Promoting Student Centered Learning: Portfolio Assessment on an Undergraduate Construction Management Program

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Higher education has begun to focus more on students' learning experiences, leading to changes and developments in assessment methods. In addition, research literature informs us that assessment is most effective when closely aligned to learning outcomes. In the institutional move towards this student-centered environment and a more 'constructively aligned' educational process, the Faculty of Built Environment has facilitated and resourced a number of initiatives in learning, teaching and assessment. This paper examines the rationale for the use of portfolio assessment as an authentic mode of assessment for construction management students in DIT. It focuses on the impact this mode of assessment has had through the qualitative analysis of student evaluation and student interview responses along with lecturer reflection. It suggests that the efforts and developmental work involved in moving to a more 'constructively aligned' system should be considered as strengths of learning development in the School and Faculty and it identifies the added value the portfolio assessment methodology offers in developing competent graduates in the field . It concludes with some reflections on the significance of the achievements to date and proposes a way in which the Program, School and Faculty might move forward into the future.

Keywords: Portfolio Assessment, Constructive Alignment, Feedback, and Learning Outcomes.

Introduction

"What the student does is actually more important in determining what is learned than what the teacher does" Shuell, T (1986, p.11)

As higher education (HE) moves from teacher-centered to student-centered learning (SCL), outcomes assessment and evidence of performance from multiple sources of what students know, understand, and can do as a result of their educational experiences has obtained a higher degree of importance(Lea et al, 2003). In parallel with the shift to a SCL environment, assessment methods too have changed and developed. It has become fashionable and appropriate to talk about constructivism in relation to higher education learning, teaching and assessment. Constructivist learning theory relates to the way in which individuals learn to make sense of the world by the development of learning constructs or mental representations of knowledge. The concept of constructivism has its roots in classical antiquity, going back to the work of Socrates. At the core of this theory is the relationship between the learner and the content, the view of learning as one in which the learners "use their own experiences to construct understanding that makes sense to them, rather than having understanding delivered to them in already organized form" (Kauchak, Eggen, 1998:184).

If we desire to assist learners to take full responsibility for their own learning, develop their higher-order thinking skills, and engage fully and actively in their learning, we need a grounded understanding of the student-centered teaching practices we should implement. Although we consider the concept of SCL to be a relatively new one, particularly in HE, interest in it has been long-standing among educators in all realms of education. There is a need for the learners to assume a high level of responsibility in the learning process and to be actively involved in

managing their learning. This paradigm shift, which, while evolving slowly, has begun to take a greater effect in contemporary pedagogy, takes the responsibility from the lecturer and places it firmly in the hands of the learner. This requires learners to be what de la Harpe et al (1999) have expressed as "effective learners".

Cannon and Newble (2000:16) provide us with a well defined definition for SCL:
"Ways of thinking and learning that emphasise student responsibility and activity in learning rather than what the teachers are doing. Essentially SCL has student responsibility and activity at its heart, in contrast to a strong emphasis on teacher control and coverage of academic content in much more conventional, didactic teaching".

Background

The drivers of change in HE are numerous and the pressures for that change are occurring globally. Higher education in Ireland has not been ignored on this front. Changes have been brought about in quality assurance arrangements, the National Frameworks of Qualifications have been introduced and at institutional level, DIT has put in place a strategic imperative to develop a multi-level learner-centered learning environment through the roll out of a modular structure. A new learning environment was encouraged by the National Qualifications Authority of Ireland (NQAI) requirement that all awards should be defined by learning outcomes, the achievement of which would be confirmed through the use of appropriate assessment strategies.

Based on the changes occurring in HE and in particular in the practices required in the move to a modular structure, the author set about reflecting on his practice in order to move towards an SCL experience. The study undertaken for this paper involved a cohort of students registered on a part-time National Qualifications Framework level 7 degree program in Construction Management in the academic year 2006/07. All forty-five students were part-time learners employed full-time in the construction industry and for 89% of them this program was their first experience of HE. Attendance on the program involved attending the college one full day and two evenings which involved the study of four 10 ECTS modules (Construction Technology, Construction Mathematics, Environmental Science & Materials, Professional Development and Financial Management) over two fifteen-week semesters. The module in construction technology was allocated two contact hours per week and the methods of teaching and learning involved face to face interactive lectures, supported by online resources which included two weeks of online learning. The traditional mode of assessment for this module in previous academic years involved students taking a three hour time-constrained examination at the end of the module. As part of the reflective process, consideration was given to an assessment strategy that would best enhance student learning and achievement.

The impact of assessment on student learning

Research literature informs us that assessment is most effective when it is closely aligned to the learning outcomes. Cross (1996) refers to assessment and feedback as providing one of three conditions for learner success. It is generally acknowledged that a student's approach to learning and the quality of learning achieved will be influenced by the way in which this learning is to be assessed (e.g. Gibbs, 1999, Entwistle and Ramsden, 1983). In addition adopting a holistic approach to curriculum design that seeks to constructively align assessments with the learning outcomes, and teaching and learning methods that create a seamlessly inter-related curriculum (Biggs1999) are important if a diversity of desired learning outcomes is to be achieved (e.g. Gibbs, 1999). Boud (1995) also identifies a need to move from seeing particular assessments in isolation towards recognizing them as linked to the other kinds of assessment used, the proximity, frequency and also the context of their usage. Furthermore, bunching of similar types of assessment at certain key points, perhaps at the middle and end of programs, is likely to result in students' adoption of a surface approach and the attainment of a limited number of lower-level learning outcomes (Scouller, 1996). In other words, cross program strategic planning of appropriate assessments is fundamental if the intention is for students to attain higher-level learning outcomes such as problem solving and critical thinking (Biggs, 1999, Gibbs, 1999).The critical importance of formative assessment (assessment that contributes to the student's learning through the provision of feedback about performance, Yorke (2003)) should not be underestimated by lecturers and is confirmed by the review work of Black and Wiliam (1998).

Assessment for learning, more commonly understood as formative assessment, is defined by Black and Wiliam (1998, p.22) as "all those activities undertaken by teachers and/or by their students, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged". In very simple terms, assessment may be defined as such activities that measure student learning. Boud (1990) posited that assessment has two purposes, firstly that of improving the quality of learning where learners engage in activities and are given feedback that will direct them to effectiveness in their learning (commonly referred to as formative feedback). The second concerns that of the accreditation of knowledge or performance, which occurs generally for the award of a degree or diploma (commonly referred to as summative assessment).

Today, students are more focused and they approach assessment with a better understanding of what is involved. Bloxham and Boyd (2007, p.19) refer to students as "being cue conscious concentrating on passing an assessment". We now hear academics speak in terms of formative and summative assessment, however we have a long way to come before assessment and feedback become central to learning and in turn to the student experience. With the importance of life-long learning beginning to permeate thorough HE, along with the impact of the National Frameworks of Qualifications in Ireland, a greater, more explicit emphasis and attention is being paid to learning outcomes and competencies. A SCL 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). 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 pass the assessment and get a good grade. 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).

Therefore, the importance of taking cognizance of assessment *for* learning and assessment *of* learning has relevance for lecturers in the design of their assessment strategies. Assessment of learning is where assessment for accountability purposes is paramount; its function is to determine a student's level of performance on a specific task or at the conclusion of a unit of teaching and learning. The information gained from this kind of assessment is often used in reporting and is purely of a summative nature. However, assessment *for* learning, on the other hand, acknowledges that assessment should occur as a regular part of teaching and learning and that the information gained from assessment activities can be used to shape the teaching and learning process. It can, most importantly, also be used by the learner to enhance learning and achievement.

Academic assessment must be accurate, objectively measured, consistent and fair and so providing assessment that is accessible to all students without compromising academic standards can present challenges. At DIT, previous practice has largely been characterized by the application of a standard set of summative assessments to a relatively limited range of assessment activities, which were seen as additional and separate to the teaching of a module/program. This model, while generally successful, was very much administratively-led, not particularly pedagogically sound nor student-centered. The Institute's commitment to developing a learner-centered environment has brought about an amount of important pedagogical developments, including a commitment to focus on assessment. The 'constructively aligned' approach to curriculum has given lecturers the opportunity to reflect and develop authentic assessment methods that measure the particular outcomes set through the support at Faculty and Institute level.

The rationale of portfolio assessment

As Boud (1994) posits 'students can escape bad teaching: they cannot avoid bad assessment' and so it is of the utmost importance that we design appropriate assessment in order that we can ascertain what each of our students has learned. The concept of the 'portfolio' is not new to education its use has been evident in architecture and the arts for many decades. Their use is growing in all disciplines in HE including Engineering and Built Environment. The use of portfolios allows for the possibility to move towards what Mueller refers to 'authentic assessment' as opposed to the traditional examination. A very important aspect of the use of portfolios is that they treat the learners' achievements as positive contributions unlike the traditional examination which is designed to uncover what the learner has failed to achieve.

An example of the application of appropriate assessment methodologies is the use of the portfolio in the assessment of the Construction Technology module on the Degree in Construction Management in the Faculty of Built Environment. The lecturer has embedded the use of the portfolio to assess the student performance and achievement in learning in this module, which is deliberately designed to be simultaneously formative and summative – formative as the learner is expected to learn from the feedback provided along the way and summative as the mark awarded contributes to the overall grade for the module along with providing the opportunity for deep learning. This is quite appropriate both from the learner's perspective and from the lecturer's perspective. The learner, in true constructivist fashion, has an opportunity to construct their own understanding based on authentic learning tasks while engaging in meaningful learning which is underpinned by current understanding. The structure of the portfolio is based around the engagement with and completion of twelve tasks with a requirement to submit tasks 1-6 by the end of semester 1 and the completed portfolio by the end of semester 2. The appendix includes an example of the first task set which required the students to address a given scenario and apply the skills, knowledge and competences developed in the early weeks of the module. Students were afforded the opportunity to get formative feedback on their progress at the end of each lecture and were actively encouraged to collaborate with each other. A very positive element of the educational encounter is that their different levels of experience in the industry and the sharing of knowledge contribute greatly to their achievements.

Measuring the impact on student learning - benefits

The impact on student learning was evaluated by means of three different mechanisms, namely the use of the institute's quality assurance student survey, the completion by the learner of a task associated to the portfolio and also formative feedback from the students during class sessions, an end of semester meeting with each student to discuss progress and also an individual meeting with each student on the return of the portfolio following its assessment. One measure of success is the number of students who both completed the module and the assessment. Data analysis of the retention rates for the program between 1998 and 2005 indicated that it has been as low as 50%, not uncommon for a program where part-time learners are involved. The retention rate for this cohort of students was 88% in this module while across the program it was 76%.

The institute's quality assurance arrangements require each lecturer to distribute and compile feedback from student surveys at the end of a module. This pro forma survey focuses on the organization and content of the module, the resources available, and the presentation of the component material along with the effectiveness of communication. Some thirty-six students returned the survey with a very high satisfaction rate indicated. The overall feedback was very positive and students identified the interactive type lecture approach and the online resources as hugely beneficial as can be seen from some on the comments made:

"the chance to relay my difficulties at the end of the lecture was very helpful to my learning"

"the method of explaining and asking questions back to the class was of great benefit because it got everybody thinking about the topic rather than just sitting trying to look interested"

"we always felt the lecturer had time for us… he was usually available at the end of the class to answer any questions" (anonymous student feedback survey).

The comments reflect the students' satisfaction with the feedback they received on their learning throughout the module. The use of a portfolio assessment approach did assists in this as exemplified in the comment by one of the students:

"while not convinced of the tasks set, the opportunity to ask questions on completed work helped me in gaining a good grasp of the course material, having an opportunity to do each week allowed me to learn as I went along".

The module evaluation task as part of the portfolio required the learner to reflect on their learning experience during the module which included reflection on method(s) of delivery, the assessment methods used, the overall workload

in the module and most importantly what they have learned and achieved. The inclusion of this type of task in the portfolio in the assessment of the success of the introduction of this constructivist approach has been essential. A review of the feedback from the students involved in this module indicates that they have had a very deep and meaningful learning experience with the following illustrations of what two students wrote in the module evaluation:

"the portfolio assessment is what I enjoyed most about this module. I think it works far better than a 3-hour exam at the end of the year. I have learnt more from this than what I would have just studying for an exam….. The more you read about a particular subject the more you are going to learn, I think when you are drawing something it is going to stay in your mind for years to come. It also gives you pride to look back over what you put together for your college assignments in the years to come"   (Student number D06107410)

"I think the tasks and the timber frame unit was expertly thought out as they cover every area of the module. I think this because the student researches the topic themselves, it is a most effective and interesting way of making a student learn……. I think this type of portfolio assessment makes it easier for part-time students as it eases the pressure and boosts one's confidence knowing that you have completed your assessment before even entering the exam hall"   (Student number D06107441)

Formative feedback was provided both at the end of semester feedback session and at the end of the module where a timetabled session was arranged to specifically get feedback from each student. Also, included in the planning for each lecture was time for the students to raise any issues/points of clarification with respect to any part of their learning. Feedback is an essential element of the learning process, but it is evident that students reported a perceived need for increased levels of feedback during the semester and particularly towards submission time.

Taking the different evaluative mechanisms into account, one very important element that emerged from the analysis of the student feedback was the confidence gained by the learners and how the portfolio assessment contributed to this. The end of semester submission and the subsequent feedback aided the learners in addressing some of their misconceptions of what was required in terms of the module learning outcomes. The real plus for the lecturer was to get concrete evidence through the assessment process of meaningful learning taking place.

How can other Departments reproduce this?

Traditionally the programs in construction related disciplines at DIT have been focused and influenced on the requirements of the construction field and have set about the teaching and assessing of that through traditional ways. The Faculty through the different Schools, in more recent times, has taken an active interest in the developments in HE and in particular in the emerging developments in learning, teaching and assessment. In the context of curriculum design and delivery this has included alignment of taught unit as we proceed to modularization, consideration of a more student centered approach through problem based learning and other initiatives. The sharing of practices has been one initiative that has been very successful. This has been achieved at program level, at School level and at Faculty level. There is evidence of a better understanding of the theoretical aspects of student learning and the alignment of learning outcomes, content and assessment. Willingness, while slow in progress, appears to exist to get beyond the rhetoric of the matter and engage in 'constructively aligning' program modules.
The inclusion of opportunities for discussion around changing practices at program committee level has begun at School and program meetings across the Faculty. An additional positive feature has emerged in the last few years, with the emergence of lunchtime seminars, where Faculty share their innovations with their peers. This cross fertilization of practices from other disciplines within built environment has been a hugely positive departure. Modules within those programs need to be viewed within the context of a Departmental or Faculty ethos that might for example be seen to promote strong links with industry or to support high levels of research. Mutch (2000) emphasizes a need to put in place frameworks at different levels within an institution to support such contextualization, for example as part of the implementation of an overarching learning, teaching and assessment strategy. Thereby, individually designed module assessment strategies, adhering to institutional policies and meeting professional body requirements, can be effectively embedded within program, Department and in turn Faculty level strategies. Such a systems approach within a modular system helps sharpen the understanding of the place and purpose of modules within programs and at the same time encourages ownership from individual and Departmental staff (Astin, 1991).

With an increasing amount of education research data linking assessment practice to student learning, academic staff are already being more proactively encouraged to think about assessment at a strategic level at DIT. This is encouraged through accredited and non-accredited short courses, workshops and the growing number of national initiatives seeking to respond to the increasing diversity of the student population in HE (for example HEA, 2008). Interestingly, although staff have had to engage in the redesign of modules to comply with a move towards a modular system and although various incentives are present, this seems to have resulted only in an increase in the coursework required relative to summative assessments. There seems to have been little impact upon the kinds and range of assessment used (Brown and Knight, 1994, Gibbs and Simpson, 2003) and hence, unseen examinations and essays still predominate e.g. the UK system (Elton and Johnston, 2002).

Many institutions have started to fund projects or make teaching awards that will encourage innovative practice in order to reward staff for making changes in their teaching practice. However, many of the staff taking up such opportunities can still be considered to be the 'early adopters' of innovative practice generally rather than the critical mass of staff often content to stay with more traditional tried and tested methodologies. Fullan (1991) mentions that often, after an innovation has been planned, the change agent or early adopter will 'ease up' but that the implementation stage is equally important to the original idea in order to generate a momentum of change. 'Implementation changes change'. Brown and Knight (1994) also emphasize the importance of encouraging widespread involvement with the implementation of any innovative practice. Firstly, they suggest that the process of reflecting upon practice at, for example, Departmental level will generally result in an improvement in teaching practice as the ownership of the innovative practice moves to that level and away from the individual. Secondly, that most innovations will appear successful at first, but it is the act of innovation rather than the innovation that makes the difference in the longer term. Again the sharing of innovative practices can assist in developing this.

With this current educational theoretical position in mind, the author set about reviewing the way in which he delivered a construction technology module to part-time undergraduate students in the Department of Construction Management at DIT. If the goal of teaching is to promote learning, and most are in agreement with this, then the role the lecturer takes to achieve this must include the process of planning, of making connections, particularly for the learner and importantly the 'constructively alignment' (Biggs, 1999) of set learning outcomes. It is for each School and each lecturer to determine their own educational learning outcomes, analyze the context in which they operate, identify the factors that constrain their operation, and choose the curricular model and teaching and learning methods that suit it best. Provided it is evidence based, diversity of approach is a good thing and to be encouraged. Whatever the detail, a strategy that promotes SCL is likely to be the most effective and rewarding and if academics are encouraged to share their practice this will go a long way to embedding an appropriate educational experience for learners in our disciplines.

Conclusions and reflection

This is just one example of an important development that has taken place in the School of Construction that has contributed to the enhancement of student learning. There is a commitment by some of the lecturers in the Faculty to share with colleagues their experiences in introducing new learning, teaching and assessment strategies. While the objective of this change in practice was to enhance student learning a knock-on has been the engagement with lecturers in how this mode of assessment might be used to improve student learning across other programs in the School and Faculty. Any institutional moves towards introducing innovative changes in any area can be perceived as threatening to both staff and students. However, when such changes are presented as integral to overall strategic development rather than simply 'bolt-on' changes, resistances can be reduced. Adoption of such an integrated approach necessitates institutions as well as individuals to take ownership of these strategies and to be prepared to make sometimes extensive changes to their practice within prioritized areas. Astin (1991) refers to the need for staff across a Department or Faculty to develop a shared commitment to changing strategies as part of reaffirmation of a sense of Departmental culture and identity. This has begun to happen between the Schools of Architecture and Construction. Such changes need to be centrally and locally proactively supported and guided as processes are changed: academics are likely to be resistant to commit time and effort to areas with little observable benefit to either themselves or their students and if they feel a lack of confidence in their skills. Ewell (1988) talks about a need for transparency within emergent institutional assessment systems as well as tangible support from senior management combined with the extensive development in the assessment expertise of individual staff if observable

changes in institutional culture are to be achieved. Otherwise, there is likely to be a resistance to a change away from well established and familiar practice.

It is clear that much developmental work has been done and is ongoing in the area of assessment. The main focus of assessment should be on enhancing student learning along with indicating what has been learnt and to what level that learning has been achieved. The challenge for us all is to engage in innovative ways of enhancing learning, teaching and assessment while encouraging others to develop their practices.

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Appendix

Example of portfolio task:

TASK 1   **SUBSTRUCTURE:**

A given scenario:

An elevated 1 acre site has been granted outline planning permission. In preparation for full planning permission you are asked to visit the site and design an appropriate foundation detail. The soil type is cohesive and a river passes close to the boundary of the site, drainage is fair.

The proposed building is a single storey four-bed roomed bungalow with traditional cavity wall construction (brick external finish). There are no excessive loadings to be considered by the designer.

Candidates must complete the following elements:

- Describe your visit to the site and include all the factors you need to consider before designing the foundation. Indicate any tests that need to be carried out and use sketches to supplement your response.
- Decide on the type of foundation, giving reasons for your choice and how you arrived at your decision.
- Draw a 1:10 scaled drawing of the chosen foundation detail including the correct conventions for each element.