



What'd I Miss? A qualitative exploration of student and staff experiences with lecture recording over an academic year

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ABSTRACT

Lecture recording is the process of capturing the visual and/or audio aspects of a lecture for students to access at their own convenience. Recorded lectures have the potential to benefit student learning through making lecture content more accessible, however effects on student attendance, attainment and engagement are debated. This is of particular interest to professional degrees, which teach to standards set by professional bodies and have limited control over curriculum content. The aim of this study was to explore student and staff use and opinion of lecture recording over an academic year in a professional degree to see how patterns of use may change after lecture recording becomes common place. Four students provided longitudinal blogs over the academic year (four blogs per student) which were thematically coded. Student use of lecture recording changed over the academic year, and was sensitive to the structure of the veterinary programme. Concurrently, semi-structured interviews with staff members highlighted frustrations with lecture recording technology and a perceived lack of flexibility due to recording. Guidance and support is needed to help staff and students to overcome these problems.

Keywords: learning technology; opinion; blended learning; veterinary medical education; longitudinal; qualitative

Introduction

In the UK, the veterinary medicine and surgery undergraduate degree is taught to the Royal College of Veterinary Surgeons (RCVS) professional standards (Rcvs.org.uk, 2019). The UK's veterinary schools must produce students who can meet the RCVS 'day-one competencies', minimum standards of practical skills, knowledge and attitudes which graduates must be able to demonstrate. A new graduate is expected to be 'capable and confident enough to practice veterinary medicine at a primary care level on their own, while knowing when it is appropriate to seek direction from more experienced colleagues' (Rcvs.org.uk, 2014). Additionally, these graduates are expected to work at a masters level of the national qualifications framework (Level 7 in the framework for England, Wales and Northern Ireland, Level 11 for the Scottish Qualification Framework). A typical veterinary degree lasts for five years and has a pre-clinical period for the first two years where students attend theory-heavy lectures, a clinical phase for the third and fourth years where students learn practical skills, and a professional fifth year where students work in practice. Throughout the degree, students also work on extra-mural studies or EMS placements where they are hosted by an industry partner. Shorter graduate entry degrees typically condense the pre-clinical teaching to one year, but still feature the EMS placements and have the same graduate requirements. The veterinary undergraduate population has a higher prevalence of mental health challenges than the typical undergraduate population, in line with the mental health estimates of the veterinary profession (Cardwell et al., 2013). Students report that feeling under-prepared (Langebaek et al., 2012) and having limited study skills (Sutton, 2007) are sources of stress in the professional component of their degree. The veterinary profession is considering all technological and pedagogical interventions that may help to reduce stress in the veterinary curriculum (Rhind and Grant, 2017), while still maintaining the high standards required. This is similar to other professionally accredited degree programmes such as medicine (Gmc-uk.org, 2019). These types of curricula often retain didactic teaching as a key component, despite the increasing implementation of small-group and problem-based learning to teach practical concepts (Lane, 2008; Behr, 1988). Given the volume of theoretical knowledge delivered alongside extensive practical training, the implementation of lecture recording systems in professional degrees has the potential to improve student experience and attainment by removing the pressure of attending every lecture, and giving students more resources to study with.

Lecture recording is the process of digitally capturing visual and audio content within the classroom or lecture theatre (e.g. the lecturer's voice, the lecturer's slides and the environment in which the lecture takes place). Students can watch these recordings back after the live performance when released on a server. Depending on an institute's policy on lecture availability, students could have on-demand access to the lecture at any place and at any time (Ford et al., 2012; Kwiatkowski and Demirebilek, 2016). Recent

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advances in technology, such as reduced costs and ease of use, have made the implementation of lecture recording within universities more widespread (Billings-Gagliardi and Mazor, 2007; Leadbeater et al., 2013). Many higher education institutions, including those with veterinary medicine courses, have adopted a roll out of lecture recording technology (Owston, Lupshenyuk and Wideman, 2011; Ford et al., 2012; Marchand, Pearson and Albon, 2014). In this study, we explored how the provision of lecture recordings (Media Hopper Replay, ©Echo360, 2019) within the context of the veterinary undergraduate degree programme affected staff and student attitudes and perspectives to the lecture, and why students make the choices they do around their study strategies.

Lecture recording has the potential to benefit student learning in several ways; enhanced accessibility for all students, as well as supporting students with additional learning requirements, students with English as an additional language (Leadbeater et al., 2013) or during times of absence (Soong et al., 2006). Additionally, students can revisit material to assist with understanding and revision (Gosper et al., 2002; Owston et al., 2011). Gosper et al., (2002) surveyed 813 students from several courses at four universities, with experience of recorded lectures within different courses. There are many varied uses of lecture recordings in an individual students' study strategy. Gosper et al., (2002) found students used recorded lectures to 'pick up things missed' (78.6%), revise for exams (76.4%), revise complex ideas and concepts (76.2%), work at their own pace (73.9%) and review as a non-English speaking background students (20.4%). Comments from focus groups by Leadbeater et al., (2013) included; that recorded lectures were a great way of learning with the availability to go back over the recording without time pressure, and the capacity to pause a recording was beneficial. Woo et al., (2008) found that students almost always (44%) or frequently (32.3%) had positive experiences with recorded lectures and 79.9% students felt that recorded lectures made it easier for them to learn. Despite this, as lecture recording has become more widespread, concerns have been raised by lecturers that increased provision of recorded lectures may result in decreased student engagement, by reducing lecture attendance and in-class participation (Bond and Grussendorf, 2013; Chang, 2007; Kwiatkowski and Demirbilek, 2016; Leadbeater et al., 2013). With these studies we can see broad patterns of student use and student opinions of lecture recordings at a single point of time, but there is limited research exploring how student use and motivations may change with time.

Staff perspectives on lecture recording can also impact how they're used. Chang's (2007) interviews with staff surfaced worries about lecture recording being used as a substitute for engagement between staff and students. The worries over reduced attendance of lectures led staff to conclude that recordings should be supplementary to traditional lectures, even though they were beneficial to students in general. Kwiatkowski and Demirbilek, (2016) surveyed 50 faculty members, and found that 31% of staff who did not use lecture recording had made this decision because they felt that it would not accommodate their teaching style. In this study, one respondent described difficulties when interacting with students and being recorded. Other concerns of teaching staff include the potential for the dissemination of recordings out with their intended audience or so-called 'YouTube fear' reported by lecturing staff when surveyed by Bond and Grussendorf, (2013).

Frustrations with the technology also became apparent for staff members. Kwiatkowski and Demirbilek, (2016) discovered that technical problems were one major reason for staff members not recording lectures. Reasons for this include concerns about image and audio quality for students and one staff member felt that as they move around in the lecture and interact with students, this would not be easy to record. In a study by Marchand, Pearson and Albon, (2014) surveying 239 students, the students expressed frustration due to lag times between the live lecture and recordings being posted online and that some lectures were not recorded (Marchand et al., 2014).

One recurring staff concern is that the implementation of lecture recording will reduce student attendance of live lectures (Bond and Grussendorf, 2013; Chang, 2007; Kwiatkowski and Demirbilek, 2016). However, research looking at the effect of lecture recording on attendance has come to conflicting conclusions. Brotherton and Abowd, (2004) found that with the implementation of recorded lectures, actual attendance figures did not decrease despite 30% of students stating they would be encouraged to miss lectures. No significant drop in lecture attendance has been identified in other studies (Pilarski et al., 2008; Dickson et al., 2012). Contradictory findings elsewhere highlight that there can be a reduction in attendance (Owston et al., 2011). Traphagan, Kucsera and Kishi, (2010) found that attendance was on average 9% lower for lectures with recording compared to those without. Harley et al., (2003) found that the most common reason for students to use lecture recordings was due to absence of the live lecture (66-72%), with the second most common reason (42-63%) as a revision tool. Lecture attendance is a complex issue affected by many factors such as academic or non-academic commitments, transport problems, illness, academic attainment, gender and motivation to attend lectures such as the required or elective nature of a course (Kottasz, 2005; Traphagan et al., 2010). Bassili (2008), identified that students were more likely to attend a live lecture if the content was perceived to be more challenging, therefore it is difficult to assess the true effect lecture recording has on attendance (Billings-Gagliardi and Mazor, 2007). If lecture recording *does* affect attendance, although the evidence is far from conclusive, we should ask why providing a recording changes a students' motivation to attend a lecture. Does the recording change the student's study strategies, removing an otherwise engaged student from the learning environment? Or does the recording enable the student to form a study strategy around their own schedule, and their attendance would not necessarily have been productive? We need to understand more about the choices students make, and how this is affected at different points during the programme, given the complexity of student attendance (Kottasz, 2005).

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Staff worry about the impact of lecture recordings on student engagement with their learning. This can manifest in impact on attendance, but also on student attainment. The impact of lecture recording on academic attainment is unsurprisingly also a subject of discussion within the literature (Danielson et al., 2014). Several studies have indicated that lecture recording has no significant impact on attainment (Wieling and Hofman, 2010; Leadbeater et al., 2013; Traphagan et al., 2010), although there are no cohesive recommendations on how recordings should be used to enhance study strategies. In a study by Leadbeater et al., (2013), the exam results of 16 students who did not use recorded lectures were compared with 25 students who did use recordings and from this data, the authors suggested that lecture recording had no significant impact on exam results. However, motivation for using recordings, e.g. periods of illness, being from a widening participation background, were not recorded. It is not possible to know what the results of those students would be had they not used recordings. In another survey of 439 undergraduate students, Owston et al., (2011) identified that the frequency that students accessed recorded lecture material was related to exam results, with students who viewed recordings once a month or less achieving higher grades than those who viewed them more regularly. The authors suggest lower attaining students are more likely to benefit from recorded lectures and use recordings more frequently as students who struggle with the content are more likely to revisit sections to improve their understanding. The way in which students use recorded lectures in relation to their attainment was also identified in this study, with higher attaining students fast forwarding to specific sections in a recording whereas lower attaining students tended to watch the entire recording. On the other hand, von Kinsky, Ivins and Gribble, (2009) compared the use of recorded lectures and the attendance of live lectures with academic performance in 108 undergraduate students. They found that higher attaining students had a higher attendance of live lectures together with greater use of recorded lectures. Students themselves commonly report a perception that recorded lectures improve their learning and academic results through several mechanisms, such as through revision, by allowing students to review complex concepts and take comprehensive notes (Gosper et al., 2002; Woo et al., 2008). In a study by Danielson et al., (2014), 93% of 222 veterinary students surveyed indicated that they were 'very likely' or 'somewhat likely' to learn better with lecture capture technology indicating that in this study the veterinary students felt lecture recording benefits their learning.

Research has looked at the effects of lecture recording on student attendance (Traphagan et al., 2010; Brotherton and Abowd, 2004; Bassili, 2008; Billings-Gagliardi and Mazor, 2007), exam results (Dickson et al., 2012; Owston et al., 2011), and veterinary student and staff opinion on lecture recording (Danielson et al., 2014; Kwiatkowski and Demirbilek, 2016). The majority of these studies have used surveys and sampled the opinions of the student population at one point in time. Little research has evaluated why undergraduate veterinary students and staff opinion and use of recorded lectures changes over time and staff and student motivations and reflections on why they choose to use recorded lectures as they do. Therefore in this study, we aim to characterise veterinary student and staff engagement and opinions with regards to lecture recording in a qualitative manner over a period of time through repeated sampling.

Method

Ethical Approval

Ethical approval for the study was granted on 18/07/2017 by the Human Ethics Review Committee at the Royal (Dick) School of Veterinary Studies, Project reference HERC_111_17.

Position of Researchers

As this study was a qualitative exploration of participants' perspectives on the lecture recording phenomenon, the underlying assumptions, or biases, of the researchers should be made explicit (Braun and Clarke, 2006). The lead author is a white, female veterinary surgeon and graduate from the veterinary programme being studied. The co-authors are educators on the same programme. The lead author acknowledges how her own experience as a veterinary student on the programme could influence interviews conducted, thematic analysis, and her own opinions on the functionality of recorded lectures, alongside her public and professional identity. As a veterinary surgeon, the lead author has ongoing exposure to webinar-based learning as part of her 'continuation of professional development' programme as a veterinary surgeon and therefore reflection on online teaching through live or recorded lectures could also affect opinions. As such, this study is conducted by 'insiders' who are part of the group that they have been researching. Hockey, (1993) defines an insider as someone who has "some prior knowledge of the people, their culture and language, as well as the ability to be accepted by some degree". The insider status of researchers can affect how participants within the research respond to questions, often allowing for a shared understanding of the subject matter and a constructivist approach to the data. This type of approach is sometimes criticised for being 'less objective' (Silverman, 2015), and so we regularly ran our results and findings past a larger university-wide committee as a form of participant checking (Twining et al., 2017). These committees included academics from a broad range of disciplines, support staff, student interns, student representatives and student union sabbatical officers. While efforts were made to recognise the potential for bias due to the lead author's and co-authors' prior involvement with the programme, 'insider' knowledge of the teaching and situation could allow for more in depth discussion and deeper understanding of the issues raised in the research through the authors' own contextual knowledge and experience.

Student Attitudes

To explore how student attitudes to lecture recording change with use, students were asked to engage in a reflective blogging exercise over a 6 month period in the academic year of 2017-2018. We chose to use blogs as our research tool because we hoped to capture the progression of attitudes and feelings over time. Elective blogs can blur the lines between the 'private' and the 'social' (Gurak, 2008), and so can be viewed as a way for the individual to engage in a dialogue without necessitating the involvement (and leading) of an interviewer. In this study, participants were asked to blog, which may have limited this private/public blurring, however recruiting participants to blog directly, as opposed to scraping blogs from the web, allowed participants to participate with fully informed consent (Markham and Buchanan, 2012). Additionally, reflective writing and practice is a key component of veterinary practice (Armitage-Chan and May, 2018), and is commonly requested throughout the BVM&S curriculum, and so we felt it would be an appropriately familiar and context-relevant exercise for this particular cohort. As a qualified veterinary surgeon, continued professional development has recently shifted focus to combine traditional training with reflection. Reflective blog writing is therefore relevant to development as a veterinary surgeon as part of development during the students' future careers. Experience of this method will likely benefit the students as they may have an elevated understanding of the reflective component of their CPD commitment in future careers. Students were made aware of the project via leaflets distributed in the common areas and a mention of the project at the end of targeted lectures in a course that made extensive use of lecture recording. Students were asked to submit four blogs via email over a six month period, with each blog having a suggested maximum word limit of 600 words. Completing participants were offered a £40 Amazon gift card.

Ten students expressed an interest in participating and were sent further information about the study including information on their ability to withdraw consent and how their data would be used. Blog prompts were provided to students to assist in writing e.g. *how you have used recorded lectures? What are your motivations for using recorded lectures? What do you like about the recorded lectures? Have you experienced any problems?*

Staff Attitudes

All staff who had previously recorded a lecture, identified through virtual learning environment records, were initially invited to submit a blog. Staff were encouraged to produce repeated blogs if they had time throughout the year, but were also informed that a single blog would be enough. Unfortunately participation was low, and only one staff member produced a blog. Therefore, the same staff were invited to participate in semi-structured interviews conducted by the lead author which were audio recorded and then transcribed by the author verbatim. Interviews were approximately 20-30 minutes in length. The background knowledge and experience of the lead author as outlined above allowed a more natural discussion to the interview as information regarding systems of work and courses was assumed. The main topics approached were; general questions on use or impressions of lecture recording, students use of lecture recordings, changes to teaching technique or lecture content due to recording, technical frustrations, changes to student interaction and attendance.

Qualitative Analysis

Student and staff data was analysed separately to search for emerging themes. First, SC reviewed the student data and formulated central themes in discussion with JM and KH. These themes then informed the interpretation of the staff data. The multiple consecutive student blogs were analysed sequentially throughout the process, and the themes were developed with time. The material was analysed manually by SC to identify themes, initially by hand with the data in paper format using a number code system and then for the second and third repeat analysis with the assistance of software, NVivo (QSR International Pty Ltd, 2016). Themes could consist of facts, criticisms, emotions or any other opinions. The main codes were developed further using NVivo (QSR International Pty Ltd, 2016) to have categories or sub-codes. This method of reviewing both datasets to search for new and develop existing codes and sub-codes was repeated several times until no new emergent ideas were apparent (Silverman, 2015). Phrases or opinions on topics which were repeated either by different blog authors or in multiple blog posts were identified as potential themes. The experience of the lead author and co-authors assisted in construction of themes due to a background knowledge which highlighted pertinent topics, or opinions of interest.

The impact of COVID19 on blended learning research

SARS-COV-2, more commonly known as COVID19, has massively disrupted education across the globe (Nordmann et al., 2020), and as part of this, our understanding and use of blended learning tools must also adapt. Students at all levels of education have now experienced some form of blended or distance learning, and we cannot yet be certain of the impact this may have on higher education, or more importantly for this paper, its impact on the practice of recording lectures. Much of the research into distance learning shows that an excellent student experience can be had where the pedagogical design takes into account the flexibility of online learning, and high quality resources are provided (Ginns and Ellis, 2007; Donkor, 2011; Zawacki-Richter and Naidu, 2016). We know that, at least for veterinary students, distance learning and blended learning formats can support transitions and professional development, as well as provide student access to resources, particularly those that cannot be timetabled (Short,

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2002; Gledhill et al., 2017; MacKay et al., 2018; Paterson et al., 2019). Therefore, it may be reasonable to assume that, post COVID19, our students will maintain an expectation of flexibility and self-direction. It is important to note, however, that the vast majority of present literature on distance learners features learners who chose to learn at distance. Additionally, the population described in this study with limited experience of blended learning no longer exists, as they have all experienced the transformation associated with COVID19. We should make use of studies like this one to understand how blended learning resources are utilised and considered by those students who may not have chosen to study online, if we hope to support students appropriately through the COVID19 disruption.

Limitations of Methodology

The small sample size was the main limitation of this study, as the commitment to multiple blogs appeared to be off putting for students. Toward the end of the data collection period, students were offered the opportunity to provide a single blog if they had expressed an interest in participating, and the format of the blogs was opened up to include ad-hoc verbal recordings on a Dictaphone or other device, however this was not taken up. As mentioned, students were offered a reward for participating, and so this low participation rate may be attributed to the heavy workload of students. Due to end of year examinations, staff and student focus groups were not attended and therefore further insight could not be gained from these.

Despite these limitations, this study offers a unique insight into how student attitudes are formed with time, and concerns change with the progression of the academic year

Results and Discussion

Participation

Four out of the ten students submitted blogs and these students were sent a reminder every 4-6 weeks depending on how frequently they produced a blog, and all four students completed four blogs. This resulted in 16 blogs from four students over the academic year 2017-2018, each between 200-500 words in length. One staff member produced one blog and three additional staff members were interviewed by the lead author.

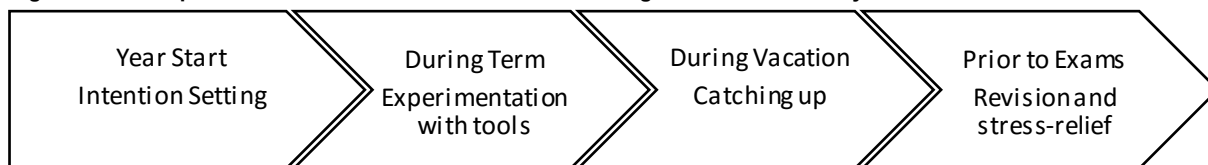
Summary of themes

In the student blogs, the main themes were the use of lecture recordings to ease pressure or stress; that lecture recording could change their interactions with lecturing staff, and the ways in which lecture recording can be utilised academically, to enhance learning and revision. The main themes within the staff blog and interviews were changes to interaction with students, concerns about the dissemination of the recorded lecture material out with the university, and the associated stresses with lecture recording such as additional time pressures and worries about material being shared and viewed by an unintended audience. There was considerable overlap between staff and student themes, such as the change in how staff and students interact in the lecture space, and questions about how recordings could facilitate student learning. Lecture recording affected staff and students' personal feelings of stress differently; staff viewed it as an additional stressor, while students viewed recordings as reducing their stress. Additionally, both staff and students voiced frustrations with the technology available for lecture recording, with students feeling the lectures were not always captured effectively and staff members feeling constrained by timed recording.

Student Perceptions of Lecture Recording Over Time

With each student writing four blogs at similar intervals, it became evident that events throughout the year, e.g. holidays or exams, affected their engagement with the programme. By mapping these changes described in the blogs throughout the year, a characterisation of student use over a period of time could be formed (see Figure 1).

Figure 1: Development of student attitudes to lecture recording over the academic year



In the first blog, at the beginning of the academic year, the students all expressed an intention about how they were going to incorporate lecture recordings into their study plans. For example, students would only use recordings to catch up after unavoidable absences.

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My main motivation for using the online lecture system as for right now is for when I miss a lecture. It is nice to be able to have the availability to catch up by watching the lecture later. (Student 1, Blog 1)

As the term progressed and students became familiar with lecture recordings, they began to experiment with different uses. One student highlighted that recordings gave them novel methods to manage their learning adjustments. The importance of mainlining adjustments was also highlighted by one participant. A student with dyslexia described their process of using a device to record speech during lectures before lecture recording was introduced (as was explicitly allowed in the university policies). They noted that this had been difficult to match with slides. This student found recorded lectures with their video component much easier to follow. This is similar to other work in this institution which suggests students with learning adjustments make greater use of recordings, and are more sensitive to their absence (MacKay, 2020).

A range of different study strategies was also displayed within the blogs, demonstrating how students use recordings to adapt their learning environment to suit them, taking control of the pace of delivery. Two students described attending lectures and during the live lecture would identify concepts they found difficult or did not understand. They would mark the time on their printed lecture notes to allow for quick reference when revising the material later and would then review these sections within the lecture recording.

This method was used by several students indicating the popularity of a blended learning experience. Lecture recording gives students the opportunity to repeat sections to gain understanding, which can help students take lectures at their own pace, enhancing learning. Additionally, students may be more able to focus on the lecture when in attendance, with the understanding that they can review a section that they missed. This concept was also highlighted by Marchand et al., (2014) who found students to be more engaged in live lectures when students were aware they were being recorded. This is the most common use of lecture recording by students in the blogs (50% students) who started the year using this mechanism to aid their studies and continued with this throughout the year, indicating that the perceived benefit to their learning was sustained. It could be beneficial for veterinary students to be made aware and make use of this technique at the start of the year. Literature indicates that higher lecture attendance alongside greater use of online lectures has positive effects on grades (Traphagan et al., 2010; Wieling and Hofman, 2010), therefore, recorded lectures can be an effective and useful learning tool when used in this way and students could benefit from being 'taught' this technique.

The reflective blogs also offered deeper insight into issues surrounding lecture attendance. The blogs discussed using recordings as a substitute for attending live lectures, when they could no longer concentrate after attending several lectures consecutively. These students considered that they were able to more effectively use their time by not attending the later lectures and would watch recordings of these lectures at a time when they could focus on the material. This relates to the content-heavy accreditation-driven curriculum, as few would argue that effective learning can happen in the fifth lecture of the day. With that said, students also discussed skipping sections of lectures where they felt the lecturer was 'off topic' or sections where the lecturing style did not suit them.

Rather than missing the lecture and having no replacement, in this programme, students now have a recording of that missed lecture therefore can 'attend' this lecture at another time. This is beneficial for students as the opportunity to repeat missed lectures is present and students will not miss any crucial information. In a quantitative study, Traphagan et al., (2010) demonstrated that the availability of online lectures negated any adverse effect absenteeism (e.g. for illness rather than not attending any lectures) has on performance. This is pertinent to veterinary courses as students must meet specific standards set by the RCVS to become professionally accredited veterinary surgeons (Rcvs.org.uk, 2014). By providing recorded lectures, students can now be exposed to everything and therefore being absent should have no effect on students meeting 'day one competences' (Rcvs.org.uk, 2014). Although this may be an unwelcome proposal for some lecturers, there is a need to consider whether attendance is necessary in all lectures or whether the best possible engagement with the learning opportunity is the most desirable outcome. For example, when students find it challenging to concentrate for 50 minutes, as per the traditional lecture format, is their engagement with learning improved by being able to revisit the materials? Farley, Risko and Kingstone (2013) found that attention to a live lecture and retention of content decreases with a function of time, so if students are dividing recorded lectures into more manageable chunks, this is likely to be more beneficial to their learning than being present in the live lecture. Similarly, some students identified that they could concentrate more effectively in certain environments in comparison to in the live lecture, in more comfort or with less distractions. If students can concentrate for longer periods in these situations in comparison to the live lecture, this is also likely to benefit their learning. Farley et al. (2013) found that fidgeting increases with decreased attention due to the length of time spent on a task. In other work on this cohort, some students suggested that they utilised recordings to support their attention, particularly where they struggled to focus in lecture hall environments (MacKay et al., 2021). High rates of non-attendance in a class are not likely to be the fault of the provision of recordings, but an issue with the lecture itself (Sharp et al., 2017), and these lecturers may benefit from greater continued professional development.

After two or three lectures (with sometimes only a few minutes break in between) I have realised that there is usually no point in forcing myself to sit through the fourth and fifth lecture if I can't concentrate. (Student 4, Blog 2)

Another student described speeding up lecture recordings to get through material in a manner that they perceived to be more efficient. Students used the lecture recording software to modify their learning depending on a lecturer's style. Some students liked to 'speed up' lectures to process them in a reduced time, or skip sections where a lecture 'drags' and in their opinion a more efficient manner, whereas others needed to slow down lecturers if they speak too fast. This method of slowing down a lecture has

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been seen as beneficial for students with additional learning requirements (Leadbeater et al., 2013), which is also acknowledged within the blogs, however this student had to experiment to find this technique.

The lecture recording system is a useful tool to have if you don't prefer a certain lecturer. That way you can miss class but watch it later and skip through parts where they might drag on. (Student 1, Blog 2)

Participants also outlined that recorded lectures were used to recap topics while away from campus on EMS. The students spoke about how lecture recordings enabled them to refresh their understanding of course content while applying these practical skills.

After a day of placement, once I have come home, it is very help to be able to look up something in a lecture that perhaps I didn't make sufficient notes on before and don't fully understand. (Student 3, Blog 3)

Prior to examinations, participants described their use of recorded lectures for revision and more efficient use of time. With recorded lectures, they felt they could prioritise their time, reducing their stress around exams. It is important to note, however, that even within this small sample we observed a range of different study strategies, with students holding contrasting opinions on whether they used recorded lectures as much as they anticipated during revision periods;

After a long day of making brief notes and summaries, I found it useful to spend some time in the evenings watching trickier lectures as a 'refresher' of that topic This task [watching recorded lectures] was a gentler way to revise a subject ... (Student 3, Blog 4)

With the exams coming up, I have difficulty finding the motivation to go through the recorded lectures and had tended to just refer to notes. (Student 2, Blog 2)

In the blogs, a student with dyslexia recognised that slowing down and pausing lectures made it easier to take notes, and consequently take more from the lecture. For students whom English is not their first language, having the opportunity to slow down lectures will give them more time to process the information (Danielson et al., 2014). It would be useful to provide students, especially those with additional learning requirements, with guidance on the ways lecture recording can be used to supplement learning. This may include discouraging them from speeding up, as despite students feeling that they are using their time more efficiently, Song et al., (2018) suggested, results were poorer.

One of the novel aspects of this work is the repeated sampling over time to form an in-depth picture of student attitudes. We observed that students began the year with a regimented outlook of only using recorded lectures to substitute for unavoidable absence, possibly following the staff recommendations. Veterinary students are often considered to be highly conscientious and motivated (Whittington et al., 2017), and so this form of expectation setting may be thought to work particularly well for this population. It is particularly interesting to note how this changed as they reflected on their study strategies. The level of experimentation itself was variable between the students, with some attempting multiple strategies. Their usage patterns also changed with the demands of the programme. How much students experiment with lecture recording is individual, and may be related to personality (i.e. do they like to try new things) and likely to be influenced by other factors relating to the student's lifestyle; is this student involved in several extra-curricular activities, does this student invest a lot of time into studying. Further research could investigate lecture recording 'users', frequency and methods of use and their backgrounds. Leadbeater et al., (2013) investigated ways students use lecture recordings however future research could assess factors that determine how much a student experiments with lecture recording, such as academic attainment.

Support for facilitating learning

Technical issues were mentioned throughout all student blogs and during staff interviews however these problems improved for both parties over time. For students, some frustrations remained, such as not being able to see the lecturer if they move outside the view of the video camera.

Sometimes they do really good physical gesticulations or demonstrations of movements but they do them to the side of the room, which is then not caught on camera. (Student 3, Blog 3)

Another related problem is demonstrated by a student below:

It is also frustrating when staff use the laser pointer and not the computer mouse or interactive whiteboards pens to highlight things on the screen, because this does not translate to the recording software. (Student 3, Blog 1)

Staff members did not discuss these problems in the interviews which suggests they may not be aware of them. This may highlight that an important aspect of faculty development is regularly reviewing what happens inside of a lecture, and how students experience them, (Lund et al., 2015), particularly as new forms of technology impact delivery.

Both staff and students voiced irritation at a lack of flexibility in the software currently being used in relation to timings. Staff expressed feeling rushed as lectures are scheduled to automatically record within a specified time frame (e.g. 10am – 10:50am) which meant they felt less likely to engage in discussion which may take up time and felt they had less flexibility to 'use' the time in which they were given to lecture. Students showed considerable frustration at lecturers running over their allocated recording time as these sections would not be recorded. Both student and staff comments below summarise some problems.

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I often give double lectures...if you have a double lecture sometimes the way you spread the material across them means you maybe take slightly longer on the first one...if you go over it stops recording. You can't set it for a two hour period... you can't pause it in between. (Lecturer 2)

Another issue is that some professors go over their time limit and the system stops recording so you have missed what was said about those last few slides. (Student 1, Blog 4)

Throughout the course of the year, both staff and students discovered problems with the technology used to record lectures and watch the recordings. Some technical problems were fixed, such as sound issues on recordings while others remained unresolved as sources for frustration, such as being unable to view the laser pointer on recordings.

Staff members should be made aware of any issues with recordings so that their lecturing technique (i.e. using a laser pointer which does not show on a recording) can be modified. If a method of informing staff members of problems with their recordings could be made available, with the support of IT staff, staff could make amendments to teaching to improve recordings. If staff members took part in developmental activities and were made aware of the way in which students were using recorded lectures, they could modify teaching techniques, for example with signposting, so students can gain more and feel more engaged if they are watching the recordings. Even further modification to the veterinary curriculum could be made, especially for content heavy subjects such as anatomy, with the use of recorded lectures and flipped classrooms, however this changes the function of recording to pre-recorded lectures rather than recording live lectures (Bergmann and Sams, 2012).

Both students and staff would benefit from guidance on the possible effective use of recorded lectures to benefit learning, especially in the current climate due to COVID-19. Students could be educated in ways in which other students have used the recordings to remove the initial experimental phase within this, for example through a workshop when starting the first year of the programme or handouts within an introductory pack. Students will still need to identify which techniques work best for their learning but educating them in the different methods may help them find their preferred methods in a reduced time.

Future work

Several issues were highlighted in the student blogs and staff interviews and further research is needed to explore these are as. Staff members need more education in the ways students are using recorded lectures currently, and innovative pedagogical methods using lecture recording and the software could be developed. Lecturers could modify their teaching techniques to better suit the recorded lectures, for example for content heavy topics such as anatomy, a flipped classroom approach using the recorded lecture could be created. Staff could record small sections in a lecture format, direct students to watch these and then discuss these sections within tutorials. While this does move away from the recording of traditional lectures, it could act as a substitute for some specific, well-suited topics, possibly freeing up an already densely packed timetable for the veterinary medicine students.

Further research looking at the different ways in which students use recorded lectures (above methods found in this study) and how effective each method is would allow for direction to be given to students when they begin their undergraduate degree, to make the best of this new tool provided to them.

Conclusion

Student engagement and behavior with lecture recording changed throughout the academic year, from the implementation of recorded lectures within the veterinary curriculum. In the blogs, students used the recorded lectures in several different ways which they felt enhanced their learning, changing their methods throughout the course of the year, with experimentation to find their preferred techniques. Recordings were used when on campus, during term time, when on placement, during vacations and during revision periods, indicating the potential versatility of recorded lectures as a tool for students. Attendance of live lectures was not a concern to staff despite initial apprehension, and despite some students reporting using recordings for attendance of the live lecture, students in this study used the recorded lectures either to make up for unavoidable absence or as an addition to the live lecture. Both staff and students encountered frustrations with the technology and a lack of flexibility with the recording software. Staff members felt constrained by timed recordings while students expressed irritation over not all aspects of a lecture being video recorded. Staff did not seem aware; a platform for highlighting these concerns to staff after recordings are viewed should be available. The disruption to education due to COVID19, has highlighted the importance of this research and the findings are likely to prove useful as delivery methods may have to be adapted long term.

Biographies

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