Assessing architectural design processes of diverse learners

Philip Crowther
School of Design, Queensland University of Technology, p.crowther@qut.edu.au

Given that what students learn is so strongly related to how they learn, the modes of delivery and assessment that we as teachers provide them with have a major impact on their ability to learn. As this paper shows, good learning environments are constructed from a range of modes that respond to student learning styles and seek to align activities and learning outcomes with assessment tasks, to better accommodate a diversity of student learning styles and backgrounds. This paper uses a number of models of learning to critique and analyse the traditional practices of assessment in an architectural design class, and then proposes and reports on an alternative pattern of assessment. It discusses the issues of accommodating a group of first-year architecture students at Queensland University of Technology in 2009. These students arrived with diverse prior learning backgrounds, the group being evenly split between those with drawing capabilities and those without. They also had a variety of learning style preferences. The experiment in alternative assessment patterns presented here shows that what has traditionally been considered a diverse and difficult cohort of students can benefit from the assessment of a range of task types at different stages in the learning cycle.

**Keywords:** assessment; design; diversity; first year; variety.

**Introduction**

Architectural education has a long history – as long as the profession itself – which has developed from an apprenticeship model of education. Indeed it is still a requirement in most countries that a student or recent graduate (apprentice) be employed by a practising architect (master) for a period of two years before being eligible to become a registered architect. This historic relationship of student and teacher bears heavily on the way in which contemporary architectural education has developed. In particular, the studio or atelier is still the dominant mode of engagement, and within contemporary universities can be considered something of a unique learning environment (Glasser, 2000; Stevens 1998). This learning environment is, however, being questioned. In light of significant changes in society, in the professional practice of architecture and in higher education, the need to review and amend this learning environment and its assessment practices is becoming a major challenge.

A design studio seeks to create an environment in which students work on individual design projects while tutors move from student to student, offering formative feedback on the projects and reviewing the work in progress as illustrated by a set of architectural drawings and models. These design projects are themselves the assessment tasks, traditionally assessed at the end of the process. This model attempts to replicate some aspects of the activities and relationships of a professional practice office (Nicol & Pilling, 2000, p. 8); it does not, however, replicate good learning practice.

First-year students in architecture programs arrive with a diverse range of skills and knowledge, as in many cases – including at Queensland University of Technology – there are no prerequisite high-school subjects. Although knowledge of art and of technical drawing are considered desirable, they are not required. Students are typically split fairly evenly between those with both, one or neither of these backgrounds. While the first-year curriculum has a substantial focus on drawing skills, it also seeks to develop an understanding of the processes of architectural design. Unfortunately the nature of the design project as a learning activity and assessment task has long favoured students with an ability to communicate well visually, through drawing. This often makes it difficult for students with no background in drawing to communicate what may be well developed understandings of architectural design.
As an alternative to the traditional end-of-project assessment model, this paper reports on a group of 364 first-year architecture students studying at Queensland University of Technology in 2009, whose performance and learning were assessed using a range of assessment tasks that sought to accommodate their diversity of backgrounds and of learning styles.

**Studio learning and critiques**

Within the design studio learning environment, the dominant learning strategy used by nearly all architecture schools is semi-structured experiential learning, in particular, the “project” (Delahaye, 2005, pp. 308-312). The way in which most teachers build their learning environments also includes some aspects of the strategy of problem-based learning (pp. 324–326), in which solutions to a ‘problem’ are assessed on completion of the project. Such solutions typically take the form of a set of architectural drawings.

There is, however, a significant problem with this mode of delivery and assessment. This learning environment and the associated assessment are no longer consistent with contemporary professional practice, nor the contemporary higher education context, with its greater diversity of commencing students. The environment of the studio, with its associated ‘critique’ (the jury-like system of presenting and assessing design projects), is not a successful learning environment, and replicates a very poor and outdated model of professional practice. It favours a certain type of student and is no longer aligned with the expectations of students or the needs of society (Milliner, 2000).

When the editors of *Architectural Record*, one of the leading architecture journals in the US, conducted a survey in 1999 to canvass views from professional practitioners and academics on critical issues facing architectural education, the topics of the studio and the critique prompted strong responses. In reviewing the critique, one respondent noted that “the jury system of evaluating design work in schools of architecture is abusive, undermines teamwork, and should be reconsidered” (Mitgang, 1999, p. 4). Most disturbing are the comments that seek to justify the abusive nature of this mode of education by likening it to professional practice: “We’ve seen bullying, but you see that in the real world”, and “I don’t think it’s any more abusive than real life”. These comments suggest that some see education’s role as being to prepare students for the realities of professional practice as they experienced it, rather than to challenge professional practice or even to develop a new culture of professional practice more appropriate to the 21st century.

Webster’s (2006; 2007) analysis of the design studio and jury review (critique) system uses Michel Foucault’s writings on power and his references to educational institutions as sites for the creation of the modern subject. She describes how architectural education can be seen to employ the “microtechnologies of power” to socialise and acculturate students into becoming architects (2007, p. 21). She sees this dominant mode of education as a “critic-centred event that coerces students into conforming to hegemonic notions of habitus” and as “profoundly de-motivating and competitive” (2006, pp. 286-287). Webster is just one of many researchers and academics (see also White, 2000; Brindley, Doidge, & Willmott, 2000; Wilkin, 2000) who have analysed the systems of architectural education and assessment and found them lacking as learning environments, especially for first-year students who are thrust into such systems with no prior comparable experiences. As Mitgang (1999, p. 4) argues, “It’s a very incomplete system of education” which fails to recognise or accommodate a diverse range of students.

**Purpose of assessment**

While numerous purposes of assessment can be established (Nicholls, 2002, p. 106), these can be seen to fall primarily into two categories: providing feedback and motivation to students with respect to their performance, and providing certification of achieved standards (usually in the form of grades) for accountability and accreditation reasons (Brown, 1999, p. 6). These might in turn be classified as formative and summative purposes of assessment. From the student’s point of view it is clear that assessment sends a message to the student about what is considered important, what standards are expected and how much work is required. It is therefore vital that assessment also becomes part of the learning experience itself, not just an additional activity for testing purposes (Ramsden, 2003). If assessment is to be used to aid deep learning it needs to be aligned with the learning objectives of the relevant
unit (p. 182). Assessment solely at the end of an architecture project, conducted in the form of confrontational critique, is not thus aligned.

Alignment of assessment with learning objectives

Biggs notes that “when curriculum and assessment methods are aligned, the results of instructions are massively improved” (1996, p. 350). Many traditional forms of assessment, including design project critiques, frequently end up testing a limited range of skills, knowledge rather than ability, and products rather than processes (Brown, 1999, p. 7). Assessment needs to be more broadly integrated into the activities and learning tasks of the unit, and into the developmental processes of the students’ learning (Nicholls, 2002, p. 108). It is in fact the learning objectives that need to be assessed, as processes, and as such the assessment methods must align with those objectives (Brown, 1999, pp. 5-9).

The curriculum development project described in this paper adopted a range of approaches, with particular focus on the cognitive approach (Toohey, 1999, p. 55-59). This provides “opportunities for students to engage in active processing and questioning of ideas, and practice thinking skills” (p. 58) – the kind of thinking that leads to learning (Sale, 2001). The aim of this approach is that students will “actively construct ideas and generate meaning from sensory input by interpreting the input on the basis of previous experience” (Posner, in Toohey, 1999, p. 55). Such previous experience is, however, obviously not always present in first-year students. With this in mind, this project established a process to accommodate a diversity of prior learning experiences through a range of activities and assessment tasks. It attempted to assess knowledge of architectural design though a number of modes not exclusively reliant on students’ existing skills in drawing.

Learning styles and cycles

Obviously, different modes of delivery and assessment also favour different personal learning styles (Atherton, 2005; Mason, n.d.). Robotham (in Hagel & Shaw, 2006, p. 228) notes that “students may also perceive greater learning benefits when there is a match between their preferred learning style and their study mode”. Table 1 shows the relationships between different learning styles and the seven steps in an architectural design project. We can see that different types of learners benefit from different steps of the project. As such, the traditional approach of assessing an architectural design, as communicated through a set of drawings, at the conclusion of a project, favours not only students with prior learning in the skills of drawing but also certain styles of learner (for example, Assimilators and Theorists).
### Table 1: Project steps, the learning cycle and learning styles

<table>
<thead>
<tr>
<th>Seven steps in an architectural design project</th>
<th>Stage of the learning cycle</th>
<th>Learning style</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Delahaye, 2005, p. 310)</td>
<td></td>
<td>(Kolb, in Delahaye, 2005, p. 262-263)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Learning style questionnaire (Honey &amp; Mumford, 1992, p. 4)</td>
</tr>
<tr>
<td>1 Definition of project: exploration of issues and design possibilities, generation of ideas</td>
<td>1 Have an experience</td>
<td>Accommodator/Activist</td>
</tr>
<tr>
<td>2 Critique and analysis</td>
<td></td>
<td>“Take in information by concrete experience and transform it by active experimentation (Kolb)”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Involve themselves in new experiences (Honey &amp; Mumford)”</td>
</tr>
<tr>
<td>3 Review of theories and concepts: testing of possibilities</td>
<td>2 Review the experience</td>
<td>Diverger/Reflector</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Take in information by concrete experience and transform that information by reflective observation (Kolb)”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“View a situation from many perspectives (Honey &amp; Mumford)”</td>
</tr>
<tr>
<td>4 Critical thinking: synthesis of results and communication of solutions</td>
<td>3 Conclude from the experience</td>
<td>Assimilator/Theorist</td>
</tr>
<tr>
<td>5 Analysis: discussion and communication</td>
<td></td>
<td>“Take in information by abstract conceptualisation and transform that information by reflective observation (Kolb)”</td>
</tr>
<tr>
<td>6 Repeat of steps 1–5: critique of results for further iterations</td>
<td>4 Plan the next steps</td>
<td>Converger/Pragmatist</td>
</tr>
<tr>
<td>7 Report on findings or solutions</td>
<td></td>
<td>“Take in information by abstract conceptualisation and transform that information by active experimentation (Kolb)”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Prefer technical tasks and problems (Honey &amp; Mumford)”</td>
</tr>
</tbody>
</table>

The curriculum development project described in this paper uses a variety of learning experiences in addition to the traditional critique at the conclusion of a design project, in order to engage students with a variety of learning styles. The learning experience described here offers a range of activities and integrates of lectures, case studies, experiments and design projects to provide experiences at all four stages of the learning cycle (Honey & Mumford, 1992) and to accommodate all four learning styles (Kolb, in Delahaye, 2005, p. 262-263).
Conversational frameworks and learning strategies

As well as the learning cycle described above, there are other models that seek to explain stages or activities in the experience of learning. Laurillard (1997; 2002) has explored the complexity of learning through her “conversational framework”, in which she identifies 12 activities necessary to complete the learning process (see Figure 1). Laurillard (2008) has proposed that this framework may be used to both design and test learning activities for optimal learning experience and it has indeed previously been used to analyse the communication activities of an architectural design studio (Crowther, 2007). In that exploration, the in-class activities of drawing were mapped against the activities of the framework in order to expose their nature and their role in the overall conversation between student and teacher. That analysis provided deeper understanding of those activities as forms of visual communication: the activities of drawing provided an illustrated dialogue rather than a verbal one. That research also highlighted some of the problems of dealing with students from diverse backgrounds with a range of prior capabilities in drawing and visual communication.

Figure 1: The conversational framework (adapted from Laurillard, 2002, p. 87)

The assessment activities of a learning environment can be mapped against the interactions of Laurillard’s conversational framework. All interactions must be present to achieve a “complete learning process” (Laurillard, 2008, p. 142). Laurillard proposes that a combination of types of activities is usually required to address the full conversational framework, and that the sequence of learning activities needs to incorporate all of these types of affordances/conversations if it is to be successful (1997, p. 174-175). This is especially the case with diverse groups of learners.

We can see that the traditional assessment activity of the end-of-project critique is flawed not only in its abusive and confrontational nature but also in its limiting of conversational activities – especially for first-year students with little or no prior experience to build on. This method of assessment really only addresses the student’s ‘modified actions’ (activity 9) in Laurillard’s model. What follows here is a variation of the process of assessment for optimal learning.
Case study: an alternative assessment strategy

Efforts at trialling an alternative assessment environment to the traditional end-of-project critique led to the use of a form of learning journal in which students record, using text, images and other forms of expression, the weekly development of their proposed designs and, more importantly, their critical reflections in light of discussions with tutors and their peers.

If we want to assess the process of learning rather than just the product, and to assess this process at multiple points of the conversational framework, then we need evidence of the process (gathered during the semester), not just of the product (gathered at the end). Brown, Rust, & Gibbs (1994, p. 28-30) suggest several strategies for obtaining such “evidence of process”, including laboratory reports and portfolios. The curriculum development project described here used a form of laboratory report (a reflective learning journal, diary or log book) to record and report on a design project. As well as being a very good form of authentic assessment, “project work also provides a good opportunity for students to engage in divergent – as opposed to convergent – thinking” (Rowntree, in Light & Cox, 2001, p. 179). It is also a good form of learning through doing (Sale, 2001). Using project work for assessment thus has the advantage of being, in itself, a good learning activity (Toohey, 1999, p. 182). While a design project can be useful in developing critical thinking and meta-abilities, much of the learning actually takes place outside the classroom. Delahaye (2005, p. 310), writing in the educational context of adult training, advocates some form of recording reflection for learning and assessment. In the curriculum example being discussed here, a learning journal, as well as encouraging deep reflection, ensures that the process by which the product (design project) was achieved can be assessed (Toohey, 1999, p. 182).

If we think of assessment as an opportunity for students to demonstrate how much they have learnt (Ramsden, 2003, p. 185), then the use of some form of learning journal is clearly a good idea. In many architecture units it is traditional for some form of design portfolio to be used to provide evidence of the student’s learning over the course of the semester (Webster, 2007). Such a portfolio, when appropriately used to document the student’s thinking processes, is actually more akin to a learning journal, but it is seldom used as an assessment item in its own right to cover the full diversity of activities in a rigorous manner. More often it simply supplements the concluding drawings of the architectural project.

The learning value of using some form of incremental journal for weekly reflection is widely acknowledged (Brown, 1999, p. 11; Kingsland, 1996; Pavlovich, 2007). As Biggs argues (2003, p. 188), “The reflective journal is especially useful for assessing content knowledge, reflection, professional judgement and application” and offers “evidence of quality in thinking”. It is precisely because a learning journal provides such ‘evidence of process’ that it is so useful for assessment purposes (Toohey, 1999, p. 176). “The journal encourages students to engage in self-reflection and provides … evidence that they do so” (Lovie-Kitchin, 2001, p. 153).

In this case, students had the choice of using text, images, diagrams, creative expression, critical analysis or any other mode of representation that could be recorded physically in their learning journal. Thus the learning journal provided them with the opportunity to choose how they wanted to express what and how much they had learnt. In this way they could use their diverse prior learning skills, rather than being expected to rely solely on drawing capabilities. While this choice accommodated a diversity of student backgrounds, it also helped in the development of independent learning capabilities (Kift & Moody, 2009). The learning journal, as an extension of the learning strategy of the project, further encouraged the students to “reflect deeply on the experience” (Delahaye, 2005, p. 310).
Structuring alternative assessment

To ensure that the learning journal was used to assess a range of capabilities at different stages of the learning cycle, it was structured using Laurillard’s conversational framework. While such learning journals have been used in the past, it is the way that this example was structured for assessment using the conversational framework that is of interest.

Table 2 shows how the seven steps of a learning project (in this case, an architectural design project) can be mapped to the activities of Laurillard’s conversational framework. In most traditional design studios it is the seventh step of producing the report (an architectural design) and presenting it (through the ‘critique’) that is assessed. Table 2, however, highlights all of the activities of the student’s conceptions and actions. It is at all of these points that a diverse assessment pattern should assess the student’s learning. This therefore becomes the structure by which the requirements of the student’s learning journal are established: the journal must provide an opportunity to assess each of these activities at the relevant stage(s) of the project.

**Table 2: Project steps mapped to the 12 activities of a conversational framework**

<table>
<thead>
<tr>
<th>Seven steps in a successful learning project (Delahaye, 2005, p. 310)</th>
<th>‘Activities’ from Laurillard’s conversational framework (Laurillard, 2002)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Explicitly define project</td>
<td>1 Theory, ideas</td>
</tr>
<tr>
<td>2 Visit the work situation, review context and stakeholders</td>
<td>6 Teacher sets goal</td>
</tr>
<tr>
<td>3 Review theories and concepts</td>
<td>10 Adaptation of actions in light of theory, goal and feedback</td>
</tr>
<tr>
<td>4 Critical thinking and critical reflection</td>
<td>11 Reflection on concept in light of experience</td>
</tr>
<tr>
<td>5 Discuss with teacher and students</td>
<td>2 Conceptions</td>
</tr>
<tr>
<td>6 Repeat steps 1–5 (in any order)</td>
<td>7 Student’s action</td>
</tr>
<tr>
<td>7 Produce report</td>
<td>8 Feedback</td>
</tr>
<tr>
<td></td>
<td>9 Student’s modified action</td>
</tr>
<tr>
<td></td>
<td>(12 Reflection on student’s action to modify descriptions)</td>
</tr>
<tr>
<td></td>
<td>(5 Adaptation of task goal in light of student’s description)</td>
</tr>
</tbody>
</table>

This analysis of the learning activities for an architectural project shows that all of the activities of a conversational framework are occurring. What we can also see is that in a traditional critique-style assessment, only step seven (activity 9 in Laurillard’s conversational framework) is assessed at the completion of the project. The use of a learning journal, however, can allow assessment to be made, if appropriately structured, at all steps of the project (activities 10, 11, 2, 7, 4 and 9 in the conversational framework). In this way it more fully represents the multiple stages of learning. As already shown, different steps in the project favour different learning styles and different prior capabilities.

In this project, the students were directed to respond to their design project on a weekly basis by recording their thoughts in the form of text, diagrams, illustrations, collage and ‘traditional’ drawings. Such specific recordings at
each of the steps of the project highlighted the development of students’ thinking between journal entries. Each entry asked for representations of the student’s conceptions (activities 2 and 4), reflections (activity 11) and actions (activities 7, 9 and 10), but allowed the student to choose how they would represent these. In this way a more complete picture of students’ learning could be assessed, without undue focus on drawing skills or final critiques. Conceptions and reflections could be given as much attention and focus within the assessment design as the student’s actions.

**Evaluation**

The success of the learning journal as a more holistic type of assessment design can be gauged by means of three measures: student feedback, staff feedback and learning outcomes (standard of student work), each of which in this case yielded positive results. Student feedback is a normal part of evaluation and curriculum development, as is reviewing the quality of student learning outcomes through assignment work. For this project, however, feedback was also specifically sought from teaching staff to supplement these other sources.

Anonymous student feedback on the unit was collected at the end of semester through a University-facilitated online system. Out of a class of 364 students, 42 per cent responded. Of those, 94.2 per cent reported being ‘satisfied’ with the assessment tasks – well above the University average of 85 per cent. The subject scored a favourable overall rating of 4.1 on a 5-point scale; the University average was 3.6. This numerical data was supported by anonymous comments from the same survey:

“Planning the entire semester evaluation as a continuous whole works well.”

“The weekly tasks help to build upon knowledge at a manageable rate.”

“I like the assessment item of the log-book; something to keep forever to refer back to.”

“I enjoyed it and the fact that there’s no exam [critique] at the end made it less stressful and we could enjoy learning.”

Teaching staff, most of whom had taught in previous years, were similarly supportive of the continuous assessment pattern, commenting that the learning journal not only motivated students to continuously engage with design activities but also offered staff a more holistic picture of the students’ learning, irrespective of their prior learning or their drawing capabilities. Previous research (Crowther, 2007) has shown that drawing operates in the architectural design studio as a mode of conversation, and that students with less developed drawing skills may be disadvantaged in that conversation. The learning journal offered a structured pattern of assessment that was less reliant on traditional drawing skills and facilitated and assessed the visual conversation at a range of stages. Staff were also positive about the overall learning outcomes of the students, noting a more consistent level of development across the cohort.

This particular cohort of students (n = 364) was surveyed at the start of their studies to record their prior learning in the areas of art and technical drawing. Data collected in that survey allowed comparison of students who had studied art or technical drawing at school with those who had not. A comparison of the overall achievement of students revealed that on average students who had studied art to senior level at school received just 2.5 per cent higher grades than those who had not. While there is, unfortunately, no such quantitative data for the preceding cohorts with which to compare this performance difference, it is anecdotally less than in previous years. This small variation in achievement in such a diverse cohort suggests that the new assessment pattern is indeed assessing a range of activities and conceptions of these commencing students, rather than favouring visual communication skills.

**Conclusion**

This paper has shown how a diverse assessment design can accommodate a diverse group of students with a diverse range of prior learning experiences. It has also shown how Laurillard’s conversational framework can be used to interrogate the assessment regime, map the activities and tasks against the affordances of the conversational framework and, thereby, develop a more complete and holistic assessment pattern. Project learning activities – in particular, the architectural design project – offer a good environment for learning, one in which all of the activities
of ‘conversational learning’ may occur. However, traditional design studios fall short of taking full advantage of this by focusing assessment at the conclusion of the ‘conversation’, a strategy that favours some students over others. Here we have shown how it is possible to assess at multiple point of the conversation through a range of modes and thereby enhances the learning of diverse students.

References


