Veterinary students' perceptions of open-book exams

Abstract

In response to the COVID-19 pandemic, Nottingham Vet School and Bristol Vet School adopted an open-book exam format for all assessments. The aim of this study was to gather the perceptions of open-book exams from students and staff. A mixed methods approach was utilised, and data was collected using questionnaires and focus groups. The quantitative data was analysed using descriptive statistics and Mann-Whitney U tests, while the qualitative data was analysed using thematic analysis. The majority of students found open-book exams less stressful than closed-book exams but did not find open-book exams easier. Students thought that the open-book exams helped prepare them for clinical practice, and the majority of students thought open-book exams were a fair reflection of their ability. Both students and staff thought open-book exams should be part of the veterinary assessment curriculum going forward. In the future, a blended approach of both closed-book and open-book exams would allow students skills and knowledge to be tested in different ways.

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1 Introduction

In March 2020 the COVID-19 pandemic forced veterinary schools across the UK to move teaching and assessment online, and in response to this many veterinary schools including The University of Nottingham and The University of Bristol changed their assessments to an open book format. The purpose of this research was to gather veterinary students' perceptions and experiences of the new open book format of assessments. This was done through questionnaires and focus groups. To properly understand and contextualise the data gathered it is important to first understand the purpose and context of assessments within the veterinary curriculum.

1.1 The purpose of assessment in the veterinary curriculum

When evaluating assessments within the veterinary curriculum we must first define the purpose of the assessment, as any decision made regarding assessments rests around the alignment and purpose of the course curriculum and programme of study (Norcini et al., 2018). Weeden et al. (2002) describes a four-fold classification for the purposes of assessments including, "diagnostic" to identify students current performance, "formative" to aid students learning, "summative" to certify an end of course or to grade performance, and "evaluative" to determine how institutions or teachers are performing. Lockyer et al. (2017) also describes two of the core principles of assessment as 'assessment for learning' and 'assessment of learning' (Lockyer et al., 2017).

Assessment of learning has traditionally been the main purpose of assessment, and the ability of assessment to evaluate the quality of learning has long been known (Ramsden, 1997, Maclellan, 2001). However in recent years there has been a shift of focus from 'assessment of learning' to 'assessment for learning' (Martinez and Lipson, 1989, Schuwirth and Van der Vleuten, 2011) as the value of assessment as an essential educational tool to aid and enhance learning has been recognized (Fuentealba, 2011).

Assessment in medical education is multi-faceted, with multiple different purposes; evaluating competency, driving and aiding learning, and multiple different stakeholders; students, teachers, patients, professional and regulatory bodies. Therefore, the desired outcomes and the importance assigned to each individual variable making up the assessments vary depending on the priority and need of the individual or organisation (Norcini et al., 2011, Fuentealba, 2011).

1.2 Assessment of Learning

Assessment of learning is infrequent, commonly at the end of a year and often referred to as summative assessment, resulting in a score or grade based on student performance.

1.2.1 Bloom's Taxonomy

In 1954, "The Taxonomy of Educational Objectives" was developed by Benjamin Bloom, more commonly known as "Bloom's Taxonomy" in an attempt to produce a framework for categorising educational goals (Bloom, 1956, Armstrong, 2016). Bloom's taxonomy describes three learning domains; the cognitive, the affective, and the psychomotor, each with a cumulative hierarchical structure of categories in which mastery of the previous simpler category was a prerequisite before mastery of the next, more complex one (Bloom, 1956, Krathwohl, 2002). Bloom's taxonomy was then revised in 2001 to allow for a more dynamic and fluid structure of the designated categories. The authors of the revised taxonomy replaced the categories with verbs rather than nouns and made small changes to the structure while still keeping with the overall ideas and structure of the original taxonomy in an attempt to make it more applicable and useful with modern teaching methods (Anderson and Krathwohl, 2001, Krathwohl, 2002).

The first domain described by Bloom was the cognitive domain, and Figure 1 shows the main categories and many subcategories from the revised taxonomy, with

increasing complexity starting with ‘Remember’ then progressing to ‘Understand’ then to ‘Apply’, then to ‘Analyse’, onto ‘Evaluate’ and finally ‘Create’.

Structure of the Cognitive Process Dimension of the Revised Taxonomy

1.0 Remember – Retrieving relevant knowledge from long-term memory.
- ***1.1 Recognizing***
- ***1.2 Recalling***

2.0 Understand – Determining the meaning of instructional messages, including oral, written, and graphic communication.
- ***2.1 Interpreting***
- ***2.2 Exemplifying***
- ***2.3 Classifying***
- ***2.4 Summarizing***
- ***2.5 Inferring***
- ***2.6 Comparing***
- ***2.7 Explaining***

3.0 Apply – Carrying out or using a procedure in a given situation.
- ***3.1 Executing***
- ***3.2 Implementing***

4.0 Analyze – Breaking material into its constituent parts and detecting how the parts relate to one another and to an overall structure or purpose.
- ***4.1 Differentiating***
- ***4.2 Organizing***
- ***4.3 Attributing***

5.0 Evaluate – Making judgments based on criteria and standards.
- ***5.1 Checking***
- ***5.2 Critiquing***

6.0 Create – Putting elements together to form a novel, coherent whole or make an original product.
- ***6.1 Generating***
- ***6.2 Planning***
- ***6.3 Producing***

Figure 1: A revised version of Bloom’s Taxonomy from Krathwohl (2002) Table 3, p215 (Krathwohl, 2002).

The curriculum at University of Nottingham School of Veterinary Medicine and Science reflects this taxonomic model, as students move up through the years the learning objectives and assessment increase in complexity and build upon one another. The emphasis of students’ learning in the early years of the course (years 1 and 2) is focused on ‘Remembering’ and ‘Understanding’, while in the later years of the course students are expected to be able to ‘Apply’, ‘Analyse’, ‘Evaluate’ and ‘Create’. An example of this would be students first learning basic anatomy and physiology such as the names of different bones and organs, being able to identify

the functions of these within the context of the living animal and then using this knowledge to effectively diagnose and develop treatment plans in practice.

1.2.2 Criteria for good assessment

When developing assessments within a curriculum it is important that assessments both fulfil their specified roles while also ensuring confidence in the results to all the stakeholders involved (Norcini et al., 2011). Van Der Vleuten (1996) developed a conceptual formula to evaluate the utility of an assessment method. The model represents the concept, that the utility of an assessment method (U) can be determined by the combination of the following variables: reliability (R), validity (V), educational impact (E), acceptability (A) and cost (C).

$$U = R_{W_r} \times V_{W_v} \times E_{W_e} \times A_{W_a} \times C_{W_c}$$

Figure 2: Van Der Vleuten's utility model from Van Der Vleuten (1996), p55 (Van Der Vleuten, 1996).

Although this formula was not meant as an actuarial algorithm and it's variables are unquantifiable, it gives an idea of which variables must be considered when evaluating the utility of an assessment and shows that different weights should be assigned to each depending on the purposes of the individual assessment (Van Der Vleuten, 1996).

In 2010, Norcini et al. (2011) further developed on these concepts and gave their 'criteria for good assessment'. The criteria determined by Norcini et al. (2011) were; validity or coherence, reproducibility or consistency, equivalence, feasibility, educational effect, catalytic effect and acceptability. The validity or coherence of an assessment is a body of evidence that supports the use of an assessment for a specific purpose. The reproducibility or consistency of an assessment, which is also often referred to as reliability, is whether the results of an assessment would be the same when repeated under similar circumstances. The equivalence of an

assessment is whether the same assessment gives equivalent scores across different institutions or cohorts of students, while feasibility assesses whether the assessment is practical or realistic within the specific context. The educational effect of an assessment evaluates to what extent that assessment motivates the students involved to prepare in a way that is beneficial to their learning. The catalytic effect meanwhile evaluates whether an assessment provides results and feedback that are able to enhance and drive future learning. Finally, the acceptability of an assessment assesses whether the stakeholders involved find the assessment itself and the results of the assessment to be credible (Norcini et al., 2011). Norcini et al. (2011) place particular effect on the catalytic effect of assessments while also acknowledging how the purposes and perspectives of the different stakeholders affect the importance of each individual criteria, for example the educational or catalytic effect of a summative assessment to test the knowledge of medical graduates for a licensing exam is not as important as the validity, reliability or acceptability of such an assessment.

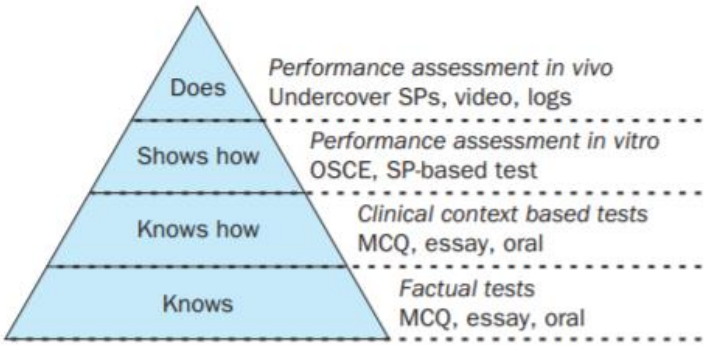
In addition to designing a good assessment that fulfils all the above criteria, a test standard that is appropriate and transparently decided is required. A test standard is the score in a test that serves as the cut-off point to differentiate between the students that perform well enough and those who do not (Norcini, 2003). There are two main types of test standards. The first type of standard is the relative standard, also often referred to as norm referencing and is described as “where the students’ performance is measured against the group” (Rhind, 2006, Norcini, 2003). Norm referencing or relative standards are often most appropriate where the purpose of the examination is to identify a certain number of students, for example in an admissions process where there is only a limited number of spaces available. The second type of standard setting is the absolute standard, also known as criterion referencing “where a student’s performance is measured against an expected standard rather than against the performance of others in the group” (Petrusa, 2002, Norcini, 2003). Criterion referencing is best used when the aim of the assessment is to assess whether the examinees know enough for a specific purpose, for example within the veterinary course this is important in final or licensing exams

when assessing clinical competence (Norcini, 2003). Rather than trying to select a certain number of students to pass, the aim of assessing clinical competence is to ensure all students passing are competent at the clinical skills required, whether that may be all or none (Rhind, 2006, Wass et al., 2001) and therefore criterion referencing would be best in this situation.

1.2.3 Clinical competence

Towards the end of the veterinary curriculum, one of the most important purposes of 'assessment of learning' is the assessment of clinical competence (Rhind, 2006). The RCVS defines competence as "the ability to perform the roles and tasks required by one's job to the expected standard" and explains that "the standard of competence expected at any given time will vary with experience and responsibility". The RCVS acknowledges that the competence of an individual is relative and more is expected as a veterinary surgeon develops throughout their career. However, the role of the RCVS is to ensure that when vet students graduate and are certified to practice as fully qualified veterinary surgeons that they are competent enough to perform their duties as vets safely and to a minimum level of competence. Therefore, the RCVS has set out 'Day One competencies' that new graduates must be able to meet when they qualify, and it is up to the veterinary schools to assess their students by these criteria.

When assessing clinical competence, (Miller, 1990) explains that no single method of assessment is sufficient to provide a judgment of a physician's professional skill or competence, but rather assessment should occur within a 4 tiered pyramid framework, known commonly as "Miller's Pyramid". At the base of the pyramid is the assessment of knowledge or 'knows', then moving up to the assessment of the application of knowledge or 'knows how', then the assessment of the demonstration of knowledge or 'shows how', such OSCEs or practical exams, and then finally the assessment of performance in practice, or 'does' at the top (Miller, 1990).



(SP=simulated patients, OSCE=objective structured clinical examination, HCQ=multiple-choice questions.)

Figure 3: Miller's pyramid of competence from Wass et al. (2001) Figure 2, p946 (Wass et al., 2001)

The extension of Miller's pyramid described by Wass et al. (2001) is shown with the examples of assessment that are appropriate for each level. Rhind (2006) also notes that while the objectivity of assessments at the base of the pyramid is relatively simple to establish, the level of subjectivity involved in the assessment methods increases as the pyramid is ascended. This increase in subjectivity in turn can affect the reliability of assessments and therefore the perceived 'fairness' by students. According to Miller (1990), the intrinsic subjectivity and variance of traditional in vivo assessment methods, such as observing students in wards and clinics means their value in summative assessment is limited, with Wass et al. (2001) describing the attempt to address the challenges involved in developing reliable measurements of student performance that assessments at the top of the pyramid has been described as "the international challenge of the century", and "a gold standard yet to be achieved" (Miller, 1990, Rhind, 2006, Wass et al., 2001).

In an attempt to meet some of these challenges, the term "programmatic assessment was introduced by Van der Vleuten and Schuwirth (Schuwirth and Van der Vleuten, 2011, Van Der Vleuten and Schuwirth, 2005). The programmatic assessment model is defined as "a specific approach to the design of assessment and education aimed at optimising the learning and decision function of assessment"

and attempts to overcome the challenges of limitations of individual assessment methods by aggerating multiple data points from a variety of assessment formats to give a more rounded view of a student's learning, knowledge and clinical skills (Heeneman et al., 2021). For programmatic assessment to be implemented successfully, Heeneman et al. (2021) explains the theoretical principles of both the learning function and the decision function of assessment must be present, and the curriculum should be one with a learner-centred with a constructivist view on education, with an emphasis on life-long and self-directed learning. If programmatic assessment is implemented properly within the veterinary curriculum, especially in the context of workplace based assessment, it allows for a more holistic view of a student's knowledge and skills which gives more points of information to institutions and assessors allowing for more accurate high-stakes decision making (Bok, 2015).

1.3 Assessment for Learning

When planning and designing assessments within the veterinary curriculum, it is important to recognize the vital role of assessment not just as a means to evaluate learning, but also as a tool to drive learning (Fuentealba, 2011). Therefore, many institutions are now investing considerable time and effort into designing assessment strategies that help students develop the skills needed to become effective, self-directed lifelong learners (Fuentealba, 2011, Maki, 2002, Bone, 1999).

The concept of formative assessment as the application of feedback to learning and teaching may be confused as in the context of the terms 'formative assessment' and 'summative assessment', formative assessment can mean just an assessment carried out frequently alongside teaching (Broadfoot et al., 1999). To emphasize the learning aspect of assessment, the Assessment Reform Group proposed alternative terms for formative and summative assessments (Black and Wiliam, 1999, Schellekens et al., 2021, Earl, 2003). Formative assessments became "Assessment for Learning", to signify the learning and teaching process of these assessments, while summative assessments became "Assessment of Learning", to highlight that

the purpose of these assessments were to judge performance and measure learning outcomes (Black and Wiliam, 1999).

A third term "Assessment as Learning" was suggested by Earl (2003), to emphasize the active role of students in self-assessment and self-directed learning, by which the students themselves act as the vital link between the assessment and learning process (Earl, 2003, Earl, 2012, Schellekens et al., 2021, Earl and Katz, 2008, Dann, 2014). Whether assessment as learning is considered as a subsection of assessment for learning or a key concept in its own right is subject to considerable debate, it is important to understand the relevance of both assessment for learning and Assessment as learning as educational tools (Clark, 2012, Lam, 2016, Earl, 2012, Schellekens et al., 2021). However, rather than simply equate formative assessment with assessment for learning, and summative assessment with assessment of learning, it is important to take a more nuanced view and understand that while these may be the primary objectives, summative assessments may function formatively, and formative assessment may function summatively (Bennett, 2009, Wiliam, 2011).

Feedback from assessments for learning can help students identify areas where their knowledge is sound, and also where there are gaps in their understanding and what they can do to improve their chances of achieving their goals. While feedback from summative assessment can be useful, formative assessments defined by Cowie and Bell (1999) as ''*the process used by teachers and students to recognise and respond to student learning in order to enhance that learning, during the learning*'' are crucial as it allows students to not only identify areas of the curriculum they may need to revisit and develop their understanding, but also allow students the time to do this before high stakes summative assessments (Brown, 2005). Meta analyses carried out on literature concerning the influences on student achievement and specifically the effect of feedback on student performance all showed feedback to have a positive effect on student performance (Hattie and Timperley, 2007, Kluger and DeNisi, 1996, Black and Wiliam, 1998, Shute, 2008). The feedback given to students must be detailed, comprehensive and supportive, outlining clearly not only the areas

where students have done well or not so well, but also what they can do to improve (Brown, 2005). How students respond to feedback is just as important as the feedback given (Wiliam, 2011). A study by Kluger and DeNisi (1996) outlined the two types of feedback interventions; those indicating that a student's performance falls short of the target, or that a student's performance exceeds the target. Once this feedback is received, the student then has the following choices to make.

Possible responses to feedback interventions (Kluger & DeNisi, 1996).

Response type	Feedback indicates performance exceeds goal	Feedback indicates performance falls short of goal
Change behaviour	Exert less effort	**Increase effort**
Change goal	**Increase aspiration**	Reduce aspiration
Abandon goal	Decide goal is too easy	Decide goal is too hard
Reject feedback	Feedback is ignored	Feedback is ignored

Figure 4: Possible responses of students to feedback interventions from Wiliam (2011) Table 1, p6 (Wiliam, 2011).

The table above from Wiliam (2011) showing work from Kluger and DeNisi (1996) outlines the types of response available to the student once feedback is received and as demonstrated in bold by the tables, of the 8 possible responses to feedback there are only two responses likely to have positive outcomes, increased effort in response to feedback indicating they are falling short of their target, or increased aspiration in response to feedback indicating they are meeting or exceeding their target.

1.3.1 The educational impact of assessment

Assessments themselves drive students' learning (Muijtjens et al., 1998), as when presented with the prospect of an assessment, students will prepare by learning and revising the appropriate material. However a superficial assessment will drive surface learning, as the focus of the student is on passing the exam, and therefore is in danger of inhibiting deeper learning (Newble and Entwistle, 1986, McLachlan, 2006). In 1976, Marton and Säljö (1976) conducted a study to analyse how different students approached learning, and concluded the two main levels of processing were "surface-learning" and "deep-level learning", and the prospect of assessment affected students attitudes towards the task. Further studies noted the influence

that the concept of assessment had on students approach to studying and while surface and deep learning were based on how students extracted meaning from a specific text, two approaches to how students approach everyday learning were suggested, the “strategic approach” and the “apathetic approach” (Entwistle, 2000, Entwistle and Ramsden, 1983, Entwistle et al., 2001, Tait and Entwistle, 1996). The strategic approach is defined as where the aim of student is to achieve the highest possible grades through organised study methods, time management, and alertness to the assessment process, while the apathetic approach is the antithesis of these attitudes (Tait and Entwistle, 1996, Entwistle and Ramsden, 1983). A deep, strategic approach is related to high levels of academic achievement only if the assessments are built to reward deep understanding of the material assessed, otherwise a surface strategic approach may prove more effective (Entwistle, 2000).

A study by Theophilides and Dionysiou (1996) found that the examination format had an effect on students’ study behaviour and learning strategy. The study found that when students studied for a closed-book exam, they focused on rote-learning and memorising information for specific use during the exam, whereas for open-book exams students focused on collecting and organising information, and the memorising is replaced by critical thinking. Although this study surveyed teacher education students in Cyprus, the students surveyed were of a similar age and level of education as most undergraduate veterinary students in the United Kingdom these results maybe applicable to the veterinary course, particularly the non-clinical years. It is important that deep learning rather than surface learning is encouraged by assessment strategies (Chalmers and Fuller, 2012). Chalmers and Fuller (2012) explain that the choice of assessment system is the biggest influence on the quality of students’ learning, and that assessments that challenge students critical thinking skills encourage students to engage in learning styles that foster deep learning. It is however important to remember that it is difficult to measure how “deep” or “surface” a student’s learning is. The aforementioned study by Theophilides and Dionysiou (1996) relied on students responses to questionnaires to self-evaluate their study behaviour, and so care must be taken when interpreting these results due to the subjective nature of the data.

Studies by Theophilides and Dionysiou (1996), Baillie and Toohey (1997) and Eilertsen and Valdermo (2000) have shown that the open-book exam format encourages students to develop these deeper learning styles, while closed-book formats encourage a more surface approach to learning. It is also reasonable to assume that open-book exams would be ideally suited to the process of "Assessment as Learning" as described by Earl (2003), as while students are completing the assessment they are actively researching and learning about the topic.

1.4 Open book assessments

Open book assessment by its most basic definition is the permitted use of reference materials, notes and textbooks by students during an exam (Eilertsen and Valdermo, 2000). Although only recently introduced to many veterinary schools, the concept of open book assessments is not a new one having been considered by Stalnaker and Stalnaker (1935) as early as 1935 (Eilertsen and Valdermo, 2000). In 1951, Tussing (1951) suggested that open book exams helped "*remove much of the fear and emotional block encountered by students during examination, while, at the same time, it emphasizes practical problems and reasoning rather than recall of facts*". Theophilides and Dionysiou (1996) describe later studies that looked comparatively at different types of assessment. These concluded that open book exams; do not necessarily lead to increased achievement in test scores, particularly when questions were designed to demand higher order thinking (Jehu et al., 1970, Kalish, 1958) and to reduce the stress and anxiety around exams leading to a fairer exam process and longer lasting learning (Feldhusen, 1961, Jehu et al., 1970, Michaels and Kieren, 1973, Weber et al., 1983). These studies also found that reducing the amount of rote learning of facts encouraged students to develop a deeper understanding of the material.

Theophilides and Dionysiou (1996) conducted a factor analytic study to identify the major functions of open book exams, and to what extent these functions are affected by students' level of anxiety and students' expected grades. There were

several major factors identified by Theophilides and Dionysiou (1996). The factors identified were, 'Creative Use of the Knowledge Gained' meaning students were encouraged to think about problems on a deeper level and apply critical thinking in their answers, 'Course Content Mastery' requiring students to develop a deeper understanding of the course subject matter, and 'Student Self-evaluation and Feedback' offering students the mechanism for self-evaluation (Theophilides and Dionysiou, 1996). They also identified 'Reduction of the Examination Stress' which showed although not completely removed, the stress and anxiety around assessments was significantly reduced, and 'Student Self-regulation in Course Studying' meaning throughout the course students were in a position to identify and assess their learning (Theophilides and Dionysiou, 1996). None of these functions were significantly affected by students' anxiety or expected grades. Theophilides and Dionysiou (1996) noted that although the many benefits of open book exams were clear, open book assessments should not be considered a panacea to all assessment problems. Students were tempted to devote large amounts of time locating information during the exams, reducing the time available to formulate their answers, while students also showed the tendency to not prepare as thoroughly for open book exams (Theophilides and Dionysiou, 1996).

A study by Baillie and Toohey (1997) exploring the impact of open book assessment on engineering student's learning also found that open book assessments were successful in encouraging students to adopt a deeper approach to learning, although in this study it was shown that anxiety around the open book exams increased. This was most likely as students struggled to adapt to the change to a new assessment format in the final year of their course, rather than anxiety attributed to the concept of open book exams themselves (Baillie and Toohey, 1997). Eilertsen and Valdermo (2000) also reported students showed anxiety around open book exams when faced with unfamiliar assessments or a shortage of time to prepare. They suggested that this may be mainly due a lack of student preparation, but when introduced to the format in good time and supported through this transition, many students felt at ease with the new open book exam format (Eilertsen and Valdermo, 2000).

1.4.1 Open book assessments in clinical education

The amount of knowledge available to clinicians in both the medical and veterinary fields is growing and expanding faster than ever before, and it is therefore vital that students are able to access and apply the correct information to the specific situation, to become competent in their future roles as clinicians in the years to come (Heijne-Penninga et al., 2008, Durning et al., 2016, Adair and Vohra, 2003). Proponents of open book assessments argue that for a clinical assessment to be relevant, it must challenge the student's ability to understand, evaluate and apply external resources, and that assessments that test these skills are more reflective to real-life clinical practice (Durning et al., 2016, Theophilides and Dionysiou, 1996, Heijne-Penninga et al., 2008). Compared to closed-book assessments then, open book assessments offer a much more realistic reflection of the clinical setting, where a clinician will rely on the many resources available rather than solely on their own memory (Frederiksen, 1984, Feller, 1994, Baillie and Toohey, 1997, Broyles et al., 2005, Durning et al., 2016).

As mentioned previously, open book assessments also encourage students to develop a deeper understanding of the material (Heijne-Penninga et al., 2008, Baillie and Toohey, 1997, Eilertsen and Valdermo, 2000) and students are stimulated to engage with the course content in a more active way (Theophilides and Koutselini, 2000). The use of open book assessments also encourages the implementation of questions that test students' comprehension and application of knowledge, rather than simple recall or reproduction (Heijne-Penninga et al., 2008). Bengtsson (2019) explains the benefits of take-home assessments, which are able to test higher-order thinking, problem solving and the application of knowledge, and this style of assessment lends itself well to clinical and case-based problems (Fuller et al., 2020).

1.5 COVID-19 and reason for study

In the summer of 2020, the COVID-19 pandemic meant that veterinary students at the University of Nottingham SYMS and the Bristol Vet School sat their assessments remotely and un-invigilated for the first time. Under government advice face-to-face

teaching was suspended from March 23rd 2020, and the decision was taken to deliver assessments remotely to minimise disruption to students progression on the course. The assessments for the summer and autumn assessment periods had already been written and reviewed, and due to the short amount of time between the move to remote assessments and the summer and autumn assessment periods, the questions were not altered to reflect the open book format of the assessment.

Students were allowed to access any resources they chose during the assessments, including teaching materials provided by the school, online resources, or their own notes. However, students were advised to revise as they normally would and not to rely on looking up information during the assessments to avoid running out of time. Extra time was given to all students to account for any IT issues that may be encountered with the delivery of the remote assessments. Proctoring software was not used for these assessments, and they were undertaken un-invigilated. It was made clear to students that while they were allowed to refer to resources, collusion or collaboration with anyone else was strictly prohibited and would be viewed by the school as academic misconduct.

In the summer of 2021, students undertaking high-stakes assessments in years 4 and 5 of the course returned to campus to complete their assessments which remained open book but were invigilated to prevent collusion or collaboration between students. Students were allowed to bring a tote-bag containing paper notes and a USB stick containing digital resources. Students were also allowed to access to the internet to access online resources. While the switch to open-book, remote, and un-invigilated assessments has posed many challenges, it has also presented opportunities to develop and improve the existing assessments within the veterinary curriculum.

The aim of this study was to gather the perceptions of open book exams amongst veterinary students, specifically in the following three areas:

- How do veterinary students approach the open-book exams compared to closed-book exams?
- What are the positive or negative thoughts of students towards open-book exams?
- Do students support the use of open-book exams in the future?

2 Materials and methods

2.1 Introduction to materials and methods

This study sought to examine the perception of open-book exams amongst veterinary students at the at the University of Nottingham School of Veterinary Medicine and Science (SVMS) and the Bristol Veterinary School at the University of Bristol. The study used a mixed-methods design with the quantitative data gathered by list, category and scale questions within questionnaires, and the qualitative data was gathered by free text responses from questionnaires and focus groups.

2.2 Data Collection

2.2.1 Questionnaire design and distribution

Four questionnaires were designed and distributed. All questionnaires were designed using JISC Online Surveys software. Respondents were asked to give their permission for their answers to be included in any future studies before they started the questionnaire and advised their answers would be anonymous and confidential. The study received ethical approval from the ethics committee at the SVMS (approval number 3264 201021). No incentives were offered to respondents for completing any of the questionnaires.

Five questionnaires were distributed amongst both staff and students across the SVMS at Nottingham and the Bristol Vet School. Respondents were asked questions about their preparation for the summer's open book assessments, their experience of the open book assessments, the resources they used during the assessments, their experience completing the assessments remotely and their opinion of whether open-book assessments should be used in the future. For the design of the first questionnaire (N1 and B1), A priori themes were used to develop the questions. These themes were derived from the literature around open book exams. Each questionnaire consisted of five sections: introduction and consent, preparation for open-book assessment, approach to open-book assessment, remote assessment,

and space for further comments. The questionnaires included list, category, and free text questions, and Likert-scale questions with a scale of strongly disagree to strongly agree (1-5).

Table 1 – Questionnaire distribution

Questionnaire Name	Purpose of questionnaire	Vet School	Academic year	Delivery method	Year groups
N1	Survey to gather perceptions of OB exams at SVMS from students in years 0-5	Nottingham	2019/2020	Remote	0-5
B1	Survey to gather perceptions of OB exams at Bristol from students in years 1-5	Bristol	2019/2020	Remote	0-5
N2a	Survey to gather perceptions of OB exams at SVMS from students in years 0-3	Nottingham	2020/2021	Remote	0-3
N2b	Survey to gather perceptions of OB exams at SVMS from students in years 4-5 following return to F2F delivery	Nottingham	2020/2021	Invigilated	4-5
S	Survey to gather perceptions of OB exams at SVMS from staff	Nottingham	2019/2020	Remote	Staff

(Table 1 – The above table shows where, when and to whom the questionnaires were distributed to. OB=open-book exams, SVMS=School of Veterinary Medicine and Science, F2F= face-to-face.)

In the following description the questionnaires will be referred to as Questionnaire N1, Questionnaire B1, Questionnaire N2a, Questionnaire N2b and Questionnaire S as shown in Table 1. Questionnaire N2a and N2b will be referred to as Questionnaire N2 where the data is combined as appropriate. Each questionnaire can be found in the appendices.

The student questionnaire was piloted with a small number of veterinary students in May 2020, following which minor typographical changes were made. Questionnaire N1 was distributed to students in years 0-5 at SVMS via an email link following the

assessment period. Questionnaire B1 was identical to Questionnaire N1 and was distributed to students in years 1-5 at Bristol Vet School via an email link following the assessment period. The surveys remained open from 27/05/2020 to 20/07/2020. A full version of the questionnaires is included as Appendix A.

Questionnaire N2a was distributed to students in years 0-3 at the SVMS and Questionnaire N2b was distributed to students in years 4-5 at the SVMS. Both these questionnaires were distributed via an email link following the assessment period and the surveys remained open from 22/11/2021 to 24/12/2021. These questionnaires were kept as similar as possible to questionnaires N1 and B1 to allow accurate comparisons to be drawn between the questionnaires, but slight changes were made to reflect the fact that in 2021 year groups 4 and 5 had returned to campus to sit on-site invigilated open book exams. A full version of the Questionnaire N2a is included as Appendix B. A full version of Questionnaire N2b is included as Appendix C.

Questionnaire S was distributed to staff at the SVMS via an email link following the assessment period. The questionnaire consisted of fourteen multiple part questions which was designed to gather the opinions of staff regarding remote un-invigilated assessments, open-book assessment and their opinions on both these topics moving forward. The questionnaire included list, category, Likert-scale and open questions. A full version of the questionnaire is included as Appendix D.

2.2.2 Focus group design and delivery

Five focus groups were conducted with students at the University of Nottingham SVMS between March 2021 and October 2021. The purpose of the focus groups was to expand on some of the themes raised from the initial questionnaire (N1 and B1) while also giving students a space to share their opinions of the recent open-book assessments anonymously and confidentially. Focus groups were chosen as a method of qualitative data collection, as they enable a more natural setting for students to voice their feelings and experiences (Green and Brown, 2005). There is a

risk with focus groups as peer-pressure may influence what students say or do not say (Green and Brown, 2005), but the anonymous free text responses in the questionnaires offer students the chance to say things they may not want to say in a group of their peers.

The focus groups were designed as semi-structured interviews (Galletta, 2013), and followed a semi-structured script was developed from initial analysis of the open text questions from the responses to questionnaires N1 and B1. The focus groups were piloted with three students from the University of Nottingham SVMS. The pilot lasted for 30 minutes and led to some minor alterations to the wording of the questions.

The focus groups were conducted either in-person or online. Focus groups conducted in-person were recorded with a handheld voice recorder and then manually transcribed to Microsoft Word (Microsoft® Word for Microsoft 365 MSO (Version 2301 Build 16.0.16026.20002)). The focus groups conducted online were recorded on Microsoft Stream (© Microsoft Corporation 2023. Version 1.0.3937.243) and transcribed using transcription software, then manually checked and edited. Each focus group started with a welcome from the moderator, an outline of what students could expect from the session. Informed consent was obtained from each to allow them to be recorded and for the anonymised data to be used for future studies. The moderator then asked a series of questions to the group. The questions asked were designed to gather the students' experience of open book exams, their preparation for open book exams, how accurately the open-book exams reflected their own ability and the impact of open book exams on their mental health. The students were also asked questions regarding the impact of open-book exams on their assessment for learning, whether they felt open-book exams prepared them for moving into clinical practice, and their opinions on remote assessments and return to on-campus exams. As each group had students of different years and stages on the course, the questions asked to each group varied slightly to take this into account. Great care was taken when writing the questions to

avoid any bias or leading questions and for the moderator to remain impartial. See Appendix E for FG script.

2.3 Quantitative Data Analysis

The anonymised data from each questionnaire was exported from JISC Online Surveys to Microsoft Excel (Microsoft® Excel® for Microsoft 365 MSO (Version 2301 Build 16.0.16026.20002)) and SPSS Statistics 28 (IBM Corp. Released 2021. IBM SPSS Statistics for Windows, Version 28.0. Armonk, NY: IBM Corp) for analysis. The Likert-scale questions were assigned the values 1 for strongly disagree, 2 for disagree, 3 for neither agree or disagree, 4 for agree and 5 for strongly agree. The distribution of responses was calculated using to Microsoft Excel (Microsoft® Excel® for Microsoft 365 MSO (Version 2301 Build 16.0.16026.20002)). Density plots of the distribution of responses were inspected and the data was found to not be normally distributed, and therefore non-parametric statistical tests were chosen when analysing the data. Statistical comparisons between cohorts and between year groups were carried out using SPSS Statistics 28 (IBM Corp. Released 2021. IBM SPSS Statistics for Windows, Version 28.0. Armonk, NY: IBM Corp). Mann-Whitney U tests were used to compare between independent populations of students, for example between students from Nottingham and Bristol. A p-value of <0.05 was considered statistically significant.

2.4 Qualitative Data Analysis

The six step method of reflexive thematic analysis described by Braun and Clarke (2006) was used for the qualitative data analysis in this study, and an inductive approach was used. Coding was performed using NVivo (NVivo 12 Version 12.6.0.959 Edition: Pro). A codebook was created in NVivo (NVivo 12 Version 12.6.0.959 Edition: Pro) and was then used as the main reference for the coding of the future questionnaires and focus groups. Coding was also performed by a secondary researcher who independently applied and reviewed codes to reduce researcher bias. The codebook was continually updated as more Questionnaires and Focus groups were analysed through a process of review and refinement.

3 Results

3.1 Response Rate

Table 2 – Questionnaire Response Rate								
	Number of responses							Response Rate
Questionnaire	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Total
B1	N/A	39	63	37	26	7	172	28.6% (172/602)
N1	7	52	89	50	59	39	296	38.0% (296/779)
N2a	0	42	43	16	N/A	N/A	101	15.1% (101/670)
N2b	N/A	N/A	N/A	N/A	10	6	16	5.5% (16/293)

(Table 2 – Response rate by year group)

The 2020 questionnaire received 296 responses from students at the University of Nottingham (N1), a response rate of 38.0%, and 172 responses from students at the University of Bristol (B1), a response rate of 28.6%. The 2021 questionnaire distributed amongst years 0-3 at the University of Nottingham (N2a) received a total of 101 responses, a response rate of 15.1%, and the 2021 questionnaire distributed to students in years 4 and 5 (N2b), received a total of 16 responses, a response rate of 5.5%. Table 2 provides a breakdown of responses from different year groups.

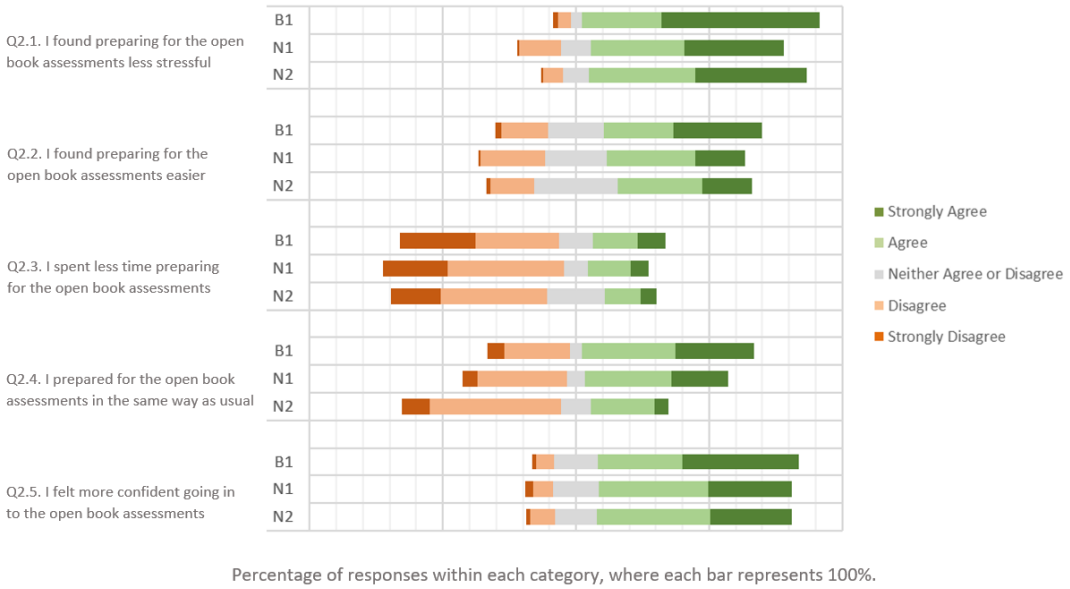
3.2 Quantitative Results

The results of the questionnaires are reported in the following sections. Section 3.2.1 reports responses to questions relating to how veterinary students approach the open-book exams compared to closed-book exams. Sections 3.2.2 and 3.2.3 report responses to questions relating to student experiences of sitting open-book exams and how open-book exams impacted their learning. Section 3.2.4 reports responses to questions relating to collusion and collaboration between students, while sections 3.2.5 and 3.2.6. report responses to questions relating to the future of open-book exams.

3.2.1 Preparation for Open Book Exams

Students were asked about their preparation for the open-book exams, and their responses are shown in figure 5. The distribution of responses are measured using Likert items and Likert-type items and demonstrated below using a Likert-scale.

Figure 5: Student responses to questions relating to preparation for open-book exams.



(Figure 5 – Student responses to questions relating to preparation for open-book exams)

The majority of students across all three questionnaires (over 72%), found preparing for the open-book exams less stressful than preparing for closed-book exams.

The majority of students across all three questionnaires found preparing for the open-book exams easier than preparing for previous closed-book exams.

The majority of students from Questionnaire B1 (59.9%), Questionnaire N1 (68.2%) and Questionnaire N2 (59%) disagreed or strongly disagreed with the statement that they spent less time preparing for the open book exams.

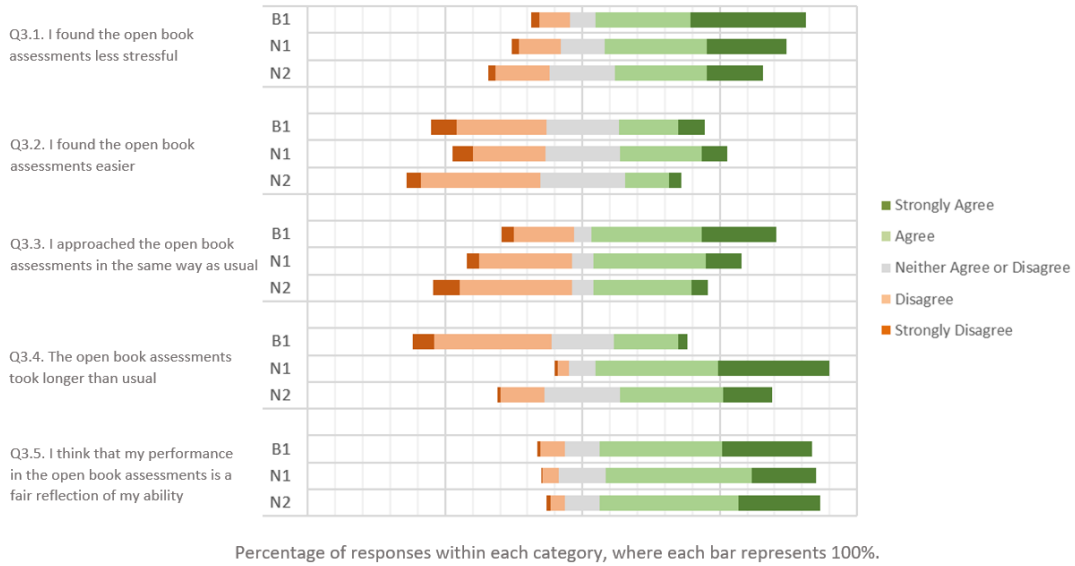
While the majority of Bristol (64.5%) and Nottingham students (54.1%) in the 2019/2020 academic year prepared for the open book assessments in the same way as usual, the majority of students (58.1%) in the subsequent academic year (N2) changed how they prepared for the open-book exams compared to how they would prepare for closed-book exams (U=58.8, p<0.001).

In all questionnaires, the majority of students (over 70%) agreed or strongly agreed that they felt more confident going into the open book assessments than they felt going in to previous closed book assessments.

3.2.2 Experiences of Sitting Open Book Exams

Students were asked about their experiences of sitting open-book exams, and their responses are shown in the figure below. The distribution of responses are measured using Likert items and Likert-type items and demonstrated below using a Likert-scale.

Figure 6: Student responses to questions relating to students' experiences of sitting the open-book exams.



(Figure 6 – Responses to questions relating to students' experiences of sitting the open-book exams)

The majority of students in each cohort found the open-book exams less stressful, however more students in the 2019/2020 academic year (N1) found the open-book exams less stressful than students in the subsequent year (N2) (U=27.57, p=.028).

The majority of students in each cohort found the open book assessments just as difficult if not more difficult than closed-book exams, and more students in the 2020/2021 academic year (N1) found the open-book exams just as difficult if not more difficult than the previous year (U=40.8, p=.001),

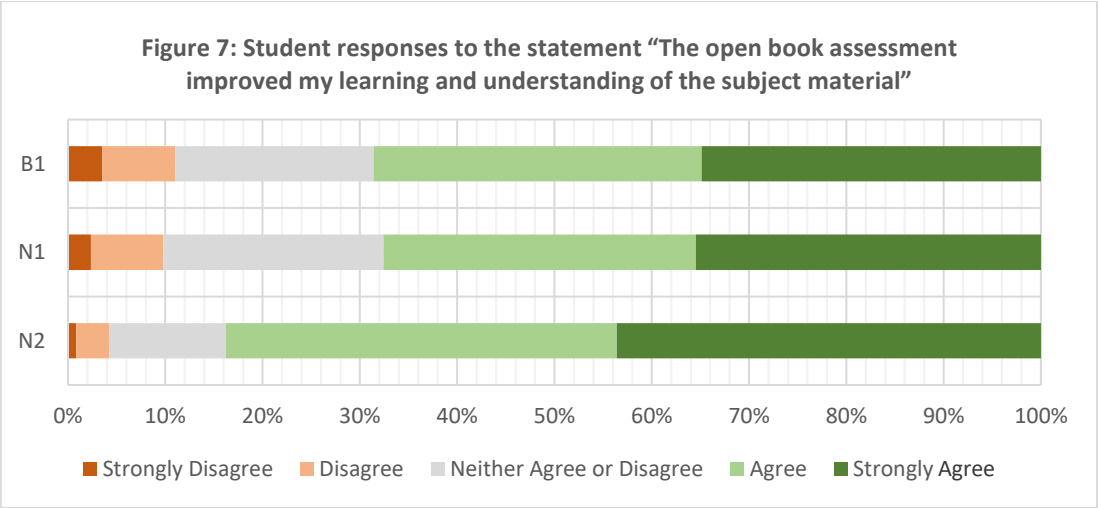
The majority of students in the 2019/2020 academic year (N1) approached the open-book exams in the same way as usual, however in the subsequent year (N2) a slight majority of students (50.4%) reported they did change their approach to the open-book exams compared to closed-book exams (U=34.7, p=.005).

Only 26.9% of Bristol students found the open-book exams to take took longer than usual, however most students (85.1%) in the academic year 2019/2020 at Nottingham and a slight majority of students (55.6%) in the subsequent year at Nottingham found that the open-book exams took longer than closed-book exams.

Across all three cohorts, the large majority of students agreed or strongly agreed that “I think that my performance in the open book assessments is a fair reflection of my ability”.

3.2.3 Assessment for learning

Students were asked to respond to the statement “The open book assessment improved my learning and understanding of the subject material”, and their responses are shown in the figure below. The distribution of responses are measured using a Likert item.



(Figure 7 – Responses to the question "The open book assessment improved my learning and understanding of the subject material")

The majority of students across each questionnaire thought that the open-book exams improved their learning and understanding of the subject material, with more students (83.8%) in the 2020/2021 academic year at Nottingham agreeing or strongly agreeing with this statement than students in the previous year (67.6%) at Nottingham (U=33.4, p=.007).

3.2.4 Collusion and Plagiarism

Students were asked about their academic conduct during the open-book exams, and their responses are shown in the figure below.

Table 3 – Responses to questions regarding plagiarism

	Q9 "Did you copy word for word or "copy and paste" answers from external resources?"		Q9a "Were you aware that this may constitute plagiarism"	
Questionnaire	Yes	No	Yes	No
B1	0.6	99.4	92.8	7.2
N1	3.4	99.6	82.4	17.6
N2	5.1	94.9	84.5	15.5

(Table 3 – The above table shows the percentage of students "Yes" or "No" to questions regarding plagiarism)

Most students said that they had not copied word for word, or used copy and paste in their answers, and most students were aware that this would constitute plagiarism.

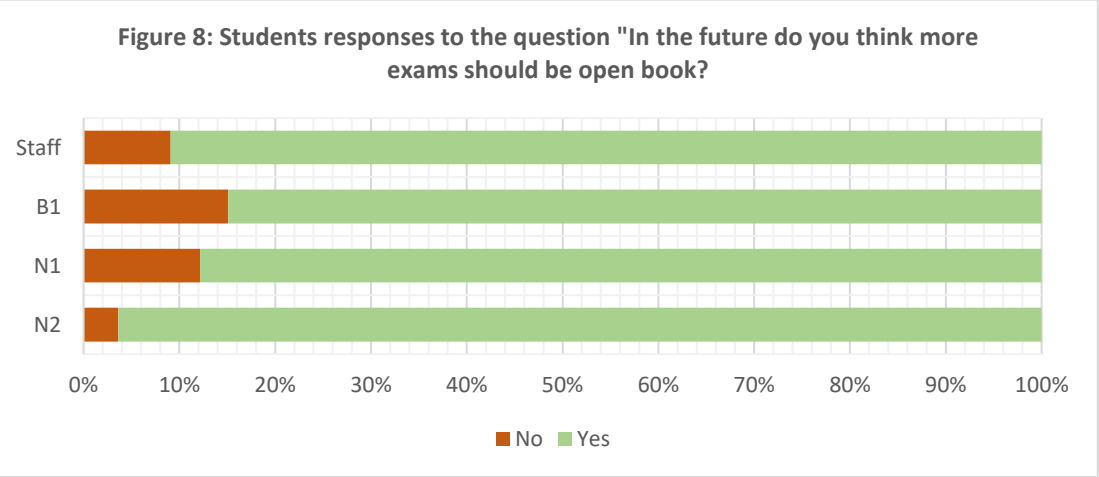
Table 4 – Responses to questions regarding collusion				
	Q10 "Did you discuss questions or answers, in person or electronically, with any other person during the assessments?"		Q10a "Were you aware that this may constitute collaboration or collusion"	
Questionnaire	Yes	No	Yes	No
B1	3.5	96.5	98.8	1.2
N1	1.4	98.6	99.3	0.7
N2	0	100	98.3	1.7

(Table 4 – The above table shows the percentage of students "Yes" or "No" to questions regarding collusion)

Most students said that they did not discuss questions or answers with other students during the open-book exams, and most students were aware that this would constitute collaboration or collusion.

3.2.5 The future of open book exams

Students were asked to respond to the question "In the future do you think more exams should be open book?" and their responses are shown in the figure below.

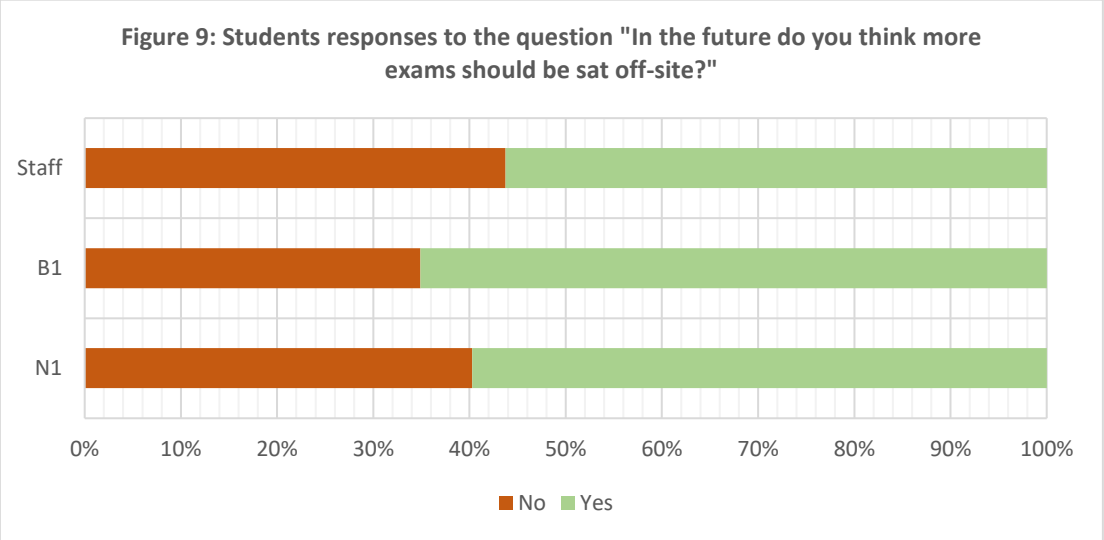


(Figure 8 – Responses to the question “In the future do you think more exams should be open book?”)

Across all four questionnaires, the majority of staff and students said that they thought there should be more open book exams in the future with 90.1% of respondents from Questionnaire S, 84.9% from Questionnaire B1, 87.8% from Questionnaire N1 and 94.4% from Questionnaire N2 all agreeing with the statement. Significantly more students from Questionnaire N2 agreed with the statement than students from Questionnaire N1 (U=17.4, p=.010).

3.2.6 The future of remote assessments

Students were asked to respond to the statement “In the future do you think more exams should be sat off site?” and their responses are shown in the figure below.



(Figure 9 – Responses to the question “In the future do you think more exams should be sat off site?”)

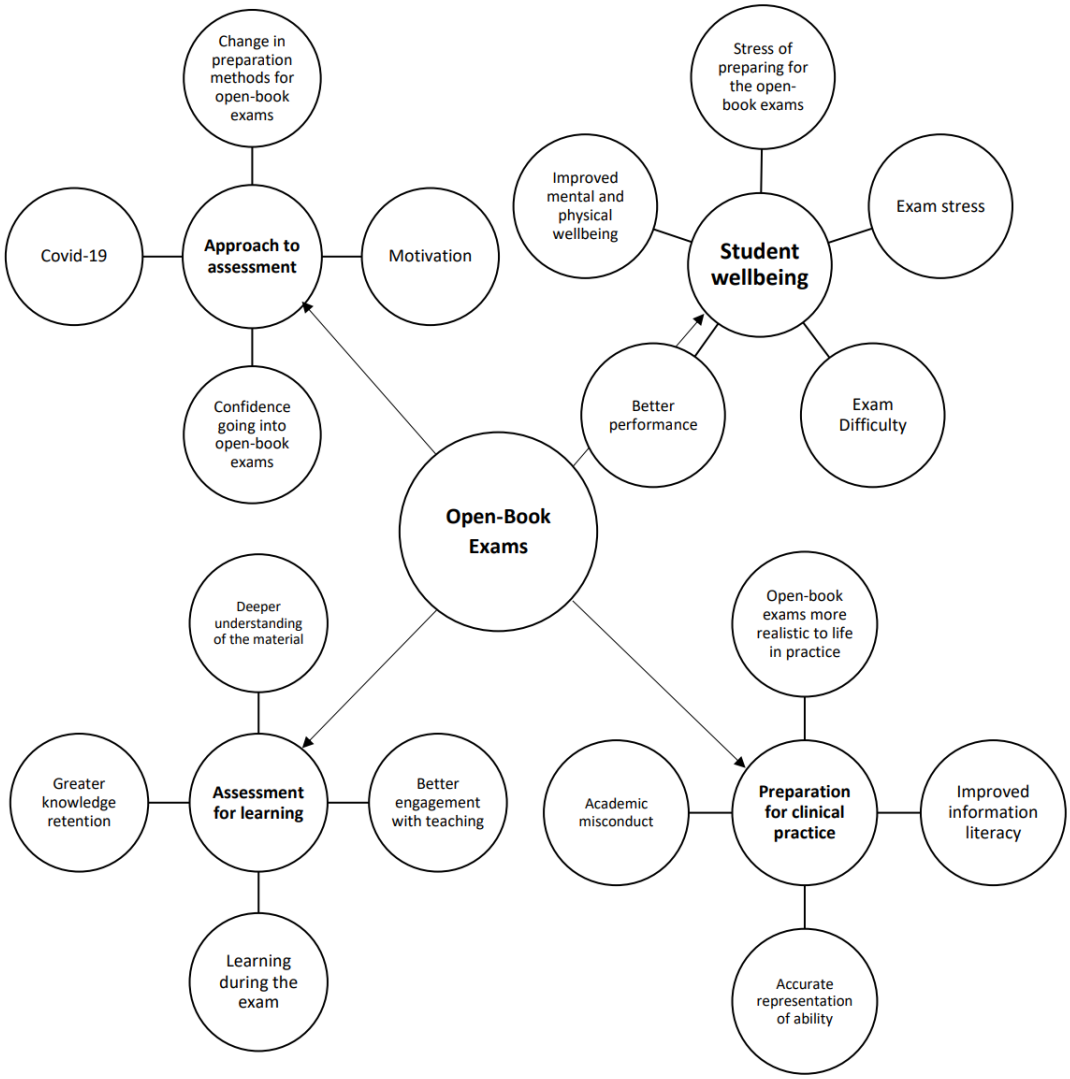
The responses from each of the surveys suggest a mixed response a slight majority of Bristol students (65.1%) and Nottingham staff (56.2%) and students (59.7%).

3.3 Qualitative Results

3.3.1 Thematic analysis introduction

Thematic analysis of the free text questionnaire data and focus groups identified four main themes, each including a number of subthemes (Figure 10). The themes identified from the data were grouped into four over-arching themes; approach to assessment, student wellbeing, assessment for learning and preparation for clinical practice. The following section describes these themes and provides example quotes, triangulation with quantitative data is included where relevant.

Figure 10: Thematic map demonstrating the four over-arching themes and their associated sub-themes.



(Figure 10: Thematic map demonstrating the four over-arching themes and their associated sub-themes.)

3.3.2 Approach to assessment

This theme arose as students discussed how the change in format from closed to open book exams impacted their approach to study in the lead up to assessments. These discussions were not limited to the revision methods utilised in the different contexts, but included broader discussions around motivations, confidence in their own abilities and how the Covid-19 pandemic had impacted their learning.

Change in preparation methods for open-book exams

The free text responses show a positive change in learning behaviour for some students in response to the open book format, in that students reported spending less time memorising facts but more time focusing on the core concepts, as one student reported;

"(I) focused more on note sorting and overall knowledge and understanding rather than focusing on memorising definitions and random information, (which) meant I knew the concepts of everything much more clearly".

However, others reported that they ended up spending more time organising their notes than learning the material;

"It was more about writing concise notes and exam strategy rather than knowing the content."

This effect is less desirable given the importance of core knowledge to clinical competency. These data can be triangulated with the quantitative results, which also suggest that while many students spent a similar time preparing for open and closed book exams, once they had experience of sitting a period of open-book exams the way they prepared in future changed significantly. The open book context clearly results in a change in study approach in preparation for assessments, however, it is not clear if the overall educational impact of these changes is beneficial for learning and development of clinical competency.

Motivation

This theme describes the impact the open-book format had on their motivation to revise. Some students reported that knowing their exams would be open book meant that they felt less pressure which led to a decrease in their motivation to revise;

"Felt much less pressure, but as a result had absolutely no motivation to revise in the way I normally would for exams." and had difficulty concentrating *"I found it difficult to concentrate when revising as I knew I could look things up.".*

However, some students said that the open-book exams meant they felt they had more time to do additional reading and to research subjects that they were interested in which could increase motivation;

"I was able to do more reading around subjects and spend longer on areas I enjoyed as opposed to just learning names or content so recall."

Confidence going into open-book exams

Students reported they felt more confident going into the open-book exams as they knew that they would be able to look information up during the exams and therefore felt more confident in their preparation;

"I know if I understand the concepts, I know if I've got notes, I feel like I can kind of control the outcome a bit more".

However, there were a minority of students that felt less confident going into the first set of open-book exams and this was because students weren't confident in their exam technique as they had no experienced open-book exams before so were not sure how to prepare;

“I wasn't sure how to approach an open-book exam and didn't feel confident in my technique”.

Covid-19

It is important to report the impact that COVID-19 had on students’ preparation, with some students reporting that they found it difficult to concentrate on preparing for their exams;

“I think my answers would be quite different had this not been in the midst of the coronavirus crisis. The reason I spent less time preparing was not because the exams were open book, but because I was struggling to focus in a new environment, there were a lot of changes to day to day life and I generally found concentrating difficult.”.

Due to the COVID-19 restrictions, many students had to move home and for many students this was disruptive for their revision schedules and ability to concentrate;

“*I did find the later prep for the exams challenging due to family being around and not having access to the library and the relevant resources available in the library (especially for the essential reading)!*”.

3.3.3 Student wellbeing

This theme arose as students discussed the effect the change to open-book exams had on their stress levels around the exams, and how this affected the quality of their preparation and exam performance. Students also spoke about the impact of the open-book exams on their mental and physical wellbeing, compared to the traditional closed-book exams.

Stress of preparing for the open-book exams

Students reported a decrease in stress associated with the open book format which enabled them to concentrate on their revision more easily and be more productive while revising;

"*The reduced stress from knowing that the exams would be open-book meant that I actually found revision more enjoyable and I was actually more productive than normal as I wasn't panicking as much as I normally would be*!".

However, some students in the first year of open-book exams, described increased levels of stress associated with being were unsure of how to prepare for a new assessment method and under confident in their open-book exams technique;

"I wasn't sure how to approach an open book exam and didn't feel confident in my technique".

These feeling were far less common in the second year of open book exams, as students became familiar with open-book exams and knew how what to expect from the exams and knew how best to prepare;

"I think the stress moved between areas between the first and the second because in the first lot of exams there was such stress of the uncertainty of what it was going to be like, because we'd never had it before".

Exam stress

Students felt less stress taking the open book exams because they knew they could look up answers and facts they had forgotten;

"It just meant that I didn't overstress myself 'cause if I didn't know something, I could rely on my notes. So it was like that kind of safety net that did kind of make me feel calmer!".

However, some students reported that because they had access to their notes and were allowed to look up the answers to each question, they felt increased pressure to look up questions even if they did know the answer and they found this stressful.

"*I doubted myself more so would look things up to check my initial answer, whereas in a non open-book exam I would always trust my instinct".*

Exam Difficulty

The qualitative data shows that even though students found the open-book exams less stressful than closed-book exams, they still found the open-book exams difficult;

"(I found the open-book exams) less stressful and (they) did not cause me the anxiety that usual exams do without it being in any way easier. I could not have done it without the same level of work put in as in non open book examinations".

While some students reported that they found the open-book exams just as difficult as closed-book exams;

"*The exams were still as difficult as 'closed' exams", "especially the last set of clinical exams I did like I found them I still found them hard, even with them being open book"*.

Better performance

The reduced stress students felt going into open-book exams meant students felt they could perform to a higher level than for closed-book exams;

"I approached it the same way as the other assessments yet was able to perform much better due to being a lot less stressed about the minuscule things I might forget".

Another student said;

“Having an open book exam enabled me to answer first without refering to external sources followed by checking my understanding/ confirming or correcting my answer using external sources. This encourages more effective way of learning in my opinion and prevents the problem of doing poorly solely due to stress/ anxiety with test-taking. ”

This theme also relates to the theme of ‘accurate representation of ability’ as the decreased stress and pressure of open-book exams allows students who panic in exams to give a true account of their ability;

“In exams, I tend to forget the words I am looking for therefore I found it much less stressful because even before the exams, I knew that I would be able to look things up if this happened. Whereas in normal exams, I tend to lose stupid marks simply because the stress gets to me slightly and I forget words”.

<u>Improved mental and physical wellbeing</u>

The qualitative analysis also revealed that the open-book exams led to an improvement in students mental and physical health. Students said this was because the open-book exam format meant they could strike a better work-life balance as they didn’t feel the need to cram before exams;

“I'm feeling like it's still stressful now, but I'm managing it better and I actually I get up at a reasonable hour. I go to bed at a reasonable hour. I have three meals a day that are like, nutritious.”

Students also reported that knowing they could look answers up if needed reduced their stress levels significantly;

"I was a healthy amount of stressed compared to what I used to be like, I used to literally make myself sick, I wont to be able to eat, I'll just get more anxious and have headaches, it would just be awful".

3.3.4 Assessment for learning

This theme arose as students discussed how the open-book exams impacted their learning and understanding of the material. Students also spoke about the impact of the open-book exams on their knowledge retention and engagement with teaching.

Deeper understanding of the material

Students reported that knowing the exams would be open-book exam format meant that they felt less pressure to rote-learn or 'cram' information during their revision period, and so they were able to focus on developing a deeper understanding of the material, as one student said;

"Due to feeling less stressed, and less pressure, I felt I was able to learn the material and understand at a deeper level for use throughout my career as opposed to learning to regurgitate in an exam".

Another student said;

"I focused more on understanding the knowledge rather than just cramming it".

Better engagement with teaching

Students reported that knowing that their exams would be open-book led to a better engagement with the course teaching. Students said that the open-book format meant they were less focused on writing down every fact from lectures, but instead were more engaged and would ask more questions, with one student saying;

“I'm definitely more engaged because I feel like I'm actually actively listening more and taking in more because I feel like I have the time luxury to know it all and, and to create notes”

Another student commented;

“I feel I take so many more opportunities in a lecture to make sure I understand what's being said. I think like the whole of our year, there's so many more people asking questions, querying things”.

Students in later years of the course also spoke about the fact that they were studying not just to pass exams, but to become good veterinarians;

“So for me that's been the biggest, pro of open books, I'm not trying to just memorize to pass an exam. I'm trying to learn to be a better clinician.”

<u>Learning during the exam</u>

The qualitative analysis showed that some students actually used the open-book exams as learning opportunities. One student said;

“I felt that even during the exam it was a learning opportunity for me and having the extra time to allow me to confirm my understanding was a big boost to my confidence and I was so much less stressed”.

Another student said;

“I genuinely feel like I learnt more throughout the exam then I could've any other way”.

Students also spoke about the fact that the method of going through the exam closed-book then again open-book led to them learning during the exam;

"*Having an open book exam enabled me to answer first without referring to external sources followed by checking my understanding/ confirming or correcting my answer using external sources. This encourages more effective way of learning in my opinion".*

Greater knowledge retention

Students felt that they were able to retain more knowledge from revising for open book exams;

"When cramming for closed book exams I found knowledge was more in my short term memory rather than after open book exams I feel I have remembered more",

Students also thought they were better at retaining knowledge from the exams themselves;

"After the exams I feel more confident on the topics due to them being open book. I feel after usual exams content can be forgotten easier as you just learn it for the exams".

3.3.5 Preparation for clinical practice

This theme arose as students discussed how open-book exams could prepare students for working as a vet in clinical practice, through improving information literacy, simulating clinical scenarios, and tasking students to practice the application of their knowledge.

Open-book exams more realistic to life in practice

Qualitative analysis showed that many students thought that the open-book exam format was a much more realistic reflection to life as a clinician in practice, as clinicians will have a base knowledge but look and check many things during the day*;*

"I feel that open book examinations are more representative of a real-life situation. As a veterinary professional, you aren't able to remember everything - a lot of the time you still have to look things up".

Students also thought the open-book exams were a better preparation for life in clinical practice;

"They make for a more realistic type of assessment that better reflects how we will work as vets in the future!"

Students felt the open-book exams gave them more confidence in their knowledge and ability going into clinical EMS and final-year rotations;

"I feel way more prepared to go into to go into placement or practice now then then I did I would have done, I think if we had closed book exams."

However, there were a small number of students who felt less confident going into the later years of the course and spoke about having 'imposter syndrome' and feeling like they only passed the exams because they were open-book;

"*I had had my pre-clinical exams completely open book, I would have felt a lot less stressed, but I would have finished them with a lot less understanding and a lot more impostor syndrome of 'I only passed that because I looked it up'*".

<u>Improved information literacy</u>

Students reported they thought open-book exams improved their information literacy, and many students felt better equipped with knowing where to find the required knowledge in a timely manner;

"I think it's also beneficial as it teaches us how to be able to organise our notes and how we find the information we need in a timely matter, which is very important during a busy day".

Students also reported the open-book exams helped them identify which sources of information to trust;

"*It is important to understand what sources can be trusted and which can't which using it in exams was useful to appreciate*".

<u>Accurate representation of ability</u>

Students thought open-book exams were a fair reflection of their ability because the open-book exams were testing their long-term understanding of material rather than their short-term memory;

"*Open-book is a good way of assessing learning from the whole year rather than fact recall*".

Some students noted the distinction between memory and understanding and explained that they thought open-book exams were a fair way of assessing understanding but not memory;

"(*I) felt the open book (exams) was better at assessing understanding rather than assessing memory*".

Another reason students gave was that they panicked less during the open-book exams and therefore could show their true potential;

"*The exams being open book allowed me to be less stressed and nervous, therefore I was able to answer the questions more calmly showing a more accurate representation of my ability*".

It is important to note that some students thought timing restrictions were important in making the open-book exams a fairer reflection their ability as it means students cannot look everything up, and need to use the open-book aspect as an additional resource rather than relying on the fact they can look information up;

"I found that within the time limits, you wouldn't have time to look everything up, so you had to know the majority to complete, and anything you did need to look up could be just about done within that time. I believe this is a good reflection on how you would know/find information as a veterinarian".

Academic misconduct

The qualitative data showed that students were keen to emphasise they did not engage in either plagiarism or collusion during the open-book exams and many students felt strongly that it was important to maintain their integrity as future veterinary professionals;

"As far as I'm aware, nobody did (cheat), like and it didn't even cross my mind, like we're all at vet school (be)cause we want to graduate and we all know we have to learn it at some point, no one wants to like trick their way through the system like we want to actually be good vets."

Other students spoke about the important of trust and how they thought as a future clinician they deserved a degree of trust;

"I think its an old fashioned attitude to assume that people would have behaved in this manner, especially on a professional degree. There has to be some belief in the integrity of people wanting to do a professional course."

However, when the qualitative data is triangulated with the quantitative data, a sightly different picture emerges with regards to plagiarism, as over 15% of Nottingham students admitted to plagiarising their answers.

4 Discussion

The aim of this study was to gather the perceptions of open book exams amongst veterinary students, specifically in the following three areas:

- How do veterinary students approach the open-book exams compared to closed-book exams?
- What are the positive or negative thoughts of students towards open-book exams?
- Do students support the use of open-book exams in the future?

This study found that students spent just as much time preparing for the open-book exams but found preparing for the open-book exams less stressful. Students also reported that they felt more confident going into the open-book exams, while students in the second year of open-book exams changed their approach to the open book-exams more than students in the first year of open-book exams. The study also found taking the open-book exams to be less stressful, but just as difficult as closed-book exams. Students also thought that the open-book exams improved their understanding of the material. The study found that both students and staff thought that open-book exam format should be used in future.

4.1 Approach to assessment

The majority of students in this study disagreed that they spent less time preparing for the open book exams. This indicates that the majority of students spent just as much time if not more preparing for open book exams than for closed book exams.

Previous studies have found conflicting results regarding the time spend preparing for open-book exams. A systematic review of studies comparing open-book and closed-book exams was conducted by Durning et al. (2016). Betts et al. (2009) and Gharib et al. (2012) found no difference in time spent preparing for open book exams compared to closed book exams. However, studies by Boniface (1985), Moore and Jensen (2007), and Agarwal and Roediger III (2011) reported students

spent less time preparing for open-book exams compared to closed-book exams. Agarwal and Roediger III (2011) suggested the reason for this was that students perceived open book exams as easier and therefore spent less time preparing. The study by Moore and Jensen (2007) showed that while some students still spent the same time preparing, attended classes and performed well when they knew their assessments would be open book, there were a larger number of students who spent less time studying and did not attend as many classes and ended up performing poorly when faced with open book assessments. It is possible this difference between findings might be explained by the type of course and the motivation of the students. The students in the study by Moore and Jensen (2007) were introductory biology students, and the students in the study by Agarwal and Roediger III (2011) were psychology students which are both academic courses, while the students in this study were veterinary students which is a vocational course. It has been shown that there is a positive correlation between student motivation and the importance students place on a course that will help them achieve their future goals (Creten et al., 2001), therefore it is possible that veterinary students spend just as much time preparing for open-book exams as they are motivated not just by passing exams but by being good clinicians. This is reflected in free-text responses by students in this study. However, it is important to note that increase in preparation time does not necessarily equate to improved learning, as students preparing more for exams could indicate poor previous engagement with the course delivery (Heijne-Penninga et al., 2010).

How students' use their preparation time is also an important factor to consider. The results of the study also suggest that while many students spent a similar time preparing for open book exams as they would for closed book exams, once they had experience of sitting a period of open-book exams the way they prepared for future open-book exams changed significantly. This was reflected in the free text responses, with students reporting they spent less time memorising facts, but more time both focusing on the core concepts and organising their notes for the exams. Students also reported that they felt more engaged with the course learning in a more active way and spent more time trying to understand the concepts taught

rather than copying down the teaching without thinking about the concepts. This is also evidenced by the fact that the quantitative data shows that the majority of students thought the open book assessments improved their learning and understanding of the subject material. The quantitative data also shows that more students in the second year of open-book exams thought that open-book assessments improved their learning and understanding of the subject material compared to the first year which suggests that some students who spent an additional year preparing for the open-book assessments and may have developed a deeper approach to learning. However there were students, especially in the second year of open-book exams, who reported spending their revision time focussing on organising their notes in a searchable fashion for the exams rather than learning the material, which indicates that these students were still utilising a surface approach to their learning.

These results are reflected in previous studies that have shown open-book exams promote a deeper approach to learning and encourage students to engage in the course material in a more active manner (Theophilides and Dionysiou, 1996, Baillie and Toohey, 1997, Eilertsen and Valdermo, 2000). A study of open-book exams in Norwegian high schools by Eilertsen and Valdermo (2000) reported that students studying for open-book exams were more focussed on developing a deeper understanding of the material during lessons and spent less time cramming before exams. Baillie and Toohey (1997) also reported that students studying for open-book exams asked more in-depth questions. This was due to the inherent understanding of the material required to succeed in well-designed open-book assessments as explained by Theophilides and Koutselini (2000).

However, a study of psychology students by Agarwal and Roediger III (2011) found that when students were expecting an open-book exam, their study habits dropped and they found students spent less time revising and were less engaged in class. They also found that students did not retain the information they learnt in the longer term as well as they did when taking closed-book exams. This is in disagreement with the findings from the free text responses of this study, where

students reported an increase in knowledge retention after the exams. Care must be taken when directly comparing these results, as the current study did not measure students' performance, and only sought to gather students opinions and relies on students self-perception, whereas the study by Agarwal and Roediger III (2011) did look at student performance. Further work is needed to investigate whether the students' perceptions of their own understanding are correct, and whether they really have developed a deeper approach resulting in a more in depth understanding of core concepts underpinning clinical competency. Another reason for this difference in attitude may be the different courses the students studied. Eilertsen and Valdermo (2000) found that students in vocational subjects (such as veterinary medicine) had a more positive attitude towards open-book exams than students in more academic subjects (such as psychology). This study also found that the majority of students felt more confident going in to the open-book exams. Kalish (1958), found that students studying for open book exams can have greater self-confidence regarding the outcome which can in turn lead to reduced exam preparation. While this study did not find this to be true for the majority of students, there were some students who felt this way as shown in the free text responses.

It is important to consider the impact that COVID-19 had on students' preparation, with some students reporting that they found it difficult to concentrate on both revision and the exams themselves. This was due to them being concerned about their health or their family members health, or not having an adequate space to study at home.

4.2 Exam Stress

In previous studies regarding open book exams, exam stress has often been looked at as a secondary issue rather than the focus, although decreased exam anxiety is thought to be a positive reason to consider open-book exams (Durning et al., 2016). The results of this study show that the majority of students found preparing for and taking open-book exams less stressful than preparing for and taking closed-book exams. Students reported that they found preparing for open-book exams less

stressful as they knew they would be able to look things up that they didn't know the answer to. This also allowed students to read around subjects, and pursue their own interests within the course, which is something students have not had time to do in the past. A study by Theophilides and Koutselini (2000) found that open-book exams reduced the stress and tension students felt while taking the exams. This led to students approaching the exams with more confidence and in a more relaxed manner which this meant students felt that they were able to perform to a better reflection of their ability. Feller (1994) also spoke about how the open-book exam format reduces students stress and therefore allows for a calmer and more thoughtful response to questions. These findings are consistent with this study's finding that open-book exams are less stressful than closed-book exams and are a fair reflection of student's ability. The free text responses also support these findings with many students also reporting they were able to think more clearly and perform better as they felt less pressure during the open-book exams.

During the first year of open-book exams at Nottingham, while many students felt less stressed about preparing for the open-book exams, the quantitative results showed that there were a minority of students who felt just as stressed if not more stressed than they would normally feel before closed-book exams. Comments from students revealed that this was because they felt anxious about a change in exam format, and they did not know what to expect and were worried about how much the questions would be changed to reflect the open-book exams format. Students were also anxious about needing to adapt to a new method or revision and study. These feelings are similar to those found by Baillie and Toohey (1997) who reported that student anxiety did not decrease as much as they expected. They suggested this may have been due to the change in curriculum and exam format led to increased anxiety due to the many unknown factors. There were significantly more students from Questionnaire N2 than Questionnaire N1 that found preparing for the the open book exams less stressful which indicates that by the time students had taken one set of open-book exams they were less stressed about taking open-book exams as they now knew what to expect and therefore knew how best to prepare for the open-book exams which would support Baillie and Toohey (1997) theory. This

theory is also supported by the free text responses as students reported one of the main reasons that the open-book exams caused them anxiety was because of the change to a new-format and they were unsure of how best to prepare. Students' assessment literacy around open-book exams is important here, as knowledge and understanding of the open-book format would lead to decreased anxiety amongst students and enable them to improve their exam performance (Price et al., 2012). A study by Rhind and Paterson (2015) recommended when introducing students to new assessment formats, veterinary schools should introduce a curriculum to help students develop their assessment literacy, which would in turn help to ease students' transition to a new exam format.

This study found that students in the second year of open-book exams actually found taking the open-book exams more stressful than the students in the first year of open book exams, which may be considered surprising as students had an extra year to get used to the open-book format and now knew what to expect. The free text responses suggest a reason for this however, as students at Nottingham were given less time to complete the exams in the second year of open-book exams. This added time pressure meant students did not have the time to look as much information up and were forced to rely on their knowledge much more. Although students felt this meant the open-book exams were fairer and a better reflection of their ability, it did mean that more students felt more stressed while taking the exams compared to the previous year.

It is important to note that overall, the majority of students across all questionnaires thought that the open-book exams were less stressful compared to closed-book exams. It is also important to note that there will always be some amount of stress that comes with exams by their very nature, and a small amount of stress is helpful to students as it helps motivate students to fulfil their potential (Entwistle and McCune, 2004, Parsons, 2008).

4.3 Difficulty

A criticism that is often levelled at open book assessments is that they are easier than closed book assessments (Boniface, 1985, Durning et al., 2016). However, the results of this study show that the majority of students found the open-book exams to be just as difficult, if not more difficult than closed-book exams. The free text responses suggest this was because students still needed to have a base level of knowledge to be able to answer the questions. Some students also spoke about second guessing themselves and looking up answers they already knew to make sure they had the answers correct. A study by Heijne-Penninga et al. (2008) showed that students who performed poorly on closed book assessments also performed poorly on open book assessments, while students who performed well on closed-book assessments also performed well on open-book assessments. Heijne-Penninga et al. (2008) also found that students performed worse on open book assessments overall. Some reasons suggested for this are that open-book exam questions were more difficult (Heijne-Penninga et al., 2008), students did not prepare as well for the open-book exams (Boniface, 1985, Ioannidou, 1997, Eilertsen and Valdermo, 2000) and students spent too much time looking up answers and ran out of time during the exams (Kalish, 1958, Boniface, 1985).

The qualitative data shows that how difficult students find an exam does not always correlate to how stressful students find the exam. This was also backed up by the quantitative data which showed that the majority of students found the open-book exams just as difficult if not more difficult than closed-book exams, even though the majority of students found the open-book exams less stressful. Interestingly, this study found that students taking the second year of open-book exams found the open-book exams more difficult than the students taking the first year of open book exams. The free text responses showed that the main reason for this was that students had a lot less time to complete the exams and therefore some students reported spending too much time looking up answers and ran out of time, as was found in previous studies (Kalish, 1958, Boniface, 1985). Another reason for this finding was that in the first year of open book exams the questions were not altered

to reflect the open-book nature of the exams, whereas in the second year of open-book exams the questions were changed to reflect the fact students were able to look up information and were therefore designed to test students' application of knowledge rather than their recall. Theophilides and Koutselini (2000) found that open-book exams that were designed as to be taken as open-book exams required a deeper learning approach from students as they test a student's understanding of a subject over memorisation. Therefore, students who did not adopt this approach and maintained a surface approach to study may have found these exams much more difficult. This is key as assessments must be created with the context and purpose in mind. Closed-book exams should be designed to test students knowledge and recall, while open-book exams should be designed to test students' problem solving skills and ability to apply their knowledge (Durning et al., 2016).

It is important to note that analysing the performance data for the students at the Nottingham SVMS and Bristol Vet School was outside the scope of this project, and therefore it is only possible to use student perceptions of how difficult they perceived the open-book exams to be when discussing the difficulty of the exams. It would however be a useful area for future study.

4.4 Reliability and validity

There is a perception amongst some that open-book exams are easier and therefore less valid than closed-book exams, and therefore less useful in high-stakes exams (Durning et al., 2016). A systematic review of studies into open-book exams showed either no significant difference between student performance on open and closed-book exams, or that students performed better on closed-book exams. Some of the free text responses from this study agree with these findings, as some students reported achieving very similar grades to the grades they had attained in previous closed-book exams, whereas other students reported that their mark had increased. Further research looking at student performance data and changes between closed-book exams and open-book exams would be useful to further explore these findings.

The results of this study show that the majority of students thought their performance in the open book exams was a fair reflection of their ability. Students felt the open-book exams were a more accurate reflection of the work they had put in over the year rather than how much information they could cram in the revision period. The fact that students feel the open-book exams are a more accurate reflection of their ability speaks to the face validity of the open-book assessments. Students also felt that they were able to perform to better as they felt less stressed and were able to think more clearly as found by Feller (1994). Students reported that they felt an important way of making the results of the open-book exams fairer was to reduce the amount of time given for each exam, as this would then mean students that had a good base of understanding and just needed to look up a few things would not still perform well but students who did not have the same knowledge base would struggle to perform as well as they would not have the time to look all the answers up. These findings are similar the results of a study by Ng (2020) who studied the academic integrity of open-book exams on a undergraduate medical science course during the COVID-19 pandemic. Ng (2020) found that the main factor in maintaining academic integrity was maintaining strict time limits on the open-book exams, preferably the same amount of time as would normally be given for the equivalent closed-book exams.

Part of the concern regarding the reliability of open-book assessments is that it makes it easier for students to cheat (Fuller et al., 2020). Harper (2006) defines cheating as "*breaking the rules to get ahead*". In closed-book exams cheating would often mean students covertly trying to look up answers during the exam. In open-book exams this is allowed and is therefore not considered cheating. For open-book exams, cheating is categorised into plagiarism or collusion. Students at both schools in this study were informed about plagiarism and collusion before the open book exams and told either offence would be classed as academic misconduct. This study showed that the majority of students were aware that copying and pasting answers constituted plagiarism and very few students admitted to plagiarism. The majority of students also said they were aware colluding was also academic misconduct and very few students admitted to colluding with other students during the exams,

however it is possible that more students did plagiarise or collude but did not admit to this in the questionnaires or the focus groups. It is notable that a number of students at Nottingham seemed to be aware that colluding would be viewed as academic misconduct but were not aware that plagiarism would be viewed as academic misconduct, whereas this was not as obvious at Bristol. This could be due to the fact that although students were warned against both plagiarism and collusion at Nottingham, more emphasis was placed on collusion. This highlights the need to prepare students adequately for any new format, including open-book exams so students understand what is expected of them.

These findings are similar to the findings of a study by (Dyrbye et al., 2010) of medical students at 7 different medical schools in the USA reported that around 1.5% of students admitted to cheating during closed-book exams, including allowing other students to copy from their work (collusion). This suggests that the exam format does not have an effect on number of students cheating. However, it is important to try and prevent any students cheating, especially in high stakes examinations regardless of exam format and the un-invigilated nature of remote exams does present more of an opportunity for collusion between students than traditional invigilated exams. Academic dishonesty amongst medical students or veterinary students can lead to these students to act dishonestly in their professional careers which can have a negative impact on the care their patients receive (Ainsworth and Szauter, 2006) (Jervis and Brown, 2020). It is also important to differentiate between remote exams and open-book exams, and in the future invigilated open-book exams should pose no more of an issue for academic misconduct than traditional closed-book exams.

4.5 Preparation for practice

There are many purposes of assessment in the veterinary curriculum but one of the main purposes is the assessment of clinical competence (Rhind, 2006). Students are expected to graduate from medical school as safe, competent, and qualified clinicians (Fuller et al., 2020), and the same can be said for students at veterinary

school. The free text responses of this study show that particularly in the later years of the course, students focus turns to not just passing the exams, but to also becoming good veterinarians. This is similar to the finding of Gummery et al. (2018), who reported a shift in the intrinsic motivation to be a 'good vet' from 2nd year to 4th year. The longitudinal study by Gummery et al. (2018) looked at the perceptions of anatomy teaching amongst veterinary students at the University of Nottingham and found that as students moved from 2nd year to 4th year, their motivation to study shifted from learning to pass exams to learning to become a veterinarian.

Students felt that the open-book exams were much more representative of life in practice, and the need to look information up in a timely manner during a busy day in the clinic. Zagury-Orly and Durning (2021) agree with these opinions and suggest that open-book exams are ideal to prepare students for the skills required by a modern-day clinician, such as knowing what to search, where to search and how to search for the information required. Fuller et al. (2020) also suggests that well designed open-book exams that require a deeper understanding of the material are excellent ways of assessing students' ability to tackle clinical cases and problems.

Open book exams allow examiners to pose questions that challenge students' higher-order cognitive skills by asking 'why' questions, which are both less easy to simply look up but also help uncover students reasoning (Zagury-Orly and Durning, 2021). Durning et al. (2016) and Zagury-Orly and Durning (2021) argue for a blended approach to examinations as both open and closed book assessments have their own pros and cons. A mixed assessment curriculum could use closed-book exams to test students' knowledge base and understanding of essential medical or veterinary concepts, while an open-book exams would assess students' ability to research topics, and apply the higher order critical thinking skills needed in clinical practice.

4.6 Study limitations and suggestions for future study

A limitation of this study is that this study did not look at performance data for the open-book exams. It would be helpful to examine student performance over the

period that the open-book exams are used, to see if the students' opinions are reflected in the results. Another limitation of this study was that as Bristol Vet School only delivered one year of open-book exams, further data was not available for comparison. This study was only able to analyse the results from two vet schools, Nottingham and Bristol. Surveying more vet schools in the UK would give a better representation of how the wider veterinary student population in the UK perceived open-book exams although given how similar the data was across Nottingham and Bristol Vet Schools, it would be unlikely effect the conclusions of the study. Due to the nature of the surveys, there is also a non-response bias present as students who did not answer the questionnaires may have answered differently to the students who did respond, and therefore caution must be exercised when generalising the results of this study. It is also important to note that response rate dropped in the second year of open-book exams.

Across all four questionnaires, the majority of staff and students said that they thought there should be more open book exams in the future. At this moment in time there is a lack of evidence for use of open book exams over closed book exams, or vice-versa (Zagury-Orly and Durning, 2021), while a systematic review by Durning et al. (2016) suggested utilising a combined approach of both closed and open book assessments as part of a complementary assessment program which would allow students skills to be tested in different ways. Rather than open-book exams replacing closed-book exams, open-book exams offer value in expanding on what can be measured by CBEs (Durning et al., 2016). In the future, concerns around academic misconduct due to the nature of remote exams can be addressed by time-restricted, invigilated open-book exams on campus. The authors suggest the use of closed-book exams earlier in the course where students' knowledge base and scientific learning is of the most importance, and using open-book exams later in the course when students are being asked to apply their knowledge in clinical scenarios.

4.7 Conclusion

In conclusion, this study has found open-book exams to be perceived by students as less stressful than closed-book assessments, but they are not perceived as any easier. This study also found that open-book exams can have a positive impact on students' engagement with the veterinary course and affects the methods students use to prepare for exams. However, there were some students who felt less motivated to study for open-book exams and it is possible some students may focus more on organising their notes rather than learning the material. Overall students were positive about open-book exams and thought they were a fair reflection of their ability, while both students and staff thought open-book exams should be part of the veterinary assessment curriculum going forward. The authors of this study would recommend a blended approach of using both closed-book and open-exams as previous studies have suggested (Durning et al., 2016, Fuller et al., 2020, Zagury-Orly and Durning, 2021). This would enable the different cognitive skills, both knowledge retention, critical thinking, and application of knowledge of students' to be tested most effectively.

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6 Appendices

6.1 Appendix A – 2020 student questionnaire

COVID-19 Assessment Student Survey 2020

Page 1: Information

This survey is for veterinary students at the University of Nottingham School of Veterinary Medicine and Science.

Title of the study: Open book exam review

Researchers: John Remnant (john.remnant@nottingham.ac.uk), Erica Gummery, Kay Millward, Kate Cobb

Purpose of the study: Understand student experiences of remote, non-invigilated assessments.

Consent: This consent form is a formal way of indicating that you agree to participate in this study and that you understand that any information collected by the researchers:

- will be used for a research study
- may be written in a report for publication
- may be presented at research conferences or meetings
- will be anonymised and treated confidentially will only
- be accessed by research colleagues
- will not be used to inform assessment or mark decisions in this assessment period and does not constitute an appeal or EC claim

If you have any queries regarding this study, please speak to the researcher directly or contact them via e-mail (details above).

1. Please confirm the following statements before proceeding

Required

1/15

I understand that participation in this study is voluntary and that I may leave the study at any time (without needing to provide reasons for doing so)	Please select
I agree that information I give during the study can be used in a report, a published paper or a conference or meeting presentation.	Please select
I understand that the study is being conducted for the purposes of research	Please select

1.a. Please give your year of study at the time of the assessments (i.e. if you have just sat year 3 exams and started year 4 select year 3) *Required*

1.b. At the time of completing this questionnaire, had you received your marks for this summer's assessments

Page 2: Open book assessment

In this section we are interested in your experiences of the *open book* aspect of this years assessment. That is the lack of invigilation and the opportunity to use resources to inform your answers, not sitting exams remotely. There is a later section to provide feedback on your experiences of sitting the exams remotely.

We are asking for your honest feedback to inform future assessment strategy.

2. Please select your level of agreement with the following statements about your assessment **preparation** for the open book exam format this summer, compared to previous or intended preparation (selecting "Neither agree nor disagree" if they are the same)

Please don't select more than 1 answer(s) per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I found preparing for the open book assessments less stressful	☐	☐	☐	☐	☐
I found preparing for the open book assessments easier	☐	☐	☐	☐	☐
I spent less time preparing for the open book assessments	☐	☐	☐	☐	☐
I prepared for the open book assessments in the same way as usual	☐	☐	☐	☐	☐

3/15

I felt more confident going in to the open book assessments	☐	☐	☐	☐	☐

2.a. Please add any further comments on how you approached **preparing** for the assessment

3. Please select your level of agreement with the following statements about your experience of this summer's open book **assessments themselves**, compared to previous assessments (selecting "Neither agree nor disagree" if they are the same)

Please don't select more than 1 answer(s) per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I found the open book assessments less stressful	☐	☐	☐	☐	☐
I found the open book assessments easier	☐	☐	☐	☐	☐
I approached the open book assessments in the same way as usual	☐	☐	☐	☐	☐
The open book assessments took longer than usual	☐	☐	☐	☐	☐

I think that my performance in the open book assessments is a fair reflection of my ability	☐	☐	☐	☐	☐

3.a. Please add any further comments on your experiences of the open book assessments

Page 3: Approach to open book

In this section we are interested in how you approached the open book assessment.

Please remember that all answers are anonymous and will not affect marking or marks awarded for the assessments. This information is to inform future assesment strategy within the vet schools and the wider university.

4. Which (if any) open book resources did you refer to **during the exam**? *Please select all that apply*

- ☐ Teaching material from the school
- ☐ My own notes
- ☐ Online resources identified in advance
- ☐ Online resources found via a search engine
- ☐ Textbooks/leaflets/journals
- ☐ Other (please state)

4.a. If you selected Other, please specify:

5. How frequently did you use each of the listed resources?

Please don't select more than 1 answer(s) per row.

	Never	Occasionally	Frequently
Teaching materials from the school	☐	☐	☐
My own notes	☐	☐	☐

6/15

Online resources identified in advance	☐	☐	☐
Online resources found in a search engine	☐	☐	☐
Textbooks/journals/leaflets	☐	☐	☐
Other	☐	☐	☐

6. How helpful did you find the following resources

Please don't select more than 1 answer(s) per row.

	Not used/don't know	Not helpful	Generally helpful	Always helpful
Teaching materials from the school	☐	☐	☐	☐
My own notes	☐	☐	☐	☐
Online resources identified in advance	☐	☐	☐	☐
Online resources found in a search engine	☐	☐	☐	☐
Textbooks/journals/leaflets	☐	☐	☐	☐
Other	☐	☐	☐	☐

7. Please provide any additional comments on the resources you used

8. Roughly what proportion of questions did you refer to resources for additional information

7/15

Please don't select more than 1 answer(s) per row.

	none	a few	some	most	all	
No questions						All questions

9. Did you copy word for word or "copy and paste" answers from external resources *Please remember we can not identify you and will not use survey responses in any academic misconduct investigations*

- Yes
- No

9.a. Were you aware that this may constitute *plagiarism*

- Yes
- No

10. Did you discuss questions or answers, in person or electronically, with any other person during the assessments *Please remember we can not identify you and will not use survey responses in any academic misconduct investigations*

- Yes
- No

10.a. Were you aware that this may constitute *collaboration* or *collusion*

- Yes
- No

8/15

11. Please provide any further comments on the approach to an open book assessment

Page 4: Remote assessment

In this section we are interested in your experiences of sitting assessments off-site (not your use of external resources)

12. Please select your level of agreement with the following statements about sitting the assessments off-site compared to assessment held on campus (selecting "Neither agree nor disagree" if they are the same)

Please don't select more than 1 answer(s) per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I found the remote assessments less stressful	☐	☐	☐	☐	☐
I found the remote assessments easier	☐	☐	☐	☐	☐
I approached the remote assessments in the same way as usual	☐	☐	☐	☐	☐
The remote assessments took longer than usual	☐	☐	☐	☐	☐
I think that my performance in the remote assessments is a fair reflection of my ability	☐	☐	☐	☐	☐

12.a. How could remote assessments be improved to ensure a fair assessment process

11/15

Page 5: Further comments

13. In the future do you think more exams should be open book

- ○ Yes
- ○ No

14. In the future do you think more exams should be sat off site

- ○ Yes
- ○ No

15. Please select your level of agreement with the following statement regarding the open book assessments when compared to standard invigilated assessments (selecting "Neither agree nor disagree" if they are the same)

Please don't select more than 1 answer(s) per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
The open book assessment improved my learning and understanding of the subject material	☐	☐	☐	☐	☐

15.a. Please comment on the extent to which you felt having an open book exam affected your learning and understanding of the subject material

16. Please provide any further comments on open book or remote assessments

Page 6: Final page

Thank you very much for taking the time to fill in our survey. Your responses will be helpful for us in planning assessments in the future.

We are interested in speaking to small groups of people about their experiences with these assessments. To avoid your email address being linked with your answers we are not asking for contact details here, but if you would be willing to help us understand more about your experiences, please email John.Remnant@nottingham.ac.uk

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Key for selection options

1.1.a -

Yes

1.2.a -

Yes

1.3.a -

Yes

1.a - Please give your year of study at the time of the assessments (i.e. if you have just sat year 3 exams and started year 4 select year 3)

Prelim/Gateway
Year 1
Year 2
Year 3
Year 4
Year 5

1.b - At the time of completing this questionnaire, had you received your marks for this summer's assessments

yes
no

15/15

6.2 Appendix B – 2021 student questionnaire (years 0-3)

COVID-19 Assessment Student Survey 2021 (Years 0 - 3)

Page 1: Information

This survey is for veterinary students in years 0, 1, 2 and 3 at the University of Nottingham School of Veterinary Medicine and Science.

Title of the study: 'Open Book' Exam Review

Researchers: John Remnant, Erica Gummery, Kay Millward, Kate Cobb, Sam Marsh.

Purpose of the study: Understand student experiences of non-invigilated, open book assessments.

Consent: This consent form is a formal way of indicating that you agree to participate in this study and that you understand that any information collected by the researchers:

- Will be used for a research study.
- May be written in a report for publication.
- May be presented at research conferences or meetings.
- Will be anonymised and treated confidentially.
- Will only be accessed by research colleagues.
- Will not be used to inform assessment or mark decisions in this assessment period and does not constitute an appeal or EC claim.

If you have any queries regarding this study, please speak to the researcher directly or contact them via e-mail.

1. Please confirm the following statements before proceeding:

	Required

1/12

I understand that participation in this study is voluntary and that I may leave the study at any time (without needing to provide reasons for doing so).	Please select
I agree that information I give during the study can be used in a report, a published paper or a conference or meeting presentation.	Please select
I understand that the study is being conducted for the purposes of research.	Please select

1.a. Please give your year of study at the time of the assessments (i.e. if the most recent assesments you sat were year 3 asessements and you have since started year 4, please select year 3): *Required*

2/12

Page 2: Open book assessments

In this section, we are interested in your experiences of the *open book* aspect of this year's assessment. This includes the lack of invigilation and the opportunity to use resources to inform your answers, not sitting exams remotely.

When asked to compare to previous closed book assessments, please compare to the most recent closed-book exams you have taken. This may be either at the vet school, or in your previous education prior to starting the course (e.g. A-levels).

We are asking for your honest feedback to inform future assessment strategy.

2. Please select your level of agreement with the following statements about your assessment **preparation** for the open book exam format this summer, compared to previous closed book assessments (selecting "Neither agree nor disagree" if they are the same):

Please don't select more than 1 answer(s) per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I found preparing for the open book assessments less stressful	☐	☐	☐	☐	☐
I found preparing for the open book assessments easier	☐	☐	☐	☐	☐
I spent less time preparing for the open book assessments	☐	☐	☐	☐	☐

I prepared for the open book assessments in the same way as I prepared for closed book assessments	☐	☐	☐	☐	☐
I felt more confident going in to the open book assessments	☐	☐	☐	☐	☐

2.a. Please add any further comments on how you approached **preparing** for the assessments:

3. Please select your level of agreement with the following statements about your experience of this summer's open book **assessments themselves**, compared to previous closed book assessments (selecting "Neither agree nor disagree" if they are the same):

Please don't select more than 1 answer(s) per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I found the open book assessments less stressful	☐	☐	☐	☐	☐
I found the open book assessments easier	☐	☐	☐	☐	☐

I approached the open book assessments in the same way as I approached closed book assessments	☐	☐	☐	☐	☐
The open book assessments took longer than usual	☐	☐	☐	☐	☐
I think that my performance in the open book assessments is a fair reflection of my ability	☐	☐	☐	☐	☐

3.a. Please add any further comments on your experiences of the open book assessments:

5/12

Page 3: Approach to open book assessments

In this section we are interested in how you approached the open book assessment.

Please remember that all answers are anonymous and will not affect marking or marks awarded for the assessments. This information is to inform future assesment strategy within the vet schools and the wider university.

4. Which (if any) open book resources did you refer to **during the exam**? (*Please select all that apply)*

- ☐ Teaching material from the school
- ☐ My own notes
- ☐ Online resources identified in advance
- ☐ Online resources found via a search engine
- ☐ Textbooks/leaflets/journals
- ☐ Other (please state)

4.a. If you selected Other, please specify:

5. How frequently did you use each of the listed resources?

Please don't select more than 1 answer(s) per row.

	Never	Occasionally	Frequently
Teaching materials from the school	☐	☐	☐
My own notes	☐	☐	☐

6/12

Online resources identified in advance	☐	☐	☐
Online resources found in a search engine	☐	☐	☐
Textbooks/journals/leaflets	☐	☐	☐
Other	☐	☐	☐

6. How helpful did you find the following resources?

Please don't select more than 1 answer(s) per row.

	Not used/don't know	Not helpful	Generally helpful	Always helpful
Teaching materials from the school	☐	☐	☐	☐
My own notes	☐	☐	☐	☐
Online resources identified in advance	☐	☐	☐	☐
Online resources found in a search engine	☐	☐	☐	☐
Textbooks/journals/leaflets	☐	☐	☐	☐
Other	☐	☐	☐	☐

7. Please provide any additional comments on the resources you used:

8. Roughly what proportion of questions did you refer to resources for additional information?

Please don't select more than 1 answer(s) per row.

	none	a few	some	most	all	
No questions						All questions

9. Did you copy word for word or "copy and paste" answers from external resources? (*Please remember we can not identify you and will not use survey responses in any academic misconduct investigations)*

- ○ Yes
- ○ No

9.a. Were you aware that this may constitute *plagiarism?*

- ○ Yes
- ○ No

10. Did you discuss questions or answers, in person or electronically, with any other person during the assessments? (*Please remember we can not identify you and will not use survey responses in any academic misconduct investigations)*

- ○ Yes
- ○ No

10.a. Were you aware that this may constitute *collaboration* or *collusion?*

- ○ Yes
- ○ No

11. Please provide any further comments on the approach to an open book assessment:

Page 4: Further comments

12. In the future do you think more exams should be open book?

- ○ Yes
- ○ No

13. Please select your level of agreement with the following statement regarding the open book assessments when compared to standard closed book, invigilated assessments (selecting "Neither agree nor disagree" if they are the same):

Please don't select more than 1 answer(s) per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
The open book assessment improved my learning and understanding of the subject material	☐	☐	☐	☐	☐

13.a. Please comment on the extent to which you felt having an open book exam affected your learning and understanding of the subject material:

14. Please provide any further comments on open book exams:

Page 5: Final page

Thank you very much for taking the time to fill in our survey. Your responses will be helpful for us in planning assessments in the future.

Key for selection options

1.1.a -

Yes

1.2.a -

Yes

1.3.a -

Yes

1.a - Please give your year of study at the time of the assessments (i.e. if the most recent assesments you sat were year 3 asessements and you have since started year 4, please select year 3):

Prelim/Gateway
Year 1
Year 2
Year 3

6.3 Appendix C – 2021 student questionnaire (years 4-5)

COVID-19 Assessment Student Survey 2021 (Years 4 - 5)

Page 1: Information

This survey is for veterinary students in years 4 and 5 at the University of Nottingham School of Veterinary Medicine and Science.

Title of the study: 'Open Book' Exam Review

Researchers: John Remnant, Erica Gummery, Kay Millward, Kate Cobb, Sam Marsh.

Purpose of the study: Understand student experiences of on-site, open book assessments.

Consent: This consent form is a formal way of indicating that you agree to participate in this study and that you understand that any information collected by the researchers:

- Will be used for a research study.
- May be written in a report for publication.
- May be presented at research conferences or meetings.
- Will be anonymised and treated confidentially.
- Will only be accessed by research colleagues.
- Will not be used to inform assessment or mark decisions in this assessment period and does not constitute an appeal or EC claim.

If you have any queries regarding this study, please speak to the researcher directly or contact them via e-mail.

1. Please confirm the following statements before proceeding:

	Required

1/14

I understand that participation in this study is voluntary and that I may leave the study at any time (without needing to provide reasons for doing so)	Please select
I agree that information I give during the study can be used in a report, a published paper or a conference or meeting presentation.	Please select
I understand that the study is being conducted for the purposes of research	Please select

1.a. Please give your year of study at the time of the assessments (i.e. if the most recent assesments you sat were year 4 asessements and you have since started year 5, please select year 4): *Required*

2/14

Page 2: Open book assessments

In this section, we are interested in your experiences of the *open book* aspect of this year's assessment. This includes the lack of invigilation and the opportunity to use resources to inform your answers, not sitting exams remotely. There is a section later to provide feedback on your experiences of sitting the exams remotely.

When asked to compare to previous closed book assessments, please compare to the most recent closed-book exams you have taken. This may be either at the vet school, or in your previous education prior to starting the course (e.g. A-levels).

We are asking for your honest feedback to inform future assessment strategy.

2. Please select your level of agreement with the following statements about your assessment **preparation** for the open book exam format this summer, compared to previous closed book assessments (selecting "Neither agree nor disagree" if they are the same):

Please don't select more than 1 answer(s) per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I found preparing for the open book assessments less stressful	☐	☐	☐	☐	☐
I found preparing for the open book assessments easier	☐	☐	☐	☐	☐
I spent less time preparing for the open book assessments	☐	☐	☐	☐	☐

I prepared for the open book assessments in the same way as I prepared for closed book assessments	☐	☐	☐	☐	☐
I felt more confident going in to the open book assessments	☐	☐	☐	☐	☐

2.a. Please add any further comments on how you approached **preparing** for the assessments:

3. Please select your level of agreement with the following statements about your experience of this summer's open book **assessments themselves**, compared to previous closed book assessments (selecting "Neither agree nor disagree" if they are the same):

Please don't select more than 1 answer(s) per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I found the open book assessments less stressful	☐	☐	☐	☐	☐
I found the open book assessments easier	☐	☐	☐	☐	☐

I approached the open book assessments in the same way as I approached closed book assessments	☐	☐	☐	☐	☐
The open book assessments took longer than usual	☐	☐	☐	☐	☐
I think that my performance in the open book assessments is a fair reflection of my ability	☐	☐	☐	☐	☐

3.a. Please add any further comments on your experiences of the open book assessments:

5/14

Page 3: Approach to open book assessments

In this section we are interested in how you approached the open book assessment.

Please remember that all answers are anonymous and will not affect marking or marks awarded for the assessments. This information is to inform future assesment strategy within the vet schools and the wider university.

4. Which (if any) open book resources did you refer to **during the exam**? (*Please select all that apply)*

- ☐ Teaching material from the school
- ☐ My own notes
- ☐ Online resources identified in advance
- ☐ Online resources found via a search engine
- ☐ Textbooks/leaflets/journals
- ☐ Other (please state)

4.a. If you selected Other, please specify:

5. How frequently did you use each of the listed resources?

Please don't select more than 1 answer(s) per row.

	Never	Occasionally	Frequently
Teaching materials from the school	☐	☐	☐
My own notes	☐	☐	☐

6/14

Online resources identified in advance	☐	☐	☐
Online resources found in a search engine	☐	☐	☐
Textbooks/journals/leaflets	☐	☐	☐
Other	☐	☐	☐

6. How helpful did you find the following resources?

Please don't select more than 1 answer(s) per row.

	Not used/don't know	Not helpful	Generally helpful	Always helpful
Teaching materials from the school	☐	☐	☐	☐
My own notes	☐	☐	☐	☐
Online resources identified in advance	☐	☐	☐	☐
Online resources found in a search engine	☐	☐	☐	☐
Textbooks/journals/leaflets	☐	☐	☐	☐
Other	☐	☐	☐	☐

7. Please provide any additional comments on the resources you used:

8. Roughly what proportion of questions did you refer to resources for additional information?

7/14

Please don't select more than 1 answer(s) per row.

	none	a few	some	most	all	
No questions						All questions

9. Did you copy word for word or "copy and paste" answers from external resources? (*Please remember we can not identify you and will not use survey responses in any academic misconduct investigations)*

- Yes
- No

9.a. Were you aware that this may constitute *plagiarism?*

- Yes
- No

10. Did you discuss questions or answers, in person or electronically, with any other person during the assessments? (*Please remember we can not identify you and will not use survey responses in any academic misconduct investigations)*

- Yes
- No

10.a. Were you aware that this may constitute *collaboration* or *collusion?*

- Yes
- No

8/14

11. Please provide any further comments on the approach to an open book assessment:

Page 4: Return to on-site assessments

In this section we are interested in your experiences of the return to sitting assessments on-site (not your use of external resources).

12. Please select your level of agreement with the following statements about sitting the assessments off-site compared to assessments held on-site (selecting "Neither agree nor disagree" if they are the same):

Please don't select more than 1 answer(s) per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I found the on-site assessments less stressful	☐	☐	☐	☐	☐
I found the on-site assessments easier	☐	☐	☐	☐	☐
I approached the on-site assessments in the same way	☐	☐	☐	☐	☐
I think that my performance in the on-site assessments is a fair reflection of my ability	☐	☐	☐	☐	☐
I was happy with the adjustments made made by the school for the return to on-site assessments	☐	☐	☐	☐	☐

10/14

12.a. How could on-site, open book assessments be improved to ensure a fair assessment process?

Page 5: Further comments

13. In the future do you think more exams should be open book?

- ○ Yes
- ○ No

14. Please select your level of agreement with the following statement regarding the open book assessments when compared to standard closed book assessments (selecting "Neither agree nor disagree" if they are the same):

Please don't select more than 1 answer(s) per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
The open book assessment improved my learning and understanding of the subject material	☐	☐	☐	☐	☐

14.a. Please comment on the extent to which you felt having an open book exam affected your learning and understanding of the subject material:

15. Please provide any further comments on open book assessments:

Page 6: Final page

Thank you very much for taking the time to fill in our survey. Your responses will be helpful for us in planning assessments in the future.

Key for selection options

1.1.a -

Yes

1.2.a -

Yes

1.3.a -

Yes

1.a - Please give your year of study at the time of the assessments (i.e. if the most recent assesments you sat were year 4 asessements and you have since started year 5, please select year 4):

Year 4

Year 5

6.4 Appendix D – Staff Questionnaire

COVID-19 assessment SVMS staff survey

Page 1: Page 1

This survey is for staff at the University of Nottingham School of Veterinary Medicine and Science.

Title of the study: Open book exam review

Researchers: John Remnant (john.remnant@nottingham.ac.uk), Erica Gummery, Kay Millward, Kate Cobb

Purpose of the study: Understand staff experiences and attitudes to remote, non-invigilated assessments.

Consent: This consent form is a formal way of indicating that you agree to participate in this study and that you understand that any information collected by the researchers:

- will be used for a research study
- may be written in a report for publication
- may be presented at research conferences or meetings
- will be anonymised and treated confidentially
- will only be accessed by research colleagues

If you have any queries regarding this study, please speak to the researcher directly or contact them via e-mail (details above).

1. Please confirm the following statements before proceeding

	* Required
I understand that participation in this study is voluntary and that I may leave the study at any time (without needing to provide reasons for doing so)	Please select

1 / 10

I agree that information I give during the study can be used in a report, a published paper or a conference or meeting presentation.	Please select
I understand that the study is being conducted for the purposes of research	Please select

Page 2: Questions

We are interested in staff opinions on this summer's open book assessments, and more importantly your thoughts on the potential role of open book assessments in the future. A similar questionnaire has been sent to students and we will conduct an analysis of the results compared to previous cohorts.

There were limited options for managing and delivering assessment this year due to the COVID-19 pandemic. The "open book" nature of these assessments had far greater scope than would be traditional in an open book exam, this was further complicated by the students sitting assessments remotely.

Staff have informally shared some observations and concerns as well as some positives. We are keen to learn from these experiences and would welcome your thoughts on whether, and how, we should retain some elements of these emergency assessments in the future.

Information

2. What has been your involvement with the summer "open book" assessments (please tick all that apply)

- ☐ Marker
- ☐ Module convenor
- ☐ TLA quality assurance role
- ☐ Attended exam board
- ☐ No direct involvement in assessment
- ☐ Tutor/welfare support
- ☐ Student experience team
- ☐ Other

2.a. If you selected Other, please specify:

3 / 10

3. For which year groups have you been involved in the summer open book assessments

- ☐ Prelim/Gateway
- ☐ year 1
- ☐ year 2
- ☐ year 3
- ☐ year 4
- ☐ year 5

Thoughts on non-invigilated, remote assessments

4. Please select your level of agreement with the following statements about the **remote, non-invigilated assessments** (i.e. as they were carried out this year), compared to previous assessments

Please don't select more than 1 answer(s) per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
This format of assessment is fairer to students	☐	☐	☐	☐	☐
This format is less stressful for students	☐	☐	☐	☐	☐
This format of assessment provides an accurate reflection of student ability	☐	☐	☐	☐	☐

I have confidence in the results of these assessments	☐	☐	☐	☐	☐
This would be a good format if the questions were prepared to be used in an open book assessment	☐	☐	☐	☐	☐

4.a. Please add any comments to explain your answers

5. Please select your level of agreement with the following statements about **open book assessments** (as we might plan to do them i.e. invigilated, on site pre-planned)

Please don't select more than 1 answer(s) per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
This format of assessment is fairer to students	☐	☐	☐	☐	☐
This format is less stressful for students	☐	☐	☐	☐	☐
This format of assessment provides an accurate reflection of student ability	☐	☐	☐	☐	☐

I have confidence in the results of these assessments	☐	☐	☐	☐	☐
This would be a good format if the questions were prepared to be used in an open book assessment	☐	☐	☐	☐	☐

5.a. Please add any comments to explain your answers

Page 3: Comments

6. Please share any concerns you have about this style of assessment (focusing on the use of "open-book exams" rather than the emergency off-site assessments this year)

7. Please share any advantages you see in this style of assessment (focusing on the use of "open-book exams" rather than the emergency off-site assessments this year)

8. Do you think we should consider more use of "open book" assessments in the future

- Yes
- No

9. Do you think we should consider more use of remote delivery of exams

- Yes
- No

10. How do you think we could improve the use of open book assessments

11. Do you have any suggestions on exam/question preparation based on your experiences this year (to be applied in an open book **or** standard assessment)

12. Do you have any suggestions for preparing the students for open book assessments

13. Please provide any other comments you have on the assessments this year

Contact information

14. If you are happy to do so, please tell us who you are

14.a. Would you be happy for us to contact you to discuss this topic further

- Yes
- No

Page 4: Thank you

Thank you very much for your time. We will report back findings at TLA committee and staff meetings as appropriate. Please don't hesitate to get in touch with any of the TLA team if you have any further questions or comments.

Key for selection options

1.1.a -
yes

1.2.a -
yes

1.3.a -
yes

6.5 Appendix E – Semi-structured focus group script

Open-book exams - Semi-structured script for focus groups

Hello everyone, thank you for giving up your free time to join this focus group today. So a bit about me, my name is Sam and I graduated from the Vet School last year. I took my finals remotely and open book last summer. I am now doing an MRes, looking at the impact of open book exams, the advantages and disadvantages, and potentially whether they should be a part of the assessment curriculum moving forward once life at the vet school is back to normal. The discussion will centre around open book exams at the vet school, and your own experiences and thoughts. By taking part in this discussion you are consenting to your thoughts and discussions being included in this and future research, but all personal information will be kept anonymous and confidential. The discussion will also be recorded if that is ok with everyone?

Ok great, so I will just ask some questions, and give everyone a chance to answer these. Please feel free to respond to your colleagues comments, and discuss your ideas and thoughts with one another, I am here to facilitate the conversation and to ask questions.

Topics I would like to cover in the focus group

1. Experience of open book exams
2. Preparation for open book exams
3. Reflection of ability
4. Exam stress
5. Assessment for learning
6. Life in practice
7. Remote exams
8. Closing thoughts?

Questions:

Experience of open book exams

1. So if everyone is ready, can we start with the first question:

2. *Preparation for open book exams*
    a. How did you prepare for open book exams; for example time spent on a topic, how do you spend that time?
    b. Is this different to your preparation for closed book exams?

3. *Reflection of ability*
    a. Do you think open book exams give a fair reflection of your own ability?
    b. Please explain why/why not?
    c. Do you think it is a fair way to assess vet students generally?

4. *Exam stress*
    a. What effect do you think the open book exam format has on your levels of exam-related stress?
        - Preparing for the exam?
        - During the exam?
    b. How does this compare to closed book formats?

5. *Assessment for learning*
    a. What impact, if any, do you think the open book exam format has had on your learning?
    b. How does this compare to closed book formats?

6. *Preparation for life in clinical practice*
    a. How do you think open book exams might affect your future approach to learning, either in vet school or in practice?

7. *Remote assessments*
    a. What have been your experiences of remote assessments, and has the return to in-person exams been affected by this?

Closing thoughts and opinions, anything anyone wants to add or any questions for me?