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Why Wikis Work: assessing group work in an on-line environment

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Abstract

The emergence of interactive contemporary on-line learning and assessment tools is well documented. In semester 2, 2007 first year Bachelor of Oral Health (BOH) students at The University of Adelaide undertook a group research assignment using Wikis as the platform for their projects. A major aim of this project was to create a learning community which promoted collaboration rather than competition, and which provided a flexible environment where a social and interactive approach to learning could be fostered. It also provided an opportunity to use the Wiki on-line learning tool as a means to formatively and summatively assess both the student's individual and group work contributions. Further to this, there is growing evidence that Wiki-style technology supports collaboration and communication in on-line group work and provides an accessible repository for shared resources and readings. As a social learning tool, the Wiki promotes a constructivist learning experience whilst enhancing student engagement. Initial post-project evaluation indicated a significant increase in students' knowledge, skills and confidence in using Wikis for group-based learning, with an associated rise in the percentage of the cohort who rated the on-line learning experience as highly positive.

Background

The Bachelor of Oral Health is a 3 year undergraduate program offered by the School of Dentistry at The University of Adelaide. Since its inception in 2002, an average of 30 students have enrolled in first year. The Human Biology I OH stream (subject) provides grounding in the biological sciences upon which oral health practice is based. Students entering the BOH come from a wide range of educational backgrounds and levels. There are usually around 60% of mature age students in the mostly female dominated first year cohort. A strong emphasis on group work underpins the learning and teaching philosophy in the School of Dentistry. The Wiki project was implemented to replace a previous assessment task where a traditional group-based research activity was followed by a PowerPoint presentation to the rest of the class. Student Evaluation of Learning and Teaching surveys (SELTs) and anecdotal feedback strongly indicated a degree of student dissatisfaction with the previous structure and assessment; the main issues raised were disparities in individual effort in group work and difficulties in getting the groups together out of class time to work on the project in view of the fact that the BOH 1st yr program has an average 25 hr per week contact load. The Wiki project was proposed after careful consideration of this student feedback, as a means of providing a fairer, more transparent and flexible learning environment.

Phase 1: Establishing the On-Line Learning Community: Developing a Blog

An evidence-based approach is critical in the development of effective contemporary on-line learning environments. In a 1999 report on the use of on-line tools in learning, Fahraeus et al present a wide range of issues to consider when utilising 'Electronic Collaborative Learning Groups' (ECLGs). The report identified teacher expertise and student readiness as key factors in the planning and implementation process. In the case of the Bachelor of Oral Health, the academic staff recognized their lack of experience at on-line facilitation. Consequently, they developed their own wiki as a means of gaining the necessary insight and confidence in participating in social on-line learning technologies. From the student perspective, the cohort demonstrated a diverse range of educational entry levels with a directly proportional range of on-line experience – not just in an educative context, but also in working with computers in any

environment.

Oliver (2001) considers it 'arrogant' that universities 'impose' on-line learning, without undertaking a diagnosis of their students' technology skills and literacy, and providing both the support and opportunity to develop the necessary competence and confidence. Therefore, the first step in the development of the Human Biology on-line learning project was to create a Blog for the first year students <http://bohonestcommunity.blogspot.com>. It was set up purely as a social forum, and students were invited to become members. An induction session on using the Blog was run for students – explaining that it was not for assessment nor analysis, but as a means of communication between the students and also the teaching staff. Chickering and Ehrmann (1996) emphasise that when using on-line teaching technologies “good practice encourages contacts between students and faculty”. They saw frequent contact, both in and out of class time, as a critical component in establishing student motivation and involvement. The aim of the Blog was to encourage students to make contact with each other and teaching staff on-line; to de-mystify the world of cyberspace for the less experienced and confident; and to develop a culture of working together without being physically in the same room.

Downes (2004), whose article on “Educational Blogging”, analysed the virtues and vices of Blogs, and determines that, despite the risks and concerns raised by many educators, “blogs encourage students to write”. This was certainly the case with the BOH students – over semester one 125 posts were uploaded, with 100% of the students having accepted the invitation to the Blog. 60% of the students were actively involved in uploading posts and comments at least 3 times a week. The remainder posted less frequently with at least 15% identified as silent observers of the Blog, an observation verified in the face-to-face discussions sessions. These students stated that they were satisfied to keep track of the discussions but did not feel a need to contribute online. The nature of the posts was (almost) irrelevant to the ultimate aim of getting students to become familiar and comfortable with on-line communication, however the Blog became an important social and study support system for many as they settled into university life. Teaching staff contributed by providing feedback and guidance to students – which enhanced face-to-face interaction in class. Harasim (1995) shared the view that “online you get to know your students' minds, not just their faces.” Chickering and Ehrmann (1996) saw online communication technology such as Blogs as particularly important for “shy students... reluctant to ask questions or challenge the teacher directly...commuting part-time students...providing opportunities for interaction not possible in class.”

The success of the BOH1 Blog was evident through the content diversity of the regular student posts, particularly when an analysis of the postings revealed a significant level of communication from students who had rarely contributed in face-to face class meeting and from those who were studying part-time. Another issue analysed by Fahrens et al (1999) was the on-role of the teacher, which they saw as changing “from knowledge provider to facilitator”. Felder (1995) saw this as a potential barrier to online collaborative learning, particularly in the early years of a program, when students are often reliant on the teaching ‘telling them what they need to know’ rather than having to work together to determine their own learning needs. Felder and Brent (2001) encourage tertiary educators to resist this opposition, to be in a position to foster a form of learning that promotes the value of effective group work as an initiation into a post-secondary, more academic form of pedagogy. As mentioned earlier in this text, the teaching staff allowed the students the freedom to direct the topics and flow of the discussions and only contributed if they perceived a need to provide guidance and/or support. The Blog was created as a means of encouraging student constructivist learning during the initial stages of their course and provided an alternative platform for students to develop new social networks and familiarity with peer group learning.

Phase 2: Expanding the On-Line Learning Environment: Setting up a Wiki

The choice of the appropriate on-line educational tool for the BOH learning activity was determined based upon the requirements of the learning task, which included independent research combined with peer group constructivist learning. Guy (2006) promotes the use of Wikis in education as “they support sharing and collaboration, are great for group project work and peer-to-peer activities. They can allow students to ...work on specific activities and are good for reflection on written work (critical assessment and peer review)...They also allow the creation of shared repositories of resources and shared reading lists.” Fichter (2005) sees Wikis as an e-collaborative tool that “allows users to freely add and edit content with Web browser.....and are particularly good tools for research.....that....build a shared knowledge repository”.

These characteristics matched the needs of the project well. A Wiki would serve as the platform for the groups undertaking a defined research task, where individual members researched independently initially, and then presented their findings to the group for peer directed collaboration, moderation and calibration. Each group had their own page on the Wiki, to be utilised as a site to share and develop their research findings. The ultimate goal of the learning task was for each group to develop an on-line scientific poster summarising their findings that were to be presented in a simulated academic forum. The Wiki was set up via the website www.wikispaces.com, entitled ‘bohone’ (for BOH 1 – although it became colloquially known as *bohonnee*) <http://bohone.wikispaces.com> .

The home page, entitled “A Wiki on How to Make a Wiki”, provided an overview of the learning task as well as instructions on how to use the site. Hyperlinks to the sites which supported the learning task were also included in the home page. The importance of well organized, clearly expressed orientation to the on-line educational technology is well documented (ADEC 1999, Oliver 2001, Guy 2006). Campbell (1997) encourages on-line course designers to create Course Sites with explanations, descriptions, and cues about goals and accomplishments, as students “prefer clearly defined learning outcomes, or tasks, and recommended sequencing, from which they can orient themselves at any time.” Each student was invited (via email) to join the Wiki, which allowed only BOH1 students to have access to the Wiki and actively have input into their own group pages. Individual Wiki pages were created for each of the 12 groups (each with 3 students) with an e-facilitator assigned to mentor each group. There were two e-facilitators allocated to this project with the responsibility of overseeing six groups each. Both e-facilitators jointly developed the Wiki project outcomes and the initial Wiki page. This provided an opportunity for the e-facilitators to calibrate their approach to overseeing the online learning process having been involved in the development and implementation of the project from its onset.

The role of the e-facilitator was seen as critical to the success of the entire project. Whilst the use of on-line learning technologies may be viewed as a means of eliminating or minimising the role of the teacher, educational commentators recognise it as never being more important (Campbell, 2007, Chickering and Ehrmann 1996, Harasim 1995, Guy 2006, Fahraeus et al1999). Effective on-line facilitation can provide ongoing guidance, formative feedback, motivation and high-quality communication between teachers and students. In some respects, the challenge for e-facilitators to compensate for their lack of physical presence and high level of on-line interaction requires additional skills for this contemporary teaching role.

Each e-facilitator in the BOH Wiki established their group's topic page, providing a series of learning outcomes and a time-line for the task. Regular facilitator 'visits' to the page were established – at least once a week. Students kept in contact with their e-facilitator via the message board on the Wiki page or by email. Chickering and Ehrmann (1996) stress the importance of prompt feedback in on-line learning – as they succinctly state “knowing what you know and don't know focuses your learning”. Although face-to-face meetings were available to students, only one or two groups met with their facilitator in the early stages of the project; the on-line facilitation proved most effective for both students and facilitators. Balanced with this facilitator presence and support, was the importance of the students determining their own learning needs. Once the initial framework had been created for each group by their e-facilitator, the Wiki's scope and content, as well as the style and form of the poster, was driven by the learners themselves. Effective collaborative learning requires students to use “higher level cognitive thinking skills” (CLPD, 2000) and acquire knowledge in an environment, which promotes active student engagement, with a focus on the process of learning as well as on the final outcome. The Wiki promoted an interactive and constructivist pedagogical approach that sits well within a heutagogical framework. This framework developed by Hase and Kenyon (2000) emphasizes the importance of process over content and empowerment of students to make sense of their learning, rather than trying to satisfy the expectations of the teacher.

Phase 3: Designing the assessment of the on-line research task

After determining that the students would use Wikis as a platform for their research task and the results of the research would be presented in the form of a scientific poster, the mode of assessing these learning activities was the next step in the project design.

A web search was undertaken on the formulation and design of a scientific poster – one particular site <http://www.owl.net.rice.edu/~cainproj/courses/bios312.html> became a hyperlink for students on the Wiki and served as a valuable learning resource. It provided students with a range of exemplars of how scientific posters are organised and presented. Baron and Keller (2003) discuss the importance of using exemplars to demonstrate the appropriate standard of 'real examples', as well as showing how mistakes can be made. The rubric designed to assess the BOH students' scientific posters was based upon the exemplary characteristics of the sample posters; this allowed students to become familiar with the standard expected in the project.

The decision to use rubrics to assess the group's research task on the Wiki and the consequent scientific poster was based upon both facilitators' successful use of the tool in classroom-based assessment. Baron and Keller (2003) caution against making rubrics too long and detailed, as they introduce a level of stringency that is off-putting not only for students, but also for the assessors.

Key aspects of the Wiki and poster rubrics were descriptors of performance for each criterion at a number of graded levels. Chickering and Ehrmann (1996) in their article discussing best practice principles in on-line education, specify “good practice communicates high expectations”. By clearly laying out the performance characteristics at what is termed 'distinction' level, gives students a transparent means of achieving level – in a sense, a roadmap to using the Wiki as a highly effectively group learning tool.

One aspect of the Wiki that was a key part of the formative assessment of group work and collaboration was the e-facilitator's ability to access the history tab for each group page. This allowed analysis of not only the **number** of contributions from each group member, but the **quality** of each posting. This formed an important component of the overall assessment of each group's Wiki.

The rubrics were introduced to the students in a face-to-face orientation session and uploaded onto the Blackboard Human Biology My Uni site. This served to keep the students on-track over the 10 weeks of the Wiki/Poster project. The rubrics were

frequently used by the e-facilitators during on-line feedback with their groups as a means of providing formative guidance and benchmarking.

Phase 4: Designing the evaluation of the on-line research task

With the rapid growth of on-line education technologies, the evaluative research of the effectiveness of these initiatives compared to traditional classroom-based teaching, is still evolving. Stephen Ehrmann (2000) discusses the importance of what he terms 'grassroots evaluation' of educational technology. He considers that many educational administrators and faculty heads believe that by simply using new on-line Web tools, learning outcomes will automatically improve; even without a major review of staff development needs, students ICT literacy and access, as well as technological support. Without the benefit of prompt and relevant evaluation of the effectiveness of using on-line educational tools, Ehrmann considers that teachers are 'flying blind'.

With this thought in mind, and to gather data from the BOH project that was targeted and relevant, students undertook a pre-course questionnaire, designed around their:

- knowledge, skills and experience in using Wikis as a learning tool
- opinion of the legitimacy and value of Wikis as a learning tool
- attitude to undertaking collaborative group work in an on-line context.

The same questions were given to the students after the completion of the project. The results of each were analysed and a summary of their pre and post-course responses is attached as Appendix 1. Although the sample size was small ($n=32$) there is significant initial feedback to be gleaned from the results. Before undertaking the Wiki-based learning task, three quarters of the students did not think they had the knowledge to use the technology in this context; however 100% of the class considered they had the necessary knowledge after their Wiki experience. 47% of students stated they were reluctant in using a Wiki as a learning tool pre-course; this percentage dropped by almost half (28%) after the experience – not entirely surprisingly as it should be assumed that some students would not be fully confident after only one experience. In terms of using the Wiki as part of a group work activity, the evaluation was significant. Prior to undertaking the Wiki task, 78% of students in the class reported uncertainty as to their role in on-line group work. In the post course evaluation, this figure had fallen to just 18% - signifying over 80% of the class understood their role in using a Wiki as a group learning tool. Whilst this evaluation is not conclusive, it provides a form of 'grassroots' evaluation upon which to build further research; not just in future years of the same course, but across different subjects and different disciplines.

Future Directions

The Bachelor of Oral Health Wiki model has since been adopted by other lecturers in the Dental School and also in the newly established School of Veterinary Science at The University of Adelaide. Further adaptation and application of this on-line teaching and learning approach in a diverse range of contexts in other disciplines within the tertiary environment, will provide future opportunities to explore and evaluate the effectiveness of this contemporary pedagogy in educational practice.

Furthermore, the on-line assessment rubrics that formed an essential part of the Wiki project, have been adapted using the Research Skills Development Framework, developed by Willison and O'Reagan at The University of Adelaide. This will enable the level of students' research skills to be identified and referenced against a criterion-based framework which **is** becoming utilized widely across the university. This collaborative learning and research approach is a strong focus within the School of Dentistry Vision Statement 2007.

Summary

This paper has described how on-line educational technologies have played an integral role in the design **and** implementation, and both the formative and summative assessment, of an undergraduate on-line research project. It has highlighted the importance of designing and maintaining the learning environment to promote a student-driven constructivist approach, with an emphasis on collaboration rather than competition.

Assessment tools designed for this project were developed to demonstrate a fair, transparent and evidence-based approach. This was particularly relevant to the perennial challenge of equitable assessment of group work, where the Wiki tool demonstrated significant benefits in tracking the quality of individual student contribution within a group project.

The role and accessibility of the e-facilitator allowed a degree of guidance for students, but more importantly led to increased opportunity for formative feedback, motivation and communication, that would not have been possible in a more traditional face-to-face classroom.

Post-project student evaluation and anecdotal feedback indicated a high level of knowledge, competence and confidence in using a Wiki-style learning and assessment approach; opportunities for further evaluation are being realized with the continuance of the Wiki project in the Bachelor of Oral Health in 2008, and the establishment of similar projects in others courses within the Faculty and the University.

The BOH project has demonstrated that Wikis can not only work in on-line group assessment, but that they can work well, and provide a great deal of scope for further development of this on-line pedagogy.

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**The Use of Wikis in Education
Participant Evaluation**

BOH YR I

Number of Participants = 32

Please tick one box in each row.	Disagree Precourse	Disagree Postcourse	Change	Tend to disagree Precourse	Tend to disagree Postcourse	Change	Tend to agree Precourse	Tend to agree Postcourse	Change	Agree Precourse	Agree Postcourse	Change
I have the necessary knowledge to be able to use a wiki as a learning tool	14	0	43.8%	10	0	31.2%	7	12	15.6%	1	20	59.4%
I am confident in my ability to use a wiki as a learning tool	16	0	50%	7	1	18.8%	9	11	6.3%	2	20	56.3%
I have the necessary experience to use a wiki as a learning tool	18	0	56.2%	8	1	21.9%	5	12	21.9%	2	19	53.2%
I do not have many of the skills necessary to use a wiki as a learning tool	7	16	28.1%	4	12	25%	11	2	28.2%	11	2	27.6%
Wikis have a legitimate role to play in learning	1	0	3.1%	13	3	31.2%	17	16	3.1%	3	13	31.2%
I am reluctant to use a wiki as a learning tool	7	8	3.1%	11	15	12.5%	11	9	6.3%	4	0	12.5%
I feel comfortable in asking my group members for support on how to use a wiki	0	1	3.1%	3	1	6.3%	10	6	12.5%	19	24	15.6%
I am uncertain of my role in using a wiki as a group learning tool	1	14	40.6%	5	13	25%	16	3	37.5%	10	2	25.1%
I would prefer not to use a wiki as a learning tool	6	10	12.5%	15	17	6.2%	7	4	3.1%	6	0	18.8%
I believe using wikis for learning is important	4	1	9.4%	10	4	6.3%	17	17	0	3	10	21.9%