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Article

Uncovering Dental Students' Online Learning Habits from an Educator's Perspective

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Abstract: Introduction: Dental students' use of online material to supplement learning has been studied, but educator awareness and reaction to the findings of this research is unknown. This small local study aimed to investigate dental students' use of online content as a learning tool from an educator's perspective. **Methods:** Educators at an Irish dental school completed a survey based on dental students' use of online learning. Quantitative descriptive analyses were carried out as appropriate on the data collected, and a subsequent focus group was held to gain deeper insight into survey results. Data were analysed for themes by deductive and inductive coding methods. **Results:** This study found a sample of educators were aware of some student behaviours around online videos. Most educators correctly thought that students are likely to refer to online videos to prepare for dental procedures. Several educators believed that teachers should incorporate videos into their learning, but do not themselves upload or recommend online videos. Most recalled discussing accuracy and/or relevancy of online content with their students. Fewer thought that students would discuss contradictory videos with them. Focus group participants expressed concern over the accuracy of online content. This along with a lack of time were some reasons deterring them from referring students to online videos. **Conclusions:** An opportunity exists for dental educators and their students to have local dialogue around (1) student use, critical appraisal, and sharing of dental procedural video material; and (2) perceived benefits and challenges of incorporating both school-produced and online videos into teaching and learning. Although arguably non-generalizable beyond this context, this study may inform future research and serve to spark conversations within schools regarding video use for teaching clinical dental procedures.

Keywords: dental education; dental curriculum; E-learning; video learning

1. INTRODUCTION

The use of online resources to support learning in dentistry, while not new, arguably increased with the COVID-19 pandemic disrupting traditional in person teaching methods. Research suggests that online learning may be used successfully in a dental school's curriculum to enhance students learning, particularly in the clinical curriculum.[1]

The current generation of dental students frequently turn to platforms like YouTube for educational support.[2] They appreciate the flexibility and accessibility that online resources provide.[3,4] Indeed, research suggests that students find video tutorials easier to understand than traditional face to face lectures.[5] It has been suggested that when learning preferences are expressed by students in dental education, educators should adapt their teaching styles to meet the learning needs of their students.[6]

Educators may be hesitant to shift their teaching style to online learning for a number of reasons. The literature suggests these include a perceived lack of benefit, the difficulty in developing online resources, the frequency of student usage, and the time investment required.[7–10] Perhaps as evidence of this hesitancy, a 2019 study revealed UK and Irish dental schools provide limited online educational content, and found only 5% of videos uploaded to YouTube were from universities.[11] Most videos are uploaded by individuals rather than training institutions or recognised experts in

the field.[12,13] As Knösel *et al.* observed, much of the online dental content available may not even be produced by licensed dentists or dental educators.[14]

The danger is that this content students come across in their independent study may be inaccurate and lead them astray. A study from Jamleh *et al.* in 2022 found that most root canal access cavity preparation YouTube videos were of poor educational quality and lacked information.[15] Similarly, Kodonas *et al.*'s analysis of YouTube videos on pulpotomies and pulp capping concluded these too were of low educational quality or provided incomplete information.[13] Compounding the issue of misinformation, is research showing that dental students report continuing to share videos with their peers despite knowing the videos presented erroneous or suspect information.[16]

Previous investigations into dental students' behaviour around accessing online content have obviously focused on the learner; rather than educator understanding of and reaction to that behaviour. This research project attempted to explore this gap by surveying dental educators using modified questions asked of students in two large studies,[2,16] and conducting a focus group from the pool of participants to further explore their thoughts on this topic.

2. MATERIALS AND METHODS

Ethics approval was granted by the School of Dental Science Ethics Committee at the Dublin Dental University Hospital (DDUH) on 21st November 2022.

Questions for the survey were written to mirror research by Burns *et al.*[2] and da Silva *et al.*[16] to check educators' awareness of student behaviours described in these papers; and to collect information of interest locally. The survey consisted of 15 items: perceived student behaviours (7 items), their own teaching practice (7 items), and lastly an item asked their opinion of expected student behaviours.

Educators at the DDUH were invited by this undergraduate dental student research group to participate in an anonymous web-based survey by email distributed through the staff directory. Survey participants interested in joining a focus group on the subject were invited to provide the research group with their contact details. In both cases, participants were well aware they were engaging as part of a student research project.

Survey data was collected from 1 December 2022 to 17 January 2023. Each participant consented prior to completing the survey, and was permitted to opt out of the survey at any point with their submitted responses being deleted immediately. Data collection and analysis were carried out using Qualtrics and SPSS. Descriptive statistics were used to describe the data, and chi-square analyses were attempted.

Two undergraduate dental students conducted the focus group. Both previously completed a qualitative data analysis course offered by the developer of the Delve qualitative data analysis software. Questions asked at the focus group were selected to prompt discussion amongst participants on the topic of online learning. The discussion was recorded using a digital audio recording device (Zoom H1N) which was then transcribed to text using Microsoft Word. Themes used for coding were decided based upon recurring points which were raised by the focus group participants. Both deductive and inductive coding analysis was aided using the Delve Qualitative Data Analysis Tool.[17]

3. RESULTS

Fully completed survey data was collected from 20 of 60 teaching staff invited to participate, for a response rate of 33%. Responses were tabulated (Table 1). Due to the small sample size, some responses were dichotomized for statistical testing where possible; however still no statistically significant relationships between collected variables were found.

Table 1. Survey responses.

n=20	n	%
1. What device do students prefer for accessing dental education online?		
Smartphone	5	25
Tablet or iPad	2	10
Laptop or desktop computer	13	65
2. From which primary source do students' learn about dental education?		
Recommendations from teaching staff	4	20
Recommendations from classmates	5	25
Internet search engines	11	55
3. How frequently do students use online content as a complementary learning tool for dental course studies?		
Once a week	2	10
Always	15	75
Other	3	15
4. Students access dental procedure videos from ... (select all that apply)		
YouTube	18	36
My university's website or virtual learning environment	11	22
Other dental school websites	8	16
Their classmates and friends	12	24
Other	1	2
5. What would students do if they watched an online dental procedure which contradicts what you or your colleagues in the school have taught?		
Nothing	4	20
Ignore the resource	1	5
Show to you or your colleagues	4	20
Discuss with a classmate	11	55
6. What is the likelihood that students will refer to online videos to prepare for a dental procedure that they have never done before?		
Unlikely	0	0
Very unlikely	1	5
Likely	14	70
Very likely	5	25
7. If you have uploaded or referred students to an online video, what proportion of your students will actually watch that video?		
I have not uploaded and/or referred to an online video	6	30
0-20%	1	5
21-40%	6	30
41-60%	5	25
61-80%	2	10
8. Which of the following best describes your primary teaching activities?		
Formal lectures	5	25
Clinics	6	30
Small group teaching	9	45
9. What is your preferred method of teaching your dental students?		
PowerPoint lectures	5	25
Discussion groups	11	55
Video tutorials	1	5
Books	1	5
Other	2	10

10. It is challenging for me to incorporate online videos into my teaching activities		
Disagree	6	30
Somewhat disagree	1	5
Somewhat agree	9	45
Agree	4	20
11. Teachers should incorporate online videos when teaching clinical procedures		
Disagree	0	0
Somewhat disagree	1	5
Somewhat Agree	7	35
Agree	12	60
12. Students should only access online videos their teachers have recommended		
Disagree	4	20
Somewhat disagree	6	30
Somewhat agree	8	40
Agree	2	10
13. I upload videos I make to a video streaming platform or virtual learning environment to assist students with learning dental procedures		
I do not teach dental procedures	7	35
Never	4	20
Infrequently	7	35
Frequently	1	5
Always	1	5
14. I refer students to online videos to assist them with learning dental procedures		
I do not teach dental procedures	6	30
Never	3	15
Infrequently	5	25
Frequently	5	25
Always	1	5
15. I have discussed the accuracy and/or relevancy of online video content with my students		
Disagree	6	30
Somewhat disagree	1	5
Somewhat agree	8	40
Agree	5	25

3.1. Survey data

The most common age of educators was 50 to 59 years (n=8), and second most common was 40 to 49 years (n=6). Twelve educators had been teaching for 10 or more years.

Thirteen educators amongst the 20 participants in this study believed that students use either a laptop or desktop computer as their preferred device for accessing dental education content online (Table 1). More than half (n=11) thought that students mostly use internet search engines to learn about dental education in the form of videos. Three-quarters (n=15) responded that students 'always' use online content as a complementary learning tool. When asked to select which dental procedure video platform was most popular amongst their students, most (n=18) selected YouTube.

Just over half of the educators (n=11) believed that students who come across an online dental procedure video contradicting their school's teaching would discuss its content with their classmates. In contrast, only four thought the video would be brought to their or a colleague's attention. Nearly all of the educators (n=19) believed that students are likely to refer to online videos to prepare for a dental procedure that they have never done before. Interestingly, of 14 educators who upload or referred students to videos, none thought that they would be watched by more than 80% of their students.

The most common teaching method of this sample of educators (n=9) was small group learning. In terms of their preferred method of teaching dental students, 11 stated that they preferred discussion groups over the use of slides, books and video tutorials. Just over half of the sample (n=13) agreed or somewhat agreed with the statement that they find it difficult to incorporate videos into their teaching. Despite this, nearly all of the educators (n=19) agreed that educators should be incorporating online videos when teaching clinical procedures. Among 13 educators with some responsibility for teaching dental procedures: most (n=11) never or infrequently upload their own videos to a streaming platform or virtual learning environment, although more participants reported frequently or always (n=6) referring students to an existing video. Thirteen educators of the study's 20 participants report discussing the accuracy and/or relevancy of online video content with their students.

3.2. Focus group findings

Of the 20 survey participants, four attended the focus group: three were present physically and one joined virtually. In line with the survey findings about educator perceptions of student behaviour, focus group participants expressed concern that students may be unable to critically evaluate material online, and are not inclined to ask their educators for guidance when they encounter unassigned content. One focus group participant said that "a lot of students question the accuracy of content and that they also don't discuss this with their teachers". This sentiment was shared by the other participants; with one participant expressing doubt about students' ability to "critically appraise and judge content". In addition, videos will be assumed to be more accurate than others based on the reputation of the institution or source that uploaded it.

The participants felt strongly that students should approach their educators when in doubt about the accuracy of online content. Further, a participant identified students' failure to do so as a missed learning opportunity:

I don't know why students don't share that they're looking at the videos with their supervisors because that would be a lovely educational construct to explore where you explore the space between what YouTube says and what your lecture [*sic*] says.

To add depth to the survey questions grouped by participants' own teaching styles, a number of reasons for not uploading or referring students to videos were mentioned. These related to generational differences, teaching qualifications, and resources; and the risk of student disengagement from in-person learning. Participants felt that older educators would be less likely to see a need to incorporate videos into their teaching, possibly related to a lack of video learning in their own training. A quote from one of the participants was "Maybe certain generations didn't use videos in their training and they were fine". This idea was supported by other participants, as seen in another quote:

Maybe there's disconnect between people my age and people your age in terms of, you would see the videos are essential and we should have loads and loads more videos, whereas perhaps more mature or older people wouldn't.

Participants also felt that educators with higher qualifications in education would be more likely to use videos in their teaching. One participant said that those incorporating videos "all have Masters in Education, higher education, and these are the people who are embracing the technologies".

Thirdly, participants felt that resources were a limiting factor in the creation of and referral to videos. One participant remarked, "It's a lot of time, energy and effort to generate that level of material." This was echoed by another participant who said, "To do it properly is very time intensive and most academic staff don't have as much time as they would like". Further, participants that that producing videos would require spending money on new equipment. Tied to this limited resources idea, but arguably a separate one on its own, was the participants' belief that videos are not essential for students to fulfill stated learning outcomes. A participant asked rhetorically, "Is the video absolutely core essential learning that you need to know this to be able to succeed". If it was not essential, then it would not be prioritized.

The fourth reason for not uploading or referring students to videos that arose in discussion was the risk of student disengagement from in-person learning. Participants worried that students having access to videos might result in them being less inclined to attend in-person sessions and miss out on presumably better learning opportunities. This concern was expressed by a participant who said “The worry is if you prepare videos, then students won’t attend the lab. It’s Monday morning, nine o’clock, I’ll watch the video instead.” Another participant supported this by saying “There’s all sorts of videos online, which can show you how to do this, but you can’t beat being in there with the doctor, with the patient”.

4. DISCUSSION

It is firstly important to recognise that this was a very small, single institution research project. The questionnaire used was not formally validated. Terms like ‘reliability’ and ‘accuracy’ were left open to educators’ own interpretation, leaving room for ambiguity. In addition, many quantitative variables of interest could not be adequately studied for relationships due to low participant numbers. Similarly; different themes and concepts, and possibly a framework may have emerged from the qualitative data with a larger focus group and followed by more rigorous analysis. These findings, then, are likely not generalisable to the greater dental educator community. Nevertheless, this study may inform future research in this area and serve as a springboard for conversations within dental schools regarding video use for teaching clinical dental procedures.

This mixed-methods study explored some aspects of dental educators’ practice around video content in teaching, and some of their reactions to student interaction with online material and video content. This study found that local educators are aware that students often access online videos to supplement their learning, but that they worry that students may not be able to judge the accuracy of videos they watch. Further, this study found educators may be disinclined to create original video content or refer students to existing online videos for various reasons related to generational differences, teaching qualifications, and resources; and that educators may not be providing guidance on how to appraise videos.

These educator perceptions of student behaviour can be compared to the research from Dias da Silva *et al.*¹⁶ who asked students directly about their practices. They found that the majority of students do indeed use videos for learning dental clinical procedures. Further, da Silva *et al.*[16] found that many students would discuss a contradictory video with their lecturer, which differs from this study’s results suggesting that only a few educators believed that students would do so. There is room here for educators to actively encourage students to come forward with the opportunity of, as one participant put it: “a lovely educational construct to explore where you explore the space between what YouTube says and what your lecture [*sic*] says”.

Concerns about the accuracy of online content and the utility of videos as a learning tool were raised several times during the focus group, which echoes findings from studies previously mentioned (2, 16) as well as research conducted by Habib *et al.*[18] In the latter, only a few of the videos analysed by the group from a large pool of online videos were deemed to be educationally useful. There may then be an impetus for educators to produce their own online content to guard against the effects of having inaccurate content accessible by students; should educators be able to overcome some of the difficulties previously mentioned.

Where educators are unable to produce their own videos; it may be appropriate to assign students existing online videos for viewing, and equip them with the skills to appraise video content they may encounter outside of ‘assigned viewing’. Although some educators in this sample reported they had instructed their students on how to determine the accuracy and reliability of online content, more training would likely be welcomed. Da Silva *et al.*[16] found that the majority of students expressed a desire to receive guidance on how to verify the reliability of online content.

Burns *et al.*[2] recently found over one-third of students lacked confidence in judging the evidence base of the videos they accessed. Interestingly, a study dating back to 2014 from Khatoon *et al.*[19] found that dental students were fairly confident in their ability to appraise information on the internet. One hypothesises that the growth in the volume of online material; and ease of creating,

uploading and sharing material may be contributing factors to this change in confidence. In light of continued growth in the number of videos and materials generally, it becomes increasingly important for students to use a critical eye in their current studies and for future practice.

This study suggests an opportunity exists for dental educators and their students to have local dialogue around (1) student use, critical appraisal, and sharing of dental procedural video material; and (2) perceived benefits and challenges of incorporating both school-produced and online videos into teaching.

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