

Online assessment is not always quick and easy

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Abstract: *The University of South Australia (UniSA) has successfully used online ePortfolios as an assessment tool in three of its common first year Engineering courses. Two of these courses include the first semester course Sustainable Engineering Practice and the second semester course Engineering Design and Innovation. Both courses are targeted at the development of professional practice skills such as communication and teamwork. In these courses ePortfolios are used to help students develop their reflective practice through reflection on learning and reflection/evaluation on individual contribution to group projects. To create the ePortfolios several online assessment methods have been trialed including wikis, blogs, and the ePortfolio program PebblePad. A survey of students' computer literacy conducted in 2009 found that students are comfortable with working in this online environment; however their experience is very dependent on what tool is selected, how it is used, and the training provided. Students found the online tools a fresh alternative to traditional assessment methods, however many students were frustrated by the technology and would prefer to focus on learning the subject rather than learning new software. This paper will consider some strengths and weaknesses of the on-line pedagogy and explore why online assessment is not necessarily quick and easy for students or staff.*

Introduction

An ePortfolio is used to record “personal learning and achievements supported by reflective activities through which learners can gain greater understanding of their development and progress over time” (DfES, 2005). EPortfolios can be used as a form of assessment, including self and peer assessment, in the form of diaries, blogs or wikis (JISC, 2007). Many Australian students are now introduced to ePortfolios in high school where they use an online ePortfolio tool such as Studywiz (www.studywiz.com) to help build a secure online portfolio of work, achievements and future aspirations. In Australian universities ePortfolios, as an alternative to paper based assessment, are gaining popularity. In mid 2007, the Australian Learning and Teaching Council (ALTC), commissioned an intensive research project to examine the use of ePortfolios by university students in Australia (Hallam et al., 2008). The research findings revealed that there is a high level of interest in the use of ePortfolios, however their current use in Australian universities is fragmented and requires a more cohesive approach.

At the University of South Australia (UniSA), students in the four year Bachelor and two year Associate degree in engineering programs participate in a common first year. The first year student cohort consists of approximately 200 students from electrical, mechanical and civil engineering disciplines. The common first year program aims to provide students with a foundation in multidisciplinary areas of engineering and emphasises experiential learning through project and practice based learning and development of professional practice skills. There are eight courses in the first year engineering program, three of which utilise electronic portfolios (or ePortfolios) as an assessment tool. Two of these courses are Sustainable Engineering Practice (SEP) taught in the first semester and Engineering Design Innovation (EDI) taught in the second semester. These two courses are targeted at the development of professional, non-technical skills such as communication

and teamwork. The use of ePortfolios as an assessment component is gaining popularity in engineering programs, particularly in professional practice courses such as EDI and SEP.

An online ePortfolio assessment was selected for SEP and EDI for the following reasons:

- The online environment can be easily formatted and it collates a student's assessment tasks.
- Time and date of student's work can be monitored.
- The online environment can be personalised and pictures, audio and videos can be included
- Teaching staff can view online content and check on students' progress, providing ongoing formative feedback to help students improve their work
- It enables teaching staff to effectively keep in contact with students located off campus
- Student feedback provided in the online content can be used to immediately modify the course, to meet the needs of the students
- It is assumed that an online environment will be familiar to the students, with the increased popularity of social networking websites and Web 2.0 services.

Computer Literacy

It is frequently assumed that today's generation of students is more familiar with working with computers and more comfortable working in an online environment than ever before. To ensure we were not assuming too much and to help understand the computer literacy background of UniSA's first year engineering cohort, a survey of students in the 2009 Sustainable Engineering Practice course was performed. The survey asked questions to gauge students' level of computer literacy, computer background and use of internet based social environments. A total of 136 students from the 199 enrolled responded to the survey. Of these, 12.7% of students were located at the Whyalla campus (400 km from the Adelaide campus) and were provided tuition via videos of lectures and video conferences with a tutor based in Adelaide. The remaining 87.3% of students were based at the Adelaide campus. The characteristics of the survey respondents are shown in Table 1, where it can be seen that the majority of students were male, school leavers, studying full time, born in Australia and under the age of 20.

Table 1: Characteristics of the survey respondents (n = 136) (Smith & Mills 2009b)

Survey Response					
Gender	Male:	88.6%	Female:	11.4%	
Student Status	Full Time:	85.9%	Part Time:	12.1%	
Study Location	Adelaide:	87.3%	Whyalla:	12.7%	
Birth Place	Australia:	75.6%	Overseas:	24.4%	
Age	<20	20-24	25-29	30-34	≥ 35
	70.7%	18.0%	6.0%	3.8%	1.5%
Discipline	Assoc	Civil	Mech	Elec	
	15.9%	34.1%	25.4%	24.6%	
Last Education Setting	TAFE (Technical and Further Education)		Secondary School	University	
	6.7%		78.4%	14.9%	

Students' computer and internet access is summarised in Table 2. Out of the students surveyed 97.7% had access to a computer at home, with 72.8% having had access for more than 10 years. When asked what their comfort level in using computers was, 86.8% of students answered either comfortable or very comfortable, with less than 1% answering not comfortable. A majority of students had access to the internet at home, but there were still 12.2% of students without access. It can be assumed that a majority of students are used to communicating via email as 98.5% indicated that they had email access prior to starting at the University, with 85.8% of students having had an email account for more than 5 years. As expected, students were highly active in online social networking websites, with 75% of students having a Facebook account. MySpace was less popular with 41.2% of students having an account.

This survey shows that the assumptions on students' computer literacy levels were justified, in that the vast majority of students were comfortable with computer use and had ready access to computers and internet. A full analysis of these survey results is presented by Smith & Mills (2009b).

Table 2: Computer Background, % of all survey respondents (Smith & Mills 2009b)

Survey Response						
Home access to computer	Yes:	97.7%			No:	2.3%
Home internet access	Yes:	87.8%			No:	12.2%
Email access prior to uni	Yes:	98.5%			No:	1.5%
Previously kept a blog	Yes:	11.1%			No:	88.9%
Comfort level in using computers	Not Comfortable	Fairly Comfortable	Comfortable	Very Comfortable		
	0.7%	12.5%	32.4%	54.4%		
How many years access to a computer	1	2	3 to 4	5 to 9	≥ 10	
	0.8%	0.8%	0.8%	24.8%	72.8%	
How many years since first email account	1	2	3 to 4	5 to 9	≥ 10	
	1.6%	0.8%	11.8%	60.6%	25.2%	
How often email checked	Hourly	Daily	Weekly	Monthly		
	12.6%	65.9%	18.5%	3.0%		
How often internet accessed	Hourly	Daily	Weekly	Monthly		
	35.6%	55.6%	8.9%	0.0%		
Have an account with...	MySpace	Twitter	Facebook	Flickr	YouTube	
	41.2%	5.2%	74.3%	2.2%	40.4%	

Course Structure and Assessment

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. The course also helps students to develop some of the core working skills of an engineer including; 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.

The course is structured so that students attend two one hour lectures and one two hour tutorial per week. In the course students are required to work on three assessment tasks, as shown in Table 3 below. The first assessment task requires students to write an individual Report on the role of engineers in a particular industry or sector of the profession. The second assessment task requires students to use an online ePortfolio program to reflect on industry interactions, SEP course content, self awareness exercises and reflection/evaluation of individual contributions to the group project. The final assessment task is the Engineers Without Borders (EWB) Challenge (EWB, 2009). This requires students to work in an interdisciplinary group of 4 to 6 to design a sustainable engineering solution to a chosen EWB problem. The design problems are based in a location and in a subject area with which the students are unfamiliar. Consequently the project requires students to undertake considerable research to develop a design solution.

Table 3: Sustainable Engineering Practice Assessment Tasks

Form of assessment	Length	Weighting
Assessment 1 - Individual Report (submitted as softcopy Word Document via AssignIT)	1000 words	15%
Assessment 2 - Online student portfolio including a wiki and blog	~2000 words	45%
Assessment 3 – Major Group Project Work in groups of 6 to complete a project report and presentation (report submitted as softcopy Word Document via AssignIT)	1500 words (per student)	40%

When the course was first run in 2008, both wiki and blog online programs were selected for students to compile their ePortfolio. 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. Since the university did not have its own wiki or blog software, third party openly accessible software was used. PBworks (formerly called PBwiki, www.pbworks.com) and blogger

(www.blogger.com) were selected. Blogs and wikis were regularly monitored by tutors to check on student progress and provide formative feedback. However, the use of the two online environments was difficult to manage and mark for 200 students and an alternative program was selected when the course was taught again in 2009. The University invested in an ePortfolio program called PebblePad (www.pebblepad.co.uk), which includes both a blog and wiki type environment. This new program was used in the SEP course in 2009 and is easier for teaching staff to access and mark. The use of Blogs and wikis in the SEP course is discussed in detail by Smith, Mills and Myers (2009).

The aim of the Engineering Design and Innovation (EDI) course is to recognise the roles of systems thinking, innovation and creativity in the design process. Through lectures and tutorials students are exposed to a variety of areas in design and innovation. These include: Engineering problem solving, the engineering design process, creativity, innovation and entrepreneurship, and project management principles.

Like SEP, the EDI course is structured so that students attend two one hour lectures and one two hour tutorial per week. In the course students are required to work on four assessment tasks, as shown in Table 4 below. The first assessment task is a minor design project requiring students to demonstrate their knowledge of basic engineering design principles, coupled with an understanding of the role of creativity in engineering, through the design of a novel effective solution to a design problem. Students work in teams of 4 to design and build a solution, then individually they submit a short report reflecting on the design process and their contribution to the project. The second assessment task requires students to write an individual report on the importance of innovation in engineering, focussing on one design case study. The aim of this report is to not only investigate an innovative engineering design but to develop report writing and communication skills. The third assessment task requires students to work in a group of 4 to 6 to further develop their creativity and design skills through a major design project related to their chosen engineering discipline.

The final assessment task is an ongoing work diary portfolio to help students keep on track with their major group project. There are four work diary entries requiring students to complete tasks based on their major group project including reflection/evaluation of individual contribution to the project and reflection on learning throughout the course. Each work diary task is summatively assessed with feedback provided ideally within 2 weeks of the submission date. In 2009 students were able to select how they submitted their responses to these work diary tasks. Methods for submission included using online tools such as PebblePad (the software a majority of the class had used in first semester for SEP), PBworks, blogger or other websites. Students could also select more traditional submission methods such as Microsoft (MS) Word documents. An example work diary using PBworks can be found at this URL: engg1004workdiaryexample.pbworks.com.

Table 4: Engineering Design and Innovation Assessment Tasks

Form of assessment	Length	Weighting
Assessment Task 1 – Minor Creativity Project (Individual Report and Group Design) (submitted as softcopy Word Document via AssignIT)	~1000 words + device	15%
Assessment Task 2 – Individual Report on Innovation in Engineering	~1500 words	15%
Assessment 3 – Major Group Project Group Report (25%), Group Presentation (10%) and Group Demonstration of Design (10%)	Report: ~1500 words (per student)	45%
Continuous Assessment – Individual Work Diary Portfolio (Submitted via PebblePad, Softcopy MS Word Documents, or wiki etc)	~500 words + written reflection	25%

In both SEP and EDI It is recommended to the students that they should keep their ePortfolio private, only inviting their course coordinator and tutor to view these online sites. Unlike Luca & McLoughlin (2008) where individual reflections were shared with group members to assist in the accountability of their contribution to the group, ePortfolios for this course were used as a personal reflection tool. Students were told that the journal entries within the ePortfolio must be a true reflection of what they are 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.

Comparison of online assessment options

Several different assessment methods have been used in the SEP and EDI courses. These methods have both disadvantages and advantages. The following discussion considers and compares these.

Third party blog and wiki software such as PBWorks, Wetpaint (www.wetpaint.com) and Blogger can be used as ePortfolios. They are openly accessible and free to use. They can be personalised and there are many online tutorials on how to use the software. They provide a flexible environment and the ability to load various multi-media files such as video, audio and photos. The wikis and blogs can be accessed wherever there is an internet connection and they do not require software to be installed on computers. Teaching staff access student blogs and wikis via an invite email sent by the students. These invites can be difficult to manage especially for large classes. To ensure teaching staff can find submitted tasks in these online sites, the wiki and blog need to be well structured and easy to navigate with active links to uploaded files and web pages. There are risks associated with using third party Web 2.0 services such as this. These risks are discussed by Kelly (2006), and include; potential for data loss, potential security and legal concerns and reliance on third parties with whom there is no contractual agreement.

Students can use their own websites to develop an ePortfolio. The website is free to the university, however the student may need to pay for the URL domain. Students will be able to access their site wherever there is an internet connection and have more control over the look, feel and format of their own website. However the disadvantage of this is that, like the wiki and blogs, they can be difficult for staff to navigate since they will all be formatted differently. Most websites will also be dependent on their domain providers for IT assistance.

Universities can purchase ePortfolio software such as PebblePad (www.pebblepad.co.uk) and pay a yearly licence fee. Staff can establish templates for students to use to ensure conformity and thus ease of marking. There is also some scope for students to personalise their ePortfolios. PebblePad can be accessed wherever there is an internet connection. IT help is provided by the University and PebblePad, and student work can be backed up to a server. To use PebblePad efficiently a fast internet connection is required due to the high graphical user interface (GUI) of the program. PebblePad is a comprehensive ePortfolio program however its interface (Figure 1) can be a disadvantage as students see it as more suited for primary schools than universities.

More traditional assignment submission methods can be used such as using software installed on a student's computer or university computer such as Microsoft Word. This software is very familiar to the students and they find it an easy and efficient way to prepare their assignments. Students then submit their assignments online using an inhouse university submission method called AssignIT (UniSA, 2009). Assignments are then collected on a server and staff can access them and provide feedback which can be emailed to the student. This method is very easy to use but has limited functionality and does not enable ongoing formative feedback.

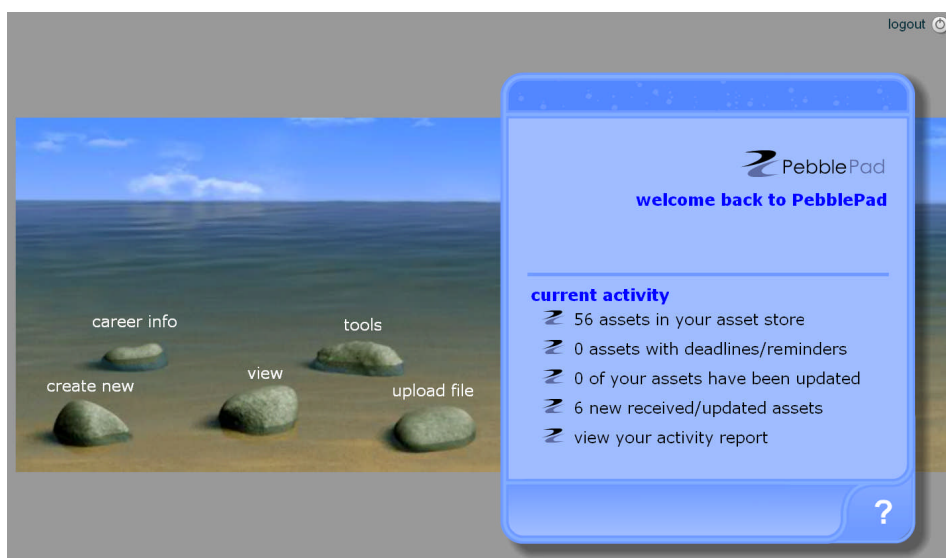


Figure 1: PebblePad GUI Welcome screen

Student feedback on the SEP ePortfolio

In SEP an online ePortfolio is used for students to submit assessment tasks including reflective writing. Students find reflective practice difficult whether it is submitted using standard submission method or via an online ePortfolio. One common reason for disliking reflective writing is that it requires students to write in a style they are not familiar with. Describing situations and events can be difficult for some students, as discussed by this response:

"I find presenting my thoughts and feelings to public very difficult"

Some students just find writing reflectively in the personal blog a waste of time as highlighted by the following comments:

"Waste of time could be studying"

"Don't see the point"

Student frustration in writing reflectively is further compounded by the use of an assessment method they are unfamiliar with, such as online ePortfolio software which can sometimes be more time consuming than standard submission methods. Some students found submitting assessment tasks via the ePortfolio frustrating and too dependent on the level of computer literacy and quality of internet connection, as illustrated by:

"The e-portfolio thing is annoying and a confusing way to hand something up as well as being difficult for people with lesser computer skills."

"Online sucks unless you have good internet"

Although some students found the online environment frustrating, it was seen by others as being a good alternative to standard assessment tasks:

"The e-portfolio however tedious at times is a fresh alternative to traditional forms of assessment like exams and essays."

The ePortfolio software, PebblePad, used by the students to compose their ePortfolio for SEP in 2009 was not as popular as the openly accessible third party software used in 2008. Throughout the teaching period of the course, the students used their personal blog and response to the computer literacy survey to inform teaching staff how much they disliked this software, as discussed below:

"I don't like PebblePad; it is useless and does not further my engineering skills. It's a waste of time and should not be taught in future years."

"The software is hopeless; it's a new software to learn. Taking time away from creating the assignment."

"The task itself is fine, however PebblePad is an annoying program to use and the formatting (spell-check etc) are not very useful."

From the negative student response in 2009 it can be assumed that they found it more challenging to adapt to using PebblePad than they did to the third party openly accessible software used in 2008. However this is not necessarily the fault of the software but rather how it was adapted and used within the SEP course and the quality of training provided to students, as discussed by these student comments:

"Need clearer instructions"

"It needs more explanation."

Choice of assessment submission method

It was hoped that students would use PebblePad to submit work diary tasks in the second semester course EDI, however after the negative feedback PebblePad received in SEP in the first semester the teaching staff were reluctant to continue using it. So instead of forcing the students to use PebblePad in EDI they were given a choice of submission method.

To help manage how and where students' submitted their Work Diary tasks they were asked via an electronic survey to indicate which submission method they had selected and why. Students were able to submit their work diary task in four different ways in addition to using PebblePad, namely:

- Microsoft Word or similar document via the UniSA online submission method AssignIT
- Blog site such as Blogger
- Wiki such as PBworks or Wetpaint
- Other, such as student's own website

Out of those students who responded 98% appreciated the flexibility of selecting their own submission method and surprisingly 66.7% selected to use PebblePad, with 27.4% selecting AssignIT. A much smaller percentage of students elected to submit via a wiki, blog or their own website as shown in Figure 2.

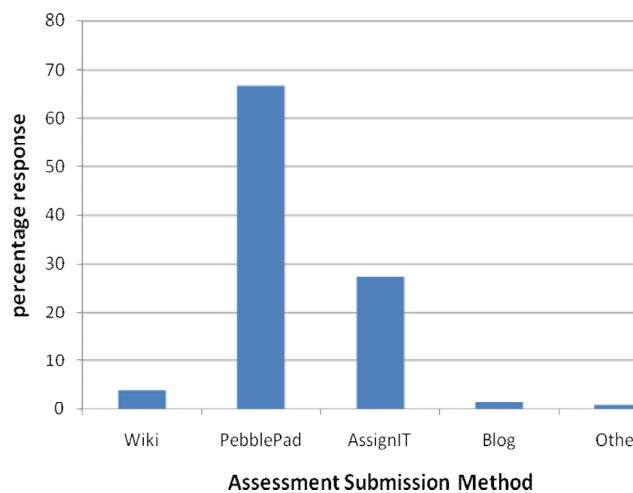


Figure 2: Students preferred work diary submission method for EDI

The students were asked to indicate what influenced their decision in selecting a submission method. The most important reason was that they were familiar and comfortable with the software and the least important reason was that it provided an effective method for tutors to provide formative feedback. Other reasons are listed below from most to least important:

1. I am familiar and comfortable using this method
2. This method is convenient
3. This method provides appropriate functionality to prepare my work diary entries
4. This method effectively collates my work diary entries
5. This method provides an effective way for my tutor to give me formative feedback

Reasons for submitting work using Microsoft word via AssignIT included students comfort and familiarity with the software as discussed in these comments

"It is quick and easy. PebblePad is too slow and takes time to set up everything."

"Word is most familiar with me and I feel most comfortable using this method."

Some students with experience in web design were frustrated by the lack of functionality of PebblePad so elected to use their own webpage to submit their ePortfolio tasks.

"I am familiar with the format, there are no restrictions and I don't have to learn yet another system that would otherwise have limited use for myself. "

"PebblePad was good for text, but too time intensive for files (uploading and accessing). Great for a novice, but very frustrating if you are familiar with web design."

Although PebblePad received very negative feedback in the SEP course it was the most popular submission method for the EDI ePortfolio. Students selected PebblePad because they are now familiar with the software and find it easy and fun to use as discussed by these student comments:

"Easy and fun"

"interesting and easy"

"because we used pebble pad in sustainable engineering practice last semester I know how to use it and it is very simple"

Some students who selected PebblePad still had some reservations as to its use, as discussed by this student:

"I think that a webfolio is a really great way of collating ones work... I strongly dislike pebble pad because it has some VERY annoying features. While it is very easy to use, I feel that it doesn't aid our professional development as engineers. (I can imagine myself as a school teacher showing year 7's how to use it, but cannot see myself using such a program as an engineer). Despite this, the reason I chose to use pebble pad over the other blogging tools was because I am familiar with it from SEP in SP1."

There is obviously a contradiction in student opinion of PebblePad between first and second semester. The swing in opinion is almost certainly due to the fact that as students became familiar and comfortable with its use, they then started to find the software easy and interesting to work with.

Unfortunately the course where new software is introduced receives the brunt of the negative feedback from students. As students become familiar with the software they will find it easier to use and less frustrating so they can focus on the assessment task rather than the submission method. To ensure students adapt to new software as soon as possible adequate training is required.

Assessing online content

In both EDI and SEP, tutors from a range of engineering and science backgrounds ran tutorial classes of 25 or less students. Each tutor assessed the online content for their own tutorial class in accordance with agreed course assessment guidelines. Depending on the number of tutorial classes they managed, tutors would assess between 20 to 70 online ePortfolios.

For SEP the online content is regularly checked by tutors to check on student progress and provide formative feedback. Marking criteria is discussed with tutors and samples of student work compared between tutorial classes to ensure consistency of marks. The ePortfolio assessment relied on the tutors giving regular feedback to the students, but unfortunately not all tutors provided this feedback due to lack of time and/or training. The online content is then summatively assessed at the end of the course.

For EDI the students submitted four work diary tasks, each work diary task is summatively assessed. It is a requirement of the university that feedback be provided within 2 to 3 weeks of the submission date; however the tutors found it difficult to regularly meet this deadline for the ePortfolio task. Unfortunately, like SEP, some students did not receive any feedback on their work diary tasks until the end of the course. Marking criteria for the online assessment is discussed with tutors with a detailed marking rubric used to ensure some consistency between tutorial classes.

For both SEP and EDI, marking of online content is not a quick or easy process. Students did not use a consistent structure for their ePortfolio and it would take time to navigate through the site to ensure all content had been marked. For EDI this was complicated further by the varying submission methods the students had selected. In the ePortfolios students would upload content in Microsoft Word Documents, pdf's and other file formats. Links to these documents would be created in their e-portfolios and each time a tutor opens one of these links a separate window would open. This can become confusing and increase the time required to mark the assessment tasks. Further factors affecting workload when assessing ePortfolios are discussed by Strivens (2006). It is less frustrating and time consuming marking work diaries submitted as softcopy Microsoft Word Documents, since

you do not have to search as hard for hidden content and you only have one window to open and mark from.

The ePortfolio task for SEP contributed nearly half of the course grade. However student feedback suggests this weighting was too high compared to the workload required for the group project. In contrast staff believe the grade weighting appropriate for the time required to assess the ePortfolio task. Consequently the SEP ePortfolio requirements have been modified for the 2010 delivery so they are more appropriate for the relative weight of the assessment task, without increasing staff time for its marking.

The ePortfolio task for EDI contributed a quarter of the course grade. Students benefited from the tasks being aligned with the major project as discussed by this student when asked what they liked about the course;

“...work diaries keeping you on track for major report”.

The assessment weighting for the ePortfolio is appropriate for the students since many of the tasks are completed during tutorial sessions and are also a requirement of the major group project. In contrast, staff time to assess the ePortfolios for EDI is high relative to its assessment weighting. This is due to the detailed summative marking rubric used for each of the four ePortfolio tasks. Although it helped ensure consistency of grades between tutorial classes, it increased the length of the marking process. Consequently the EDI ePortfolio tasks will be modified for the 2010 delivery and summatively assessed only once.

For the 2010 delivery of the EDI and SEP courses the due date for the ePortfolio tasks will be staggered throughout the study period with regular formative feedback provided. A summative mark will then be provided at the end of the course using a marking rubric to ensure consistency between tutorial classes. Teaching staff will be trained on how to provide efficient and effective formative feedback so that it is supportive and timely for students and quick and easy for staff.

Conclusion

First year at university can be a very daunting and stressful time for students. To help students adapt to this new learning environment they require ongoing feedback. The use of ePortfolio tools (if managed correctly) is an effective way to do this. Such tools also provide a creative and engaging method for students to undertake assessment tasks and communicate with teaching staff.

It is vital for the success of online assessment to provide adequate training to both students and staff. Although it can be assumed students are comfortable in communicating online, some software is more familiar than others and it is that familiarity and comfort that is necessary for students to embrace and effectively use the software. When given a choice of submission method in EDI over half the class selected PebblePad, which was surprising considering the negative feedback the software received in the preceding course SEP. This shows that once familiar with software, students can focus on the assessment task rather than the submission method.

PebblePad will be utilised as an assessment tool again in EDI and SEP in 2010. However several changes will be made in the way it is used and how feedback is provided. A template will be created to help students format and structure their ePortfolio, while still providing some scope for personalisation. This will reduce the time needed for students to become familiar with the software as well as the time needed for staff to assess and provide feedback on submissions, since the format will be more consistent. There will also be improved training provided for staff and students, both face to face and through online documentation.

To help students see the importance of the ePortfolio concept, examples of how it can be used for ongoing professional development and acquisition of chartered engineering status will be discussed. It is also hoped that UniSA will create a more professional interface for PebblePad to support its use as an ongoing tool for professional development.

At this stage the use of ePortfolios for the SEP and EDI courses could be considered unsustainable in that the demand on staff time will prevent adoption beyond the staff who have been the initiators. However, it is hoped that the changes made to the 2010 delivery will improve the use of ePortfolios making them an efficient form of assessment for both staff and students.

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