Delivery of online digital feedback and assessment for design and engineering (architectural) students

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ABSTRACT: This paper concerns questions about whether blended learning (comprising the designed amalgamation of face-to-face and digital learning components) can be matched with the delivery of online feedback. In the architecture and engineering (architectural) field where there are complex design problems presented to students, design studios with instruction and feedback often one-on-one over the drawing board and feedback personalised to each student’s design, are there mechanisms for delivery of online feedback which suit this mode of learning and will improve students’ satisfaction with the quantity, frequency, timeliness and quality of feedback?

National Course Evaluation Questionnaire data highlights the need for improvement in feedback quality and delivery in University architecture and engineering fields, due to low overall satisfaction compared with other professional education fields. University and School student evaluation supported this feedback deficit.

This paper looks at courses where modes of meaningful digital feedback (including audio feedback and online staff and peer feedback) have been introduced, and compares students’ satisfaction with feedback in these courses over five-year periods.

The paper evaluates new ways of providing digital feedback in a resource-constrained University environment and proposes eight recommendations for the delivery of blended feedback and assessment.

Conference theme: Architectural education
Keywords: blended learning, construction technologies, feedback

INTRODUCTION

In the engineering (architectural) and built environment design field of education, feedback provides a critical link within the spiral of proposition, synthesis and evaluation – which is called reflection-in-action (Schon 1983, 1987). Design propositions converge upon a domain of acceptable responses (Visser 2008, Park 2011) through the evaluation of the sketch, model or computer modelling or other artefact (the proposition synthesis) which enables a conversation about the proposition. The mode of providing that critical evaluation is through continuous feedback. Thus student perception of feedback quality and quantity, as a measure of its usefulness to them in moving through that iterative process of design (Shannon & Radford 2010) is important.

Nationally the Course Experience Questionnaires (CEQ) (Graduate Careers Australia 2012) presents Australia-wide graduating students’ satisfaction with “Good Teaching” which includes two questions directly relating to feedback: “The staff put a lot of time into commenting on my work” and “The teaching staff normally gave me helpful feedback on how I was going”. For the 2009 CEQ, postgraduate architecture and building students’ mean percentage broad agreement (BA) scores (by broad field of education on the good teaching scale) were the lowest at 58.5% for any broad field of study, with engineering at 60.3% the second lowest. For undergraduate teaching, engineering students recorded the lowest BA on the good teaching scale (52.6%), with architecture and building third lowest (59.2%). Despite the limitation of low response rates, Australia-wide dissatisfaction with elements of the good teaching scale was concentrated in the architecture, building and engineering fields of education at all levels.

Locally at University of Adelaide students recorded 58% BA in the good teaching scale in 2010 in the entire Engineering School and the 61% BA in the entire Architecture, Landscape Architecture and Urban Design School. University of Adelaide also conducts Student Experience of Learning and Teaching surveys (SELT) at the conclusion of each course. In the School of Civil, Environmental and Mining Engineering, which includes Engineering (Architectural), 2614 students recorded 53% BA with the proposition that “I receive adequate feedback on my work” in 44 course surveys for the 2011 full year standard Course Evaluation. This was 10% lower than the score recorded for any other question. The University of Adelaide has set a feedback proposition benchmark of 50% BA for first year students, and 55% for all other students, an expectation 10% below the score for any other outcomes (University of Adelaide 2012).

From national, University-wide and School-level evaluation, students in the engineering and built environment design fields of knowledge appear somewhat dissatisfied with feedback compared with their satisfaction with other areas of their Programs. Is there a disconnection between the way that feedback is given and the ways that learning and teaching happens in these fields? Coursework is increasing delivered through blended learning which is defined as
the seamless amalgamation of traditional face-to-face interaction augmented by carefully considered modules of online learning (Beer, Clark & Jones 2010). Researchers in the field of the scholarship of architectural design and engineering (architectural) higher education have evaluated the benefits of adopting blended learning in their field (see for example in engineering education Chang, Richardson, Banky, Coller, Jaksa, Lindsay & Maier 2009, Blackmore, Compston, Kane, Quinn & Cropley 2010, Iskander 2007 and in architectural design education Senyapili & Karakaya 2009, Napakan, Gu, Gu & Williams 2009) arguing that students are advantaged through the flexibility of this mode of engaging with learning material, delivered usually through a Learning Management System (LMS) such as Blackboard. They have argued that face-to-face teaching is supplemented by carefully chosen online modules to increase performance, and motivation, especially through engagement with peers instead of students assuming a passive transmissive mode of learning (Biggs & Tang 2007). The claim is that students, particularly those with employment and family responsibilities are especially advantaged by blended approaches (Dykman & Davis 2008).

What is best practice in the arena of blended learning feedback and assessment? What initiatives can be introduced into resource-constrained Universities’ engineering and architecture departments to improve the quality, quantity and timeliness of feedback, to raise student satisfaction and contribute to better learning? The exploration of two local initiatives which seek to model best-practice in delivering timely and meaningful feedback are explored in this paper.

1. UNDERSTANDING ASSESSMENT AND FEEDBACK

Hounsell, McCune, Hounsell and Litjens (2008) propose six main steps in a ‘guidance and feedback loop’ which builds from students’ previous learning, through ongoing clarification to feed-forward into future assessments. With multiple stages for feedback, clarification and review, adoption of this model is not a resource-free zone. Core to the process is the need for timely and meaningful feedback.

One core objective of built environment design education is for students to derive an understanding of design process, so that in future and different contexts, they may apply the process anew. Students focus on production of the artefact of the proposition, the ‘work’, yet at the end of the course of study, these artefacts - the drawings and models - are of little transferable value to the student – they have been the necessary tools through which a process has been engaged with and learned. This needs to be made explicit to students from the outset:

Design cannot be taught in the abstract only, but knowledge and skills can be shaped through the visualisation of process and participation in development. Design students learn design through a convergent or multi-discipline mode that enables them to approach the design work at different levels and with an emphasis on different aspects. (Visser 2008, in Park 2011:178)

The nature of assessment tasks varies from formative to summative and from simple (technical ‘right answer’) to complex (‘blue sky’ problem-based) projects (Table 1). For each assessment there are corresponding opportunities and modes for the provision of feedback to students, and opportunities for students to enhance and redirect their developing skills, knowledge and abilities. As the complexity of the assessment task increases, so the feedback mode shifts to require more individualised human assessment (Gipps 2005) that is personalised to student’s work. Assessment tasks need to be process explicit and accompanied with intensive feedback, and structured so that students can increasingly identify the strength of their own skills, knowledge and abilities.

Generalised feedback provides guidance by exemplar, and is straightforward to express within a blended learning environment (through, for example, feedback through group emails). However, many students lack the skill/ability to ‘see’ their work within the broad context of generalised feedback and are not yet able to recognise the strengths/weaknesses of their own work in relation to it (Shannon & Radford 2010). Further, many students new to tertiary learning have arrived fresh from the high school ‘draft/edit/draft/edit’ teacher-dependent approach to feedback and have some expectation of tutor as teacher-substitute (James, Krause & Jennings 2010). As students progress through their tertiary studies so they need to develop the capacity for increasing levels of student autonomy to become equipped with the confidence and competence to self-direct and self-judge (Sadler 1989, in Hounsell et al 2008). Immersive proto-professional behaviour may enhance the development of these skills which are essential for the professional. The structure of assessment and feedback needs to include a ‘weaning’ process, tapering from the highly structured staff-led feedback of early levels of education, through to greater reliance on more generalised exemplary feedback from peers and self as student autonomy increases approaching graduate levels (Fig 1).

Figure 1: Feedback spectrum towards student autonomy

There are a range of digital tools that may assist with feedback in the blended learning environment, but frequently these meet only some of the qualities for complex feedback in this architectural design and engineering (architectural) field. Which mechanisms, that have the capacity to model / develop / scaffold self-judgement and
provide sufficient re-direction / guidance in resource-constrained schools, have been trialled? What was the student experience, nationally and internationally, of engaging with these modes of assessment and feedback delivery?

<table>
<thead>
<tr>
<th>Table 1: Nature of Assessment Tasks &amp; Associated Feedback Modes &amp; Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SIMPLE</strong></td>
</tr>
<tr>
<td><strong>Nature of Assessment Tasks:</strong></td>
</tr>
<tr>
<td>- Physics / Mathematics: acoustics / thermal performance / sun, shade &amp; shadow angles / site &amp; contours etc</td>
</tr>
<tr>
<td>- Technical Drawing: orthographic projections / constructed perspective, axonometric etc</td>
</tr>
<tr>
<td><strong>Feedback Modes:</strong></td>
</tr>
<tr>
<td>- Template answers</td>
</tr>
<tr>
<td>- Online assessment with automated commentary (calculations / short answers / multiple choice questions)</td>
</tr>
<tr>
<td>- Generalised</td>
</tr>
<tr>
<td><strong>Feedback Attributes:</strong></td>
</tr>
<tr>
<td>- ‘Where did I go right/wrong’</td>
</tr>
<tr>
<td>- ‘Capacity for redirection: ‘What do I do next time’</td>
</tr>
<tr>
<td><strong>SUMMATIVE</strong></td>
</tr>
<tr>
<td><strong>Nature of Assessment Tasks:</strong></td>
</tr>
<tr>
<td>- Marks</td>
</tr>
<tr>
<td>- Online assessment with automated marking (calculations / short answers / multiple choice questions)</td>
</tr>
<tr>
<td>- Generalised</td>
</tr>
<tr>
<td><strong>Feedback Attributes:</strong></td>
</tr>
<tr>
<td>- At its most rudimentary a mark (or assessment grade) is a form of feedback, providing a student with a crude ranking of their work – but little/no information/guidance from which to develop</td>
</tr>
</tbody>
</table>

1.1 Case studies in digital feedback

Gipps (2005) claims three main reasons for the adoption of information communication technology (ICT) based assessment - to avoid a disjunction between teaching and assessment modes with e-based learning (a validity issue; Gipps 2005:174); to save staff time in marking (an efficiency issue Gipps 2005:175); and to enable successful delivery of formative feedback to students (a pedagogic issue Gipps 2005:174-5). However, Gipps cautions that while there are many developments in automated marking, which are appropriate for simple assessment tasks (for example embedded assessments Kleeman, Shepherd and Phaup 2011), complex marking needs to be made by human assessment, where assessment technology needs to match teaching and learning technology (Gipps 2005:179). Barker and Bennett (2011) trialled marking complex assignments using peer assessment with an Electronic Voting System and an automated feedback tool (in the computer programming field) to conclude that feedback was fast, efficient, useful and high quality, and that tutors’ marking time was reduced by 30% compared with in previous years when tutors marked theory and documentation using an automated feedback tool.

Locating research evaluating complex marking and complex feedback in our cognate fields was our starting point to evaluate the capacity of digital online assessment and feedback towards improving students’ learning outcomes.

In architectural design or engineering (architectural) the evaluation of anonymous online peer feedback in a group learning environment was discussed in Tucker (2007) who determined that these techniques were a successful method of providing continuous assessment and quality feedback. Chung, Shen, Leung, Hao, Hills, Fox and Zhou (2005) found that undergraduate students studying construction technology were advantaged by a blended learning environment (although not in examination results), and we extrapolated from their findings that adopting a blended learning approach to feedback may allow such students to combine the immediacy of modes of digital feedback without compromising the value of face-to-face learning. The key point of Chung et al (2005) would be that digital learning supplements face-to-face learning, and possibly feedback – not supplants it. Liu and Cheng (2008) concluded that for the desirable immediacy of feedback communication the feedback interface must permit reciprocal communication between students, as well as between staff and student(s). We adopted this principle in the designing
of ShowOff (see below). Mortera-Guitierrez (2005:5) concurred concerning immediacy, stating that “best teaching practices” included giving “feedback as soon as possible... motivate students.” We found that trialling audio-feedback to enhance immediacy of feedback, and thence satisfaction with feedback, was of benefit to students. Park (2011) also found in blended design teaching connectivity and freedom of accessibility was highlighted, as was immediacy of feedback. He restricted his communication to use of Discussion Board. We also adopted Discussion Board from 2001-2012, from the infancy of LMS adoption. We have used it most successfully latterly for continuing conversation after lectures and tutorials through Discussion Board Muddiest Point conversations (Angelo and Cross 1993).

Kvan and Yung (2005) made clear the requirement for learning choice in the architectural design studio to best accommodate students’ different learning styles. We extrapolated that the implementation of blended modes of feedback may best take into account students’ differing learning styles. Liu, Hodgson and Lord (2010:100) concluded that the “[E]xpectation of learners for online interactivity means that learner control of the environment with active communication to provide feedback is essential”. We argue that creating digital artefacts of feedback (such as digital audio recordings and digital feedback – see below) can complement face-to-face feedback, provide active communication and hand back control to the learner for when and where to receive that feedback. Reffat (2007-49) evaluated a bespoke multi-user, real time 3D virtual design environment platform “Activeworlds”, in which all architectural designing and evaluating takes place without physical co-location being an imperative. Reffat concluded that the collaborative immersive environment improved students’ motivation and fostered online critique, helping “students to improve design reflection and moving into new directions”. We concurred that any online design and critique environment which placed students’ judgement of their own and peers’ designs at its centre, scaffolded students’ learning and developed graduate attributes of self-judgement, and self and peer critique. Encouragement for students and staff to embrace new technologies to enhance independent learning and investigation is present in this blended learning studio environment (Tsai 2011). This differs from the physical studio-centred mode of learning with a potential for over-reliance upon studio teachers to direct learning (Ledewitz 1985).

1.2 Case studies in audio feedback

In 2007 ‘audio feedback’ was introduced at University of Adelaide, School of Architecture, Landscape Architecture and Urban Design in the level 1, undergraduate course Construction & Design to deliver time-efficient way meaningful individual feedback to 120+ students in early (formative) assessments. The nature of the assessment work was large graphic posters with physical models which were exhibited in gallery spaces. Students presented their work in oral presentations to their tutor and tutorial group (approximately 20 people) and received immediate verbal comment (feedback) from the tutor and peers. After the conclusion of the oral presentations the tutor and course coordinator (without the students present) examined each student’s submission (poster and model) and made a 2-3 minute audio recording of their discussion with relation to pre-stated assessment criteria. The audio recordings were posted on the Blackboard Learning Management System (LMS). Grades were not revealed in the audio feedback. Students were encouraged to listen to the feedback of other work as well as their own. Grades were posted separately on the LMS. Using this method, the turn-around time for the delivery of grades and meaningful formative feedback was within one week. The audio feedback was comprehensive - it delivered far more than could be written in an equivalent timeframe. The audio feedback was delivered in context (capturing verbal expression). Students reported they not only listened, but listened again and again: previously they had rarely bothered to collect the hand-written feedback.

The research method used for the study of students’ satisfaction with feedback was a comparison between the satisfaction with feedback in successive delivery of the courses (2006 – 2010) which either adopted or did not adopt audio feedback. Rotheram (2007) reported student and staff satisfaction with audio-feedback for summative feedback on a (cognitively unrelated) postgraduate program. Student stated benefits were that the feedback was more extensive, clearer, more personal and easily accessible. Staff said they saved time by speaking instead of writing. McCormack and Taylor (2006) reported that for graphic design students receiving audio-feedback in lieu of face-to-face critiques helped them to learn through its privacy, immediacy, convenience and accessibility and the opportunity to re-listen. Convenience, creating a comfortable feedback environment and time saving were listed by teachers. However, the teachers also reported that not being able to see the student’s response to feedback was a disadvantage, as was the expectation for a wider design critique vocabulary and a higher level of competence and confidence to use audio-feedback constructively.

In Construction & Design 2007 the post-course SELT revealed 94% BA from students that they received adequate feedback on their work. This approach was again used in the 2008 and 2009 deliveries of the same course. The high BA satisfaction with feedback was retained at 83% in 2008 and 78% in 2009. This approach was not adopted by the Course Coordinator in 2010 and the BA satisfaction with feedback adequacy dropped to 58%. Using Analysis of Variance (ANOVA) to test for differences in the mean Likert scores for the question ‘I receive adequate feedback on my work’ (Table 2), a highly significant result (F =27.181, p<0.01) was found indicating that the feedback was perceived to be significantly better when the audio method was used. The audio-feedback method was most likely to have improved the feedback satisfaction.

In pursuit of further student learning benefits through receiving adequate and timely audio feedback, the method was utilised by the same Course Coordinator in a 2008 elective course, BamZoo, where the curriculum was structured around a design/bamboo-build immersion experience at the Adelaide Zoo. In this course a percentage of the cohort (level 2) had already been exposed to audio-feedback, whereas other classmates (level 3 students) had not.

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experienced audio-feedback. Students, captivated by the immediacy and quality of the audio feedback, prompted one level 3 student to assert "...audio feedback is a great idea. It's easily the most useful feedback I've ever received."

### Table 2: Student satisfaction with feedback adequacy in Construction & Design

<table>
<thead>
<tr>
<th>QUESTION: I receive adequate feedback on my work</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of students in course:</td>
<td>95</td>
<td>102</td>
<td>131</td>
<td>159</td>
<td>186</td>
</tr>
<tr>
<td>Number of respondents to survey:</td>
<td>60</td>
<td>66</td>
<td>88</td>
<td>82</td>
<td>132</td>
</tr>
<tr>
<td>Broad Agreement (Likert 5-7):</td>
<td>62%</td>
<td>94%</td>
<td>83%</td>
<td>78%</td>
<td>58%</td>
</tr>
<tr>
<td>Likert Scale (Mean Response):</td>
<td>4.6</td>
<td>6.0</td>
<td>5.6</td>
<td>5.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Standard Deviation:</td>
<td>1.4</td>
<td>1.0</td>
<td>1.3</td>
<td>1.4</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Audio feedback was also utilised in the 2012 Master of Landscape Architecture, Master of Architecture final year research skills course Research Seminar A (RSA), by one tutor amongst five. Audio recording was utilised to record the peer and tutor conversation around a piece of research plan writing, which evolved weekly over six weeks from 100 words to 2500 words. As students progress through their studies toward graduation the reliance on peer feedback needs to be more profound. The audio recording provided a valuable opportunity for formative feedback, contributing to reflection which in turn develops competency and confidence in self-judgement, a graduate attribute.

The research method used for the study of students’ satisfaction with feedback was a comparison between feedback delivery to one tutorial group using audio feedback, and the whole of the RSA cohort’s BA satisfaction with feedback.

Broad SELT agreement of 67% for satisfaction with feedback was received over the whole RSA class, with students stating that receiving feedback face-to-face was valuable, but not useful when received on the same day that they submitted their next progressively written research feedback. Feedback received too late performs only a summative role. One hundred percent of the students who participated in, and evaluated the tutorial where audio feedback was utilised said that they had received useful feedback, and described the feedback as exceptional, valuable, clear, easy to follow up; stating “voice recordings of discussion [which] made it easy to follow up when needed”. The ability to receive one’s feedback delivered face-to-face in a seminar group, with all other students also discussing the unfolding research proposal weekly, enhanced by the capacity to listen again to the feedback, as an audio file posted on the LMS immediately, raised the student feedback evaluation from two-thirds satisfaction to 100% satisfaction.

Staff satisfaction with audio feedback over these three courses was also high; staff mentioning consistency of adoption of assessment criteria being aided by the recorded conversations conducted between each tutor and the course coordinator, as assessment criteria were explicitly addressed in the recording protocol. Tutors perceived a key gain for students was the capacity to listen to feedback about work submitted both from their own tutorial and other tutorial groups whilst the work was visible on ShowOff (see below). Students were able to view all peer projects (on ShowOff) and access all audio feedback in relation to all projects. Tutors expressed doubt that during presentation sessions students were sufficiently attentive to internalise and generalise from any broad feedback (possibly including their own). The availability of the audio recordings made it possible for students to revisit and absorb the information at a less stressful time (Anthony 1991). For tutors themselves, generally sessional staff, the benefits of quickly producing quality feedback without having to move presentation material to their office or home, was efficient.

### 1.3 ShowOff: a digital tool for display and feedback

In 2007 at the University of Adelaide it was apparent that students’ increasing engagement with digital means of production needed to be met with concomitant engagement with digital methods to submit, review, display, and view own and peers’ submissions, and submit and receive critique from peers and academic staff, and grades. As Meyen, Aust, Bui and Isaacson (2002, in Pombo, Loureiro and Moreira 2010:219) implore:

...evaluation and assessment strategies should take into account the specificity of the communication media in use, as new technology allows frequent and varied assessment strategies, which are more possible in online distance education, as compared to traditional learning environments.

No available online tools exhibited all desirable capabilities for architectural design and engineering (architectural) students’ studies. Thus it was decided to modify the open source ‘Moodle’ to create the ideal submission, feedback, grading and critique environment, digitally analogous to a traditional display room offering pin up space, and the opportunity for face-to-face encounter with peers and academic staff proffering critique. We have termed this tool ShowOff. It allows students to browse work of any digital type to a timed database. Academic staff moderators can select parameters for student exhibition and comment including students’:

- ability to view peer work prior to their own submission,
- participation in asynchronous peer and self-assessment either as a ‘forced’ activity prior to staff assessment, or not,
- receiving a variety of grading and feedback options,
- capacity to view only their own grade and feedback comments, or view the feedback comments for all students, and possibly their classmates’ grade(s),
- variable visibility of peer assessment feedback, either for the sole viewing of the peer and themselves (as well as staff) or for all the class.

The research method used for the study of students’ satisfaction with feedback was a comparison between the delivery of the courses (2007 – 2011) which either utilised or did not utilise ShowOff. Content and staff were stable.

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Initially, in 2008 and 2009, ShowOff was utilised in Human Environments, a level 1 six unit compulsory course, for student submission alone, or student submission and staff feedback, critique and grading. Harnessing the peer critique capacities designed into the ShowOff interface in 2010 and 2011 resulted in students receiving more feedback from more people. There was an added benefit that students applied that critical lens of peer reviewer to their own submissions with fore-knowledge of which assessment criteria would be applied by peers to their own work: thus the peer review on ShowOff contributed to scaffolding learning about developing sound design judgement. Despite increasing class size, and decreasing capacity to deliver quality face-to-face feedback in a resource-constrained teaching environment (Shannon & Francis 2012) there was a significant jump in student satisfaction with feedback from 2008 to 2011. Using ANOVA the statistical significance was F= 6.327 and P<0.01. The 2010 76% and 2011 80% student satisfaction with feedback was concurrent with the introduction of digital peer feedback through ShowOff. In the open ended SELT students referred to the directness or immediacy of feedback from peers through ShowOff as being of learning benefit to them. Academic staff contributed their feedback on ShowOff to support, question, or disagree with peer feedback to a debatably better informed student. De-sensitising students to the ‘fear factor’ of feedback – as they were proffering and receiving feedback weekly was of benefit (Anthony 1991). Preparing to give feedback and phrasing it with the right combination of positivity, critique and redirection may also allow students to experience the process of framing feedback, thus possibly appreciating their own feedback more.

Boyle (2007:96) cautions that cultural differences between students may mean that students “suffer if they do not understand cultural norms relating to the giving of feedback”. A tightly written script to scaffold students’ feedback interactions was devised for use on ShowOff, relating closely to pre-published assessment criteria and steering first year students away from kind but meaningless feedback “I like it”. We would recommend that clear expressions of assessment criteria, and development of class skills to understand and evaluate the satisfactory fulfilment of those criteria are an important step in the development of peer assessment competency (Barker & Bennett 2011).

Table 3: Student satisfaction with feedback adequacy in Human Environments
Level 1, Semester 1, compulsory course (2007 – 2011)

<table>
<thead>
<tr>
<th>QUESTION: I receive adequate feedback on my work</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of students in course:</td>
<td>116</td>
<td>147</td>
<td>173</td>
<td>231</td>
<td>220</td>
</tr>
<tr>
<td>Number of respondents to survey:</td>
<td>116</td>
<td>116</td>
<td>116</td>
<td>116</td>
<td>116</td>
</tr>
<tr>
<td>Likert Scale (Mean Response):</td>
<td>4.4</td>
<td>4.8</td>
<td>4.8</td>
<td>5.3</td>
<td>5.1</td>
</tr>
<tr>
<td>Standard Deviation:</td>
<td>1.4</td>
<td>1.6</td>
<td>1.3</td>
<td>1.2</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Lastly, posting peer and staff feedback online in ShowOff takes feedback from the private realm to the reciprocity of the community-of-practice realm. Here students are supported in their efforts as beginning designers by viewing the designs and feedback which other students receive. Applying their judgement, and knowing that it will be viewed by staff and their peers, as well as the designer, scaffolds studio-like reciprocal behaviour in an online environment.

ShowOff was adopted more broadly in undergraduate and graduate teaching and was received positively by students: “submission to ShowOff is awesome as students would get the chance to view other students’ work and learn from each other, as well as compare the work with each other” (Construction & Design SELT 2009).

Staff reported that ShowOff was easy to learn to operate, being intuitive. It allowed them to evaluate students’ assignments from any internet enabled location. It allowed them to comment easily upon students’ work, and also view peers’ comments and grades. It had the benefit that nothing could be lost, with the assignment, the commentary and the grades closely held in one location.

2. DISCUSSION AND CONCLUSIONS

What is a meaningful way forward for architectural design and engineering (architectural) education with respect to blended online assessment? We have described the use of two forms digital feedback delivered online over successive years with cohorts of students. We have demonstrated that students believed they were significantly benefited in the form, timeliness and content of formative and summative assessment delivered in this mode.

We have shown that formative assessment may best support students’ learning though the delivery of staff, peer and self-evaluation managed through interfaces such as ShowOff. We have shown that meaningful summative assessment extends the impact of studio critique through creating a digital artefact of the feedback session, explicating the critic’s thinking, and providing that critique online, such as through audio files of the critique.

We are concerned that adoption of these techniques is not more widespread. We speculated that one of the major impediments to more prevalent adoption of blended learning methods for proffering formative and summative digital online feedback in the research setting is that the majority of the teaching (including giving feedback) in the Architecture Department and the majority of the marking and feedback given to Engineering (Architectural) students at the University of Adelaide is conducted by sessional staff members. They are often recruited from either the ranks of PhD students as part of their induction to academia, or from practitioners who bring a current practice-based perspective to academia. We explored that limitation in another ASA 2012 paper (Shannon, Francis & Torpey 2012).

Mogey (2010) questions why there is such a low uptake of e-assessment in UK, for summative assessment and concludes that the way forward is possibly through the adoption of “computer barns” where students have individualized examinations (which is physically possible but an unlikely fit with the complex assessment in these cognate fields); or through access to wireless networked computers which facilitate immediate assessments which

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test students’ practical collaborative abilities (once again a poor fit with the individualised nature of complex feedback on students’ design propositions); or most desirably through changing the nature of assessment where assessments are personalized and build on experiences, reflections and diversity of responses. In this way the task questions become trivial and the learning opportunities and capturing student experiences becomes complex. This is the best fit with the needs of students learning in these cognate domains where design process is valued. Mogey (2010) concludes that the key point is that a complete analysis of current methods of assessment is a positive thing to determine whether these methods are in fact the best modes for maximum retention and learning. We would concur.

We would advocate that in the fields of architectural design and engineering (architectural) staff need to evaluate their present forms of feedback and assessment to consider whether there is a (mis)alignment with the modes of learning and teaching used in the curriculum. This misalignment may account for poor student satisfaction with feedback in these fields at a School, University and national level for architecture and engineering students. This assessment and feedback evaluation may also give rise to the trialling and evaluation of the impact of the adoption of some of the alternative modes for digital online feedback and assessment which scholars have piloted, including the use of digital audio-feedback delivered online, and ShowOff or similar systems for display, critique and assessment.

The limitations to the study include that it was conducted at one (research) University, in a small range of courses from four Degree Programs, for students studying either design studies, architecture, landscape architecture or engineering (architectural), and delivered by limited number of course coordinators, over a five year period. Thus the results cannot be generalised, but recommendations for adoption elsewhere based on the experiences of staff, and evaluation of students in these courses, are valuable.

3. RECOMMENDATIONS FOR THE DELIVERY OF BLENDED FEEDBACK AND ASSESSMENT

- That staff explicate the development of ‘design process’, not solely development of ‘artefact’ (and the role of feedback therein,) takes place during the continuous feedback associated with formative stages of complex work.
- That clear expressions of assessment criteria, and development of class skills to understand and evaluate the satisfactory fulfilment of those criteria are an important step in the development of peer assessment competency.
- That staff align the mode(s) of feedback to the stage (formative / summative) and nature (simple / complex) of the assessment task.
- That staff align formative and summative modes of feedback and assessment with the modes of learning content delivery and execution, to avoid a disconnect (Gipps 2005, 173).
- That staff structure feedback given by staff, peers and self (student) to segue from staff-led to self-directed across the term of each course and as they progress through their tertiary studies, and that staff explicate this process.
- That posting students’ designs, as well as the associated feedback and assessment online as a digital artefact, tightly bound with the design, takes feedback from the private realm to a community of practice realm.
- That staff seek opportunities for students to apply their judgement, knowing that it will be viewed by staff and their peers, as well as the designer, to scaffold studio-like reciprocal behaviour in an online environment.
- That feedback and grading are delivered in multiple ways to suit student’s learning styles (Kvan & Yungan 2005)

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REFERENCES


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