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Using wikis and blogs for assessment in first-year engineering

Elizabeth Joy Smith

School of AME, The University of South Australia, Mawson Lakes, Australia, and

Julie Evelyn Mills and Baden Myers

School of Built and Natural Environs, The University of South Australia,

Mawson Lakes, Australia

This paper examines some of the strengths and weaknesses of the use of on-line tools such as wikis and blogs for assessment purposes, with the aim of proposing future developments and improvements. It utilises a case study approach by examining the outcomes of a new first year course for all engineering students at the University of South Australia that was introduced in 2008. The course Sustainable Engineering Practice (SEP), gives students an insight into the disciplines of engineering and emphasises the skills required for working in multi-disciplinary teams. It introduces students to the profession of engineering and how it is practised within a sustainable context. The major assessment task for the course is the Engineers Without Borders (EWB) challenge, and for the first time in the engineering program at the university, wikis and blogs were used as assessment tools to evaluate student progress in meeting the course objectives. The evidence of student reflections in their course blogs, and the discussions of the staff teaching team in course meetings have been utilised to consider the strengths and weaknesses of the pedagogy adopted. These sources indicated that the use of these tools for assessment was effective, but that some modifications were required to improve outcomes for both staff and students.

Keywords: *Wikis, blogs, online assessment*

Introduction

The University of South Australia (UniSA) like other Australian Technology Network (ATN) member universities, derives at least in part from former Institutes of Technology. "*The ATN Universities share a long history of working in partnership with industry and the professions. In recent years they have consolidated their strong reputation for excellence in practice-based learning, flexible and online delivery and collaborative research*" (ATN Network, 2009). The Engineering program at UniSA was re-engineered in 2008. A common first year

was introduced for all engineering students at the university, which consists of electrical, mechanical and civil engineering disciplines. The common first year program aims to provide students with a foundation in multidisciplinary areas of engineering and is a strategic response to increasing competition for local and international students (Aziz, 2008). The common first year emphasises experiential learning through project and practice based learning and development of professional practice skills.

During this re-engineering process, staff from UniSA visited RMIT's Engineering School, which had gone through a similar re-engineering process to introduce Problem Based Learning (PBL) throughout their engineering programs. This visit also introduced staff to the use of online collaborative tools, such as wikis, to help facilitate team work (Molyneaux & Brumley, 2007). The other features of wikis were also demonstrated, including the facility to provide timely feedback to students, the ability to regularly check on student progress and to provide an indication of individual contribution in group projects. Inspired by the visit to RMIT and their use of wikis, UniSA staff decided to introduce wikis as an assessment tool in their first year engineering course, Sustainable Engineering Practice.

The Sustainable Engineering Practice Course

The aim of the Sustainable Engineering Practice (SEP) Course is to introduce students to the profession of engineering and how it is practiced within a sustainable context. Where Brundtland (WCED, 1987) defines sustainable engineering as the "development which meets the needs of the present without compromising the ability of future generations to meet their own needs"

The course also helps students develop some of the core working skills of an engineer, *viz.* locating and using information, critical analysis and reflective practice, effective teamwork, engineering report writing and effective presentations. These skills are developed by working on real engineering problems in an international context as well as meeting with engineers from industry.

Each week, students attend two one hour lectures and one two hour tutorial. The lectures were organised into three streams - communication and career skills, sustainable engineering and industry awareness. The first three weeks of lectures and tutorials focused on developing the students' soft skills, including how to work in groups, report writing, referencing and plagiarism, learning styles and career management. The next ten weeks of lectures included speakers from industry, practicing engineering in a sustainable context and engineering ethics. In the course students were required to work on 3 assessment tasks, as shown in Table 1 below.

Table 1: Assessment Tasks

Form of assessment	**Length**	**Weighting**
Assessment 1 - Individual Report (submitted as hardcopy)	1000 words	15%
Assessment 2 - Online student portfolio on professional practice and group work reflection	~2000 words	45%
Assessment 3 – Work in groups of 6 to complete a project report and presentation (report	1500 words (per student)	40%

submitted as hardcopy)		

The three assessment tasks help develop the core graduate skills of the University and are aligned with the assessment philosophy of the University (UniSA, 2009). They are designed to provide students with the stimulus to learn in depth, to apply their developing skills and knowledge in new situations and to challenge and change their ways of thinking and doing. They are diverse, inclusive assessment tasks enabling both formative and summative feedback.

The first assessment task required students to write an individual Report on the role of engineers in a particular industry or sector of the profession. They were also asked to discuss the ethical issues that may arise for engineers in that industry and consider how they might deal with these in practice. Students were required to seek information from a range of sources such as the Engineers Australia Code of Ethics, journal articles, the course text book (Johnston et al, 1999), websites and reference books. The aim of this report was to not only show understanding of the role the engineer but to also present information in a report format. The other primary reason for this assessment task was that it was deliberately set as an English language writing assignment due within the first 3 weeks of semester. This enabled the identification of students who required additional support with written work so that they could be referred for additional learning support in this area.

The second assessment task required students to use online wikis and blogs to reflect on industry interactions, SEP course content, self awareness exercises and reflection/evaluation of individual contributions to the group project. The wiki was used to compile a portfolio to help in the transition from student to professional. The blog was used to help develop reflective thinking, and assist with learning interaction. Quotes presented in this paper have been extracted from the 2008 SEP students' blogs.

The final assessment task was the Engineers Without Borders (EWB) Challenge. The aim of this assessment task was to get students to work in an interdisciplinary group to design a sustainable engineering solution to a chosen EWB problem based in a rural community of Cambodia. The projects were based in a location and in a subject area with which the students were unfamiliar. Consequently the project required students to undertake considerable research to develop a design solution. Some students complained of the extra work required after hours to do this research, and were unhappy that this information was not provided to them in lectures. However, they also recognised that this was a learning experience for them, as discussed in this entry extracted from a student's online blog:

> *"These first few weeks at university have been a new experience for me. The level of independent work is unlike what I'm used to, where I prefer to have class time to do tutorial work/assignments and do reading during class with the teacher explaining the text as we go along, but I have been able to quickly adapt to this change with gusto."*

Teaching Arrangements

The teaching team for Sustainable Engineering Practice course included two Course Coordinators (a civil engineer and a mechanical engineer), plus a course manager who was an environmental scientist. Tutors from a range of engineering and science backgrounds ran tutorial classes of 25 or less students.

Regular meetings between tutors, course coordinators and course manager were organised. In these meetings student feedback, assessment moderation and upcoming tasks were discussed. The meetings were also used as a training opportunity, particularly early in the semester, with training sessions for the tutors on issues such as learning styles, managing group work and so on, which were facilitated by the learning support unit at the university and the course coordinators.

The course was also provided to students located on a regional campus at Whyalla. These students watched lectures via downloadable video podcast and had 3 hours contact with a tutor per week via video conference, as well as two half-day visits from the tutor during the semester.

Why we chose to use Wikis and Blogs as an assessment tool

Computers are not only used as an educational tool but also as form of socialising. It can be assumed that today's generation is more familiar with working in an online environment than ever before. As discussed by Duffy & Bruns (2006), most students are highly socially active in internet based environments such as myspace.com, flickr.com and the blogging space blogger.com. In these online spaces they are already writing reflectively and commenting on their friends' writings.

Wikis have been successfully used in teaching since 2000 (Molyneaux & Brumley, 2007), with a comprehensive discussion of the pedagogy provided by Renee Fountain (2005), including a background to what wikis are and examples of good teaching practice.

Since the university does not currently have its own wiki or blog software, public domain software was used. PbWiki (www.pbwiki.com) and blogger (www.blogger.com) were selected. There are risks associated with using third part Web 2.0 services as discussed by Kelly (2007), which include potential for data loss, potential security and legal concerns and reliance on third parties with whom there is no contractual agreement. Using open source software does have the important advantage that students retain ownership of their wiki and blog after the course is complete and once they graduate.

The students used the wiki as a place to create an online portfolio of assigned tasks. The tasks were focussed on developing the student's understanding of the engineering profession. This included collecting three on-line news articles on engineering and sustainability and commenting on each article and how it related to sustainable practice; collecting two on-line job advertisements for graduate engineering positions and summarising the attributes for which the employer was looking; developing a career plan map and discussing how the student planned to manage their ongoing professional development; reporting on the industry speakers who presented throughout the course and preparing a resume. Each of these tasks was approximately 200 word equivalents.

To assist with the development of the students' critical analysis and reflective practice skills, a blog was used for regular bi-weekly journal entries. In the blog, students were asked to comment on what they had learned/gained from the course lectures and tutorials and how they believed this would help with their future study/career, as well as writing a reflection on and evaluation of their individual contribution to the EWB group project.

It was recommended to the students that they should keep both their wiki and blog private, only inviting their course coordinator and tutor to view these sites. Unlike Luca &

McLoughlin (2008) where the blogs were shared with group members to assist in the accountability of their contribution to the group, the blogs for this course were used as a personal reflection tool.

Students were told that the blogs must be a true reflection of what they were feeling and that they would not lose marks for strong criticisms against the course overall or specific activities within it. As discussed by Wellington (2007), formative assessment of reflections can help overcome these fears.

Assessing Wikis and Blogs

Assessment tasks were marked by the tutors. Marking criteria for each assessment task were discussed with tutors during meetings with course coordinators. Samples of student work were discussed in the meetings to ensure consistency of marks.

The blogs were assessed on regularity of entry, depth of thought/expression, and following the reflective process. The wikis were assessed on presentation of information and completion of individual tasks. A summary of assessment criteria and mark breakdown for the blogs and wikis is shown in table 2.

Blogs and wikis were regularly checked by tutors to check on student progress and provide formative feedback. The assessment relied on the tutors giving regular feedback to the students, but unfortunately not all tutors provided this feedback.

Table 2: Assessment tasks and mark breakdown

Task and mark	Mark Break down
Engineering in the news /9 Collect three news articles on engineering and sustainability published during weeks 1 to 10. Write 200 words on each article and how it relates to sustainable practice (600 words in total).	**3 marks per article.** • 0.5 marks for finding appropriate article • 1 mark for summarising it • 1 mark for comment on sustainable practice • 0.5 marks for expression, grammar, covering sustainability concepts
Attributes of Engineers /6 Collect two job ads for graduate engineering positions (in your enrolled discipline) published during weeks 1-10. For each ad summarise the attributes the employer is looking for (200 words per ad)	**3 marks per job ad** • 2 marks for summary of attributes • 1 marks for finding appropriate ad and highlighting different attributes between ads
Resume and Career Plan /6 Map a career plan and how you plan to manage your ongoing professional development (template will be provided on the online study guide) Prepare a Resume of no more than 4 pages. Resume should contain adequate detail, be well structured, professional and neatly presented.	**3 marks for career plan** • 2 marks for filling in form with care and thought • 1 mark for depth of detail **3 marks for resume** • 1 mark for presentation • 1 mark for having most relevant information on first page • 1 mark for overall depth of content
Reflect on Industry speaker sessions / 9 Report on at least 3 of the 7 industry speaker sessions (600 words total)	**3 marks per speaker:** • 1 mark for summarising presentation • 1 mark for discussing what they got from the lecture • 1 mark for commenting on if field of engineering is something they would like to do and why (thoughtful comments about the field in general, trends, employment prospects, ethics)
Personalise blog and blog introduction /4 Personalise your blog with a colour scheme and include a picture of you As an introduction to your blog write a 200 word introduction to self, path take thus far in life, and why you want to be an engineer.	**Blog introduction** • 2 marks for structure and presentation of blog • 2 marks for introducing self, path taken thus far and why they are studying engineering
Blog entries /6 Student is to develop own blog contributing at least one blog entry per fortnight (in weeks 3 to 10). In each blog entry discuss: What you have learned/gained from SEP lectures and tutorials and how you believe this will help with your future study/career.	• **Suggested mark scale:** • 2 marks for bare minimum discussion, • 4 marks for average attempt • 5 marks for good and • 6 for outstanding reflection

Students' reactions to using wikis and blogs

To create the wiki students were provided with information on how to get started. The variable level of student computer literacy was shown as some students were able to get started very easily while others found it hard to adapt to the process of the online environment. The issue of assumptions about students' prior learning in this regard is one that the course team has already resolved will need to be addressed differently in future years.

> *"The blog was fairly easy to learn compared to the wiki because the blog was more user friendly."*

In addition to the individual wiki, students were also encouraged to initiate a group wiki, where links and files for the group project could be shared. Some groups did this and used it very successfully as a collaborative tool, as discussed below:

> *"We have started a group wiki and most of the group members have started using it. We are finding it a good way to communicate"*

> *"I have certainly learned a great deal from this course, even if that may be predominantly about how to construct and edit blogs and wikis. I have also learned a little about group work, in terms of the use of blogs and wikis as a communication tool between group members. In terms of the face-to-face communication and working techniques, I feel I have enough experience in this area already."*

Some students really valued the reflective process and were inspired to pursue their own online reflective journal as discussed by this international student:

> *"just have finished my wiki and this is my last reflective Blog. Sustainable Engineering Practice was a great experience for me. Researching, understanding , writing reports, writing Résumé and looking for the areas I need improvements at and try to fix them. I am really feeling bad while I am writing this reflective journal. I had one of my best times studying this course. Most important thing is that I learnt many things during this semester. I am afraid that there will be no chance to write a reflective journal again for this course so I have to say that group assignment was very useful for my personal good and for my future career good. It helped me to get over my weaknesses like talking in front of a group of people and working in group, these two things was like a nightmare at the beginning of this semester but now, I AM ALRIGHT. I would like to take this opportunity to thank our lecturer, tutor, course coordinator and every one who participate to make this course such a successful and useful for all first year students. THANK YOU VERY MUCH"*

Use of blogs for course evaluation

The final blog post gave the students the opportunity to reflect on the course, and offered the teaching team an opportunity to gather an additional source of course evaluation and feedback, that was in many ways more useful than the formal course evaluation undertaken as a university requirement. As discussed by Wellington (2007), evaluation of reflective writing can give more insight into the positive and negative aspects of a learning activity. With regular blog entries you can see what activities motivated students and what failed to motivate students, and adjust the course accordingly.

A majority of students were able to see the positive aspects of the course but some saw the course as a waste of time. The range of viewpoints is illustrated in the following quotes:

> *"I have found this subject to be of no practical use in the pursuit of knowledge. It has floundered from the beginning and I have until now reserved judgement on the selected project of Engineers without Borders. The topic of sustainable engineering practice was from the beginning hijacked by all sorts of ideas and expectations. Truthfully I still do not know the purpose or intent of this subject. I feel that I have not obtained value for the money I have paid to attend this course. I will not leave this course with any sense of achievement but rather a relief that I have finished with this lame subject."*
>
> *"I had doubts about the SEP program in the beginning as it seemed not to have any substance and seemed boring. Although it is still like that in some ways and during some lectures the overall experience was good. The EWB challenge project has been the highlight of my semester almost as I got to work with a good group of people on an interesting assignment."*
>
> *"In summary, the SEP course has really provided me with solutions to many queries about engineering. In addition, it has created an awareness in me of what engineering truly is and has given me a rough idea of the career to proceed with in my future undertakings."*

All three comments clearly demonstrate the conflicting viewpoints of the students. The first two comments suggest that the aims and structure of course were not clearly defined at the start of teaching and this is something that will need to be improved.

During meetings with SEP course coordinators, manager and tutors the feedback provided in the blogs was regularly discussed. This feedback was then used to make modifications to the course along the way, during its first delivery. The immediacy of the feedback was invaluable for a course being taught for the first time.

The most notable change made was the reduction in the number of lectures that were originally scheduled, since it was very clear that students preferred to use the tutorial sessions as their primary learning opportunity. After completion of the first delivery of the course in 2008, the coordination team met several times to discuss the evaluation outcomes from both formal course evaluations and the blogs and put in place several modifications for the course delivery in 2009. These included:

- Rather than use a separate wiki and blog program, an online software with both these functions was selected for which university support was available
- Providing a help-desk session for students in the first couple of weeks to enable all students to get their online portfolio (wikis and blogs) commenced. This was also followed up in tutorials, where students were helped by tutors.
- The EWB project was introduced in the first week of the course with a presentation from an EWB representative in week 2.
- Course material on communication and career skills has been shifted to the on-line learning resources.

- Ensuring all course tutors are committed to the idea of online portfolios within the course and that they provide regular feedback to their tutorial students (which can be monitored by the course coordinators)
- Scheduled formative feedback of the online portfolio

Reflections on using wikis and blogs

Several students made comments about the use of wikis and blogs within the course, and again the views were varied, but generally positive.

> *"The wiki and blog have been coming along as well, the reporting on industry speakers was ok but the news articles and job ads were kind of tedious. Hopefully I should do reasonably well for the wiki but I think the blog is a bit pointless and shouldn't be assessed."*

> *"The Wikis and blogs however tedious at times are a fresh alternative to traditional forms of assessment like exams and essays."*

Some students also expressed the view that they would like to continue to use a blog for other courses or for their own benefit:

> *"This is my final post for my personal blog as our portfolios are due today. I hope to use this or something like it again as it has been a good experience and a good log for my thoughts."*

> *"I think that because of my experiences with the blog I think that I will start my own private blog which will allow me to express how I feel and allow me to stay organised with my work and my life. Even though nobody will be able to read it."*

The wiki and blog proved an excellent tool for reflective learning and enabled students to have regular feedback from tutors. By regularly checking the wikis and blogs every two weeks, tutors can quickly identify students who are keeping up to date, those falling behind, and can comment on the work of students who misunderstand the intention of a particular assessable component before the 'formal' submission date.

The use of wiki and blog techniques did provide some challenges. The *Sustainable Engineering Practice* course involved the entire first year engineering cohort of approximately 215 students, located both on the main campus and at a regional campus. Upon the initiation of both the wiki and the blog website students were instructed to email both their tutor and the course coordinators for feedback on site setup and current posts. The course coordinator subsequently received several hundred emails in a short period of time, all of which were pending an informed response. This particular requirement was unmanageable and was another change that was made in 2009.

The requirement for students to produce both a wiki and blog also proved to be a logistical problem. The wiki was selected for its adaptability to publishing several pages within the one site, but student feedback suggested they were less user friendly. Blogs, on the other hand, were straightforward to use but not as adaptable as a wiki for organising sections of guided responses. Furthermore, course coordinators and tutors found it logistically difficult to access

multiple pages for each student. Associated with this, individual students received varying degrees of feedback to their responses from tutors. Since there was no formal program scheduled for providing feedback to students, discrepancies between the frequency of feedback was detected. This will be overcome in the future with an online task response schedule for tutorial staff and a small assessment component included for regular contributions by students to their blogs.

There was also a difficulty with acquiring support in the operation of the wiki and blog pages. The wiki and blog sites used were from commercially operated entities, and support to requests from students who lost login details and passwords, and thus access to their own work, was not found to be sufficient from the website operators.

The time commitment for both staff and students is increased by working in this online environment. Students required help in getting started plus ongoing support with the software, increasing the number of emails, discussion group posts and face to face consultation than would normally be expected in a course such as this. The ongoing monitoring of the wiki and blog posts and the provision of regular formative feedback was only achievable by each tutor monitoring their own class. The course coordinators initially made an attempt to check on all wikis and blogs, but this was very time consuming and not achievable. However, the course coordinators and tutors all felt that the process did give them an excellent opportunity to monitor progress and provide early intervention and support for students, which is critically important for first year, first semester students.

Conclusion

In conclusion the pedagogical aspects of the web 2.0 software supported the practice based learning environment of this course. The blog provided a tool for reflection, and formative feedback was easily given to students enabling them to improve the quality of their reflective practice. The wiki provided an effective way to collate a series of related tasks based on professional practice and regular formative feedback was given. Due to this regular feedback and monitoring of student progress, the marks for this assessment task were very good.

The 2009 SEP course was modified based on the outcomes of the 2008 experience. Whilst both the wiki and blog components remained as part of the course curriculum, there were several logistical changes implemented to overcome the more negative experiences. To reduce the time required for marking the wiki and blog content, only one software was selected which incorporates both a wiki and blog. Consequently students only invite tutors to the one online environment, making it both easier to mark and administer. To improve feedback consistency, a scheduled feedback programme was distributed to all tutorial staff to ensure that each tutor was providing adequate feedback to their tutorial group.

The teaching team will continue to evaluate the use of Web 2.0 software in the SEP course and reflections on its use will be discussed in future papers.

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