Using persistent wikis as a pedagogical resource
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Abstract

      Wikis have become valuable tools for collaborative projects. A characteristic of wikis which has not been fully exploited in their educational applications is the ability to build content across multiple courses, or over time periods longer than a single term. This kind of wiki creates course continuity, benefiting both students and instructors. By extending the life of collaborative course wikis, students can get up to speed faster by exploring and building on previous work. This work can become a subject area resource benefiting the organization, the discipline, or the public, and instructors can use wikis to maintain a portfolio documenting student work.

Discipline/Academic Areas Addressed

      The examples presented here are drawn from courses in linguistics and psychology, but can be easily adapted to almost any discipline.

Instructional Purpose

      Wikis have become a valuable technological tool for active learning (see, for example, http://educationalwikis.wikispaces.com/). A wiki is a community website written collaboratively by users, and which users can change continuously. Educational wikis have been used as collaborative tools for class and group projects, increasing student interaction, and integrating web content and multimedia into course projects that were not possible with term papers and other kinds of projects.

      A characteristic of wikis which has not yet been fully exploited in their educational applications is the ability to build content incrementally and preserve it over time periods longer than a single term. Here, I will suggest ways to create a wiki which continues from term to term—from one iteration of a course to the next, or within a family of related courses. Some of the benefits of this kind of wiki for students and instructors include:

- **Accelerated learning curve**. I have found that one of the most common challenges facing students in completing a large-scale project is getting started. This is compounded when students are also adjusting to a new format and new technological tools. Examples of previously successful projects are helpful in this regard, and when a course- or discipline-specific wiki already exists, students can explore, update, and build on the work of previous students, rather than starting from a blank slate.

- **Content resource.** The best student work deserves to live longer than a single term; unfortunately, this is the usual lifespan of most projects. By virtue of its web existence, wiki content has the potential for a longer useful existence. With a little careful curation, instructors can create a subject resource to be shared with other students and instructors in the discipline, or with the public. My students have

often been my greatest source of inspiration for teaching materials, and their project topics and the resources compiled for them have formed the seeds for future lessons which I would have lacked the inspiration or time to create myself. By building upon the foundation laid by previous students, subsequent project based on these topics can be more advanced than if they were starting from scratch.

- **Continuing benefits and contributions.** Students learn a great deal through the process of completing research projects, and from feedback received from the instructor; but students rarely, if ever, will read the term papers of other students in their class. A benefit of wiki projects is that by presenting the product of their work in an engaging way, and connecting them all via a central online hub, students can be encouraged to explore and interact about their work. When this hub persists over time, students have even more chances to benefit from these resources. Students in the discipline may refer back to this wiki in their future studies, or be encouraged to remain as active contributors. I have found that students take greater pride in their work when they know it will be viewed not only by the instructor but by peers, future students, and the public.
- **Evidence of student achievement.** Wikis can also form an important component of instructor's teaching portfolios. In addition to the static representations of courses taught and student learning represented by syllabi and evaluations, instructors can use wikis to present a dynamic representation of the kind of active learning occurring in their classrooms, and of the depth and breadth of student work in their courses.

Various software packages available for wiki implementation allow the flexibility for instructors to customize wikis for their course objectives while managing the technical functions necessary for long term management, such as user administration, incremental snapshots, and backup. Wiki implementations and assignments can be customized to meet student learning goals and curricular needs.

Student Learning Outcomes
Wiki projects address many of the learning and academic goals of traditional research projects, while helping to foster collaborations. Creating and using a persistent wiki can help students achieve additional learning goals, including:
1. *Critically evaluate, revise, and improve disciplinary content*. Revision is a critical component of the research and writing process, but I have found that students often have difficulty recognizing areas for improvement in their own work. Revising content created by others, such as that which exists in a persistent wiki, allows students to practice the revision process, and causes them to view their own content with "fresh eyes". The ability to revise the wiki is assessed in two phases: first, the identification of problem areas in a body of work, and then in making changes or additions which address the identified weaknesses.
2. *Integrate, reorganize, or extend existing disciplinary content*. This outcome focuses on form, rather than content; even factually correct information can be obscured when organized poorly. Students are challenged to improve the presentation of a wiki page only through moving or removing content, without

any adding any additional information.

3. *Communicate advanced disciplinary content for consumption by a non-expert audience (e.g., less advanced students, the public)*. At higher levels of the curriculum, it is important for students working to become experts in their fields to learn to communicate and teach about their subjects to a wider audience. Students can be assigned to create their wiki projects with different audiences in mind, including the general public, or less advanced students. Their work can be concurrently evaluated by students, or by reviewers in the target audience.

These outcomes are assessed by distinct phases of the wiki project (see below).

Pre-requisite Skills and Knowledge

General computer/Internet literacy, including:
- Typing/word processing
- Web navigation, including logging into and out of password protected sites.

Familiarity with wikis (optional).
- Most students today are at least familiar with the concept of a wiki, but their experience may only include reading a wiki, and their comfort with editing them using wiki syntax may be highly variable.
- Non-traditional students may be less familiar with wikis, although Wikipedia is now a mainstream phenomenon, so awareness is increasing.

Some of these prerequisites (e.g., ability to type papers) may be assumed across many courses. Familiarity with wikis can be assessed in a short survey at the beginning of the class, and through the first stages of the wiki assignment (see below).

Step-by-Step Directions

Here is a description of the basic phases of a semester-long research project in wiki form. The content of the project is a review of major theories and evidence addressing a particular question in psychology or cognitive science, but the components of the project are similar, regardless of the topic.

1. Wiki orientation
   - The first step in the project is to familiarize the students with the process of viewing the wiki, logging in, making edits, and creating new pages.
   - When content already exists in the wiki, this increases the comfort of students, because they can view and play with the syntax of existing pages.
   - Students' first assignment is to create a "profile" page, which includes a short biographical statement and a description of their topical interests. The assignment also asks them to use basic wiki elements (e.g., lists, images, links, headings) in their profile.

2. Exploration/revision of previous work (SLO 1)
   - Once groups have been formed and preliminary topics identified, students are asked to more comprehensively evaluate existing wiki content related to their topic (if available), identifying strengths and weaknesses, and opportunities

for improvement.
- The product of this assignment consists first of written feedback linked from the critiqued page(s), followed by the execution of changes to the existing wiki. It is helpful for grading purposes if the students link to their contributions from their profile page.
- This assignment allows them to see examples of the structure and content of more and less successful projects, and to start to generate ideas about their own contributions to the wiki.

3. Outlining (SLO 2)
   - Groups outline the structure of existing wiki content related to their topic, as well as the organization of the contribution of their project.
   - At this stage, groups can be encouraged to identify and link areas of overlap with the projects of other groups, or with already existing wiki content, as appropriate, in order to avoid duplication of effort and to focus on creating new content.
   - This also provides an easy way to identify (and document) the responsibilities of each member of the group (both for group efficiency and instructor oversight).

4. Writing (SLO 1–3)
   - Groups work together to add content to their outlined framework.
   - Feedback and grades from the instructor can be given periodically for meeting certain benchmarks along the time line to the completed project.

5. Feedback & Revision (SLO 1–2)
   - Periodically during the writing process, or in conjunction with major course units, students provide feedback to other groups on both the content and organization.
   - This step can be repeated as necessary as groups address the criticism they receive.
   - If a goal of the project is to communicate with a target audience outside of the course (SLO 3), the wiki can cross multiple concurrent courses by assigning students from the target audience to complete the feedback and revision process as well.

6. Publishing (SLO 3)
   - The final wiki is available for all students to see and explore, and can be made viewable to the greater community in the university and discipline by linking from course and department websites.
   - When the wiki is reused and built upon over time, students who take several courses with the same instructor or within the same department may have the opportunity to use the wiki again, or to refer back to it for information and see how subsequent students have elaborated on their work.

Grading Strategies. I try to strike a balance between assigning grades for project

components based on individual and group marks, so that groups have an incentive to work well together, but students still feel a sense of individual ownership and responsibility over the work. Below, I illustrate one way in which the components can be broken down into individual and group grades.

Individually graded assignments.
- Profile
- Revision of existing content
- Feedback to other groups
- Contribution to group's final product (optional; useful to enforce "fairness" of effort within the group)

Group grades.
- Topical statement
- Outline
- Draft/progress check (or more)
- Final wiki

Approximate Time Required

The individual assignments described here span the entire term, including the option to work on the wiki during class time, or outside of class on students' own time.

The longer term project of creating and maintaining a content-ful wiki can range over several terms, possibly over several years.

Required Resources

Information about wikis in general - Wikipedia: http://en.wikipedia.org/wiki/Wiki

Students should have their own computers, or access to a computer lab on a regular basis to complete the project.

Software implementation for running your own wiki: Dokuwiki. http://www.dokuwiki.org/

Online implementation of wikis, and numerous examples: Educational Wikis. http://educationalwikis.wikispaces.com/

Many course management systems have wiki capabilities built-in, but these implementations may not persist over time, or may not be accessible to those not enrolled in the system.

Variations on the Basic Theme

Individual projects. Although wikis are ideally suited for collaborative projects, this format can also be used for individual projects in small classes, or when group projects are not preferred. The ability to interact, give and receive feedback, and link projects is still available for individually directed projects

Linking with other course components. The content of the wiki project can be linked to other course components, for example, an oral presentation of the project, or with laboratory exercises.

Teaching portfolio. Instructors can maintain a portfolio documenting topics their students have worked on, and to remix and present student work in an engaging way.

Curriculum resource. Wiki content builds over time, creating a resource for sharing subject area information among students and instructors, serving the future needs

of the same or another course; for example:

- An instructor can build the wiki over several iterations of the same course (or a family of related courses).
- Multiple sections of a course (taught by the same or different instructors) can collaborate on a project during the same term
- Students in an advanced course can build on content created by students in an introductory course.
- Advanced students (or graduate students) can create content for undergraduate/introductory students in their discipline.
- Departments can centralize resources used across courses.

Observations & Advice

Some caveats apply to all wiki-based projects, and some particularly to a wiki that will be altered over a longer period of time. Some challenges to consider in designing and using such a wikis are:

Nonlinearity
- A wiki is not as straightforward and self-contained as a paper. When individuals and groups link their content together and alter one another's work, how should credit be assigned and disputes resolved?
- The ability to track edit histories in most wiki platforms provides a tool for creating and managing such policies.

Consistent style/format
- When many individuals create and edit content on the wiki over an extended period of time, variations in style and structure inevitably occur, making the readability of the wiki for an external audience difficult.
- The imposition of a structural template or style guide (which may be explicitly provided, or implicit from existing wiki pages) may help students organize their projects, so long as it does not interfere with the accomplishment of the project's learning goals.
- After each iteration of the wiki exercise (e.g., at the end of each term), the instructor may need to adapt or impose some reorganization on the wiki.

Preservation of student work
- The benefit of a content-ful wiki that is updated by new groups of students is that old information is updated and built upon over time; the downside of such a wiki is that the work of previous students may be altered or removed.
- Students may wish to preserve a copy of their work, and instructors may wish to have access to the graded work of previous students for future reference.
- Many wiki platforms provide a method for saving snapshots of the wiki at any point in time. These can be saved to document the state of the wiki after each stage.

Academic honesty
- When wiki-based work includes the editing and reuse of material written by

previous students. How should reuse of such material be reconciled with academic honesty guidelines regarding plagiarism?

Content licensing
- Given that content on the wiki will be updated by many individuals, and possibly made available to the public, how should the content be licensed?
- Creative Commons (creativecommons.org) is a good resource for licensing options suitable to a wide range of academic projects.

Recommended Readings

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Solomon, J. & Wash, R. (2012). Bootstrapping wikis: developing critical mass in a fledgling community by seeding content. In *Proceedings of the ACM 2012 conference on Computer Supported Cooperative Work* (pp. 261-264). ACM. (ISBN: 978-1-4503-1086-4.)

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organizational wikis. *Journal of the American Society for Information Science and Technology, 61*(3), 543-554. doi: 10.1002/asi.21266.

Supplemental Materials

Sample rubric for feedback/revision (steps 2 and 5)
On a separate wiki page linked from the homepage of the page you are reviewing, provide feedback on these aspects of the wiki:

- **organization:** How well is the wiki organized? Is it easy to navigate and find the information you're looking for
- **clarity:** Is the information presented clearly explained? Is there anything that doesn't make sense?
- **content:** Do the sources presented adequately address the question? Do you have any suggestions on how to improve the project?

[insert table xx.1 here]

category	points	5	3	1
Organization	5	feedback adequately addresses organization of wiki	organization somewhat addressed	comments do not address organization
Clarity	5	feedback adequately addresses clarity of explanation	clarity addressed somewhat	comments do not address clarity
Content	5	feedback adequately addresses content	content addressed somewhat	comments do not address content
Total	15			

Sample rubric for final evaluation of wiki project
[insert table xx.2 here]

category	points	sub-category	points	5	3	1
introduction	15	significance	5	clearly explains significance of topic to cognitive science in introductory page/section	significance unclearly explained	significance not explained
		question(s)	5	research question(s) clearly	research	no research

				formulated	question(s) unclear	questions
		summary	5	clearly and concisely summarizes/previews main findings	findings mentioned	project not summarized in introduction
theory	15	explanation	5	clearly explains major theories of phenomenon of study, including relevant historical background	theories explained, but need further development	content of theories unclear
		comparison	5	discusses differences between theories under discussion	Incomplete comarison of theories	no comparison of theories
		predictions	5	describes predictions of theories which will be addressed by research evidence	theoretical predictions unclear	no discussion of theoretical predictions
evidence	15	summary	5	clearly summarizes design, methods, and results of research discussed	results discussed but design/methods unclear	research results unclear
		explanation	5	clearly explains how research results address research questions and theoretical predictions	some explanation, but little integration of results	little or no explanation of results
		variety	5	several converging methods used to examine topic	more than one type of research discussed	insufficient diversity of research presented
		sufficient	5	multiple sources of evidence presented	few sources discussed	little or no evidence presented
mechanics	15	organization	5	wiki is well-structured and easy to navigate	some technical problems which interfere with navigation	disorganized structure makes navigation difficult
		clarity	5	clear writing	some errors which interfere with clarity	reading difficult
		citations	5	all sources cited correctly	some incorrect/missing citations	few/no sources cited
total	65					

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Evan Bradley. Evan received his PhD in Linguistics and Cognitive Science at the University of Delaware and is currently a Fellow in Psychology and Creativity at Lawrence University. His research focuses on representations of sound information: how

the perceptual system turns acoustic information into linguistically and musically meaningful structures, and how this process is modified by experience. As a scientist studying the mind, he finds that his role as an educator provides both insight into and an application for his scholarship.

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