Towards the improvement of the student experience of assessment and feedback in construction management education

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It is widely accepted across Higher Education that assessment practices have a link with learning and a key factor in this link is formative assessment. Formative assessment is generally defined as taking place during a module/programme with the express purpose of improving and enhancing student learning. It is important to understand how lecturers in construction engineering education perceive their own roles and the roles of their students in using effective assessment strategies. An investigation into lecturers’ perceptions of their roles and their conceptions related to the assessment process of students in those programmes is reported. An on-line survey was conducted with over 30 Irish academics involved in the area of construction management. Discussion is focused on a critical evaluation of the findings of the study and how it relates to the current literature on the roles of academics in the formative assessment process. Recommendations are made on how lecturers/teachers might better formulate appropriate assessment strategies that will encourage deep and effective learning.

Keywords: construction management; formative assessment; academic practice

Introduction

In Higher Education (HE), assessment practices and processes have been the topic of wide ranging conversation over the last 15 years (Bryan and Clegg 2006). Academic discourse about the current state of assessment often refers to unease as to its suitability for the twenty-first century and the need for it to be ‘fit for purpose’ (Brown 2004). Knight (2002) posits the view of ‘practices in disarray’ where assessment has become a site of conflict, even a power struggle, founded on the unequal relationship between the two parties (student and institution). This disarray does not only pertain to HE in Ireland and the UK; such discourse has also taken place in the USA and beyond (Banta et al. 2000). It is argued that an in-built lack of clarity in the methods of assessment used to convey judgment on performance is an underlying factor. Assessment in the discipline of construction management (CM), like other disciplines, is required to fulfil a multiplicity of purposes and play many different and often conflicting roles. The provision and embedding of opportunities for assessment to aid learners in more formative ways has been highlighted as currently failing students (Struyven, Dochy, and Janssens 2005). In the context of construction-related undergraduate programmes, this paper discusses the need for a project
to research formative assessment in the context of the changing HE educational environment. An overall mixed methodology approach to research and signpost improvements in the quality of student learning in undergraduate programmes through the assessment process are proposed. This paper reports on the study so far, where seminal literature is explored to identify, inform and shape the assessment practices of academics. The results of the final phase of the research are presented with an in-depth analysis of the findings of the already completed fourth phase. An analysis is offered of the emerging views and preferences of academics teaching on the identified undergraduate programmes so as to help inform the development of a framework for the formative assessment of CM undergraduates where the enhancement of student learning will underpin the evaluative process.

Finding ways to assess students’ knowledge, skills, and competences has become a central focus of institutional effectiveness around the globe in HE. For example, in the UK, the Quality Assurance Agency for HE has investigated how to develop explicit statements about achievement standards for tertiary graduates that allow for comparisons. Also, members of the Australian Universities Quality Agency have drafted guidelines for developing and monitoring such standards (AUQA 2009). Further, the Assessing HE Outcomes project of the Organisation for Economic Cooperation and Development has endeavoured to pilot measures of generic skills and subject-specific knowledge in engineering and economics in 10 countries (Nusche 2008). Though most agree that it is important to determine what students know and can do by virtue of participation in an academic programme, there are disparate views about how to approach this determination (Banta et al. 2009). For example, much like procedures related to accrediting bodies in the UK and USA. France has created a process under which every programme credential of an HE institution is submitted for review and approval. In Germany, the discussion focuses on students demonstrating knowledge through instrumental competencies, systemic competencies, and communicative competencies. In other countries, such as the Netherlands, student qualifications are tied closely to labour market competencies (Adelman 2008). These differences in approaches and units of analysis lead to confusion regarding faculty (college), school, department, and institutional attempts to evaluate what students know and how they can apply that knowledge. As the focus is on the ‘measurement of learning’ the importance of assessment for learning is lost as the efforts of lecturers/teachers is on complying with institutional procedures around measurement. Given the international focus on student outcomes and the perceived confusion about how we frame and measure those outcomes, the overall purposes of this research enquiry are to:

(1) provide a background and framework for CM professionals that can inform a discussion of student outcomes assessment,
(2) identify ways that academics can delineate and engage student learning through more student-centred approaches,
(3) tie learning outcomes to class work and related module/programme activities, as well as to institutional mission and so create opportunities for formative assessment
(4) maintain a continuous improvement cycle, and
(5) provide best practice examples of the process from different programmes in the fields of Engineering and Built Environment.

**Assessment and learning**

The literature on assessment makes it quite clear that assessment shapes and drives learning in powerful, though not always in helpful ways (Ramsden 1997; Bloxham and Boyd 2007). If students perceive a need to understand material in order to negotiate an assessment task successfully, they will engage in deep learning, but if they perceive the assessment instrument to require regurgitation
and the rote learning of information, they will be unlikely to engage with the higher level outcomes which may well have been intended by the programme of study (Bloxham and Boyd 2007).

Research into formative assessment techniques has pointed to feedback as an essential mechanism in the learning process (Gibbs 2004). Ramaprasad (1983) has defined feedback as information about the gap between actual performance level and the reference level within a student cohort, which is subsequently used to alter that gap. Feedback, therefore, needs to be meaningful, understood and correctly acted upon. Lecturers not only need to give feedback; they should really evaluate how effective that feedback has been in enhancing learning and more particularly in addressing any gaps in learning. In effective practice, formative assessment that allows students to receive meaningful feedback should make a difference in student learning (Black and Wiliam 1998). However, Higgins, Hartley, and Skelton (2002) raise doubts as to what extent this is the actual case in HE today. Higgins, Hartley, and Skelton (2001, 2002) argue that students may recognise the central importance of formative feedback for their educational development, but the way in which they use feedback is not clear. A further difficulty highlighted by Lea and Street (2000) is that in fully modular systems students often do not receive feedback on assessed written work until after they have completed the module.

It is clear from student responses to questions asked during the preliminary phase of this research that summative feedback can have a formative role. On this issue Sadler’s definition of formative feedback, ‘to shape and improve the students’ competence by short-circuiting the randomness and inefficiency of trial and error learning’ is appropriate (Sadler 1989, 120). Indeed, Sadler (1998, 78) suggests that the role of the lecturer could broadly be described as ‘working to reduce the rate of error production in trial and error learning and thereby to make learning more efficient’. In order to do this, the lecturer/teacher needs to have an understanding of the subject and skill-based knowledge along with an understanding of the needs of the learner (Black and Wiliam 1998). The addressing of these two factors, which is a key issue in ensuring students receive meaningful feedback to enhance their learning, is encompassed by this study. This is important as it, in part, defines good teaching (Trigwell 2001).

A difficulty in constructing a meaningful connect to their learning may be found in the diversity of uses employed by students of the feedback they receive. Their diversity of approaches, which can range from reflective practice to a more mechanistic approach, may pose problems for lecturers in their desire to enhance individual student learning. Today, by their actions, it would appear that students are more focused in the time they allocate to their learning and they approach assessment with a better understanding of what is involved in order to successfully complete their required assessments. Bloxham and Boyd (2007) refer to students as ‘being cue conscious concentrating on passing an assessment’. This is not necessarily a positive aspect, but, as academics we must be aware of the approach students are taking. As referred to earlier, Lea and Street (2000) have reported difficulties with institutional procedures like modularity. This research supports those findings concerning students who were unable to benefit from receiving feedback as they found the comments related only to a specific piece of work or module.

Understanding the difference between formative and summative assessment has been an area that academics have identified as problematic. As referred to earlier, the essence of formative assessment is that undertaking the assessment constitutes a learning experience in its own right. The writing of an essay or undertaking a class presentation, for example, can be valuable formative activities as a means of enhancing substantive knowledge as well as for developing research, communication, intellectual and organisational skills. Formative assessment is not often included in the formal grading of work, and it has been proposed that it should not be.

Summative assessment is traditionally not regarded as having any intrinsic learning value (Boud et al. 2010). It is usually undertaken at the end of a period of learning in order to generate a grade that reflects the student’s performance. The traditional unseen end-of-module examination is often presented as a typical form of summative assessment. Two important points arise from this
Table 1. Gibbs and Simpson (2004) promoting 11 conditions under which assessment supports learning.

1. Sufficient assessed tasks are provided for students to capture study time
2. These tasks are engaged with by students, orienting them to allocate appropriate amounts of time and effort to the most important aspects of the course
3. Tackling the assessed task engages the students in productive learning activity of an appropriate kind
4. Assessment communicates clear and high expectations
5. Sufficient feedback is provided, both often enough and with sufficient detail
6. The feedback focuses on students’ performance, on their learning and on actions under the students’ control, rather than on the students themselves and on their characteristics
7. The feedback is timely in that it is received by students while it still matters to them and in time for them to pay attention to further learning or receive further assistance
8. Feedback is appropriate to the purpose of the assignment and to its criteria for success
9. Feedback is appropriate to students’ understanding of what they are supposed to be doing
10. Feedback is received and attended to
11. Feedback is acted upon by the student

differentiation; firstly, there is no compelling reason why only summative assessment should be included in any formal grading of student performance. It is perfectly appropriate to have elements of formative assessment as part, or even all, of the final grade. Secondly, the distinction between formative and summative assessment may be a false one. Whilst some elements of assessment may generate a greater formative learning experience than others, it can be argued that all forms of assessment have some formative element. Students undertaking a degree course where assessment consists only of end of module unseen examinations will over the period of the course improve their examination technique. This is a formative learning experience. There is a clear need to have some appropriate level of discourse in BE education as to the position of formative assessment in regard to the learning experiences of students.

With the importance of life-long learning beginning to permeate HE, and the impact of the National Frameworks of Qualifications in Ireland, a greater, more explicit emphasis is being placed on learning outcomes and competencies. A student-centred learning framework puts the learner at the centre of the learning process, in which assessment plays an important part. It is widely accepted that assessment has a direct impact on students’ learning (Askham 1997; Black and Wiliam 1998; Stiggins 2002; Biggs 2007). We are all familiar with the term that assessment drives learning; this is true in many instances, where the learner looks at what has to be learned in terms of what he or she needs to do to get a good grade in the assessment. Research indicates that what students focus on during the course of their studies is hugely influenced by the assessment methods employed to measure the learning experienced (Ramsden 1992). As recognised in the work of Ramsden and those of more recent times, the importance of taking cognisance of assessment for learning as well as assessment of learning must be recognised by lecturers in the design of their assessment strategies.

Assessment for learning acknowledges that assessment should occur as a regular part of teaching and learning and the information gained from assessment activities can be used to shape the teaching and learning processes. It can, most importantly, also be used by the learner to enhance learning and achievement. It is of note that the Gibbs and Simpson (2004) have developed a model that promotes 11 conditions under which assessment supports learning, as outlined in Table 1, includes 7 of 11 conditions that refer to feedback. The underlying principle and theory of this model forms the rationale for the survey of the lecturers on Built Environment programmes.

The research setting and methodology

Human beings have always shown an interest and concern to come to terms with their environment and to try to make sense and understand the nature of the phenomena to their senses (Cohen,
Manion, and Morrison 2001). All research needs to be subjected to careful methodological assessment and reflection while theory provides the discourse and a vocabulary to describe what we think. In this regard, the principal aim of the research is to help to improve the quality of student learning in CM undergraduate education. An element of the research reported is to investigate the attitudes, conceptions and views of CM programme lecturers/teachers in the area of assessment practices. This paper presents the final phase of an overall research enquiry investigating those conceptions, attitudes and positions. This phase involved an online survey of some 42 academics in the field of construction from the main providers of CM undergraduate programmes on the island of Ireland. The Bristol on Line platform was used as it is a secure licensed domain with the advantage of offering the facility to plan and design the survey to reflect the research aims and objective linked to an online data collection source. The use of the survey management software was preferred as easy online reports and data sets could be generated with ease of deployment to potential participants.

The analysis and findings

The online survey phase of the research was circulated, having been piloted, reviewed and amended, in March 2010 with a closing date end of April 2010. There were 30 responses from a survey population of 42 academics teaching on undergraduate programmes in CM. This reflected an overall response rate of 71% breaking down as 75% male response relative to a 25% female, reflective of the male/female proportions teaching on construction related programmes. The level of lecturing experience varied among respondents with only three indicating they had less than 3 years’ experience. Figure 1 provides the breakdown where 71% indicated they had seven or more years’ lecturing experience.

66% of respondents have 10 years or more experience in teaching undergraduate students. Overall it would be reasonable to say that respondents have a high level of experience and exposure to the assessment of students. It would be expected that they would be in a position to respond to questions on assessment in an informed way.

60% had completed a formal qualification in learning and teaching with ‘Masters Degree in Learning and Teaching’, ‘Diploma in Learning and Teaching’, ‘Bachelor of Technology in Wood and Building Technology or Engineering in Education’ or a ‘Higher Diploma in Education’ identified as the types of qualifications gained. In a number of cases, those qualifications were
pursued after appointment. Of those who responded as having no formal qualification in education, six (20%) indicated that they would be interested in pursuing this area at some stage. Seventy-three per cent of all respondents indicated they had attended a workshop related to learning, teaching and assessment in the last two years. This would indicate a high level of engagement in professional development in assessment, learning and teaching was taking place. Some of the workshops attended included, ‘using problem-based learning’, ‘modern approaches to learning and teaching’ and ‘use of technology in teaching’. Some respondents made reference to attendance at workshops on modularisation and semesterisation.

The variety of assessments in use by the respondents ranged from summative examination to a practical task and Figure 2 provides the details.

Projects, summative examination, continuous assessment and presentations are offered as the preferred methods of assessment in CM as represented by the respondents. Compared to other disciplines, as indicated in the relevant literature and earlier research, the responses correlate well with assessment practices in other disciplines. The ‘Other’ category of assessment identified refers to formative assessments (2) the types of which were not specified. Of the 30 respondents, 17% are using IT-based assessments, although it might be expected that a higher percentage would be engaged at this stage given the availability of software packages that support such activities.

Table 2 shows the responses to the questions posed in respect of the function of assessment. One interesting point from the analysis of the function of assessment is that 86% of respondents agreed or strongly agreed that assessment should provide feedback to students on their learning. Yet it would appear that in practice they seem to focus on the measuring of learning rather than on more formative approaches. A similar response rate relates to both questions on providing comment/direction to the student about their learning and to encouraging students to apply and demonstrate their understanding. It is very much the case that academics work with and want to work with their students and that what might be an issue is ‘the need for more time’ and/or the lack of educational theory as a foundation to their planning. When questioned about the issues that surrounded assessment, the respondents identified the following as impacting negatively on their engagement with students:

- Time management (more particularly time available)
- Large classes
- Work load
- Academic regulations
- Academic research out put
- Plagiarism

Figure 2. Types of assessment used by CM academics to deliver UG modules.
Table 2. Q7 response to questions on the function of assessment.

<table>
<thead>
<tr>
<th>Q7</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>NA or Da</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONST MGT (30 in total)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) To identify students’ understanding of skills, knowledge or competence in learning activity</td>
<td>0</td>
<td>1 (3.3%)</td>
<td>0</td>
<td>12 (40%)</td>
<td>17 (56.7%)</td>
</tr>
<tr>
<td>(b) To provide comment/direction to the student about their learning</td>
<td>0</td>
<td>5 (16.7%)</td>
<td>2 (6.6%)</td>
<td>15 (50%)</td>
<td>8 (26.7%)</td>
</tr>
<tr>
<td>(c) To provide motivation for students to learn</td>
<td>0</td>
<td>7 (23.3%)</td>
<td>4 (13.3%)</td>
<td>11 (36.7%)</td>
<td>8 (26.7%)</td>
</tr>
<tr>
<td>(d) To provide feedback to students on their learning</td>
<td>0</td>
<td>4 (13.3%)</td>
<td>2 (6.7%)</td>
<td>19 (63.3%)</td>
<td>5 (15.7%)</td>
</tr>
<tr>
<td>(e) To provide a measure of students’ performance</td>
<td>0</td>
<td>0</td>
<td>1 (3.3%)</td>
<td>16 (53.3%)</td>
<td>13 (43.4%)</td>
</tr>
<tr>
<td>(f) To develop students’ ability to learn independently</td>
<td>0</td>
<td>2 (6.7%)</td>
<td>8 (26.7%)</td>
<td>13 (43.3%)</td>
<td>7 (23.3%)</td>
</tr>
<tr>
<td>(g) To provide a measure of students’ improvement</td>
<td>0</td>
<td>5 (16.7%)</td>
<td>8 (26.7%)</td>
<td>12 (40%)</td>
<td>5 (16.7%)</td>
</tr>
<tr>
<td>(h) To rank students</td>
<td>1 (3.3%)</td>
<td>11 (36.7%)</td>
<td>6 (25%)</td>
<td>4 (13.3%)</td>
<td>8 (26.7%)</td>
</tr>
<tr>
<td>(i) To monitor lecturers’ performance in teaching</td>
<td>8 (26.7%)</td>
<td>7 (23.3%)</td>
<td>9 (30%)</td>
<td>5 (16.7%)</td>
<td>1 (3.3%)</td>
</tr>
<tr>
<td>(j) To ensure standards are maintained in a programme of study</td>
<td>1 (3.3%)</td>
<td>10 (33.3%)</td>
<td>2 (6.7%)</td>
<td>11 (36.7%)</td>
<td>6 (25%)</td>
</tr>
<tr>
<td>(k) To encourage students to apply and demonstrate their understanding</td>
<td>2 (6.6%)</td>
<td>2 (6.6%)</td>
<td>1 (3.4%)</td>
<td>18 (60%)</td>
<td>7 (23.4%)</td>
</tr>
<tr>
<td>(l) To develop students’ skills, knowledge and/or competence for professional practice</td>
<td>2 (6.7%)</td>
<td>1 (3.3%)</td>
<td>2 (6.7%)</td>
<td>19 (63.3%)</td>
<td>6 (25%)</td>
</tr>
<tr>
<td>(m) To measure the extent to which a student has attained the required standard for a qualification</td>
<td>1 (3.3%)</td>
<td>3 (10%)</td>
<td>2 (6.7%)</td>
<td>17 (56.7%)</td>
<td>7 (23.3%)</td>
</tr>
<tr>
<td>(n) To provide an opportunity for students to assess each other</td>
<td>3 (10%)</td>
<td>11 (36.67%)</td>
<td>13 (43.3%)</td>
<td>3 (10%)</td>
<td>0</td>
</tr>
<tr>
<td>(o) To identify any problems students may have encountered in learning module content</td>
<td>1 (3.3%)</td>
<td>4 (13.3%)</td>
<td>8 (26.7%)</td>
<td>15 (50%)</td>
<td>2 (6.7%)</td>
</tr>
</tbody>
</table>

aNA or D = neither agree nor disagree.

Other issues in regard to providing feedback to students include; transparency, the time factor associated with marking, institutional policy, student engagement – the lack of student attendance and student attitudes. Many cited student indifference as a matter for concern. Within any framework for assessment that supports learning, due consideration should be made to the aspiration of developing ‘self regulated’ (Nicol and MacFarlane-Dick 2006) learners where they are afforded the opportunity to develop the capacity to regulate their own learning as they progress through not only HE but life.

There is reference to student engagement in active learning tasks by some respondents. However, those tasks are not linked to an overall assessment strategy. Students are required to take a summative examination at the end of a module where they may have already demonstrated the achievement of the learning outcomes during the active learning tasks. This is a clear example of ‘over-assessment’ and a reliance on the traditional summative examination. This position reflects the polarised position across academic institutions in their advancement to the more ‘constructively aligned model’ advocated by Biggs (Biggs 2007). This is a common position not just in CM but across many other disciplines as academics engage in reflecting on and introducing a learning outcome-based approach. A number of respondents indicated a lack of awareness of the ‘power’ of academic lecturing staff to make the appropriate changes to effect learning, and hence the more traditional approaches are the preserve. There is still an over reliance on the ‘formal summative assessments’ or controlled examination, i.e. the verification of student attainment. This was exemplified by a reference to institutional procedures restricting lecturer/teachers to effect change to assessment practices. Assessment can be the final consideration for lecturers/teachers in the design of their learning, teaching and assessment strategy and the repositioning the role of assessment has the potential to change the view of learners where assessment would be considered as developmental and part of students’ ongoing educational progression.
Table 3. Emergent framework of assessment for learning.

1. Assessment should contribute positively to students’ learning
2. Assessment is considered by academics and students as an integral component of the learning and teaching process
3. Align assessment strategy with learning outcomes and teaching approach
4. Recognise the multiple roles of assessment – formative, summative, diagnostic, motivational and to foster values
5. Design and develop ‘Authentic assessments’ and ‘Transformative assessments’
6. Develop students’ conception of assessment – particularly the formative aspect and so involve students in the assessment process
7. Build assessment opportunities into learning and teaching approach through the development of ‘trouble shooting’ opportunities
8. Assessment strategy must have a strategic approach – overall module strategy linking to assessment requirements of programme
9. Focus on scholarly approach to assessment – keep up to date on changing practices/new developments Feed in to Institute, College, School Dept., Programme assessment strategy
10. Develop the capacity of learner to be self regulatory and link assessment to later stages of the programme

There is clear tension between the summative and formative assessment processes and the use of this knowledge/information to help teaching and learning. Again, the diverse positions of each school along the continuum are very much in evidence. In some instances, there has been full engagement in the alignment of programme and module learning outcomes while other schools have only just begun to grapple with this. This has a direct relationship to the approach and configuration of the assessment strategies employed. This is allied to a complete agreement of the need to strengthen the processes of assessment and in particular the formative assessment elements. The down side is that there is no real sense or vision of how this might be achieved. The notion of developing reflective practice through assessment and its contribution to enhancement of student learning and motivation is no more than referred to.

Conclusions and recommendations

Based on the analysis of the online survey, the emerging findings indicate there are clear issues for academics in the provision of formative assessment opportunities. Scott and Fortune (2009) have identified that there is a mismatch between the issues raised by students in regard to formative assessment mechanisms and their conception of feedback approaches and the responses from academics. Building both academics’ and students’ understanding around assessment is clearly an area that needs some remedial action and development. A clear need for a framework that supports academics in their approach to aiding learners in today’s complex educational environment in which we engage can be deduced from this. The expectations of both learner and lecturer/teacher are for a framework that allows meaningful and effective learning, teaching and assessment to take place.

A framework, based on the analysis of the emerging data, as outlined in Table 3 might provide for such a supportive structure. It might offer development around the need to consider the elements of a programme of study in a holistic way where the learner is regarded with reference to their development throughout that programme of study. The required support or scaffolding should be provided in the more formative years of study and as the learner develops more autonomy and peer support is advocated. Effective assessment strategies not only allows us to gauge progress, but also enables students to restructure their understanding/skills/knowledge or competences, and facilitates more effective learning strategies.

Assessment is of central importance in HE and the more one researches the field the more there seems to be a ‘lack of commonality’ (Taras 2005) across the disciplines, across engineering and the built environment. There is a growing interest in exploring the enhancement of the quality of the student learning experience, however this might be achieved and to take place requires
a readiness to share the responsibility for the management of an assessment strategy in a way that will allow learning to flourish. We must as Boud et al. (2010) proffers ‘build capacity for judgment’ and move away from our conservative approaches to assessing our students. A move to developing and implementing appropriate assessment strategies that use the most appropriate means of developing reflective learners is what is required.

Reflecting on the literature on assessment in HE and linking this to the views expressed by academics in the CM in Ireland what is identifiable is that a conceptual framework for assessment should be based on the following key assumptions:

It is important that opportunities to include assessment-led learning should be embedded in programmes and this learning should receive the necessary credit. Striking a better balance between assessment ‘of’ and ‘for’ learning is paramount to enhancing the learning experiences of students at the undergraduate level in the CM education. The evidence indicates that there is a willingness to effect change in the approach to supporting student learning through sustainable and authentic assessment strategies. The means to accomplish this presents some serious challenges and are not without the need for some concerted efforts by all.

Assessment should not be fixed, learning outcomes should be an opportunity to create a significant learning experience for the learner!

References


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