Student perceptions of their learning and engagement in response to the use of a continuous e-assessment in an undergraduate module

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Title

Student perceptions of their learning and engagement in response to the use of a continuous e-assessment in an undergraduate geography module.

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Abstract

Student engagement is an important issue in Higher Education, and is related to the quality of the student experience. Increasing student engagement is one way of enhancing quality at a Higher Education institution. An institution is able to influence student engagement in a number of ways, one being through curriculum design. The use of a low stakes continuous weekly summative assessment had a positive influence on student engagement in an optional level 5 (second year) undergraduate geography module. Students considered their increased engagement was a direct consequence of this assessment method. It was also found that students thought they improved their learning, particularly their understanding, as a result of the continuous assessment. This study suggests that carefully designed assessments can be used to increase student engagement, student learning, and as a result, contribute to improving the quality of the overall student experience.

Introduction

Astin first introduced the idea of student involvement, later termed student engagement, in 1984 and defined it as 'the amount of physical and psychological energy that the student devotes to the academic experience' (Astin, 1999, 518). Student engagement has been identified as an important topic in enhancing learning and teaching (Trowler, 2010). Kuh et al. (2007) suggest that an institution plays an important role in student engagement, through the curriculum, resources, learning opportunities and support services it provides. Trowler (2010) states that 'improving learning' is only one of the reasons to increase student engagement, with marketing, increased retention rates and economics among the other reasons listed.

Mitchell and Carbone (2011) suggest that the nature of a task students are carrying out will influence their engagement with the task. It is recognised that student engagement can be influenced by practices at their institution (Kuh, 2009; James et al., 2010). This is a belief shared by Robinson and Hullinger (2008) who think that faculty members can promote student engagement, particularly through the online learning environment, and that curriculum design should include an increased focus on student interaction with class materials. What students view as important is frequently shaped by assessment (Lemanski , 2011; Russell and Barefoot, 2011) and many students are not willing to spend time on work that they do not see directly contributing to their degree classification (Rust, 2002) – i.e., work that in their opinion 'doesn't count'. The word 'backwash' is used to refer to the effect assessment has on student learning (Biggs and Tang, 2011); that it is assessment, and not the curriculum that determines how and what students learn. We can therefore see that the choice of assessment is crucial, and correctly aligning the assessment to the learning outcomes can create a positive learning experience (Biggs and Tang, 2011), even if the student is 'learning for the assessment'. 'Assessment of student learning is a fundamental function of higher education' (Higher Education Academy, 2012, 7) and assessment is important both for accreditation and in order to support learning (Taras, 2008). In many cases there is a belief that an assessment is either formative, to support learning, or summative, leading to accreditation (Wiliam and Black, 1996). However it is possible to design an assessment strategy that both supports learning and leads to accreditation (Trotter, 2006; UK Centre for Legal Education, 2010; Ghiatău et al., 2011).

One method that has been used to try to increase student engagement is the use of continuous assessment methods, particularly e-assessments delivered using a module's virtual learning environment (VLE). Continuous assessment can be defined as 'the use of tests over a learning unit, and the accumulation of results in a final grade' (Miller et al., 1998, 34). The use of continuous assessments through a module or course can be considered to be more 'formative than summative' (Le Grange and Reddy, 1998, 10) with Trotter (2006) using the term 'continuous summative assessment' to refer to this method of assessment.

Wilson et al. (2011) found that using computer administered multiple-choice questions as formative assessment had a positive impact on student performance. Marriott and Lau (2008) used e-assessments and found that they helped to increase student engagement and motivation for learning. Results showed this form of assessment had an important role in the teaching and learning process (Marriott and Lau, 2008). There is some debate as to whether e-assessment, especially in the frequently used form of multiple-choice questions, can help promote deep learning (Jordan, 2009), but studies have found that well designed assessments, including multiple-choice questions, allow testing of higher cognitive functions, such as critical thinking and analysis skills (Brady, 2005; Leung et al., 2008; Draper, 2009). It was found that students learning for a multiple-choice assessment focussed on understanding, while when learning for a long-answer type assessment they focussed on remembering facts to reproduce in their answers (Leung et al., 2008). Multiple-choice and continuous assessment methods were found to be preferred methods of assessment by students (Furnham et al., 2011), so it is hoped that they will encourage engagement, and increase motivation and learning by students (Trotter, 2006). Dermo (2011) noted that student engagement with formative assessment, particularly the feedback, was a challenge and suggested that low stakes grades could be used to engage students with 'formative' tasks.

Student satisfaction is correlated with engagement (Kuh et al., 2007). Positive engagement by students is acknowledged to be an important indicator of quality (Coates, 2005) and it is recommended that this (engagement) is included in quality assurance determinations (cf. James et al., 2010). The student experience is crucial to the success of an institution and as a result the involvement of students in the quality process (assuring and enhancing the quality of their Higher Education) is expected to increase (cf. Coates, 2005; van der Velden, 2012; King's College London, 2013; National Union of Students, 2013; The National Student Survey, 2013; The Quality Assurance Agency for Higher Education, 2013; Student Participation in Quality Scotland, 2013). This is becoming more important as a result of the increased marketisation of Higher Education (Brown and Carasso, 2013), and the debates surrounding the idea of the 'student as consumer' (e.g., Molesworth et al., 2010). It is therefore important for institutions to try to increase student engagement as a method of quality enhancement.

The National Student Survey (NSS) (which is carried out across all publicly funded Higher Education Institutions in the UK) is recognised as a key measure of student satisfaction (The National Student Survey, 2013). Results from the NSS form part of the Key Information Set (KIS) data which are publicly available on the Unistats website, allowing comparison of different universities and courses by prospective students (Unistats, 2013). It is therefore within a University's best interest to achieve as high student satisfaction in the NSS as it can.

This study seeks to investigate the views of students on the use of weekly e-assessments in a module and whether it has any impact on their perception of their engagement with this module compared to other modules they study which are assessed using more traditional methods.

Methods

This study focuses on an optional 20 credit Level 5 (second year undergraduate) Physical Geography module delivered at a UK Higher Education Institution. This module is delivered as a two hour session (consisting of lectures, seminars and practicals) weekly for 24 weeks. All course materials are available via the module's virtual learning environment (VLE). In 2011-2012 20% of the module was assessed using one traditional (in-class) test; in 2012-2013 this was changed to continuous weekly online tests (time-constrained tests or TCTs), taken in the VLE in the students' own time, each worth 1% of the assignment grade. Feedback and grades for the e-assessment was mostly provided immediately as many questions could be marked by the computer. As well as identifying correct and incorrect answers full feedback was provided for every question; whether they answered correctly or incorrectly the student would be provided with a full explanation of the correct answer. Occasionally the questions needed to be marked by the tutor rather than the computer, in which case the feedback was provided within 24 hours of a test closing. Both types of test (traditional and online) comprised multiple-choice questions, short answer questions and data interpretation questions.

Questionnaires

A questionnaire investigating student attitudes to learning and assessment, particularly related to the selected module, was developed and completed by two student cohorts studying this module (2011-2012 and 2012-2013). The 2011-2012 cohort had not undertaken continuous e-assessments so the questionnaire asked their opinion on this as an assessment method, whereas the 2012-2013 questionnaire asked students their opinion based on their experience of the continuous e-assessments. The students were informed about the purpose of the study and it was made clear that participation was anonymous and voluntary. Both cohorts completed the questionnaires towards the end of the module. The questionnaire produced both quantitative and qualitative data.

Results

Engagement

A number of questions focussed on a student's engagement with the module. Engagement was investigated by looking at student lecture attendance and independent study.

Attendance at lectures

It can be seen that attendance at lectures (Figure 1a) was higher in 2012-2013 than in 2011-2012. 59% of students attended all lectures in 2012-2013 compared to 8% (one student) in 2011-2012. Only one student attended few lectures in 2011-2012, while no students attended few lectures in 2012-2013. Although these data were obtained from the questionnaire, class registers confirmed the attendance information. Reasons students in both cohorts gave for attending all lectures were that the module was interesting, that they enjoyed it, to learn, and to help with assignments. Additionally, a number of 2012-2013 students stated that it was because of the test each week.

Catching up on missed classes

For both student cohorts most students (>80%) stated that they would catch up on any missed material (Figure 1b). Reasons given included: students do not want to fall behind; they want to ensure they understand what they have missed; lectures follow on from each other; they enjoy the module; and, additionally in 2012-2013, in order to successfully complete the TCTs.

[Figure 1]

Independent learning

More students read through their lecture notes after lectures in 2012-2013 (82%) than in 2011-2012 (28%) (Figure 2a). Only 6% of students did not read through their notes in 2012-2013 compared with 43% in 2011-2012. Many of the 2012-2013 students stated that they looked through their notes after a lecture due to the TCT in order to refresh/review their notes before undertaking the test.

A greater proportion of students accessed the lecture PowerPoints on the VLE after the lecture in 2012-2013 than in 2011-2012 (see Figure 2b). A quarter of students said they never accessed the PowerPoints in 2011-2012 compared with 6% of students in 2012-2013. A large number of the 2012-2013 students said they accessed the lecture PowerPoints in order to review the material, to ensure they did not miss anything and to help with the TCTs. Students tended to access lectures from the VLE in 2011-2012 if they had missed a lecture or if they needed help with assignments.

[Figure 2]

Assessment preferences

Preference for online or traditional (test) assessments

The 2011-2012 students had a reasonably even split between a preference for traditional (42%) and online (50%) tests, while the 2012-2013 cohort had a greater preference for online (82%) assessments, with only

one stating a preference for traditional assessments (Figure 3a). The most frequent reasons students gave for the preference of each type of assessment are given in Table 1.

[Table 1]

Preference for weekly or termly (test) assessments

There was no clear preference for weekly (42%) or termly (33%) tests in the 2011-2012 cohort, while the 2012-2013 students preferred weekly assessments (82%) over termly assessments (6%) (Figure 3b). The 2012-2013 student who preferred the termly tests indicated that they liked revising a whole section of a module for a test. Table 2 lists the most frequent reasons given for the preference of weekly or termly tests.

[Table 2]

[Figure 3]

Continuous assessment

Can continuous assessment help to improve student learning?

In the 2011-2012 student group 58% of students thought that continuous assessment would help them to improve their learning, while 94% of the 2012-2013 cohort thought that continuous assessment had helped them to improve their learning (one student provided no answer to this question) (Figure 4a). Reasons that students provided supporting their answers are listed in Table 3.

[Table 3]

Can continuous assessment encourage students to work consistently through a module?

The majority of both student cohorts thought that continuous assessment could encourage students to work consistently through a module, although 16% of 2011-2012 students thought that it would not (Figure 4b).   The students gave reasons as to why they thought this (Table 4).

[Table 4]

[Figure 4]

Feedback

Are immediate results and feedback useful?

Most students thought that immediate results and feedback were useful (Figure 5a), although one 2011-2012 student thought that feedback was already given quickly enough (within three weeks of assignment submission). Reasons given as to why immediate results and feedback were useful included: that it stops a student from worrying about the result; they know immediately what they need to improve on; it is possible to keep track of their progress; they can see straight away where went wrong; that they feel good if they score a good mark after a period of hard work; and that they can understand where/how they went wrong while the assignment is fresh in their mind.

Would test performance one week affect preparation for future tests?

Students were unsure as to whether their performance one week would affect their preparation for following assessment. Figure 5b shows that more students thought that it would (42% in 2011-2012; 53% in 2012-2013) but substantial proportions were unsure, thought it would not have an effect or did not answer. Reasons provided by the students as to their answer are listed in Table 5.

[Table 5]

[Figure 5]

Discussion

Student engagement and assessment

This study found that the inclusion of a low stakes summative weekly e-assessment (also referred to as a time-constrained test or TCT) into a module increased student engagement with that module in terms of attendance at lectures, independent study, and engagement with the learning resources on the module virtual learning environment (VLE). This supports the theory that a student's approach to learning is shaped by assessment (Foster et al., 2012), and that students are motivated by assessment (Brown and Knight, 1994). Leeming (2002) noted that the use of frequent testing led to students studying more regularly. The students in this study undertook more frequent independent study as a result of the weekly e-assessments with one student stating 'it [*the weekly test*] makes me study at least 1-2 hours more a week'. Often student engagement with a module will increase in the week before the deadline of an assessment (Rust, 2002). When traditional assessments are used this may mean student engagement is high at just a few critical points of the module. The use of the weekly e-assessment meant that the students 'can't just work when you have a deadline'. This opinion suggests that, although the weekly tests were a summative assessment, a number of the students did not see them as such, as they did not consider the test closing to be an 'assignment deadline'. This may reflect the useful formative nature of this type of summative assessment. Students also maintained high engagement levels with the VLE throughout the module, a finding which differs from that of Lovatt et al. (2007) who noted that student access to a module VLE decreased throughout a course.

During the 2012-2013 academic year only two out of 200 tests were not completed. This is in contrast to the study by Casey and McVitie (2009) who found low engagement with compulsory continuous assessment components. Each weekly test contributed a maximum of 1% to a student's module grade. Students were aware that by completing all tests they would be able to build up marks throughout the year. All students engaged with the assessment and were rewarded with good marks. When asked if they had any other comments about this method of assessment one student wrote 'The weekly TCTs are an extraordinary way of assessing students. I have always struggled with formal exams and essays. This has enabled me to show my potential. It has also motivated me to work!!'.

When investigating how to increase students' independent study Lemanski (2011) asked students which methods they would prefer to be used to encourage them to complete independent readings weekly throughout a module. Students had various views, with some preferring assessment of the readings while others thought that as independent adults they should not need any incentives (Lemanski, 2011). Students in this study liked the fact that the tests provided structure (on a weekly basis), with one stating that the tests 'make sure I actually read my notes and understand what was taught each week', but that they could take them at a time and location convenient to them. This ability to have some 'control' over their study is important and allowed students to learn at their own pace (Dermo, 2011) and in a way that is most beneficial to them. For all students the weekly e-assessment had the effect of increasing the frequency of their engagement with the module (as opposed to a module with traditional assessments), a similar result to that of Leeming (2002) and Roediger and Karpicke (2006) who found that frequent testing increased the regularity of students' studying.

Student assessment preferences

Multiple choice and continuous assessments were found to be the most popular types of assessment among students by Furnham et al. (2011). The results of the current study suggest that students liked the online weekly tests but that they would not want to lose the other assessment methods as the more traditional assessments gave them a chance to pursue a small number of topics in greater detail. One 2012-2013 student preferred traditional methods of assessment but stated that 'the online assessments are useful to reinforce knowledge ... . However if the computer goes wrong or if your internet connection dies, they can be a pain. For this reason I prefer traditional assignments'. Students frequently stated that the weekly assessments were less stressful for them than other types of assessment. This is a similar finding to that of Leeming (2002) who found that the use of frequent tests lowered student test anxiety. Having completed the weekly test assessments all the 2012-2013 students provided positive feedback on the tests, with one stating 'the TCTs are amazing, every lecture should have one' and another 'I've actually enjoyed doing these'.

Continuous e-assessment and learning

The type of assessment was found to have no significant influence on a student's approach to learning by Smith and Miller (2005). This is in contrast to Segers et al. (2006) who found that there was a relationship between a student's perception of the demands of an assessment and their learning strategy. Methods of assessment used are often linked with the learning approach taken by a student, and many students will decide which approach to take depending on what they feel will get the highest reward in an assessment (Scouller, 1998; McMahon and Thakore, 2006; Biggs and Tang, 2011). Birenbaum (2007) also found that the learning style and instructional preferences of a student were linked to their assessment preference. Students who preferred essay questions tended to have a deep approach to learning, while multiple-choice questions were preferred by those with a surface learning approach (Birenbaum and Feldman, 1998). This is opposite to the work of Leung et al (2008) who found that there was a focus on understanding material when learning for a multiple-choice test, but that those preparing for longer answer assessments tried to remember a number of facts to include within their answers. The e-assessments used in this module consist of a range of multiple-choice, short answer and data analysis questions.

The current study has not investigated student learning styles, but students were very positive about the impact the weekly e-assessments had on their learning. A number of students used the word 'understand' or 'understanding' when providing an answer to the question 'Do you think that continuous assessment has helped to improve your learning?' They found that re-reading and reviewing the material after lectures led to a strengthened understanding of the material.

The importance of immediate feedback

There is a section on Assessment and Feedback in the NSS which comprises five statements (this is the section with the largest number of statements) (The National Student Survey, 2013). Two of these statements 'Feedback on my work has been prompt' and 'Feedback on my work has helped me clarify things I did not understand' are included in the KIS data sets (Unistats, 2013). This shows the importance of effective and timely assessment and feedback to the learning process, and to student satisfaction with their course. The students in this study thought that the immediate results and feedback from the e-assessments were useful. The use of frequent tests with immediate results and feedback allowed students to keep track of their progress throughout the module. A number of students stated that this was important to them. It also allows the instructor to check on student achievement throughout the module (Roediger and Karpicke, 2006) and intervene if necessary. Many students also found that doing well in the tests was a great motivator and confidence booster and encouraged them to prepare and perform well the next week. If they performed poorly in one test, most students suggested they would try harder to do better the next

week. A few students saw each test as an 'individual topic' and therefore thought that each week's performance was independent of other weeks.

The formative nature of this type of assessment is key to supporting a student's learning (Rust, 2002). Feedback can also help to motivate students to engage (Brown and Knight, 1994); it provides students with a means of improving their work. Butler and Roediger (2008) suggest that the provision of feedback following a multiple-choice test will help students to learn by allowing them to correct errors they have made. Students in this study stated that regular and immediate feedback was useful (cf. Dermo, 2011) and allowed them to 'see straight away where I went wrong', 'apply the feedback asap' and 'know how to improve for the next test'. Roediger and Karpicke (2006, 249) state that 'testing is a powerful means of improving learning, not just assessing it.' The 'testing effect' refers to the fact that if students are tested on material and are successful in recalling that information, they will be able to remember it better in the future than if they were not previously tested on the material (Roediger and Karpicke, 2006). Kang et al. (2007) found that short answer tests led to better long-term retention of information by students than multiple-choice tests, but that the provision of feedback was very important.

Pedagogic implications

The use of the e-assessment led to student perceptions of increased engagement with the module and strengthened understanding of the material covered. The increased engagement was reflected in improved lecture attendance and high levels of engagement with the VLE which were maintained throughout the academic year. These factors may have contributed to the improved grades achieved by the 2012-2013 cohort compared to the 2011-2012 cohort; the average pass grade for this module was higher in 2012-2013 (65%) than in 2011-2012 (57%), while the percentage of students achieving the equivalent of a First class or Upper Second class grade in the module was also higher in 2012-2013 (63%) than in 2011-2012 (54%). These figures support the perceptions of strengthened understanding held by the students.

A student's engagement throughout their degree is often shaped by their experience during their first year at university (Kuh et al., 2007); appropriate assessment and feedback are vital for this (Foster et al., 2012). The use of continuous weekly e-assessments increased engagement with this module for a group of second year undergraduate students. Perhaps the use of continuous weekly e-assessments in the first year of a degree course would encourage increased motivation and engagement amongst students from the beginning of their university attendance. The use of tests such as this would provide a structured environment for independent learning which may help students transition more easily into the Higher Education environment (Harvey et al., 2006). Regular feedback early on would help students' learning as well as acting as a motivational tool.

Limitations

This study was carried out on two small student cohorts at one UK Higher Education institution. All questionnaires were completed anonymously and it was therefore not possible to link student responses to academic achievements in the module. Future research could involve larger student cohorts and perhaps ask a similar questionnaire to groups of students who do not take any modules with continuous e-assessments.

Conclusions

This small scale study has found that students responded favourably to the use of continuous weekly e-assessments as part of an optional level 5 (second year) undergraduate geography module. Students felt that their increased engagement and learning was a direct result of the weekly e-assessments. It is clear that it is possible to increase student engagement through the careful design of a curriculum, including assessment activity (cf. Kuh et al. 2007). Although the focus of this study was the impact of increasing student engagement on student learning, and whether student engagement could be modified via assessment tasks, it is known that increased student engagement is also important to Higher Education institutions in terms of marketing, student retention rates and student performance (Harvey et al., 2006; James et al., 2010; Trowler, 2010). Student satisfaction is known to be highly correlated with student engagement (Trowler, 2010), it is therefore important to acknowledge that improving engagement is a means of enhancing the quality of the student experience (Coates, 2005; James et al., 2010). Ensuring assessments encourage students to engage with learning is one way of doing this.

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Figure captions

Figure 1. a) How many of the timetabled sessions have you attended? and b) If you miss a session, do you catch up on the work you have missed?

Figure 2. a) Do you read through your lecture notes after the lecture? and b) Do you access the lecture PowerPoints via the VLE after lectures?

Figure 3. a) Preference for online or traditional assessments and b) Preference for weekly (continuous) or termly assessments.

Figure 4. a) Could/Did the weekly e-assessments help improve your learning? and b) Would/Did they encourage you to work consistently throughout the module?

Figure 5. a) Are immediate results and feedback useful? and b) Would performance one week affect preparation for following assessments?

Table captions

Table 1: some of the reasons given as to student (test) assessment preference.

Table 2: some of the reasons given as to student assessment (test) frequency preference.

Table 3: Can continuous assessment help to improve student learning?

Table 4: Can continuous assessment help to encourage students to work consistently through a module?

Table 5: Would test performance one week affect preparation for future tests?

Tables

Table 1: some of the reasons given as to student (test) assessment preference

Traditional	Online
used to these types of assessments	less stressed/less stressful
might forget to do the online assessment	less pressure/more relaxed
easier	convenience
prefer preparing for larger assignments	can do it at home
less affected by computer problems	can get feedback quickly
	can organise the time to complete it/do it in own time
	easy to access and submit
	easier to focus

Table 2: some of the reasons given as to student assessment (test) frequency preference

Termly	Weekly
more focused and in-depth study	easier to remember
termly – less constant pressure	less stressful encourage to work constantly
less stressful as would have to do weekly tests whilst getting on with other assignments	constant learning
	more stimulating

Table 3: Can continuous assessment help to improve student learning?

No	Yes
if being forced to learn it makes it boring	makes me re-read my notes
too much work	pushes me to study
	spend more time learning
	make sure I understand what was taught
	builds on knowledge each week
	stimulating and engaging
	more focused

Table 4: Can continuous assessment help to encourage students to work consistently through a module?

No	Yes
too much work	motivator
	to maintain good grades
	cannot just work when have a deadline
	do independent reading and research
	a goal to achieve each week

Table 5: Would test performance one week affect preparation for future tests?

No	Yes
each week is a new topic	high score gives confidence
mistakes are easily rectified	if do badly will work harder on the next