

A5. The use of student generated, web-based galleries for sustainable active learning: A paperless module

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The discipline of Computing is associated for many with the conspicuous consumption and development of technological artefacts and consequent problems of disposal of 'old technology' such as out of date personal computers, peripherals such as printers and mobile devices such as phones and Personal Digital Assistants (PDAs) (Lyons 2000). When students are developing their skills in designing user interfaces to these products and prototypes for new products, it is common to produce paper prototypes and for these to be used in formative evaluation with users and submitted in a portfolio of work for assessment. The well-established Systems Thinking Approaches (Checkland and Scoles 1990) advocates the use of drawings and images to facilitate communication about design and Martin (2006) suggests that the habits developed at an early stage in designers' careers are likely to stay with them, so it is important that principles of sustainability within design practice are embedded early on. However, the very practice of producing multiple versions of paper designs is antithetical to ideas of sustainable development.

Aims

A primary aim of the activity was, therefore, to inculcate principles of sustainability into students' design practice by using web-based technologies to minimise the use of paper-based assignments. In addition, students' transferable skills of time management, reflective practice and peer evaluation techniques would be addressed at an early stage in their study programme in semester 1 of Level 1.

The activity ran throughout the semester with weekly design tasks uploaded to a server, followed by a critique session the following week enabling students to revisit their designs in the light of constructive, critical comments from their peers and staff.

From a staff perspective, tutors were able to practise and develop our web development skills in the context of conducting the module and thus lead by example and develop a community of practice.

Rationale

It is in the nature of a university undergraduate modular scheme, such as the one operational at the University of Gloucestershire, that an individual module should have a summative assessment at the end of a semester. This may be an examination, normally scheduled at the end, or coursework which may have an interim deadline. However, revision for examinations is often left until the last minute and, even in the case of a coursework assignment, there is a tendency for students to leave the work until a late stage. This can lead to a poor standard of work, plagiarism (Carroll 2002) or non-submission with consequent problems for both the student and the University of poor progression and completion rates (MU Field Annual Review Report 2001).

Creating and maintaining a culture of attendance at modules has been widely recognised as important in improving module results (Allen and Webber 2006). Multimedia is an area of study within the Undergraduate Modular Scheme of the University of Gloucestershire and is one of several programmes within the Department of Computing which a student may combine together to form a programme of study for a BSc. The programme uses websites as an essential resource for teaching and learning materials for all its modules which may mean that students begin to regard attendance at timetabled sessions as an optional extra. While this approach can be effective for the technical areas such as programming, it is less successful for the creative aspects of design. Art and Design departments have long used peer critique sessions as a method of helping students to develop their analytical and aesthetic skills and these typically involve the presentation of items in a studio during a class and formative critique before the final piece is submitted.

One possible approach considered by the tutors was to divide coursework assignments into smaller elements, but this had been found by others in the Computing Department to be unsustainable in terms of the excess amounts of clerical effort for administrative and academic staff as well as from the perspective of the students, who complained in module evaluations of problems with a plethora of submission dates. Tutors were also concerned that large quantities of high quality paper and colour

printing cartridges were being used by students who were anxious to present their interim assignment work to its best advantage. This was clearly not supporting principles of sustainability.

In 2001/02 it was decided to introduce a single portfolio assignment for the Level 1 module (15 CATS points) *Digital Media Design*, comprising a set of ten tasks representing particular design exercises. These were introduced in a lead lecture with the student work forming the critique session for the following week. This short timescale not only meant that the material was fresh in the students' minds, but also that if a student was absent for one session, then there was relatively little impact on their progress in completing all the tasks. The early tasks were straightforward, using software with which the students were already familiar, progressing to more complex design exercises and a final integrative piece which was not generally reviewed in its final form until the submission of the portfolio.

The use of a web-based gallery was seen as a sustainable method of providing an increased level of feedback in keeping with the principle of changing professional practice at source as part of the students' learning (Warhurst 1998; Higher Education Partnership for Sustainability 2004; Levett 2006). Although it appears initially to be instrumental in its approach, identifying a problem, proposing and implementing a solution, it is also in keeping with an Action Research Model as proposed by Finlayson (Science Council 2006) as it includes learning from experience and engaging new people in a community of practice.

Implementation

It is necessary to have a web server which will accept the uploading of files, in this case, image and animation files. This is a facility provided by some virtual learning environments (VLE). Within the Multimedia area, a dedicated teaching and learning server (<http://mmedia.glos.ac.uk>) is maintained by module tutors which allows staff to practise the web development skills which form part of the students' curriculum and provide examples of good practice to the students studying this discipline. Currently Macromedia Dreamweaver is used as it offers facilities for team working on multiple sites and easy access to a code view to implement the upload facility written to communicate with the server. However, freely available services on the web now make it possible to use a site such as wetpaint.com, provided only images and text were required (see example at University of Gloucestershire 2007).

The delivery model for this module is a 'lecture' of one hour followed by a two hour practical session in a laboratory of 60 computers with two staff. The 'lecture', which incorporates some theory material delivered in a traditional lecture format as well as the critique session, must be run in a room with a computer and projection facilities. Access to the web is not necessary for this if PowerPoint is used to display the uploaded work.

The first step is to analyse the curriculum material to be covered into fairly distinct elements, for example, in the case of *Digital Media Design*, the initial elements were based on a set of simplified graphic design principles for the visual novice (Williams 1994):

- *Alignment*
- *Proximity*
- *Contrast*
- *Repetition*

The obvious, but clearly inappropriate, acronym has been 'discovered' by successive cohorts of students and proved impossible for them to forget. A simple design exercise was set in each of the first four weeks which gave practice at applying one, two, three and finally all four principles. These were set in a relevant context for the students, namely branding for a company engaged in web site design which would need to work on paper and screen.

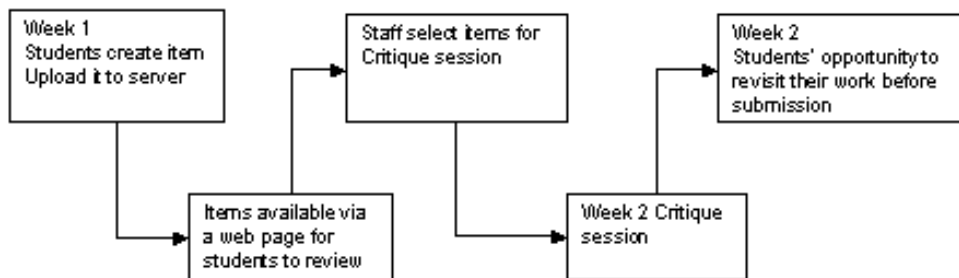


Figure 1: Activity process

In the first week, the exercise was introduced in the first part of the session and the students spent the practical time using the software to apply the design principle to the content provided for a poster. They were then encouraged to complete the work during the self-directed time and use the upload facility on the module website to send their semi-anonymous image file to the server. The filename used was based on the student's university registration number which is known only to the student and appears on module lists. The tutors then reviewed the gallery content online and downloaded suitable images (usually about 60 in total) to illustrate positive and negative points for the critique session.

In the second week, the critique session was run as part of the 'lecture' session at an appropriate time, in order to provide formative feedback. The students were divided into groups of four and discussed the image displayed anonymously on the large screen. Tutors moved between the groups, assisting if necessary and identifying useful points. In a plenary, comments were then elicited from the groups and summarised by one of the tutors with encouragement for all students to revisit their work in the light of what they had noticed about the design. The 'lecture' would also introduce the next design principle and exercise for the subsequent practical session and following week's critique.

The use of student number in the filename had several benefits. Firstly, most of these students had no experience of peer critique and were understandably nervous of having their work 'judged' in this way, so the student number offered a degree of anonymity in the critique session. Secondly, if any technical problems were detected by staff, such as large file sizes or wrong formats, it was possible to email the student concerned and offer timely advice before any final submission of assignment work. This was much more efficient and effective in terms of ensuring that students submitted appropriate assignment work for assessment.

Sustainability focus

All teaching and learning materials are provided to students *via* the module website rather than on paper, thus allowing them flexible access and explicitly reducing the environmental impact by removing the need for expensive colour cartridges and printer paper. Student evaluations from those living at a distance were very positive as it enabled them to upload their work remotely from home after further reflection, rather than during the timetabled session. Students were therefore not constrained by

traditional working hours or laboratory availability. Several commented that it reduced the numbers of journeys to the campus which they appreciated from a cost perspective, but also contributed to the sustainability of the activity (Stern 2006). In future, it is planned to include a specific reference to the sustainability aspects of this activity and invite students to evaluate the module electronically *via* the website.

The activity reduces the need for colour reproduction on paper-based assignment submissions as the portfolio items are submitted electronically for formative assessment and on CD-Rom for summative assessment.

During the sessions introducing design for websites, students are encouraged to reflect upon the benefits of an organisation providing its promotional materials *via* the web in sustainability terms. Their attention is drawn to the benefits of the availability of module resources on the web.

Active learning

This activity attempts to blend students' active learning in using the software with the e-learning potential of being able to review their own and others' work. The activity also encourages the students to work together and thus mitigates the potentially 'lonely' aspects of a modular scheme where it can be difficult to engender a 'course feel' since students do not necessarily meet each other in more than one module.

There is further scope for the activity to link more closely with other elements of the sustainability agenda by choosing design work in an appropriate context such as for a water management company or a development charity for instance. This will form part of the next cycle of the Action Research model when the single module is incorporated into a year long 24 CATS module, giving more scope for the development of suitable scenarios in the area of sustainable development.

Feedback

Module evaluation for the five years that *Digital Media Design* ran was consistently positive from staff and students and attracted positive comments from both External Examiners who advised on this subject area. After a major review of the Computing degrees, the module has become a year long 24 CATS module and continues the activity in a similar manner.

The module evaluation used a *Post it* note technique to allow students to develop their comments. Yellow notes were used to write 'one good thing about the module' and 'one thing I learnt on this module' and orange notes were used for 'things I would change about this module'. These were then put on the wall for students to peruse while they considered whether they wanted to add any further notes.

The student evaluations have been very positive in terms of enjoyment of the module and the developing social network and its support for different generations. For instance, comments have included:

- *I liked time for the portfolio and the friendly atmosphere*
- *The lab sessions were useful for sharing ideas and enhancing skills*
- *The extra time for uploading was great as I could do it (upload) from home. I have family responsibilities and it's hard to come in every day*

Some suggested that they liked to work in this way with the combination of e-learning and reflective practice, for instance:

- *Make every module work this way!*

There was evidence of a growing level of reflective thought, for example:

- *I wasn't sure at the start what the standard was for our work but the crit sessions helped me understand as we went along*
- *I have learnt to think about the layout of my work more using the design principles*

Staff noted an improved rate of assignment submission compared with a parallel module with two coursework assessment points. It has also been noticeable that the standard of presentation of written work has improved in all assignments for students who have completed this module.

Strengths and weaknesses

Some of the strengths of this activity lie in the development of students' personal skills and confidence in their ability to apply design principles to their own and others' work. Because of the use of small groups, quieter students are enabled to proffer opinions, while not having to make themselves heard in a larger group. All students improved their time management skills by submitting designs weekly. There have been some immature students who will not share their work in this way, but do continue to attend the critique sessions. This phenomenon is well known on web-based discussion groups and is known as 'lurking'. This lurking behaviour does not always stem from laziness, but is sometimes exhibited by the more skilled students who do not want their work to be copied. This attitude needs to be recognised and explored in the context of the essential need in the discipline and future professional lives for collaborative and open attitudes to teamwork. The tutors attempt to address this by encouraging emails and this has had some success.

The activity develops students' capacity to employ sustainable methods of working at an early stage of their studies by reducing the need for copious use of expensive paper and coloured ink cartridges. The activity leads by example and embeds good working practices rather than preaching a list of approved actions.

In pedagogic terms, the activity provides tutors with feedback as to the students' progress and allows timely modifications to the lectures. This outweighs the potential weakness of the impact on tutor time of reviewing the submitted work within a relatively short timescale before the critique session. Although not every student currently gets individual feedback on their design, tutors do select indicative examples and encourage students to compare their design with those that are critiqued and this helps them to develop critical thinking skills. Students always have the opportunity to show their designs to staff in the practical sessions in addition to the critique activity.

Tutors need to develop the skills required to lead critique sessions in a collaborative and encouraging manner without being tempted to 'lead from the front' and control the contributions too much, as this can weaken the students' emerging critical skills. One must not be afraid of a little reflective silence. Perambulating around the room to listen in to the group discussion is a key skill. One further strength of this activity has been that

tutors have improved their knowledge of the students and this has helped to build the community feel. Over the six years since the start of this activity, there have been a growing number of *alumni* who have stayed in touch *via* email and frequently advertise job opportunities on the 'mmedia' server.

Programmes

This activity and similar ones have been used at all levels of the undergraduate Multimedia Degree Programmes where 2D or 3D designs, animations, audio presentations or videos form part of coursework assignments. In the final year, students develop potential designs for the electronic and traditional promotional marketing material for the end of year exhibition. The most recent version has produced a brand with a green colour theme and the tag line 'Building sustainable IT solutions' which suggests that, within the student community, the awareness of sustainability issues has been raised and the possibility of using IT to promote sustainability has been recognised.

Keywords:

Active learning; website design; critique; formative feedback; virtual gallery; graphics; animation; sustainable professional practice

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