Using online collaboration to personalise the first year experience and actively engage students in their education

Paul R. Ebert$^{1,2}$, Mia O'Brien$^3$ & Wallis Edwards$^1$

$^1$School of Integrative Biology, $^2$School of Molecular and Microbial Sciences & $^3$The Teaching and Education Development Institute at the University of Queensland, St Lucia QLD 4072

Abstract

The first year university experience is characterised by very large classes that are managed by comparatively small numbers of academics. In this environment, practical and financial considerations often interfere with the establishment of optimal learning environments. Against this backdrop, we try to engage and challenge students as well as share with them our own fascination with science. Our challenge is to encourage these students to become creative and intellectually critical scientists who relish the challenge of exploring the frontiers of knowledge. So, with little budget, an absolutely crushing student to teacher ratio and a plethora of distracting administrative tasks, what can be done to encourage learning?

The good news is that students themselves can provide the solution and large classes provide the critical mass to make it work. In a first year genetics course with enrolments approaching 1100, a student-managed wiki allows them to work collaboratively on study questions. The wiki has also evolved into a self-help forum for lecture clarification as well as general information sharing. A student forum, seeded by the lecturers with topical questions every fortnight, provides a novel context in which students can integrate information from the course. A class blog combines input from lecturers and student in a timely and interesting format. These resources scale to very large enrolments with no additional effort. They assist struggling students and challenge advanced students who might otherwise become bored. They personalise the course and actively involve the students in their own education.

Introduction

In their text, *Software engineering for internet applications* (Andersson et al., 2006), Andersson, Greenspun and Rumet of MIT suggests that web applications that do not involve participants as teachers miss a great opportunity. The authors do not restrict their comments to educational institutions, but do imply that if these institutions do not involve their students, or even former students as educators, they are completely missing the potential of the web as a social, educational medium.

*What if you could go to a server-based information system and say "show me a listing of all the unanswered questions posted by other users"? You might be willing to answer a few, simply for the satisfaction of helping another person and feeling like an expert. When you got tired, you'd go to bed. Teaching is fun if you don't have to do it 40 hours per week for 30 years.* (Andersson et al., 2006)
Now, re-imagine your first year class of 1100 students as an online community of 1100 colleagues who consider teaching to be fun. Involving your students as teachers is actually quite simple and can be accomplished using a variety of readily available open source or commercial applications. Typical applications that can be readily integrated into a teaching curriculum include the following: Blogs - chronological news or information postings; Wikis - spontaneous, collaborative web sites; Forums - topical, group discussion boards; and galleries - for online display of posters and reports. The best part is that such applications are already an integral component of web activities that the students have probably been engaged in for years.

One notable example of online collaboration between university-aged young people is participation in “massively multi-player online games” which frequently contain more than 1,000,000 members. In such games, players organise themselves into small, ad hoc social groups consisting of members from anywhere on the globe. Collaboration and interaction are an integral and essential component of the activity, and the motivation to learn as well as teach other members of the team is provided by the desire to succeed. Clearly, the distinction between teachers and learners is blurred by the dual roles assumed by each individual. Such games serve as a nucleation point for related collaborative activities that contribute to the full social experience. These activities typically involve, online chat, blogs, wikis, forums and galleries.

Barbara Ganley, of Middlebury College in the United States noted something similar two years ago when she observed that students outside the classroom were engaged in lively exchanges with each other through a diverse set of communication media (Ganley 2004). She also observed that they assumed very different persona in the classroom, where they became transformed into passive absorbers of information. Unlike the creativity and spontaneity outside the classroom, the same students chose the safe course of action in the classroom where they excelled at deducing and simply meeting the expectations of the educator. She advocates the natural integration of the student’s own communication tools and styles into the educational curriculum. She has used “blogging” as a very effective communication medium in her creative writing courses. Her students now write and communicate as a required component of her classes from anywhere in the world in very novel settings. She has assumed the role of a facilitator, guide and mentor, rather than the traditional role of a university lecturer. Her overriding philosophy is that “efficacious learning [is] achieved through turning the classroom over to the students and demanding growth in return.”

Barbara Ganley teaches boutique classes, some of which have fewer than a dozen students in the bucolic environment of a small, private university in the eastern United States. What bearing could her experience possibly have on strategies for teaching in large first year courses at a public university? As an example, the first year genetics course at the University of Queensland consists of 1100 students, nearly half of whom have not done senior biology in school. Even those students who studied advanced biology in school may have received uneven coverage of the subject material. As a result, we cannot assume any level of understanding of background material. The result is a recipe for disengagement, with a pace too rapid for the struggling students that results in
inevitable boredom of the brightest and best prepared students. The typical goal is to assist the strugglers while keeping the mid-level students motivated. The most advanced students provide a unique challenge, as well as an opportunity – they need to be allowed and encouraged to explore beyond the rather low expectations of simply doing well in the course.

**The communication tool set**

One answer to this dilemma is provided by online communication. Online technologies can provide unique opportunities for building communities and asynchronous learning networks (Dabbagh, 2005). Research shows that given this opportunity, many students engage more deeply in their learning tasks, are more easily able to engage with fellow students, and more effectively consolidate their learning by working with others (Dabbagh, 2005; Firdyiwek, 1999; Salomon, 1993). The students are comfortable with the anonymity of the internet which allows them to take risks and ask question that they might not dare to ask face-to-face. Most of the students are already very familiar with posting their ideas on discussion forums and may even broadcast their thoughts and musings to the world via a blog. It is almost certain that they have taken advantage of the collaborative knowledge base that is Wikipedia, though they may not have been aware that its name reflects the fact that it was built from a wiki. These methods of communication encourage free and open discussion, often of an exaggerated nature, an important quality for embedded learning technologies (Laurillard, 2006). They also provide the opportunity to challenge ideas presented by others and to explore the strengths and weaknesses of ones own assumptions. These aspects are significant for our students, since they are on the one hand, essential skills for thinking and working scientifically, yet on the other, difficult to facilitate within the constrained environment of a large and crowded lecture theatre (Dabbagh, 2005; Laurillard, 2006). In short, our students have been practicing the skills required of effective scientists and they have been doing it for years. The online communication media allow individuals of any level of expertise to share what they know at the level of their own understanding, even students who struggle to keep up with the course (Salomon, 1993). Thus, the confidence provided by anonymity is accompanied by the building of self-esteem associated with sharing knowledge with a large group of one’s peers, a further benefit afforded by carefully designed technology-based learning tools (Dabbagh, 2005). Is there a danger of misinformation being transmitted?

The three primary tools that we have mentioned, blogs, forums and wikis, provide a range of options for oversight of what is presented as well as control over how the students might participate. Each tool was selected for a particular pedagogical purpose and learning outcome (McAlpine, 2004). A blog (sometimes called a web log or newsfeed) is basically a digital soapbox from which ones views can be published to an audience of any size. In a large class, such a tool is probably most effective when managed carefully to facilitate thoughtful contributions (Salomon, 1993), though that does not mean a lack of student involvement. Judicious selection of student comments to be published on a blog is an excellent way to encourage extremely high quality student participation in the entire range of online activities (Salomon, 1993). A forum (sometimes
called a bulletin board or discussion group) allows discussion “threads” to proceed from initiator topics and hence can encourage students to extend their learning and thinking about a particular theme or idea (Salomon, 1993). The topics can originate from the forum administrator or the participants. Forums work best if the participants gain a sense of personal involvement in, and ownership of, the medium, which means that discussions can become free-ranging. A wiki is a web page (or entire site) that any individual can create or contribute to by simply clicking a button. The software was initially designed as a completely unregulated tool for internet collaboration and it has retained much of this original intent in its most effective implementations. This philosophy reflects our purpose, which was to provide students with an opportunity to develop ownership and self-direction in their learning (Dabbagh, 2005). The potential of wikis is best exemplified by wikipedia, which as a collection of 3,800,000 articles, is the largest document ever created. The speed with which this online encyclopaedia has developed, since its inception on 15 January 2001, is a direct reflection of the nearly complete absence of barriers to its creation. The most astonishing aspect of wikis is the quality of their content despite the lack of control over the input. The explanation that is provided is that they are self-correcting, as any attempt to deface the wiki is easily rectified by other participants. Controversial topics, however, are perhaps best left for discussion by other means.

Our experience

We have used each of the communication tools according to its unique advantages. The wiki was established to allow students to work through problem sets collaboratively. The immediate tangible benefit of using a wiki is that it provides a perfect solution to the oft-repeated request for an answer key whenever example problems are distributed to students. We now tell the students where they can locate the answers, but then inform them that the answers will not be there until they post them. The students tackle problem sets with astonishing speed. It is common to have answers begin to materialise on a wiki while the questions are still being posted. It is uncommon to see a question left unanswered for more than a few hours after a lecture. The students may even post several alternative answers rather than modify the posts of others. They often provide explanations as to why the answer of another student may be incomplete or in error. As a lecturer, this provides a very instructive view into the thought processes of the students. The level of learning that is displayed on the wiki is immensely gratifying. The maturity and politeness of the students has also been impeccable.

We set up the forum as an opportunity for students to explore controversial topics, which have included evolution, genetically modified organisms and stem cells. We make no effort to evade controversy but instead encourage exploration of topics from every perspective. We particularly encourage students to switch sides in the ensuing debate and vigorously defend the opposing point of view. We explicitly tell the students that this is the first step of the scientific process, as any effective scientist must be able to challenge their own assumptions, evaluate ethical implications of their work, communicate clearly and present effective, logical arguments. The students are largely self-regulating as unsubstantiated assertions are rapidly challenged. We do at times remind students that the
discussion ought to be based on science rather than belief, but it is a simple matter to allow students to discuss beliefs in a parallel forum. The students definitely convey the sense that they embrace the forum as their own. They definitely display that they are integrating high level concepts and applying their understanding in novel ways.

The blog provides us with the opportunity to recognise particularly noteworthy student contributions to the online discussions. As such, it is probably a motivator for the students. The best aspect of a blog from the perspective of the lecturer, however, is the unshackled feeling that it provides. It is free of the constraints of the lecture in which one must be conscious of slower students who might be left behind. Blogs are for fun. Blogs are for communicating the mystery of science. Blogs are for communicating the excitement of discovery. Blogs are for mentioning what was published today. Blogs are immediate. Blog posts can be complicated or simple or can provide a teaser with links to the rest of the story. Blogs re-engage lecturers with their students in a way that is conversational and strangely immediate despite the impersonal nature of posting a new entry. There is little more gratifying than the bursting with pride feeling when a first year student makes a very insightful comment after a lecture with a casual reference to the blog post that triggered their new way of considering the topic.

We have even created our first podcast for the course. A podcast is not a collaborative tool at all, so probably does not deserve a mention in a discussion such as this. The podcast does solve a practical problem in large first year classes, however, the problem of effective delivery of information. The specific podcast we developed was an audio-visual aid that eliminated the need for students to read pages of text before prac to familiarise themselves with our microscopes. Our request that the students read the material before class may have been reasonable, but it is entirely likely that none of the students actually met our expectation. The podcast is a four minute narrated slideshow that can be viewed on an mp3 player or computer through iTunes or a range of other media presentation applications. It presents the basic care and handling of the microscopes in a visually appealing way to each individual in a manner that is impossible in the noise and confusion of a practical laboratory.

We have developed our online teaching strategies primarily from the practical insights from MIT (Andersson et al., 2006) and Middlebury College (Ganley 2004). Our approach has been to treat the use of online communication and collaboration as an empirical exercise in which we provide a framework and perhaps some feeder material or ideas to initiate the process. We then gently facilitate what evolves to ensure that things don’t go badly wrong while maintaining the student perception that this is their domain. The students tend to be strongly self-regulating, so very, very little misinformation is propagated, even with a topic such as evolution which is a very controversial social issue. Our approach has been a bit like tossing ingredients into a bowl to see if a cake emerges. We have been amazed to witness a four course meal materialise with an assortment of deserts.

**Evaluation of success or failure**

Online collaboration in first year classes - Ebert, O'Brien & Edwards, refereed paper
Some interesting preliminary insights can be gleaned from the trial last year in which we implemented a number of online activities with the disclaimer that they were “experimental only”. At that time, I (PRE) made no attempt to require participation by the other lecturers other than to make them aware of what I was doing and to occasionally suggest that they respond to a query that had not been satisfactorily addressed by a peer. That approach allowed me to experiment and to identify those things to which students responded without potentially alienating staff with “yet another well-intentioned failure”. Even with that very circumscribed beginning, there were nearly 1,500 posts to the discussion forum from approximately 10% of the class. The tracking software did not allow me to determine the number of unique visitors. The study questions on the wiki were visited by about one third of the class. The speed with which the questions were answered following each lecture and the quality of the posts provided a qualitative indication that the wiki was not only popular, but also very successful. Was the blog successful? We don’t know, but it was great fun to really share the cutting edge of science with the first year students at a level that they could understand. We hope that they enjoyed the immediacy of it, but we have not determined whether they read the posts other than through references to them in casual conversation.

As the course coordinator, I (PRE) am faced with a central question. Having initiated the development and implementation of these resources, how am I going to evaluate their success or failure in a structured way? The scientific half of me says that this is an essential component of the exercise. The emotional half of me say “So, what? I enjoy interacting with motivated students and motivating struggling students in a way that I never thought possible in such a large class.” The reality is that communicating the effectiveness of the exercise requires more than just enthusiastic anecdotes. We need to know the segments of the student population that have been positively influenced as well as those who have not. Likewise, the other lecturers and casual staff members that contribute to teaching the course need to provide feedback on factors that may have encouraged or discouraged their participation. Our short-term strategy is to encourage feedback via Email, a web form and anonymous posting to the wiki. The longer term strategy will be to query focus groups as well as track and evaluate breadth and frequency of participation across the class. It will be particularly interesting to link online participation with university entry scores as well as end of semester marks for the course.

References


