group's wiki page that illustrates the interactions between students during the first week of the project. The project developers actively managed the wiki site from the time that the teachers first accessed it in a summer professional development program through project implementation and completion — a span of about four months. This involved troubleshooting minor issues through emails and phone calls, cleaning up edits that weren't separated into paragraphs, tracking general use of the wiki and, on occasion, assisting a class at their school site. Near the end of the Under Control project, the strict editing access for students was lifted so that they could view other teams' findings and respond to them.

Figure 1. An example of the organizational structure created in the wiki for one school team.