

To see or not to see? A comparison of the effectiveness of seen exams and end of module assessments in online distance learning

Research comparing continuous assessment (e.g. coursework) with examinations generally reveals a student preference for the former. The perceived increased use of continuous assessment periodically captures media attention, with claims of greater numbers of higher degree classifications being awarded. This paper takes a case-study approach to investigate the extent to which different types of assessment allow students to effectively demonstrate and apply their learning. By considering data gathered from second-level, undergraduate students completing 60 point, online psychology modules, this paper investigates assessment effectiveness in terms of student satisfaction, pass rate and level of pass rate. Findings reveal that modules with an end of module assessment (EMA), rather than an examination, have higher completion and pass rates. Whilst students who took a seen exam also performed well, those who completed an unseen exam recorded the lowest overall pass and completion rates, despite high ratings of student satisfaction. Findings are discussed in terms of implications for improved pedagogy and student experience.

Keywords: final assessment pedagogy; student satisfaction; examinations

Introduction

The way in which a module or course is assessed can have far reaching implications for both the students studying the module and the assessors. For students, the assessment approach used may impact on their success as well as their overall satisfaction with the module, which in turn may affect their future study decisions. For the institution providing the module, issues of student retention, satisfaction and pass rates also need to be considered alongside pedagogic design. Of particular importance to both students and educators is the approach taken to final assessment on a module, which often falls into the categories of ‘exam’ or ‘coursework’. Whilst the approach to selecting a final assessment method should be informed by reasoned pedagogical design, other constraints such as position of the module in a qualification, the balance of assessment across a qualification; and the need to meet requirements for accreditation from outside bodies, can all contribute to the approach taken.

Scholarly research into the effectiveness of exams, in comparison with coursework-based final assessment, has provided support for a mixed model approach. Whilst modules which are entirely assessed by exam (with no coursework component) tend to produce lower

overall grades than those assessed entirely by coursework (Gibbs and Lucas, 1987), those which employ a combination of coursework and exam show less diverse differences in pass rates. Despite this generalised finding, there is also evidence to suggest that students of some disciplines perform better in exams than in coursework, and vice versa. Simonite (2003) found that while social sciences students performed better in coursework only modules, computing and mathematics students were stronger in exams, suggesting that the nature of the subject content being assessed may make it more or less appropriate for assessment by exam. Conversely, Kaye and Barrett (2016) found that, while social science students claimed to prefer EMAs over exams, there were no significant differences in pass rates, in the modules they investigated over a 5 year period, between those using an exam and those with an EMA.

Although these mixed findings could be taken as evidence that exams and EMAs offer roughly similar opportunities to students to display their understanding, and ability to critically apply module content, there are nevertheless several other factors which come into play when considering exam performance. This includes student anxiety, working under time pressure, the need to hand write responses and individual differences in a students' health on the day of the exam (Bassey, 1971). Although some of these factors may be used, by some, as arguments to support how exams contribute to transferable skills (e.g. the ability to perform under pressure and to a specified deadline may be of use in the workplace), others have been demonstrated by research to negatively affect exam performance and outcome. Exam stress, for example, has been shown to interfere with academic performance to the extent that differences in an individual student's exam score and coursework score can be significant (Timmins and Kaliszer, 2002). As the assessment strategy employed by a module can dominate the learning experience for students, more so than the process of learning itself, (Foster and Hawkins, 2004) the effects of exam anxiety and stress should not be underestimated.

Aside from more student-centred concerns on exam performance are the more generalised, pedagogical considerations of what an exam can actually assess. In a summary of research into the relative pros and cons of exams, Richardson (2015) highlighted issues relating to lack of feedback and reduced ability to assess both breadth and depth of learning. Bassey (1971) claims that rather than enabling learning, exams simply test knowledge on a given day, meaning the experience does not contribute to learning in the way that

coursework does. Citing the challenges students face concerning time pressure, handwriting and the impact of physical and mental health on exam performance, he claims that exams do not allow students to demonstrate academic excellence in the same way that coursework can, and that 'deeper' learning outcomes cannot be adequately assessed by exams. This suggestion is supported by Kjollerstrom and Martensson (1999), who argue that the use of exams may encourage students to focus their learning solely on the topics they predict will be examined. Whilst, in the short term, such a strategy may lead to exam success, this may come at the expense of a richer, deeper understanding of the topic (Lingam-Willgoss, 2014; Gibbs and Simpson, 2005). Conway, Cohen and Stanhope (1992) considered the difference between 'surface' learning (i.e. learning focused on passing assessment) and 'deeper' learning (i.e. learning that is processed, considered and retained over time) in their study of cognitive psychology students. They asked students who had previously completed a course to answer questions relating to the course content. They found that student understanding and recall of course content that was assessed by coursework correlated with their current test scores whereas exam scores did not. Based on these findings, Conway et al. (1992) suggest that deeper learning is more supported by regular assessment via coursework.

Kennedy, Chan, Fok and Yu (2008) further explored the issue of depth of learning by considering the feedback provided to students. They found that when students were provided with detailed feedback, future performance in other assessments improved. Whilst this may appear somewhat intuitive, it offers support for a model of assessment which is built up of complementary activities (i.e. where feedback on an essay-based assessment, for example, could be used to alter the approach taken to a presentation-based assignment). This kind of model has been shown to work well for coursework only modules, and those which combine coursework and a final exam which follows a similar approach to the coursework assignments (Gibbs, 1992). However, if the approach taken for a final exam is quite different from that of the coursework component of a module, this could explain the disparity between marks for ongoing assessment and final exam score. This disparity could be as much as a 12% reduction in the students' achievement on their final exam compared to their coursework (Chansarkar and Raut-Roy, 1987; Lingam-Willgoss, 2014).

Richardson (2015) argues that the assessment strategy of a module should be determined by the approach the module takes to teaching the subject material, as well as its learning outcomes. Therefore, whilst students may prefer coursework to exams (Furnham,

Garwood and Martin, 2008), decisions on assessment for modules need to be grounded in clear pedagogy, which is informed by scholarly research, aimed at allowing students the best possible opportunity to display their knowledge and understanding of a given subject or question. However, whilst there are a range of different approaches available to assess student learning, other factors can also contribute to the strategy employed, including the position of the module in a qualification; provision for marking; and concerns around plagiarism. Gibney (2013) suggests that due to concerns around ‘contract cheating’ (students buying bespoke essays online), and other approaches to ‘beating’ plagiarism software, more modules are opting for either personalised assessment or the increased use of more traditional unseen exams, in an attempt to ensure that the identity of the student and the provenance of their work can be confirmed. Whilst these concerns are, of course, important they make decisions about assessment strategy more challenging. Nevertheless, based on a detailed review of the literature and research on teaching and learning, Gibbs (2010) argues that: ‘Assessment makes more difference to the way that students spend their time, focus their effort, and perform, than any other aspect of the courses they study, including the teaching’ (p.3). Gibbs further suggests that in order to support deeper learning, which endures over time, the assessment strategy of a module needs to take into account the following factors:

- There should be sufficient assessed tasks to capture sufficient student study time
- Assessment demands should be designed so as to orient students to distribute appropriate amounts of time and effort across all the important aspects of the course
- Tackling the assessed task engages students in productive learning activity of an appropriate kind
- Assessment should communicate clear and high standards
- Sufficient feedback needs to be provided, both often enough and in enough detail
- Feedback should be timely: received by students while it still matters to them and in time for them to pay attention to further learning or receive further assistance
- Feedback should be appropriate in relation to students’ understanding of what they are supposed to be doing

- Feedback needs to be received and attended to
- Feedback should be provided in such a way that students act on it and change their future studying. (Gibbs, 2010).

Taken together, these factors highlight the requirement for assessment to be appropriately tailored to the learning outcomes of the module; the need for structured teaching which is supported by assessment, encouraging deep rather than surface learning; and the need for effective use of feedback from both the student and the tutor perspective. With this in mind, it is perhaps unsurprising that approaches aimed at addressing all of these issues, as well as factors relating to confirming identity and reducing plagiarism, have been implemented. Two approaches of this kind are the seen exam and the end of module assessment (EMA), discussed in the next sections.

The seen exam

In a seen exam students are provided with the questions which may appear on the paper ahead of the exam. This allows students to prepare and develop potential responses to set questions away from the time pressurised environment of the examination room. Scholarly research on the benefits of seen exams at degree level suggests that the approach fosters independent learning and study autonomy in students (Race et al., 2005). This encourages students to be more critical and evaluative in their responses and allows them to demonstrate their skills in planning, organising their ideas and presenting information. Indeed, research has demonstrated that the quality and standard of answers to seen exam essay questions can be higher than answers to traditional, unseen, exam questions (Harbenshaw et al., 1986), suggesting the approach provides students with the opportunity to demonstrate their academic excellence (Rowntree, 1977). Seen exams may also encourage students to carry out more focused research than standard module material revision alone, resulting in deeper learning (Whelan and Brown, 2011).

A seen exam can also address some of the issues of exam anxiety or stress experienced by students – much of which has been attributed by students to the ‘unknown’ element of understanding what examiners are looking for when marking answers (Payne and Brown, 2011). The removal of the need to ‘question guess’ allows for more focused preparation by students which, in turn, can also reduce exam anxiety (Gibbs, 1992). Furthermore, this approach offers support across the board; providing a scaffolding effect for students who

tend to achieve lower marks, whilst simultaneously allowing those at the upper end of the scale to stretch themselves further. Similarly, as a seen exam is still completed under exam conditions, concerns regarding identity confirmation and plagiarism can be addressed. Importantly, a seen exam does not remove all of the identified issues with unseen exams, but offers a tangible solution to some of the key factors identified as affecting exam performance outcomes.

The End of Module Assessment (EMA)

An EMA is used as an alternative final measure of student performance on a module, replacing the need for an exam. EMAs can take the form of an extended essay, practical report, applied assessment, critical review, presentation, or a combination of different approaches. Often an EMA will use a similar approach to that taken in some previous coursework on the module. This allows for the opportunity for progression in learning, based on students making use of previous feedback to improve future work. Applied assessments based on case studies or practical problems, often used in EMAs, have been shown to foster deeper learning in students (Ellis et al., 2005; Dochy et al., 2003). This supports the suggestion that depth of learning is achieved when acquired knowledge is actively used as a tool, with students being able to demonstrate not only what they know but also what they can do with that knowledge (Dochy et al., 2002). EMAs have also been shown to increase feelings of fairness and study autonomy in students (Kniveton, 1996), allowing them to organise and plan their study time to a greater extent than when revising for an unseen exam. Similarly, EMAs allow students time to adequately prepare and reflect on their work, encouraging skills in re-drafting and fine tuning work, rather than focusing on their memory for a given topic (Gibbs and Simpson, 2005). Whilst EMAs are not immune to plagiarism, strategies can be put in place to personalise assessment (by the provision of unique data to work from, for example), which are complementary to the use of plagiarism software (Gibney, 2013).

The current investigation is designed to identify whether the approach taken to end of module assessment differentially affects student performance and satisfaction. As such, it considers data from three modules: one with an unseen exam, another with a seen exam and one which used an EMA.

Methodology

This investigation takes a case-study approach, considering data on student performance and satisfaction gathered from three level two, distance learning, psychology modules, each taking a different approach to final assessment. First, comparison of outcome, in terms of pass rate, level of pass and performance in continuous assessment, using numerical data, is made. Data on student satisfaction, using both numerical ratings and qualitative student feedback, are then considered.

Teaching and learning context

Three modules were selected for comparison, all of which are second-level Psychology modules at the Open University. The student corpus covered by this sample of modules consists of 3658 students, ranging in age from 18-65 years ($M = 34$ years, $S.D. = 9.5$ yrs). 79% of the students were female. All of these modules take a blended tuition approach, with materials being presented both online and in provided textbooks, and tuition is a mixture of online and face-to-face support. Two of the modules have an exam as their final assessment (one seen and one unseen) and one has an EMA. The individual modules are briefly described below.

Module 1

Module 1 (M1) is a level 2, 60-credit psychology module, core to the British Psychological Society (BPS) accredited psychology qualifications at the Open University. It comprises key topic and methods content, required for BPS accreditation, including a residential school element to support methods teaching. This module uses a 3 hour, unseen exam as its final assessment, comprising 3 short answer and 3 essay-based questions. The exam mark comprises 50% of the student's grade, with the remaining 50% gained through 6 continuous, tutor marked, assessments. M1 was in presentation for 13 years, finishing in 2015. The data in this report are taken from the 2014 presentation of the module.

Module 2

Module 2 (M2) is a 60-credit, level 2 psychology module which, together with the level 1 and level 3 core modules, forms the compulsory spine for all Open University psychology

qualifications that are accredited by the BPS. As with its predecessor (M1), this module contains core psychology topic- and methods-based teaching required by the BPS. Due to its position in the qualifications, the assessment for this module was designed as part of the overall assessment strategy for the qualification, and in line with the set QAA benchmarks. Within the overall assessment strategy for the qualification, this module is the first and only module that has an exam. For this reason, and in consideration of scholarly research in the area, the module uses a seen exam which comprises 45% of a student's final grade (the other 55% is assessed by 5 individual tutor marked continuous assessments, and 2 interactive computer marked assessments, iCMAs).

The seen exam is designed to strategically examine topics from across the breadth of the module. Students are provided with six potential essay questions at the start of the module, of which two appear in the exam. Students are not told which two questions have been selected and therefore must prepare responses to all six questions. In the exam itself, students are given two hours to complete the two essay questions and a further hour to answer three short answer questions, from a choice of eight. As with the essay questions, students are presented with a list of all possible short answer questions which could appear on the exam, ahead of time.

Module 3

Module 3 (M3) is a 60-credit, level 2 psychology module which can be taken as a core option in the Open University's BPS-accredited Psychology qualification. The module covers a broad range of applied psychology topics, methods and skills and has an emphasis on how psychology is used to address practical problems. The assessment strategy on the module therefore combines traditional academic assignments with applied assignments. This overall strategy is inherent to the design of the end of module assessment (EMA), which includes both an academic essay question and an applied scenario-based report question. The EMA contributes 50% to a student's final grade, with the other 50% coming from 5 tutor marked continuous assessments and an iCMA.

The EMA is designed to assess both a breadth of subject knowledge and an ability to apply the knowledge and skills gained throughout the module to an applied scenario (i.e. a hypothetical, but realistic, problem, issue or situation that the student must use their

knowledge and skills to address). It draws widely across the module's topic areas and the skills that students develop throughout the module activities and their continuous assessments. Part 1 of the EMA is a traditional academic essay covering the broad conceptual themes of the module content. Part 2 is an applied report addressing a specific scenario, and builds on skills that students develop throughout the module and are assessed on in a shorter applied report as part of their continuous assessment. The timing of this assessment in relation to the EMA ensures that students get feedback on their continuous assessment well before the EMA period. The EMA information and questions are released at the very start of the module, so students are able to plan ahead and prepare throughout the module; at the end of the module, students have three weeks after the end of the taught component to complete and submit their EMA.

Results

This section considers pass rate, pass level and student satisfaction in turn. It is worth noting that, whilst student numbers on the three modules vary (M1 = 1227 students; M2 = 538; M3 = 1893), the cohort of students across the modules were similar in terms of demographics and study intentions (see above), suggesting that any differences found between modules are unlikely to be due to either the type of student or the qualifications they are taking. When considering comparisons between modules, it should be remembered that this report only looks at data from individual presentations of modules, two of which were the modules' first ever presentations (i.e. M2 and M3).

Overall pass rate

Overall pass rate was first considered, comparing exam based modules with the module using an EMA. The baseline was defined as the percentage of students who were registered at the 25% fee liability date, who went on to gain credit for the module. As shown in Figure 1, the EMA module achieved a higher overall pass rate than those using exams, although this difference is not statistically significant ($p > .05$).

INSERT FIGURE 1 HERE

Figure 1: Pass rates of modules

Figure 1 shows that whilst student performance in the seen exam was higher than those who took an unseen exam, performance outcome of the EMA module was strongest overall. This is mirrored by completion rates for the modules with 89% of students on the EMA-based module (M3) successfully completing, compared with 85% for the seen exam (M2) and 79% for the unseen exam (M1).

Difference in continuous assessment and final assessment scores

As research has highlighted disparity between continuous assessment marks and final exam score, the next comparison focused on the distinction between overall continuous assessment (CA) score and overall final assessment (FA), for all modules. For all three modules, scores for continuous assessment were higher than for final assessments (see Figure 2).

INSERT FIGURE 2 HERE

Figure 2: Scores in continuous assessment (CA) and final assessment (FA) dependent on module and final assessment type

Figure 2 shows that for the module using an EMA, the difference between continuous assessment score and final assessment score is minimal. For those using an exam, the differences in scores are slightly larger, with M1 showing a 9% discrepancy between continuous and final assessment score, and M2 demonstrating an 8% difference in scores. However, whilst the differences between continuous and final assessment scores are comparable between the seen and unseen exam modules, the former had higher grades overall than the latter. In terms of the Open University's grade boundaries, this means that students who took an unseen exam recorded an average final assessment score (54%, pass 4, which is a third-class degree equivalent) in the boundary *below* their average continuous assessment score (63%, pass 3, which is a 2:2 degree-class equivalent). This was not the case for the seen exam or EMA module which returned continuous assessment and final assessment scores that were in the same grade boundaries (see next section for further elaboration).

Analysis of grade boundaries

Further analysis of the performance of students across grade boundaries was conducted in order to ascertain if any differences were present between exam and EMA based modules. Independent ANOVAs, comparing exam-based and EMA-based modules, showed no significant differences in student performance at the different grade boundaries (all $ps > .05$), dependent on final assessment type, with the exception of the pass 3 boundary ($F(1,2) = 147.0, p < .05$) where significantly more students on the EMA-based module than the exam-based modules achieved a pass at this level, see Figure 3.

INSERT FIGURE 3 HERE

Figure 3: Student performance in different grade boundaries dependent on module and final assessment

As shown in Figure 3, the two modules which used a seen exam (M2) or an EMA (M3) both had higher student attainment than the module which used an unseen exam (M1). This was shown in higher rates of distinction, grade 2 and grade 3 passes. M2 and M3 have comparable fail/resit rates, whereas M1 had similar rates of pass 4 and fail/resit marks. Most students on the EMA module gained a pass 3 or above. Thus, it appears that this module showed a higher rate of students completing, as well as more students gaining marks at the higher end of the marking scale. The modules using an exam showed a relatively similar pattern of scores across the scale, yet students who completed a seen exam recorded a greater number of higher level passes than those who sat an unseen exam. Interestingly, more students failed the module with the unseen exam than those who completed a seen exam or an EMA (although this difference does not reach statistical significance).

Student feedback on assessment

Whilst the pass rates and level of pass provide information on the outcomes of different modules, allowing some tentative comparisons between those using exams and EMAs,

student feedback on the study experience is also worth consideration. For these purposes, responses to the Open University's Student Experience on a Module (SEaM) survey, completed by students at the end of their module, were used. Investigations were focused on responses to questions relating to ongoing assessment, and preparation for the exam/EMA, see Table 1. The data presented here for M1 were collected in June 2014, and data for M2 and M3 were collected in June 2015.

It should be noted that the uptake and completion rates for SEaM surveys is typically quite low, meaning not all students opt to complete the survey and those who do may not complete it fully (see below). Due to the varying number of students taking each module, comparisons based on percentages alone may be misleading and, as they only represent the responses of those who returned the full survey, may not be applicable to the whole module population. It should also be noted that the data for M2 and M3 are gathered from students completing the first ever presentations of the modules. This means that both the tutors and the students were new to the materials and the approach taken by the modules, making comparisons with more established, longer running modules, challenging. For these reasons, no statistical comparisons between modules for these data have been made, rather they have been treated as a qualitative measure of student experience of different types of assessment.

INSERT TABLE 1 HERE

Table 1: Student agreement with 3 core statements relating to assessment

As shown in Table 1, the more established module (M1) shows high student agreement with statements relating to module satisfaction and feedback received. All modules scored very highly in ratings for feedback enabling preparation for final assessment, with the seen exam module recording the highest score. However, notably, M1 scored lower for satisfaction with assessment for the module and preparation for the exam than M2 and M3. This difference could represent some of the issues previously identified with the use of unseen exams.

Qualitative student feedback

Responses to open-ended questions in the SEaM survey were also considered.

Representative comments for each of the modules are provided below.

Module 1 – unseen exam

For Module 1 comments on the continuous assessment were often positive:

'I found the TMAs [continuous assessments] really helpful to really understand the topics/concepts'

'Although at times I did not enjoy doing so many assessments they did help to solidify aspects of the course into my memory'

'The assignments were helpful in being able to conceptualise and consolidate the material that needed to be learnt.'

However, whilst a few students commented positively on the exam, the majority of comments focused on time pressures, stress, writing by hand, and amount of information to be recalled. Others also suggested the use of an unseen exam was unfair:

'I am sure many other students would agree that a 3 hour exam without any notes does not accurately reflect one's competency on the module.'

'I found the whole exam process very stressful and it did not enhance my learning experience!'

'I found the exam very stressful and feel it was not about testing your knowledge about Psychology but a test on how quickly you can process information if you have a good memory. I hardly slept 3 weeks prior to exam and if I haven't past [sic] I will not be retaking it as I cannot cope with going through it all again. I feel many students are working with the OU because they have previously struggled with the exam system previously'.

'I found [the exam] encouraged learning by heart rather than evaluation which was supposedly the aim'.

Module 2 – seen exam

As with M1, student feedback on the assessment used on the module was generally complimentary regarding the use of varied approaches to assignments:

'The iCMAs were a great way of helping me to learn something I may have skimmed through otherwise as well as the TMAs [continuous assessments] as they brought together the course.'

'The TMAs [continuous assessments] probably made me learn the most, as they required such in depth knowledge, so going over the materials again to write the assignments really made the material stick in my mind.'

'The writing of the qualitative and quantitative reports was particularly interesting and helpful to get an understanding of how reports are written up in the real world. So really it was the direct link to real life with the opportunity to practice using those skills.'

However, opinions on the use and effectiveness of a seen exam were mixed:

'The thought of a final exam terrified me but by the time it arrived I was well prepared and actually quite enjoyed it!'

'[The exam] ... was practically nearly all seen. Takes away the on the day pressure allowing you to be more calm,

'I did not believe the exam assessment was a suitable method of testing our learning. Seen essay questions, although allowing time to research and write notes, do not allow for anything other than how much information you are able to recall on the date of the exam.'

And others specifically cited issues regarding stress, exam nerves and lack of recent experience in sitting exams:

'Only draw-back was the exam. Although I felt prepared and that even when coming out of it I felt I had done my best, those weeks leading up to the exam were filled with nerves.'

'For some people the stress experienced through exams mean that they are at a significant disadvantage.'

'Although the exam was helpful for my learning I found it very difficult and stressful.'

'[The] ...amount of exam content to revise with such little time was too much. It was very difficult and very stressful... [It was] ...very difficult as it is years since I have sat any formal examination.'

Module 3 - EMA

For M3, comments on overall assessment strategy and use of the EMA were largely very favourable:

'I felt that the first part of the EMA was effective at getting me to go back over the years <sic> material and make broader connections between the content. Part two also felt like an effective application of psychology onto a very relative phenomena which emphasised what [we'd] learnt from the overarching course theme (from the everyday to the extraordinary).'

'I found the final EMA really useful for going back over everything we had learned for the module'

'I think [it's] very important not to do the same type of work for every TMA [continuous assessment] and to have some variety in order to develop different skills'.

However, some students commented negatively on the workload associated with the EMA and the study time allocated to it:

'I feel it would be fairer to students in the future if they were allowed the full three week' <sic>.

'give students a fair chance to give the EMA the time it deserves instead of having the shortest time'

'3 weeks to prepare the EMA which required re-reading a lot of the material, was a joke.'

'The biggest issue I had was trying to fit the EMA in, being only 3 weeks after the last TMA [continuous assessment]'

Note that the first two of these comments are factually incorrect: students were given three full weeks between submitting the final piece of continuous assessment and the EMA submission date, and the EMA had the longest time allocated of any assignment. However, these comments do illustrate that some students felt that the time allowed to work on an EMA, despite being comparable to the time allowed for exam revision, was insufficient.

Taken together this student feedback fits well with the notion of students preferring coursework based assessment over exams. Students were largely very positive about the use of ongoing assessment across all of the modules, citing the benefits of varied approaches and task requirements. Equally, the theme of exam anxiety and stress is also evident in the feedback for both the seen and unseen exam. Whilst some students commented that the seen approach enabled them to prepare for the exam, others suggested that the breadth and depth of information that could be used to respond to the seen questions provided additional challenges when revising (note, however, this theme was also identified by some students who completed an EMA). Indeed, several students claimed that the open nature of the provided essay questions left them feeling that they could not adequately focus their responses. For the EMA module, similar comments were made regarding the amount of information students were required to make use of and the openness of questions. Students also cited issues with available time to complete the final assignment, highlighting that this pressure led to feelings of stress and anxiety, which may be comparable with the feelings of some students preparing for a seen exam.

Discussion

The evidence from this investigation suggests that, whilst there are no statistically significant differences in outcomes between modules, students may perform slightly better overall in modules which use an EMA, rather than exam. Moreover, performance in a seen exam may be stronger, and more reflective of past achievement in continuous assessment, than in an unseen exam. Continuous assessment scores appear to remain relatively stable across modules, regardless of final assessment type, but continuous assessment and final assessment scores seem to be closer in modules with an EMA or a seen than those with an unseen exam, where average final assessment score fell into the grade boundary below continuous assessment score. The use of a seen exam or an EMA may also contribute to an overall increased rate of students achieving higher grade passes, compared to unseen exams. Notably, the module with an EMA showed more students completing the module, and with

higher grades, than those using an exam (although consideration of student cohort and study congruency should be taken here).

All modules showed consistently high student satisfaction with overall quality of the module and assessment feedback. However, satisfaction with assessment on the module was comparable for the EMA-based and seen exam-based module, but significantly lower for the unseen exam module, despite relatively consistent ratings for consolidation of learning through assessment and use of feedback across all modules. These findings are supported by qualitative feedback with students stating that the use of ongoing assessment was beneficial to their learning, even when time pressures for an EMA led to some students feeling stressed. In support of previous research, far more students on exam-based modules commented on stress and anxiety experienced both in preparing for and sitting the exam, the more so for an unseen exam.

The current findings are consistent with previous research which highlights the importance of feedback from continuous assessment, in preparation for final assessment on a module (Kennedy et al., 2008; Gibbs, 2010; Richardson, 2015). Across all modules, students reported that feedback helped them to develop their understanding of materials and concepts, implying deep, rather than surface-based learning (Conway et al., 1992; Dochy et al., 2002). For the EMA-based module, comments were made on how earlier assessments aided preparation for the final assessment. Such feedback, combined with the similarity in overall CA and FA scores, supports the suggestion that EMAs allow students to demonstrate their academic excellence through application of previous learning to different contexts (Dochy et al., 2003).

Findings for exam-based modules are also consistent with previous research. Students openly commented on feelings of stress and anxiety at completing exams (both seen and unseen), as well as the view that exams do not fairly assess the skills developed across the module (Bassey, 1971; Foster and Hawkins, 2004). The finding that students who sat an unseen exam were the least satisfied with the module's assessment strategy, despite otherwise comparably high satisfaction ratings, may well reflect this view (Gibbs, 2010). Similarly, Timmins and Kaliszer's (2002) suggestion that the difference between CA and FA scores on exam based modules can be significant is supported, with students who took an unseen exam recording larger discrepancies in grades than those who completed an EMA

(Chansarkar and Raut-Roy, 1987; Lingam-Willgoss, 2014). For the unseen exam, however, this effect may have further reaching implications, with exam scores placing students in lower grade boundaries. Conversely, the seen exam approach may provide a fairer representation of a student's performance across both CA and the exam, supporting the view that seen exam questions encourage students to provide stronger, more developed, answers than unseen exams (Harbenshaw et al., 1986) allowing them to demonstrate their academic excellence (Rowntree, 1977). Interestingly, despite overall better performance in the seen exam module, student feedback still suggested that the requirements of the exam were overly demanding, contributing to an approach to revision based on 'learning for the exam' rather than deeper consolidation of materials (Kjollerstrom and Martensson, 1999; Conway et al., 1992). As such, whilst outcomes based on pass rate and student satisfaction are, of course, important, research which considers the overall student experience of learning could provide further insight into how best to design final assessments.

Implications and future research

These tentative findings not only shine a very positive light on the three modules considered, in terms of student satisfaction and success, but also support scholarly research findings on different approaches to final assessment. A clear student preference for EMA-style assessments is evident. However, the seen exam approach appears to go some way in bridging the gap between ongoing and final assessment and, in this investigation at least, enabling more students to achieve higher marks. Further analysis, based on a larger data set is, of course, required before any further reaching conclusions can be drawn. Future work should also consider study intensity and concurrency as a variable in student outcomes. For example, although the Open University has a primarily part-time student corpus, 72% of students undertaking Module 2 were studying 120 credits worth of modules concurrently, which is the equivalent of full-time study. Approximately 40% of those students were also in full time employment, which may have impacted on their performance. Similarly, comparisons of outcomes from distance learning and more traditional university modules (i.e. those taught primarily through face-to-face lectures and classes) would be beneficial as a means of establishing the degree to which method of delivery of teaching impacts on performance and satisfaction outcomes.

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