

Northumbria Research Link

Citation: Tindall, Jess (2008) A critical appraisal and development of assessment strategy. Northumbria Working Paper Series: Interdisciplinary Studies in the Built and Virtual Environment, 1 (2). pp. 209-214. ISSN 1756-2473

Published by: Northumbria University

URL:

This version was downloaded from Northumbria Research Link:
<http://nrl.northumbria.ac.uk/id/eprint/614/>

Northumbria University has developed Northumbria Research Link (NRL) to enable users to access the University's research output. Copyright © and moral rights for items on NRL are retained by the individual author(s) and/or other copyright owners. Single copies of full items can be reproduced, displayed or performed, and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided the authors, title and full bibliographic details are given, as well as a hyperlink and/or URL to the original metadata page. The content must not be changed in any way. Full items must not be sold commercially in any format or medium without formal permission of the copyright holder. The full policy is available online: <http://nrl.northumbria.ac.uk/policies.html>

This document may differ from the final, published version of the research and has been made available online in accordance with publisher policies. To read and/or cite from the published version of the research, please visit the publisher's website (a subscription may be required.)



**Northumbria
University**
NEWCASTLE



UniversityLibrary

A Critical Appraisal and Development of Assessment Strategy

Jess Tindall¹

ABSTRACT

Factors effecting student motivation are important and must be considered if the performance of future student cohorts is to be improved. Theories regarding the interaction of 'expectancy and value' have been set out. Because the relationship is multiplicative it is necessary to ensure that both 'expectancy and value' are present within the psyche of each and every student for each and every task assigned. This work critically appraises the delivery of a level 5 module over two successive academic years and demonstrates the application of 'expectancy-value' theory in module improvement. A formative course work was modified to align the outcomes with the summative coursework which resulted in significantly improved student motivation due to the addition of previously lacking 'value'. Ideas are presented for the final summative coursework which could also bring significant benefits. However, these have not yet been adopted due to the real difficulties associated with group working. Both 'value' and 'expectancy' were initially lacking from different course works and were resulting in reduced student motivation.

Keywords: formative, feedback, value, expectancy, authentic assessment

1 Division of Sustainable Buildings and Energy Systems, School of the Built Environment, Northumbria University, Newcastle upon Tyne NE1 8ST, UK

[E-mail: jess.tindall@northumbria.ac.uk](mailto:jess.tindall@northumbria.ac.uk)

1.0 INTRODUCTION

Effective formative and summative feedback can be provided in many ways. It is also important for building student confidence and might be regarded as a key tool for improving the future academic performance of students. Irons (2005) quoting the work of Clarke et al (2004) confirms that formative feedback can act to “cement students understanding of key concepts and ideas”.

The aim of this paper is to critically appraise the assessment strategies employed during the 2005/06 academic year.

The module BE0750: Building Analysis and System Design Project is chosen, This is a level five, year long module on the BEng (Hons) in Building Services Engineering programme. The module has been selected as the focus of this paper because the range of prior design experience of the students is pronounced and presents some interesting challenges. The assessment for this module is as far as possible ‘authentic’ as discussed by Dunn et al 2004. In other words the assessment is designed to simulate the design process as it would be encountered in an engineering consultancy practice. It is this authenticity which creates difficulties in effectively assessing the performance of those students with previous design experience.

The expectancy-value theory of motivation as put forward by Biggs (2003) is explored and related to the experience gained on this module.

2.0 FORMATIVE ASSESSMENT

Many opportunities exist for providing verbal formative feedback. “Formative assessment is generally offered in laboratory, seminar and tutorial situations where group size allows consideration and discussion of the subject matter.” Northumbria University (2005) Building Services Engineering accreditation document (p.7)

Verbal formative feedback is provided weekly in BE0750 during the IT workshop sessions. Here the teaching staff endeavour to spend some time with each student in order to assess their progress, discuss any problems and provide verbal feedback. This strategy has been adopted over the years in order to encourage students and to help them to develop their knowledge and understanding by clarifying what they need to do or investigate. This strategy is described positively by Irons (2005) drawing from the work of Burke (2003).

2.1 Formal formative assessment

There was one piece of formal formative assessment during week four. The object of the exercise was to ensure (and monitor) that all the students had engaged effectively with the directed learning set for them. The aim was to develop competence with a new building thermal modelling software package. This assessment required the production of a short word processed document. This was to contain the output results from a number of modifications to the building model. Students had been issued with full written instructions detailing how the model should be set up. The engagement with this formative assessment was poor in 2005/06, particularly with the part time students. Irons (2005) drawing from the work of Yorke (2003) suggests that there is evidence that summative assessment tends to dominate student behaviour due to the conflicting demands which many students now face.

During an informal feedback discussion with a group of mainly mature part time students it became clear that they saw little value in this formative assessment as they were relatively confident in their ability to ‘muddle through’ until they achieved software output results which they judged to be appropriate on the basis of their experience. Biggs (2003 p58) discusses the “common-sense... expectancy-value theory of motivation” which he explains are two factors that work by multiplication. Observations from this module confirm this multiplication theory since the very students who were most experienced, had the best prior understanding, and thus would be expected to have the highest ‘expectancy’ levels within the group were the very individuals who were not motivated to engage with the exercise because they saw little or no ‘value’.

2.2 Summative: added 'value'?

A possible solution to this problem was to make the assessment summative thus assigning some 'value' to this task in the students mind. This solution was rejected due to the belief that all of the marks awarded for the module should reflect how well the student has achieved the learning outcomes and not be allocated based upon how well they have learnt how to use a piece of software.

2.3 Value added through alignment

Value was added to this assessment for the 2006/07 year by changing the assessment task in order to align it with the module learning outcomes. The students were asked to choose one of the twelve tasks from the first piece of summative assessment and apply it to the simple familiarisation model, obtain results from the software, then analyse and present the results and findings in the same way that they intend to do later for the summative assessment.

Written formative feedback was provided in 2006/07 in the place of the *easy to forget and difficult to review* verbal feed back which had previously been employed for this task. It was hoped that the students would see the inherent 'value' of engaging with the formative assessment task since they knew they would receive written feedback which would provide guidance regarding how to improve the analysis and presentation of information for the forthcoming summative assessment.

With the alignment corrected the students were able to see an inherent 'value' (Biggs 2003) and therefore engaged with the formative assessment almost without exception. Also the written feedback given was more beneficial to the student since it related to the analysis and interpretation of the results rather than concentrating on the student's mastery of the software.

3.0 SUMMATIVE ASSESSMENT SEMESTER 1

The summative assessment for semester one (2005/06) required the students to carry out twelve modifications to a substantial building model, using the software package introduced earlier in the semester. The students were then asked to analyse the results utilising the declarative knowledge gained both through the lectures, associated reading and other level 5 modules. The analysed results were then to be presented clearly using annotated graphs, diagrams and text to demonstrate their understanding. The aim being to turn their declarative knowledge into functioning knowledge by applying it to an aligned simulated real life task, i.e. by asking the students to do something that they would be expected to do independently within their jobs after graduation i.e. "authentic assessment" (Dunn et al 2004).

In 2005/06 the quality of submissions was disappointing with little analysis evident either in the text or graphical output provided. As the submission date approached it became clear that students were not analysing and writing up their findings as they went along. Instead they preferred to complete all the modelling tasks. The quality of analysis and writing up suffered by being rushed in the last week or two.

This lack of student focus upon analysis was one of the key drivers for the changes to the formative assignment as discussed earlier. In 2006/07 the summative assessment coursework specification remained essentially unchanged but the student performance was much stronger, as hoped. This was largely due to the benefit obtained from the revised formative assessment.

4.0 SUMMATIVE ASSESSMENT SEMESTER 2

The second semester summative assessment (System Design Project) requires each student to work individually in producing a detailed design for the mechanical services (heating and ventilation plant) for the same building for which they assessed the thermal performance during the first semester, another example of 'authentic assessment' (Dunn et al 2004). Whilst 'authentic assessment' of this sort is desirable and beneficial it can present some difficult challenges where there is a wide diversity in the level of prior experience among the student cohort.

4.1 Diversity issues

There is a shortage of engineers in this specialist field of engineering both in the UK and internationally. This provides a strong driver for Building Services Engineering consultancies to sponsor their employees to study on a part time basis whilst working. Many of these part time students have years of experience working in the construction industry and so study this module with significant prior design experience. Approximately half of the part time students work as electrical engineers and so are not experienced in mechanical system design. Others are relatively new to system design. The percentage of students in the cohort experienced in mechanical design is typically in the region of 10% to 15%. The course also recruits a significant number of full time direct entry students at level five who have studied similar or related courses at Northumbria University or other educational establishments both in the UK, and around the world. As a result of these factors the student cohort is very diverse with regard to their design experience and this presents challenges particularly with the second summative coursework. Put simply the challenge is that this assessment is relatively straight forward for those students with prior design experience and significantly more demanding for those without it.

The coursework specification was prescriptive regarding the engineering solutions that the students were to employ. This was intentional because this module is the very first time that most of the students attempt a full and detailed mechanical system design. It is considered essential that all students gain experience in the fundamental aspects of mechanical services design.

Some flexibility was offered to those students with experience. They were encouraged to propose some alternative design solutions. It was hoped that this would add interest for students. In practice this option was initially received positively by students. There was no evidence of this option having been taken up when the design files were marked. This is unsurprising as it is unlikely a student would compromise a potentially very high mark by expending time and effort on an unfamiliar system design option.

4.2 The sharing of ideas/information

A discussion forum was established on the elearning portal in 2006/07 in order to open up dialogue between the students and to give increased access to advice and support from staff. The intention was to try to close the experience gap by increasing the level of support for the less experienced students and to encourage experienced students to share their experience with others in the cohort where appropriate.

Use of the discussion forum was encouraging during the first semester, with some very effective exchanges. The level of use was however disappointing during the second semester for the System Design Project. In practice there was reluctance amongst the students to post questions. Instead they preferred to wait until the next IT workshop and discuss the issue face to face. A way to encourage the posting of questions could be to prioritise the staff time during the IT workshops to answering questions posted on the forum.

4.3 Expectancy

The 'expectancy value theory of motivation' put forward by Biggs (2003) has already been discussed in relation to the 'value' seen in the formative coursework. There do not seem to be any problems with students not seeing the 'value' of the second semester coursework. This is partly due to the significant percentage of the module marks allocated to this coursework and also the students desire to perform well during the final year project.

The level of 'expectancy' in the students own ability to perform well, however, is often not high. This is particularly true amongst inexperienced students and especially if they feel isolated from the other students in the cohort. This is a major issue which adversely affects the motivation, enjoyment and success of some students. It had been hoped that the discussion forum would improve expectancy in the cohort. Poor engagement with the forum in the second semester reduced its impact. As a result it did not appear to significantly reduce the number of struggling students.

4.4 Group work

Consideration has been given to making the Design Project a group work in order to deliberately mix up those students with and without prior design experience into teams that could then tackle more complex issues and designs in order to better develop the design and team working abilities of the individual team members. If successful this approach would have a number of benefits:

- Group working should help to build camaraderie within the student group and reduce the feeling of isolation which can occur when working on an individual design project. With the help and support of the other group members as well as the module staff the level of student 'expectancy' should improve significantly. With both 'value' and 'expectancy' in place the level of student motivation and enjoyment should hopefully improve.
- Those students without experience would be able to learn from their more experienced peers thus opening up an additional stream of information and ideas in addition to that currently delivered by the teaching staff. The inexperienced designers should be able to offer other skills to the group (IT, mathematics, drawing etc...) and therefore feel like valued team members who are making a valid contribution to the group effort.
- By negotiation with a tutor, regarding the systems to be employed and the problems tackled, it should be possible to ensure that the assessment is suitably demanding for each and every student within the team – something which is not currently achieved. (A similar approach is adopted in the final year design project where each student agrees with their tutor the scope of their project.) In this working environment it would also be easier to encourage innovation and imagination – both of which are expected at level six without offering opportunity for students to develop these skills at an earlier level.
- The introduction of group/team work into level five of the programme should improve management, team working and communication skills. This is some thing which the last Accreditation Panel suggested that the Programme Team should consider introducing at level five.

Whilst group working can offer many benefits there are also many problems which need to be considered. For example care would need to be taken to ensure that the basic design principles which are relatively easy to convey and understand on a simple project were not lost in the increased complexity of a larger project. Assessing group work is also highly problematic and it is rare when dissatisfaction with the awarded marks allocated is completely avoided. Marks allocation is particularly problematic if some members of the team have not pulled their weight which then can breed resentment among the other group members.

The Programme Team were also wary about implementing this idea due to concerns that some students could hide within the groups and therefore progress straight through to the individual and more demanding level six design project without having truly experienced the design process.

In addition previous experience had shown that group projects tend to result in separation of the tasks and each task being given to the member with the most confidence (prior experience) in tackling that particular task, e.g. one member doing all of the ductwork design, another all of the pipework design, another doing all the psychrometric calculations etc. This would be detrimental to the aim of the module, being that each student gains experience of the entire design exercise. It may be possible to overcome this problem by regular careful monitoring by the teaching staff to guide the areas of work done by each student. In practice this would be far too time consuming and detract from the business of providing feedback and guidance.

These issues are not easy to resolve, however, they are worthy of consideration because the benefits which could be reaped are significant.

CONCLUSION

Through reflection of the experience gained during the 2005/06 delivery of BE0750 and reading the work of Biggs (2003) it has become clear that students must have an 'expectancy' that they can successfully complete an assessment task and also see the intrinsic 'value' of engaging in the task in order to become motivated to participate. Either one of these factors in isolation does not result in a motivated student. Biggs (2003) suggests that the relationship between 'expectancy and value' is one of multiplication and this seems to be supported by the experience gained on this module.

Re-examining the concept of the formative coursework and incorporating ways to add 'value' in the student's eyes by effective alignment with the later summative assessment has been demonstrated to be a successful alternative to forcing student engagement with activities by making them summative. By aligning the formative and summative tasks more closely and providing quality written feedback it has been possible to both improve engagement with formative task and also enhance the quality of the subsequent summative work.

The introduction of group work into the level 5 System Design Project is fraught with potential problems associated with assessment and student performance. If these difficulties could be overcome so that group project work could be successfully implemented group project work could bring great rewards, primarily due to the anticipated enhancement of student 'expectancy' and therefore improve student enjoyment and motivation levels. Ways to encourage the use of discussion forums and/or blogs will continue to be sought in order to improve student 'expectancy' whilst these issues around group working are being resolved.

REFERENCES

- Biggs, J. (2003) *Teaching for quality learning at University – What the student does*. Buckingham: The Society for Research into Higher Education and Open University Press.
- Dunn, L. et al (2004) *The Student Assessment Handbook*. RoutledgeFalmer.
- Irons, A. (2005) *Red Guide 19: Formative assessment and formative feedback*. Northumbria University at Newcastle.
- Northumbria University (2005) Building Services Engineering accreditation document

BIBLIOGRAPHY

- Race, P. (2001) *The lecturer's toolkit*. 2nd Edn. London: Kogan Page Limited.