

# Introducing open book examinations in clinical education: A case study.

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## Abstract

During the recent COVID-19 pandemic, in common with educators across the Higher Education sector, the School of Dentistry at the University of Liverpool reimagined the learning and assessment strategy by moving from proctored closed book assessment to largely unmonitored open-book examinations (OBE). This article discusses understandings from an educator perspective following our implementation of OBE. The educator perspective discussed here indicates that OBE have the potential to be an authentic and acceptable form of assessment, but that some reframing of attitudes towards assessment from all stakeholders, and their approaches to assessment is necessary when developing these innovative types of assessment.

Key words: Open Book Examinations; Take Home Examinations; Assessment; Innovation in Assessment; Healthcare Education; Authentic Assessment

## Introduction

In healthcare systems, regulators and the public expect that robust progression decisions are supported by valid assessment (Durning et al., 2016; Schuwirth & van der Vleuten, 2020). This can of itself act as a barrier to using different, and more authentic approaches for assessment, as tried and tested approaches may lead to a risk averse approach 'if it ain't broke, why fix it?'. Nevertheless, changes to fine-tuned assessment approaches in normal circumstances, should be well managed and approached with caution, and give due regard to stakeholder and regulator concern (Durning et al., 2016).

The pandemic led to widespread redesign of curricula globally, at pace. The School of Dentistry, was no different in this regard, leading to consideration of innovative assessment approaches, such as open book examinations (OBE).

Literature supporting the use of OBE is scant and is reported to suffer from low methodological rigour (Bengtsson, 2019; Durning et al., 2016; Zagury-Orly & Durning, 2020). Nevertheless, the literature discussed in these reviews provides a nuanced account suggesting that for learners, OBE are an adequate substitute for closed-book equivalents, to test higher order thinking and promote retention. However, OBEs can result in lower preparation motives as they do not engage student anxieties before the exam. Where preparation motives are low, anxiety can present at the time of the exam, when students encounter a greater challenge that is unmet by their preparation. This is despite the availability of unlimited resources during the assessment. Ensuring that

learners understand the challenge and the need for effortful preparation for OBE falls to educators.

In addition to preparing students to meet the challenge of OBEs, educators are reported to recognise several barriers and enablers to using OBE in clinical programmes (Bengtsson, 2019; Durning et al., 2016). Prime amongst educator concerns are the additional, ongoing administrative burden associated with developing OBEs, that OBEs are appropriate for the students' level of learning, concerns relating to integrity of the assessment and the learner's demonstration of the same. However, OBEs may often provide an authentic synthesis of real-world competencies, and therefore are more relatable to the learners' context.

Drawing on these tentative understandings and to add to the knowledge base in this area, the current case study aimed to understand educator perspectives on the areas of greatest concern and opportunity in the introduction of OBE by the clinical sciences team in the School of Dentistry at The University of Liverpool.

## Methods

### Participants

Members of the Clinical Sciences assessment team who developed the OBEs were invited to participate. Three female and seven male team members participated. One participant was aged between 30 and 39, three between 40 and 49, and six participants were over 50. Participants held extensive experience as educators. One participant had less than five years of experience; four team members held between 10 and 20 years, and the remaining five benefitting from more than 20 years' experience.

### Materials

A survey was developed, see Appendix, with items derived following an examination of the OBE literature. A mixture of ranking options and free-text responses were used to elicit understanding in line with research aims.

### Procedure

Participants provided consent before proceeding to survey questions. PollEverywhere was used as the survey software, having first read the participant information sheet. Participants responded initially to demographic questions on age, gender and experience as an educator and were then invited to rank from lists of nine opportunities and nine barriers in order of importance, with rankings ranging from most [9] to least important [1]. Next, participants were prompted to identify opportunities or barriers that were not listed and to indicate a notional ranking. For each of the top three rankings of

opportunities and barriers, participants were asked to reflect using a free-text response format, the reasons for their rankings of challenges and opportunities. The survey closed by asking participant to reflect on the positive aspects of the development and administration process [with the OBEs], and areas of development that they would change.

### Data analysis

Participants ranking responses were analysed descriptively. Adding to understanding, the amount of variance in responses was also examined. Free text responses were analysed using an inductive, theory informed, thematic analysis (Braun & Clarke, 2006, 2014) to develop greater insight into educator responses.

## Results

### Quantitative analysis

First, descriptive analysis of participants responses to the rankings of greatest concern and opportunities to educators, see Tables 1 and 2, respectively.

#### **Table 1 Descriptive analysis of greatest educator concerns**

The chief concerns raised by educators, see Table 1, related to the ability for the OBE to assess the breadth of the curriculum blueprint. When responding, this idea might have influenced the variance seen in relation to satisfying stakeholders which saw the most disagreement between raters. Except for this statement, there was good agreement amongst raters. Next educators, were concerned about the administrative burden of developing and maintaining, which may also relate to one of the two equal third ranked responses that the OBE requires a different skillset in exam question writing. The remaining third ranked question related to student anxieties and unfamiliarity with OBE type tests.

#### **Table 2 Descriptive analysis of greatest educator opportunities**

Educator rankings of greatest opportunities, see Table 2, promoted the notion that OBEs provided benefit by testing depth of understanding, shifting responsibility for learning to the learner and developing corresponding attitudes required for the OBE. Associated with this, and for educators specifically, the move towards OBE was deemed to move assessment towards modern pedagogies whilst at the same time

encouraging collaboration and question writing within a multidisciplinary approach. Except for the lowest ranked question, responses tended towards agreement.

### Qualitative analysis

Free-text survey responses from the assessment team were analysed using thematic analysis to generate deeper understanding. Analysis indicated three broad themes associated with the introduction of OBEs. These included authenticity, reframing, and acceptance; each will now be discussed in turn.

The authenticity theme was multifaceted. For example, educators felt that the process for developing OBEs was collaborative, drawing together teams to develop questions in a multidisciplinary perspective. This collaborative process was welcomed as a supportive, team endeavour that provided informal mentoring for educators that were less experienced in question writing. Also, crucially, educators felt that the OBE experience had dual benefit by translating the multidisciplinary perspective into a rich authentic assessment experience, by enabling the assessment team to set questions that were contextualised within the real-world clinical scenarios that learners can expect to encounter.

For example, a multidisciplinary discussion on a scenario about a 'teenaged Muay Thai practitioner who presents with facial injuries and chipped teeth' generated potential questions on clinical dental treatment of chipped teeth, medical emergencies, intra-professional scopes of practice, dental charging via units of dental activity (UDAs), safeguarding, wound healing, facial anatomy and pathology, health promotion, and

illness behaviour. Disciplinary experts then created detailed model answers to the questions and the answers were google-proofed and blueprinted to learning outcomes by the exam coordinator before being reviewed by the whole team. We found all three of these steps: 1) initial discussion, 2) question and answer writing; 3) checking/blueprinting to be critical to the process and questions and answers frequently required several iterations of steps two and three before being accepted or rejected as part of the final exam paper

Exemplifying these ideas one respondent wrote:

‘Open book exams presents a good opportunity for the staff to develop multi-disciplinary questions. This will help to better test student's understanding of concepts and helps them get a taste of real life scenarios which would be beneficial for them when they enter into practice’

The next theme related to reframing; and specifically of attitudes. Aligned with the previous theme, educators reflected that OBEs appear to support learners in taking greater responsibility for depth of their learning and understanding. In this way the assessment itself could act as a learning experience that would support learners to develop mature attitudes associated with their learning, and meet the demands of more complex OBE questions. Supporting this idea, one participant wrote:



'It also forces the student to realise that they may be faced with queries which they themselves have not worked through prior to the exam and hence will help to remove the 'we haven't covered this therefore I don't know' scenario'

This initial iteration of OBEs was designed to assess higher order thinking and thus created a useful opportunity for learning to engage with metacognitive self-monitoring of their learning approach. This type of internal feedback is suggested to enhance motives to address challenges associated with learning (Gamage, Pradeep, & de Silva, 2022; Fuller et al. 2022; Zimmermann & Moylan, 2009), in this case addressing gaps in knowledge and approach associated assessment; in turn, resulting in changing behaviour and increasing effort to meet the demands.

Relating to the authenticity theme participants raised the possibility that 'collaboration' in an open book environment may not invalidate the assessment. This assertion implied that reframing of attitudes may support more authentic team based modes of assessment, whilst recognising that currently this approach is difficult to achieve.

The third and final theme was about acceptance of OBE, by learners, educators, and stakeholders. For educators how, we prepare learners to know what to expect and ensure adequate preparation, was postulate to encourage learner acceptance of the OBE assessment method. There was an apparent tension between educators recognising the value of the type of assessment, despite the academic burden and valuing OBEs as an authentic, real-world assessment piece. Beyond the acceptance of OBE by learners, acceptance was also juxtaposed with perceptions of how governing bodies or regulators would view the OBE. This had the potential to affect educators' acceptance of the OBE style of assessment as relayed by one of the respondents:

'open book exams are now regarded more highly (increasingly so) by educators but governing bodies see them as less challenging and more appropriate for continuous assessment or coursework ... This does remove some of the motivation in producing them, even though I believe they are actually more challenging'

## Reflective Discussion

The results of this short case study report on the introduction of OBEs during the time of the COVID-19 pandemic. In healthcare education, the stakes involved in progression decisions are high, some argue that this had led to conservatism in the use of assessment approaches that are tried and tested. The pandemic turned this paradigm on its head and in the current setting provided a test-bed for the use of authentic modes of assessment.

The collaborative process to develop the OBE assessments worked remarkably well. For the educator team, there were opportunities to collaborate beyond professional silos to develop tests that were more authentic, engaged deeper learning beyond the recall of facts that was more relatable to the learner experience (Schuwirth & van der Vleuten, 2020). In addition, for educators this development process allowed team members to learn from each other in developing questions that would lead to acceptance from the range of stakeholders (Bengtsson, 2019; Durning et al., 2016). Taking this approach

boosted the confidence of team members who had less experience in developing appropriate questions to test learner application of understanding.

Educators posited that the real world, contextualised assessment would lead to greater acceptance by learners. This view considered that interprofessional perspectives and to demonstrate application of that knowledge and understanding would allow for a more authentic testing experience. At the same time, the educator team recognised the need to support learner reframing by providing insight into the assessment challenges and appropriate preparation motives that are required to meet the needs of the OBE as an assessment for learning. Although beyond the aim of this case study, comparable assessment performance was noted during quality assurance processes when compared with previous, more traditional, forms of assessment.

As a case study, this approach might also go some way to supporting regulators and professional governing bodies that the use of well framed OBEs that test learner application of understanding would be an appropriate non-standard testing approach within the toolkit of available assessments (Bengtsson, 2019; Durning et al., 2016).

Whilst this case study adds to understanding, it is nevertheless limited in its scope, as it the understandings relate to the pre-clinical education in one single dental school.

Nevertheless, this case study is useful information that indicated that OBE assessments can provide strength and depth in assessment as the world emerges from the pandemic, in a manner that supports assessment for learning whilst having due regard to the need for validity of assessment (Bengtsson, 2019; Durning et al., 2016; Zagury-Orly & Durning, 2020).

## Conclusion

The clinical sciences assessment team's introduction of an OBE was delivered at pace, against the backdrop of a global pandemic. The results and discussion here from an educator perspective suggest that OBE can be an acceptable alternative to traditional forms of assessment. However, the introduction of OBE requires careful planning and implementation to manage the burdens for academic teams, student and stakeholders to ensure an assessment that is authentic and will be accepted by all parties. As discussed, this will likely require reframing of attitudes by all parties involved.

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## Appendix

### **4. Open Book Exams: Greatest Concerns. The sentence "The open book format....." may be completed by all of the following options. As a contributor to the assessment process, please rank these options in the order that shows greatest concerns at the top.**

Tap an answer you want to move, then submit your response

...adds to our workload because they are much harder and time consuming to prepare than equivalent closed b...

...cannot easily be used to test the whole curriculum blueprint

...increases student test anxiety because they have never taken this sort of exam before and they may not know ...

...requires a completely different sort of question from the ones that I am used to writing

...makes it very difficult to discriminate between students

...may encourage students to cheat by collaborating with their peers, senior students, siblings etc

...will never be taken seriously as a progression exam because it does not satisfy the needs of stakeholders, suc...

...inevitably includes questions that may be easily answered using google

...may encourage students to plagiarise through cut and paste

**9. Open Book Exams: Greatest Opportunities. The sentence "The open book format....." may be completed by all of the following options. As a contributor to the assessment process, please rank these options in the order that shows greatest opportunities at the t**

Tap an answer you want to move, then submit your response

...tests understanding above rote learning.

...encourages and rewards a mature and responsible approach to learning

...encourages staff to collaborate in creating multi-disciplinary questions

...moves assessment into the 21st century with regard to pedagogy

...moves responsibility for learning towards students

...gives the opportunity to test understanding in a real-world context

...challenges staff to continually write constructively-aligned, google-proof questions

...reduces student test anxiety because students can consult notes

...moves assessment into the 21st century with regard to use of technology



**5. As a contributor to the assessment process, please identify any concern or concerns that are not included in the list and indicate how you would rank them.**

You have not responded

Enter a response

Submit

**6. As a contributor to the assessment process, please reflect on your choices and explain briefly the reason for selecting the option that you have placed at the top of the list**

You have not responded

Enter a response

Submit

**15. What was the most positive aspect of the development and administration process?**

You have not responded

Enter a response

Submit

**16. If we were to create an OBE again, what aspect of the development and administration process would you change?**

You have not responded

Enter a response

Submit

No responses submitted yet.



## Tables for inclusion

**Table 1. Descriptive analysis of greatest educator concerns**

Areas of potential concern rated by educators (i.e. The OBE.)	Median	SD
1. cannot easily be used to test the whole curriculum blueprint	7	2.36
2. adds to our workload because they are much harder and time consuming to prepare than equivalent closed book exams and the questions cannot be used again in the future	7	2.29
3. increases student test anxiety because they have never taken this sort of exam before and they may not know how to prepare for it	6.5	2.56
4. requires a completely different sort of question from the ones that I am used to writing	6.5	2.27
5. makes it very difficult to discriminate between students	5	1.89
6. may encourage students to cheat by collaborating with their peers, senior students, siblings etc.	5	1.80
7. will never be taken seriously as a progression exam because it does not satisfy the needs of stakeholders, such as the university and the General Dental Council	4.5	3.85
8. inevitably includes questions that may be easily answered using google	3.5	1.49

9. may encourage students to plagiarize through cut and  
paste.

2.5 1.49

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**Table 2. Descriptive analysis of greatest educator opportunities**

Areas of potential opportunity rated by educators (i.e. The OBE.)	Median	SD
1. tests understanding above rote learning	7	2.43
2. encourages staff to collaborate in creating multi-disciplinary questions	6.5	1.89
3. encourages and rewards a mature and responsible approach to learning	6.5	1.80
4. moves assessment into the 21st century with regard to pedagogy	5.5	2.22
5. moves responsibility for learning towards students	5	2.31
6. gives the opportunity to test understanding in a real-world context	4.5	2.63
7. reduces student test anxiety because students can consult notes	3	2.13
8. challenges staff to continually write constructively-aligned, google-proof questions	3	1.34
9. moves assessment into the 21st century with regard to use of technology	2	3.14