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FORMATIVE ASSESSMENT STRUCTURES TO ENHANCE STUDENT LEARNING DESPITE RESOURCE LIMITATIONS

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Abstract

Abstract

Higher Education student numbers are rising globally and yet teacher numbers are being reduced - all because of economic constraints and external criticisms. Despite these limitations, which all educators face today, the quality of teaching and depth of learning requires to be maintained. The impressive pace and rising numbers of educators who research and test methodologies which are developed and then shared to enhance teaching and learning is to be applauded. The study outlined in this article was inspired by just such seminal education researchers.

This paper has emerged from a small action research case study that was completed in April 2010. It was undertaken on a constructively aligned syllabus in a specific discipline in a higher education institution and has identified how formative assessment structures that were implemented have helped to reduce assessment work-loads on tutors - yet still enhance student learning.

This paper will demonstrate how an intensive yet rewarding activity that provided swift feedback and ensured rapid assessment grades for students was applied and how this process could help other teachers in Higher Education.

The argument is made that this particular formative feedback and formative assessment model has nurtured deeper learning through improved reflection on 'knowledge' learned. By promoting greater student engagement through the application of this process, has helped students as individuals (and in groups) to develop skills that will improve potential employability and confidence, while moving towards greater personal and professional growth.

This particular formative feedback process and method of assessment can be adapted for wider use to suit many different higher education course types as well as become a far more creative and rewarding learning and teaching process for tutors and students alike.

Keywords:

Formative feedback, formative assessment, productive learning activity, experiential learning.

1 INTRODUCTION

This paper is an opportunity to share information about the successful outcome of a small action research case study, whereby the measurement of the effectiveness of formative assessment strategies through qualitative surveys conducted with the participants' consent, which formed the research undertaken for a Teaching Fellowship over the 2009-2010 Academic Year awarded to my colleague Máire Crean and I. This study has expanded the implementation of Formative Assessment as a teaching and learning methodology in the Department of Architectural Technology, School of Architecture, DIT Bolton Street, Dublin. (The main study which forms a separate document includes the data collected and

disseminated, including references is available by contacting either maire.crean@dit.ie or cathy.prunty@dit.ie).

Upon completion of this research, information that was extracted from the strategic student and staff surveys has already helped support our earlier instinct that this assessment and feedback strategy 'works', by demonstrating its observed effectiveness. We believe that the particular method we use, - that which we call 'crit-marking', which has been adapted from the 'crit' process applied in architecture and other design courses, could now be tailored to benefit other taught, project and problem based higher education courses.

While these encouraging findings are from research over one academic year, we feel it clearly necessitates more exploration, thus we would welcome any discussion and debate with other teachers and learners as to how this may (or may not) be of benefit to them.

In looking at a method upon which to base our research, we initially decided that the Gibbs and Simpson model '*11 conditions under which assessment supports learning*' (2002) was probably the most appropriate framework for this particular study. While there was some research done on formative feedback in primary and post primary education (Black & William, 1998) and while other seminal education researchers such as Sadler, Yorke, Brown, Knight, Gibbs & Simpson, Nichol et al, had done excellent work on third level assessment practices there appeared to be limited practical information about how to *apply* formative assessment strategies in a higher education context. Thus the Gibbs and Simpson model was extremely helpful in relation to this study and enabled us to structure our research.

2 CONTEXT

The Ordinary Degree, the Bachelor of Science in Architectural Technology that formed the basis of this study (which changed to a Level 8, Honours Degree in September 2010), was a constructively aligned syllabus, with explicit assessment criteria undertaken in a continual assessment method in a studio environment over two semesters. The Studio environment mimics an Architectural Office in the 'real world' in the manner in which realistic projects are set and how the students are expected to engage. This structure has remained unchanged as the core ethos of the course, but has altered since to be delivered over two Semesters in the new Honours Degree Programme.

Architectural Technology requires that the solutions to the technical problems for the assembly of a building are the requirements that must work, for example, to keep water out, or not. The students have a variety of 'answers' they can produce, but they need to be sure that their solution is appropriately applied by meeting rigorous legislative and regulatory requirements also. The students are given a 'problem' and are then required to solve it by producing work in studio. They will discuss the project with their peers, studio staff or in a group or workshop style session. Using their relevant subject lecture notes or *Webcourses* electronic resource, research, work out one alternative, revise and re-work, all to arrive eventually at their proposed solution. This work was then summatively assessed with grades given after a general overview with the class group.

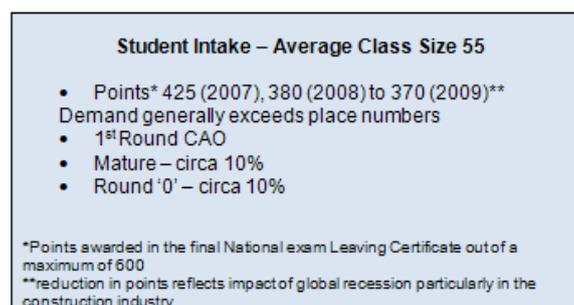


Fig. 1 Class size and demonstration of diversity of Student (learners) type

'The 'crit' is the review of the learning-by-doing process' (Flynn, 2005), a formative feedback method usually used to critique or review original individual designs in architecture, art and design courses. We have adapted this method to assess work that must meet compulsory regulatory and legislative criteria. We also apply the crit as a technical review process during projects as well as at the end of a project, post assessment.

The 'realistic' workload of the projects immediately places the student in a productive learning activity which directly generates intrinsic motivation because of its perceived relevance. The Architectural Technology students are expected to complete project work, written assessments from other modules as well as undertake research outside their busy 36 hour contact week. The students' Project work is valued at 15 ECTS per semester out of 60 ECTS credit over the full academic year and is supported by six modules of 5 ECTS credit within that total.

While most students successfully achieved the learning outcomes, it was clear that the intensity of the workload in the past led to a surface-learning syndrome amongst students. As, on many courses, many students 'write' or 'learn' only to pass on information or declare the level of their learned knowledge as required but not to any great depth. (Despite this, it is a peculiar fact that Architectural Technology students have generally graduated in the past with an exceptional ability to 'think on their feet'. They have demonstrated an excellent work ethic and make reasonably good critical judgements when required - all of which has greatly enhanced their employability potential). The very practical 'learning by doing' principle, rather than merely accepting 'received' handed down wisdom like many other courses is also very much a core ethos of Architectural Technology which has been protected and augmented in the new programme.

While there is a carefully planned sequence of tasks and projects to help pace the students learning and time management, the projects which are constructively aligned, are also structured to provide sufficient formative tasks. However, we realised that if there is a delay in receiving feedback on a task, as has happened in the past, the student can be uncomfortable or uncertain about what the desired outcome required on any subsequent task should be. Thus, each 'tasks' successful completion must clearly enable the learner to address each new task with recently learned incremental knowledge, skills, confidence and development. Thus any obstruction to this learning process in the past was a problem. (Prunty, Crean 2010)

3 TUTORS WORKLOAD

Realising that any delay in providing feedback caused a knock-on effect that induced stress amongst the students in addition to being aware of all the requirements to also meet learning outcomes and criteria, put pressure on tutors also. As projects became progressively more complex, so too did the time required for summative assessment. Attempting to notate every piece of every students work thoroughly enough to ensure that the feedback would be of good quality and was returned rapidly, created further pressure. Then to discover that despite the written or annotated comments on each student's work- which clearly was not understood, upon return invariably triggered further verbal explanations also being required by a number of students. This subsequently doubled up on the 'feedback' process as well as consumed time allocated to the next project. Additionally, some of those students who appeared to accept the 'written' feedback comments as given did not necessarily understand the full extent or depth of the tutor's comments which became evident in subsequent project work. This was frustrating and as tutors we frequently wondered about the effectiveness of what we were undertaking. This 'complex and problematic nature of summative assessment' (Yorke, 2008) prompted a thorough re-evaluation of the whole project assessment process.

4 TIME FOR CHANGE

By examining the situation it became clear that the 'crit' process we already used in a very general way could be adapted for use to create a new assessment process that could also provide quality formative feedback to each student individually. By arranging flexible timetabling so that all staff engaged in teaching in the studio environment could be available together on an agreed day or days to undertake the formative assessment was one of the keys to the success of the whole enterprise. This also reflected how feedback on projects at critical stages in an architectural office would also be undertaken, thus providing the students with an element of 'experiential' learning.

5 NEW FEEDBACK STRUCTURE

We came to realise that a series of very carefully planned constructively aligned tasks and projects which would help pace the students learning and their time management were required to be very explicit in learning outcomes and aims as well as how and when work would then be assessed. Our objectives were thus identified;

- that each tasks' successful completion should clearly enable the learner to address each new task which would be undertaken using incremental recently learned knowledge, confidence, skills, competence and development
- avoid any delay in delivering or receiving feedback

This required improved forward planning and more clearly defined learning objectives.

We also recognized the need to be very clear in stating the aims and learning outcomes of each project and task in order to:

- improve the quality and speed with which formative feedback is given
- help enhance the depth and level of learning
- provide reflective time for both students and teaching staff

By the staff 'year team' agreeing these objectives and 'front loading' the detail and very thorough preparation of each project brief, the usually burdensome and often very time consuming task of assessment had been transformed. This was achieved by a clear and rigorous marking or grading process conducted during the 'crit-marking' process, which was identified from the outset on the carefully planned project brief. Students and teachers, from the outset, all became very clear about what was required along with what elements carry what assessment weighting within a project.

6 CRIT MARKING – HOW IT WORKS

The marking 'crit', commencing by having every students' work displayed on the walls of the studio, immediately allows each student to see how their work looks alongside that of their peers and as they become more familiar with the process they can see where they are positioned within the class group, subconsciously developing 'self' and 'peer' learning.

Following a gallery style walk-about by all some general observations made by the staff about the project are then delivered to the class group covering the usual following points:

- Outlining and reminding the students of the learning outcomes that were expected to have been achieved, based on the brief issued at the beginning of the project.
- Reminding the student group how the project work done is to be assessed and how any work may be revised - if required.

Following several questions and answers and some general discussion with the class group, the studio tutors then break off into pairs initially to examine each student's work. Each staff member has a copy of the original brief issued to the students along with a separate Marking

Sheet which identifies the Project, lists each students name, and allocates an individual percentage under each of the following examples of headings;

Project 6		Student Number	Demonstration of Technical Knowledge	Layout and Presentation - Visual	Layout and Presentation - Verbal	Competence demonstrated	Total
Student Name			40%	20%	20%	20%	100%
Benz	Karl	C23456789	62	70	60	70	65
Ford	Henry	C34567890	65	60	70	60	64
Issigonis	Alec	C45678901	40	55	70	50	51
Prosche	Fredinand	C56789012	75	60	60	45	63
Schumacher	Michael	C67890123	78	90	85	80	82

Fig 2 Sample Marking Sheet – Crit-marking Criteria

The students are then encouraged to talk about their project as the staff ‘meets’ each student, while standing beside their work. Students or their colleagues record any feedback comments of significance by the teaching team at this point. Research material can also be included, usually in a booklet form and displayed on an adjacent table to support the students work. Other students awaiting their turn are encouraged to listen, observe or take part in the discussion. Tutors may indicate during the course of the discussion that something may be ‘wrong’ yet will talk through with the student how it can be ‘fixed’. Frequently a technical issue or misunderstanding which may be common to several projects may require an informal workshop to take place on the spot which includes and informs the whole class group.

Often, during the course of discussion with the student it becomes clear to a teacher whether the student understood what they were doing, or not. As Computer Aided Drawing forms such a large portion of the course, and students can easily ‘send’ each other information electronically, the ‘crit’ process helps eliminate the complexities of any copied or downloaded work by others.

As staff then progress to the next students’ presentation, they individually award marks for the work just viewed onto the structured ‘Marking’ sheet. These marks are then collated jointly by the staff after the session with the class group outside studio time, where they are then discussed and refined by the teaching team, prior to posting the grades awarded. By not giving grades until after the feedback session is completed, students pay more attention to what is actually being said about their work and about their peers. The grades then awarded are provisional, giving each student an indication of how they are doing. As the syllabus is taught in a continuously assessed framework each student knows that they can revise their work, based on the feedback acquired, towards their final grade at the end of the academic year.

This whole process of assessment generally can be done in one full day. With more complex projects, however, it could run over two days. While it is tiring for teachers, being concentrated into a relatively short time compared to traditional summative assessment done in isolation, it is also very rewarding. One can perceive immediately improved incremental interaction, a significant improvement in the students’ verbal skills and tutors also get to know their students better.

7 STUDENT AND STAFF FEEDBACK

The student feedback has been that they are very pleased to get their results so quickly, and can work to improve their grades immediately on subsequent projects. We have also observed an improved effort by the students in taking notes and writing down any feedback

during the individual 'crit' for themselves or for a colleague. As students became more aware of the requirements for each project, they started to develop some skill in 'critique-ing' each others work. Almost as important, tutors have discovered that this method of 'formative feedback' assessment is a really far more pleasant, interactive task than the customary summative assessment undertaken over weeks previously. However, all staff do recognise that the project brief preparation and pre-'crit' and post-'crit' meetings and discussions, stating the required learning outcomes clearly and the method of assessment of each part are extremely important.

Because of the perceived informality and collaborative nature of the feedback, even the most inhibited student has no difficulty with this method of assessment if it is handled sympathetically.

8 SUMMARY OF FINDINGS

The introduction of this verbal formative feedback and formative assessment through the improved studio 'crit' process has helped enormously towards the rapid improvement in quality of much of the student project-based work. Evidence of this was presented at the end of year exhibition and commented on by the Extern examiners. The pass rate between projects had improved as even weaker students grasped concepts and understood their purpose. (By the end of the students first week in college it was discernible that the atmosphere within the class group was more open and friendly than in previous years at this stage of the 'settling in process' for first year students.) The qualitative survey conducted as part of this study, (written under separate cover), observed that 89% of first year students and 100% of the second year students surveyed confirmed preference for the 'marking crit' as a form of assessment and feedback, which has underpinned our initial anecdotal observations.

Improving the quality and speed with which formative feedback is given to the students immediately after the completion of each task or project has helped enhance the depth and level of learning as well as alleviate any anxiety that may have arisen, which was common when there was unavoidable delay. Student retention also seems to have improved, but this is from observation only and will require further research to be undertaken to support this particular aspect.

The improvement in the level of self assessment or reflection on learning, along with work done as individuals and in groups has developed improved peer and teacher dialogue around learning. An improved culture of motivational philosophy and self-respect has also emerged. In conclusion, this study has helped the students to define their own understanding of learning as well as enhance their learning experiences.

This responsibility the students have taken towards their own learning will hopefully also remain with them for the rest of their lives.

Through employing improved teaching methods (and enhancing those existing methods that work) for the projected wide diversity of first year student 'types', all whilst delivering a good first year experience is an ambition that we may yet realise- despite resource constraints.

As Professor Sally Brown states:

If assessment is to be integral to learning, feedback must be at the heart of the process. Even though it is time consuming, I would argue that significant energy must be devoted to helping students to understand not only where they have gone wrong, but also what they need to do to improve. They also need feedback when they have done well, to help them understand what is good about their work and how they can build on it and develop further. No one can pretend this is an easy task. (Brown, 2004).

This is true, it is not an easy task, but it is much more rewarding for those who have to assess student work done. The big change is the front loaded preparation rather than the solitary onerous task it was previously along with the staff interaction with students around learning, which is an enriching experience for all. The opportunity for students to ask and answer questions is the most important aspect of this. Limitations for this form of verbal feedback will probably be class numbers- the larger the number, the greater the assessment load. However, seminal education researchers like Professor Sally Brown et al have devised clever techniques like coded statement banks to provide written responses to help improve the quality of feedback to each student which can then be disseminated electronically individually or as a group.

9 CONCLUSION

The positive feedback and observations made by both students and staff has encouraged us to bring this method of feedback and assessment forward into the new semesterised Honours Degree programme in line with the Bologna Accord, which commenced in September 2010. Refining this assessment method further as teachers, have also learned more through the process. The realisation that 'the role of the students in assessment is an important aspect' and that 'attention to *formative* assessment can lead to significant learning gains' (Black, Wiliam 1998) was key to implementing change also.

Thus, regardless of developments in e-learning or computer technology, as we are still dealing with human beings, this form of formative assessment and feedback will benefit other project based curricula, or disciplines. Posters, displaying a synopsis of students work, along with a dialogue around learning can also deliver immediate and effective verbal feedback, whether peer or teacher based.

The argument has been made in our research that by implementing the Gibbs and Simpson framework '*11 conditions under which assessment supports learning*' (2002) as a 'check list' to support our method has enhanced the students in this study's learning and development, all within existing resources in Architectural Technology.

'using two-stage assignments with feedback on the first stage, intended to enable the student to improve the quality of work for a second stage submission, which is only graded, Cooper (2000) has reported how such a system can improve almost all students' performance, particularly the performance of some of the weaker students'. (Gibbs & Simpson, 2004)

The rate with which educators' research and share new methods to enhance teaching and learning, despite economic constraints and external criticisms, is to be applauded. However, course managers must not view any changes in emphasis of teaching that enhances learning, as being a 'solution' to reducing teacher numbers.

The argument is made that by nurturing deeper learning through improved reflection on 'knowledge' learned, and by promoting greater student engagement, students as individuals and in groups will develop skills to improve their potential employability and confidence, while moving towards greater personal and professional growth. This learning and reflection is not only limited to the students but importantly allows teachers reflect on their own practice too. Over the period of the study, being one academic year, we further discovered the emerging wealth of excellent research done on formative feedback and other effective assessment strategies. This has developed a new deeper insight which will encourage us to keep learning new methods for effective learning in higher education.

9.1 Resources

Although teaching resources had been reduced (through retirements not being replaced etc) and as class sizes increased, the teaching staff were willing to engage with this 'new' methodology. They very quickly realised that flexibility on their part to engage in a very 'fluid'

timetable and their involvement at all stages of the project from designing the brief to agreeing the marking criteria was the key. They also began to realise that the new assessment method was a much more pleasant although more intensive one. Many felt that their teaching improved as it became more reflexive. Part time teachers also got to know their students better. This formative feedback technique that we applied does mean that staff must have a genuine interest in their students for the process to work successfully. While summative examinations are much easier to manage from a resource point of view it is a 'remote' activity and feedback for students is usually non-existent. For formative assessment and formative feedback to work properly means that staff must be involved much more in 'front loaded' planning, involvement and preparation for the project or task including more engagement with the students throughout the whole project through to assessment. However, we believe, and our colleagues agree that this method is a much more pleasant task than grading work in isolation and they were reminded why they wanted to teach in the first place. It is much more rewarding to engage *with* students, to get their interaction and their feedback and reaction to a project, a grade or assessment comment there and then. Summative grading and writing comments on feedback forms or students work in isolation (which may or may not be understood) has been reserved for some progression only. The formative feedback and formative assessment process has also given each student responsibility for their own learning, developing their progression to becoming more independent learners.

We believe that this method could be used in other project based courses in other disciplines all of which are suffering from increased student numbers and reduced resources.

The Architectural Technology programme being a constructively aligned programme each task completed brings knowledge forward into the next task. The curriculum is also designed so that the learning activities and assessment tasks are matched with the learning outcomes. As information previously learned is required for the next project it is vital that the student receives feedback in a timely manner in order to advance. The tutor workload although not reduced, has been re-directed from the individual and lonely task to an interactive and altogether more pleasant one, while the student is receiving instant, relevant and constructive feedback to enable them to tackle the next project with confidence.

Another bonus of this method is that projects can be spread across more than one Module. Integrating theoretical subjects into relevant project work can reduce the doubling up of assignments. For example a problem based technical task which would have a professional presentation element to it could be assessed in both the Technical module and the Professional Studies module. This further emphasises the co-ordination and co-operation required by teaching staff in the advance preparation of assignments. As long as all the teaching staff are flexibly timetabled for the 'marking-crit', each student can be given feedback for both subject modules and can receive feedback on both assignments quickly.

Thus the key to providing good formative feedback and formative assessment to enhance students learning is the front-loaded well prepared assignment management and groundwork. Strict adherence to ensuring that the students' voices are heard and that their involvement in the assessment is encouraged, along with measurement of the learning outcomes as agreed from the outset for each task, are also the tutors responsibilities in providing good feedback. The success of this action research study must be credited to our colleagues who were so willing to embrace change, as the concern to improve their own teaching was their goal too.

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