Title: Web 2.0 Tools for Faculty Development and Project Collaboration

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Abstract:
Technological advancements that allow fast communications and information processing are supporting new teaching and learning paradigms. As a result, higher education is no longer only based on geographical proximity. As adults, higher education faculty have come to expect training that is “just-in-time, just enough, and just for me,” typically situated in a field of practice and contextualized through peer mediation. The number of online technologies especially suited for teaching and learning has exploded. Those defined as Web 2.0 technologies hold the greatest promise for positive social change because they are typically free, user-friendly, and support user-created collaboration and interaction. This feature article discusses a case study in which Web 2.0 tools, specifically wikis and Google Docs, were used to support the development of innovative digital learning objects as well as to provide faculty development resources for the integration of the objects.

Keywords: wikis, Google, Web 2.0, faculty, professional, development, project management, collaboration, i3D, learning objects, online, support

Introduction and Background
In 2008, Fayetteville Technical Community College (FTCC) embarked on a new teaching and learning initiative involving the use and development of interactive 3-dimensional (i3D) learning objects. The college partnered with the Ft. Bragg Regional Task Force established to prepare the eleven counties surrounding Ft. Bragg (Bladen, Cumberland, Harnett, Hoke, Lee, Montgomery, Richmond, Sampson, Scotland, and Robeson) for the upcoming changes resulting from the Base Realignment and Closure Act (BRAC). As part of the initiative, in 2009, FTCC was awarded a grant by the Department of Education to provide in-service training and support for the integration of interactive 3-Dimensional (i3D) learning objects in area K-12 and community college learning environments. The goals of the program were two-fold: 1) provide teacher resources for the incorporation of i3D content into classroom instruction both at the 9-12 and community college levels; 2) assist teachers in creating proposals/storyboards for future i3D learning objects for the implementation of this new, transformational technology in their classrooms.
The distance between the eleven counties and the varying academic calendars and teaching schedules for those chosen to participate in the program represented a significant barrier to collaboration and dissemination of information. E-mail was ruled out as a primary means of communication for several reasons. Many K-12 school E-mail accounts have restrictions on senders and attachments. Further, at its core, E-mail is a one-to-one communication medium. Thus, there was a need to provide faculty with a knowledge repository that allowed continuous access to information as well as a medium for collaboration. Participants needed to be able to not only access information quickly and easily but also add content and comments. The Blackboard course management system was considered for content management and discussions. However, Blackboard could only be accessed by registered users; therefore, the content was not freely available to all interested parties. The added administration of adding users as well as the learning curve for new Blackboard users determined that this was not a viable solution.

The project as described involved a program of development initiatives designed to support the implementation of the Integrating i3D into Instruction program funded by the Department of Education. Electronic communications and Web 2.0 tools formed the core of the concept of bringing together community college instructors and K-12 teachers in the development of i3D learning objects and their integration into their teaching practices.

**Intended Outcomes**

Limitations in traditional professional development models have sparked a shift toward community-based models. Advances in technology and IT infrastructures on campuses have allowed the creation of online environments which can be used not only to support teachers’ professional practice and routines but also to develop online learning communities to facilitate professional development activities (Locke, 2006). The aim of this project was to “mashup” a number of the social networking tools which were ideal for developing a sense of community for participants who were geographically diverse (Hodgkinson-Williams, et al., 2008; Lin, et al., 2008; Mason & Rennie, 2007; Sherer et al., 2003; Vaughan & Garrison, 2006).

There were five main aspects of the project:

1. The set-up, customization, and inter-linking of the new technology applications provided a platform that enabled participants to interact with each other and to access a resource repository of information associated with i3D and related electronic learning objects which was also available to teachers outside the program.
2. The initial face-to-face meeting of participants selected from community colleges and K-12 schools in the seven-county area surrounding Ft. Bragg included training in accessing the current i3D learning objects and in using the wiki as well as an overview of the process and documents involved in developing the storyboards for the i3D learning objects.
3. Participants worked in pairs and individually to collaborate in the design and development of an i3D learning object they could use in their courses.
4. Ongoing contact with participants involved update notifications of changes to the wiki, weekly announcements, E-mail communication, phone calls, and individualized face-to-face meetings.
5. A final intended outcome of the project was the integration of the i3D learning objects into instruction at the college and K-12 levels. At the end of the program,
Web 2.0 Tools Selected
McGee and Diaz (2007) noted that “applications defined as Web 2.0 hold the most promise [for building collaboration] because they are strictly Web-based, typically free, support collaboration and interaction, and are responsive to the user.” Web 2.0 technologies can assist learners, whether students or faculty, in becoming active, engaged learners and information evaluators as opposed to passive learners who merely reflect their instructor’s knowledge. In this new environment, learners rely on and interact more with other learners, further building and constructing each other’s knowledge. According to David Peter, Director of the Center for Teaching and Learning at Vincennes University, “the use of blogs, wikis, podcasts and social bookmarking has the potential to radically transform the landscape of professional development” (2008, slide 2). These tools can be used for collaboration, communication, collaboration, documentation, generation, and interaction.

The use of Web 2.0 technology for faculty development provides the following benefits: (a) ability to provide “just-in-time” training; (b) ability to focus on breadth or depth (topical training); (c) ability to provide an archive that can be accessed 24/7. Web 2.0 tools provide a flexible delivery mechanism the address various learning styles, infuses technology into classroom practices through modeling, and mimics students’ use of technology and students’ expectation regarding technology use.

Wikis
According to Wikipedia (2010), the largest example of a wiki, “A wiki is a website that allows the easy creation and editing of any number of interlinked Web pages, using a simplified markup language or a WYSIWYG text editor, within the browser.” As a Web 2.0 tool, wikis allow individuals to contribute their own knowledge and experience on any topic (Clark, 2006). Wikis allow for the emergence of an ongoing community of collaboration and learning in which users can access and add content asynchronously. Administrators have the ability to control the wiki, restricting access or authority to modify content to certain users or groups. Business and educational institutions have started to use wikis as tools to build internal and external social networks (Fontana, 2006). Similarly, Gordon (2006) observed that wikis increase social interaction, enabling swift collaboration and interaction while exchanging information and creating knowledge. Hatch (2007) asserts that the use of a wiki as a forum may help launch the culture of collaboration in education, with the sharing of lesson plans and other educational information, for example. Moreover, a wiki can be an informal method of learning (Clark, 2006) that may impact and improve the skills and learning of employees and faculty.

Additionally, a wiki meets criteria of collaborative technology proposed by Lipponen and Lallimo (2004), namely that pedagogical theories can be applied, that facilitation takes place, that it relies on the idea of groupware, and that it is a community-building tool. A wiki is a place where people with the same interests come together in groups on a regular basis, which Wenger (2003/1998) referred to as Communities of Practice (CoPs). As a pedagogical approach in professional development, CoPs take into consideration the consequences of individual
participation within a group (Macdonald & Hills, 2005 cited in Gullet & Bedi, 2007). Another useful pedagogical approach relevant to using wikis is that of reflective practice since a wiki allows faculty time to think about what they have read before they reply and contribute. This, according to Schon (1983), is one of the most effective pedagogical concepts known in the professional development practice. Research has identified CoPs as well as reflective practice to be vehicles for change management approaches in online settings and methods for progressive professional development (Barab, MacKinster, & Scheckler, 2003; Beaty, Cousin, & Deepwell, 2002).

A Siemens Enterprise Communications study (2009) revealed that 70% of small and medium business employees lose 17.5 hours a week to communication problems. For an average 40-hour work week, that is effectively a 43.75% loss in productivity! Wikis avoid many of the problems of memos, scattered E-mails, or individual conversations by collecting and storing all the information in a central location. People can link to relevant sources, edit the wiki, embed images and document any clarifications all in the one place.

Written documents force people to make ideas clear, but can also cripple rapid development. PowerPoint presentations take too long, suffer from “PowerPoint Syndrome”, and people often delay showing the results to anyone until things are “just right.” Wikis allow for quick updates at any time, without having to re-send an entire file to everyone to fix the embarrassing error on page 17 and keeping track of all the changes that may come from several different people.

Brainstorming is vital to project development and encouraging “thinking outside the box.” However, getting everyone in the same place at the same time can be a major hassle, especially given the large geographic distribution of participants. A wiki can include an ideas, suggestions, or discussion page in which participants can chime in with ideas, comments, clarifications, and elaboration asynchronously. The wiki also allows for input of meeting notes, goals, and project requirements without having them buried in E-mails.

The wiki also allows for tracking of changes and storage of different versions of documents. Nothing is lost. In addition, the administrator has the option of “reverting” to a previous version of a page at any time. Transparency of operations is evident.

The wiki is inherently user-friendly in that it is based on a WYSIWYG format similar to common word processing programs used in the schools, so the learning curve is minimized. The wiki allows users to have control of their input and the navigation of their content, making them a part of the creation of new knowledge and allowing them to expand and grow the adoption of i3D content and technology. The wiki not only gives the geographically dispersed faculty a feeling of integration, but also allows them to access and upload a wide assortment of data. The wiki also provides user tracking and access controls to monitor the workspace at all times. An added bonus for the wiki is that the i3D Design Team would also have access to the ideas and materials collected by the subject matter experts and the instructional designer during the proposal and storyboard design phases. Previously, there had been no centralized way for all stakeholders to access the pertinent information.
The Integrating i3D into Instruction facilitators felt that a solid wiki infrastructure would not only give the geographically dispersed participants a feeling of integration, but allow them to immediately apply new knowledge gained. Basically, the use of wiki technology would allow for the emergence of workforce collaborating efforts among faculty (Tapscott & Williams, 2006). Furthermore, the use of the wiki was a great way to manage knowledge, as it allows for narratives and content to be stored and for the thread to be recalled on demand (Gordon, 2006).

**PBworks Chosen to Host**

PBworks, which boasts that it is “the world's largest provider of hosted business and educational wikis,” was chosen to host the wikis used to facilitate collaboration between subject matter experts (K-12 and community college teachers), the instructional designer, and the i3D Design Team. The company serves over a third of the Fortune 500 companies and was home to three presidential campaigns, the United Nations, DePaul University and school districts including the Baltimore County Public Schools. Currently, PBworks hosts over 300,000 educational workspaces, with nearly 15 million pages (three times the size of Wikipedia) and 3 million users per month. PBWorks provides several page templates to get users started on page design or they can simply add a blank page. Users can upload files and images as well as click the Insert Plugin tool to add a variety of productivity tools including videos, chat room, calendars.

**Google Docs**

Google Docs are web-based word processor, spreadsheet, presentation, and form applications provided free by Google. The programs follow similar conventions as those in Microsoft Office, with minor differences because of the web environment. These applications allow program participants to create and/or edit documents online while collaborating with other participants. As web-based applications, they are also easily accessed by the modeling and programming team who will be creating the i3D learning object.

Besides the advantage of no requirement to purchase the software, there are also no compatibility issues between different versions of the software. Collaborators no longer need to E-mail files to other group members or deal with the hassle of uploading a new version to the wiki each time it is changed. Google Docs allows for group collaboration without the delay of waiting for others to update their portion of a document. Google Docs allows program participants to work collaboratively on the same document asynchronously or at the same time (De Lay, 2009). Google Docs displays an indicator in the top right hand corner that lets all users know who else is making changes to the document. If all collaborators are online at the same time, they’ll see the changes as they occur. An added bonus is that participants could also use Google Talk to discuss the work at the same time. In addition, the application maintains a revision history so users can track changes and even revert to a previous version.

**Creating the Network**

Garofoli and Woodell (2003) suggested a faculty development program based on Rogers’ Diffusion of Innovations model. This framework would provide multiple online spaces offering different points of entry based on the user’s needs and experience. For example, one space would consist of self-paced tutorials and guided practice activities. Another space would provide personal success stories. Yet another would offer a place for faculty to interact and participate in discussions with their peers. Garofoli and Wood’s concept of a variety of spaces would allow
faculty to choose when and where to participate and how to directly apply their learning to
course design and implementation. The online learning space developed for the Integrating i3D
into Instruction program incorporated elements of successful faculty development initiatives
which also provided an online repository of ideas, tools, templates, practices, and modules to
connect faculty to online teaching both through peers/mentors and just-in-time resources

The following applications that are open source and/or operated on a Creative Commons license
were utilized to create an integrated network to support the project:

- A series of wiki spaces designed to encourage collaboration and sharing of ideas and
  content related to the development of the i3D learning objects and associated lessons. The
  primary wiki also serves as a repository of information related to i3D and links to
  additional electronic learning objects that can be accessed 24/7.
- The word processing application in the web-based Google Docs was used for collaboration
  in the creation of the final storyboards for the i3D learning objects.
- As some participants professed to be “not technologically savvy,” traditional means of
  communication including E-mail and phone calls were also incorporated into the
  communication loop.

The i3D Learning Collaboration Space (http://i3dlearning.pbworks.com) is a faculty community
resource tool viewable by anyone. However, only K-12 teachers and community college
instructors involved in the Integrating i3D into Instruction Program were allowed to edit the
content. The structure of the wiki is constantly evolving; however, the primary organization
includes individual pages and files collected in folders. The sidebar contains access to pertinent
resources under the main headings of Administration, Resources, Reviews and Evaluations, and
Projects.

Figure 1: Screenshot of opening page

Items under Administration include blank forms, timelines, program information, and participant
information. Two important pages under Administration are the Sandbox and the Suggestion
page. The Sandbox allows users to experiment and to “play around” with the wiki tools without
affecting any of the content, and the Suggestion page allows users to offer suggestions and tips regarding the program, wiki organization, and collaboration.

Resources include sample documents, links to learning object repositories, educational games, and multi-user virtual environments, technical information, and teacher tips.

Evaluation is an important element of a successful program; therefore, the wiki includes links to surveys and checklists to be used in evaluating the Integrating i3D into Instruction program, the i3D Learning Object Checklist, and the use of i3D technology in the classroom.

Resources specific to each i3D learning object project are kept in separate folders which can be accessed from the Navigation window on the right. Each folder contains a minimum of the following pages for collecting and sharing information: discussion, research information, related documents, storyboard, graphics, and animations. Participants were encouraged to create new pages as necessary, as shown by the Heart folder below.

![Figure 2: Screenshot of the Navigator window and folder contents](image)

Participants were also encouraged to utilize the word processing program in Google Docs to create and edit the final storyboards that would be sent to the design team for production. A table with a link to the storyboards was included under Projects, so participants would have easy access to the Google Doc even if they had lost the link. In addition, a link to the Google Doc storyboard was included on the corresponding i3D learning object Storyboard wiki page. The Google Doc storyboards were set up to allow viewing and editing without a Google account.

One participant commented:

I have found google docs [sic] immensely helpful in eliminating the hassle of emailing updated versions of documents or uploading them to the wiki. I also love the fact that you
can collaborate on the same document simultaneously from different locations, i.e.
content specific groups can add their input to the storyboard where changes and
modifications are instantly viewable. (B. Britton, personal communication, Feb. 4, 2010).

Evaluation
This project encompassed three interdependent components: informal learning, technology, and
collaboration. Together they had both an outward facing aspect (increasing awareness of learning
with i3D) and an inward facing aspect (building a virtual CoP to support the development and
integration of i3D learning objects). Therefore, the following questions drove the evaluation of
the project:
1. Do the interventions of the project increase informal learning, ownership, and
   motivation to adopt i3D learning objects in teaching practices?
2. Have the participants in the Integration of i3D into Instruction program been
   positively affected by the project interventions? For example in their take-up and
   familiarity with the technology and in their social networking habits?
3. Have the interventions of the project increased access and use of i3D learning objects
   by a wider population?

At the beginning of the project, participants in the Integrating i3D into Instruction program and
other teachers who had previously participated in i3D workshops and demonstrations were asked
to complete the Integrating i3D Pre-Survey. A total of 46 responded, including both community
college instructors and K-12 teachers representing each of the 11 counties in the BRAC-RTF.
The survey was primarily designed to gauge respondents perceptions of the perceived attributes
of i3D learning objects. Once the i3D learning objects had been developed and instructors had
the opportunity to incorporate them into their curricula, they will complete the Integrating i3D
Post-Survey to obtain their reactions and perceptions of i3D learning.

The wiki also supports a suggestion box which, hopefully, users will use to provide feedback in
order to improve the process and the wiki structure. In addition, the facilitators received
unsolicited feedback via comments on the wiki and E-mail/phone communications.

Results of the Integrating i3D Pre-Survey.
The top four advantages for i3D learning objects were (a) allow me to develop new technological
skills; (b) increasing student motivation and attention; (c) use technology more innovatively in
teaching; and (d) address different learning styles. Several comments seem to indicate that the
advantages were discipline-related in that English and Algebra I teachers had difficulty
determining “a practical/economical way to truly use this tech to its fullest potential.” Another
commented that his/her responses were primarily in the neutral category “as this is a new
technology and un-assessed in terms of outcomes.” The two ranking lowest were whether i3D
learning would (a) be an efficient use of my time and increase productivity and (b) would make
it easier to do my job.

The compatibility questions revealed that the respondents recognized that i3D learning objects
would be compatible with their students needs. The majority agreed that i3D learning objects
would be compatible with their teaching style and philosophy of teaching. They were less sure of
whether using the technology would be a comfortable fit for them and would be compatible with
their level of technology expertise and experience. Several commented that they were concerned about “the time required to acquire knowledge of this technology” and worried that at their “current tech expertise [whether they] could use it to its best advantage.”

Despite the previous comments regarding technology expertise, respondents generally felt that learning how to integrate i3D learning objects and using them in their courses would be easy. Respondents were torn as to whether it would be easy to remember how to perform task associated with the i3D learning objects and whether they could learn to use the objects quickly and easily. Comments indicated that the respondents felt that more practice using the objects was necessary and that including operating instructions would be helpful. Respondents felt they were able to explain why using i3D learning objects may or may not be beneficial and the results of using i3D are apparent; however, few of their colleagues were using i3D learning objects and they were not able to observe others using it in their teaching.

The choice to adopt or reject using i3D learning objects was generally a left up to the individual instructor; however 20% indicated that it was mandated by their superiors. Over 80% of respondents indicated that their institutions supported faculty attendance at professional development activities associated with i3D technology and encouraged innovativeness and experimentation. Although 78% agreed that using i3D learning objects was viewed positively by their superiors, 62% felt they were not adequately compensated for using them in their courses, and 82% agreed people at their institution using i3D learning objects did not have more prestige and 76% agreed they did not have a high profile. Comments indicated that respondents felt that many teachers were unaware of the availability of the learning objects and/or the technology.

They also indicated that additional training and development of the technology infrastructure to support the technology would be necessary for continued adoption.

Challenges
As with preparing faculty to teach online (Berge, 1998; Betts, 1998; Butler & Sellbom, 2002; O'Quinn & Corry, 2002; Schifter, 2000; Shea, 2007), one of the major challenges in implementing the Web 2.0 interventions for this project was the issue of time. Not only are faculty concerned about the amount of time it took to design, develop, and manage an online course, but they were also concerned about the time required to develop their skills to complete these tasks more effectively and efficiently. Similar concerns were evidenced by several respondents in the Integrating i3D Pre-Survey.

The program started with 42 participants; however, after the initial face-to-face meeting, the number of active participants eventually dropped to 26 who actually produced a proposal and collaborated on the development of a storyboard. Several participants noted that they had not realized how much time would be involved or that they had been assigned new work responsibilities that interfered with their participation. Others noted that they were trying to fit the i3D project into their already busy schedules. Two participants made gestures of contacting the program facilitator after phone calls, but failed to follow through with any productive information. Several participants seemed to “drop off the face of the earth” in that they failed to respond to either phone calls or E-mail solicitations. Getting feedback to determine the reason for their lack of participation was not possible.

The next challenge was in part a consequence of the issue of time in that although participants were willing to learn the new technology, they did not always have the time to dedicate to
learning how to use it. Several participants continued to communicate with the program facilitator via E-mail rather than post ideas and content to the wiki. One participant noted that when she initially went to the wiki, she felt overwhelmed by all the information available. She had to take the time to browse the resources before she felt comfortable. The facilitator also met face-to-face with several groups in order to help them put together their ideas and formulate their storyboards.

**Conclusion and Future Directions**

There were two innovations involved in this project:

- Linking together in an integrated manner a combination of emerging technology applications in order to facilitate professional development and the creation of i3D learning objects.
- Developing and integrating i3D learning objects into instruction.

The project has only just begun and the initial evaluation and first stages executed. The early engagement has been encouraging, given how steep the learning curve was for a community largely new to Web 2.0 concepts and terminology as well as to i3D learning concepts. However, it has been noted that the success of any teaching professional development effort, especially with collaborative tools [such as the wiki and Google Docs], requires the involvement of participants in order to initiate and sustain growth and teaching changes (Angula & De La Rosa, 2006, cited in Gullett & Bedi, 2009). The critical process of developing community participation was more challenging and slow to develop. The author anticipates that with continued input and facilitation, the use of the wiki and Google Docs will provide a medium for further collaboration to develop resources to aid the integration of i3D learning objects into instruction.

**References**


