Effect of Video Triggering During Conventional Lectures on Final Grades of Dental Students in an Oral Biology Course: A Two-Year Retrospective Study

Imran Farooq, BDS, MSc; Badr A. Al-Jandan, DMSc, FRCD(C)

Abstract: The aim of this study was to analyze the effect of the inclusion of video triggers in conventional face-to-face lectures on the final grades of dental students in an oral biology course. The study consisted of two groups of students taking the course in two academic years at a dental school in Saudi Arabia: group 1, 2013-14 (control); and group 2, 2014-15. The total sample comprised 163 students (n=163; group 1: 71 and group 2: 92). Group 1 received lectures without any videos, whereas group 2 received lectures that included two to three videos of one to five minutes in duration with triggering effect (a video was shown every 10-15 minutes into the lecture). The final examination grades of the students were accessed retrospectively, and the data were compared with a chi-square test. The results confirmed that a higher number of students who received video triggering during lectures (group 2) performed better than their counterparts who did not receive video triggers (group 1); the difference was statistically significant (p<0.05). Among the group 2 students, 26% achieved a grade of A, and 37% achieved a grade of B. In contrast, only 7% of the group 1 students obtained a grade of A, and 31% achieved a grade of B. These results suggest that video triggers may offer an advantage over conventional methods and their inclusion in lectures can be a way to enhance students’ learning.

Dr. Farooq is Lecturer, Department of Biomedical Dental Sciences, College of Dentistry, University of Dammam, Saudi Arabia; Dr. Al-Jandan is Associate Professor and Chair, Department of Biomedical Dental Sciences, College of Dentistry, University of Dammam, Saudi Arabia. Direct correspondence to Dr. Imran Farooq, Department of Biomedical Dental Sciences, Oral Biology Division, College of Dentistry, University of Dammam, Kingdom of Saudi Arabia; +966 3 8574928, ext. 113; drimranfarooq@gmail.com.

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A cademicians in health professions education play a vital role in training competent future doctors and dentists. Generally, there is a lack of appropriate teacher education in medicine; thus, it becomes mandatory for every instructor to take steps to acquire contemporary teaching skills. Previously, the access of instructors to modern technology was constrained by high costs and lack of expertise. Today, such access has been made easier than ever, and guidelines are provided online to help educators with beginner-level knowledge of technology get accustomed to innovative ways of delivering their lectures. A wide variety of new audiovisual aids are currently available, and the teaching methodologies of instructors should benefit from these tools. One such tool is the use of video technology.

The use of videos to help deliver the message during lectures is not a new approach, but such practice has not spread to all dental schools. Videos offer audiovisual stimuli and can augment different teaching concepts, as previously shown by the Visual, Aural, Read/Write, and Kinesthetic (VARK) analysis questionnaire. Educating patients by showing them videos of various procedures and treatment options relevant to their present condition has been previously found to be very useful. Similarly, the use of videos to teach students is anticipated to be highly advantageous.

In this study, video triggering is defined as a positive stimulation of thought process initiated by a video, which can be used efficiently to gain the attention of students and to strengthen a concept. Previous research has reported that this generation of computer-savvy students avoids reading long texts and feels comfortable in an image-rich environment, in which they are confronted with less cognitive load during the teaching process. Middendorf and Kalish reported that, when attending a lecture, an adult learner loses attention after 15-20 minutes, no matter how captivating the subject matter is, and that optimal focus is present only at the start of the lecture. This means that, in a 50-minute lecture, the last 30-35 minutes pass with the audience having a considerably lower attention span. Effective techniques to gain back student attention include asking a question to be answered, having students work in
groups, creating a discussion opportunity, and using video triggers.\textsuperscript{12}

In dental education, few studies have been done to determine the effectiveness of educational videos in teaching clinical skills, but two studies have shown the advantage of video clips in the overall teaching and learning process.\textsuperscript{13,14} In the absence of previous research on the effect of video triggering on the learning abilities and performance of students in examinations, the aim of this study was to analyze the difference in performance on a final examination in an oral biology course between two groups of dental students (one group received video triggering during the lectures and the other did not) in two academic years.

\section*{Methods}

This study received ethical approval from the review board at the University of Dammam, Saudi Arabia, prior to initiation. The study was conducted at the College of Dentistry of the University of Dammam over a period of two years. Written informed consent was obtained from all the student participants, who were also informed that their grades would be anonymously accessed.

Students at the College of Dentistry, University of Dammam take an oral biology course in the first semester of their third-year studies. To ensure the best learning environment, various instructional aids, such as blackboards, multimedia, and videos, are used alongside conventional 50-minute lectures. The videos presented in the lectures are acquired from numerous sources, including YouTube, Facebook, and Google Videos. The videos used are carefully selected (keeping in mind the content and copyright laws) and then reviewed by all faculty members of the division to confirm their usefulness and adherence to the learning goals of the lecture.

The study consisted of two groups of students taking the oral biology course in two different academic years: group 1, 2013-14 (control); and group 2, 2014-15. The total sample comprised 163 students (n=163; group 1: 71 and group 2: 92). Group 1 received lectures without any videos, whereas group 2 received lectures that included two to three videos of one to five minutes in duration with triggering effect (a video was shown every 10-15 minutes into the lecture). A single instructor was chosen for maximum standardization of the delivery method and content of the lectures. The examination given to the two groups at the end of their respective academic years had different contents, but the topics that were tested and the ratio of examination questions (multiple-choice questions to short essay questions) were the same for both groups. The final grades of the students in the two groups were accessed retrospectively. No specific exclusion criteria were applied in this study.

Data were collected and entered into spreadsheets. The SPSS software (version 19.0; SPSS Inc., Chicago, IL, USA) was used in the analysis. Chi-square tests were applied to compare the difference in grades achieved in the oral biology course between students in groups 1 and 2. A p-value of $<0.05$ was considered statistically significant.

\section*{Results}

The results showed that a higher number of students who received video triggering during lectures (group 2) performed better on the final examination compared with their counterparts who did not receive video triggers (group 1); the difference was statistically significant ($p<0.05$). Among the group 2 students, 26\% achieved a grade of A, and 37\% achieved a grade of B. In contrast, only 7\% of the group 1 students obtained a grade of A, and 31\% achieved a grade of B (Table 1). A higher number of students from group 1 attained grades of C and D compared with group 2. In addition, one student in group 2 failed the examination, whereas no student in group 1 failed.

\section*{Discussion}

Lectures are one of the most popular teaching methods used at many teaching institutions because they provide a convenient way of delivering the message and sharing conceptual information to a large audience all at once. However, some underestimate the strength of lectures as a significant teaching method, probably because of the lack of a substantial rationale in some lectures.\textsuperscript{15} The method of teaching by didactic lectures has been much critiqued by many and is sometimes even referred to as “lecturalgia.”\textsuperscript{16} Therefore, finding ways to make didactic lectures more interactive is needed. There are many ways to make lectures interactive. One useful way is to include videos in the form of triggers,\textsuperscript{17} which not only makes the lecture more interesting but also helps to gain students’ attention and reinforce concepts to improve their learning and knowledge retention capa-
observed at the College of Dentistry, University of Dammam, where the number of students applying for admission in the dental undergraduate program is increasing every year. This trend could also be the reason for the difference between the sample sizes of the two groups in this study, which could have tipped the results in favour of group 2 and may be a limitation of this study.

The results of our study show that the students who received video triggers during their course performed better on the final examination than those who did not receive video triggers. Other than the sample size difference between the two groups, many other factors, such as individual preparations for examination and the learning capabilities of different students, could have also affected the results of this study. Every effort was made to standardize those factors (such as by choosing the same instructor and using the same topics to test the academic performance of students) to ensure the consistency and quality of the study results. The only factor that was intentionally changed to find out its significance on performance was the inclusion of video triggers in the lectures delivered to group 2. Video triggers were therefore anticipated to positively influence the students' learning and knowledge retention, resulting in the achievement of better grades.

In a typical lecture hall environment, in which the students have little control over the proceedings, the use of video clips as triggers not only makes the lectures more interesting but also provides students with the choice to watch those videos again and again at their own pace and convenience. Students born in the 1980s and 1990s are called “Generation Y” and are more accustomed than earlier generations to the use of technology. Logically, such students can be said to prefer a teaching method that they find interesting and is closer to their technology-savvy minds. Thus, the teaching approach should now be shifted from a teacher-centered methodology to a student-directed approach, and it has become common for educators to incorporate technology in the classroom.

Table 1. Grades achieved by students in groups 1 and 2, by number and percentage of total

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Corresponding Numerical Grade</th>
<th>Group 1 Number (%)</th>
<th>Group 2 Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (A+ and A)</td>
<td>90-100</td>
<td>5 (7%)</td>
<td>24 (26%)</td>
</tr>
<tr>
<td>B (B+ and B)</td>
<td>80-89</td>
<td>22 (31%)</td>
<td>34 (37%)</td>
</tr>
<tr>
<td>C (C+ and C)</td>
<td>70-79</td>
<td>30 (42%)</td>
<td>22 (24%)</td>
</tr>
<tr>
<td>D (D+ and D)</td>
<td>60-69</td>
<td>14 (20%)</td>
<td>11 (12%)</td>
</tr>
<tr>
<td>F ≤59</td>
<td></td>
<td>0</td>
<td>1 (1%)</td>
</tr>
</tbody>
</table>

A study similar to ours tested whether paper and video triggers encouraged different learning traits among medical students during problem-based learning and concluded that paper triggers stimulated only cognitive skills, whereas video triggers helped students improve their psychomotor skills as well. How many video triggers should be included in the lecture is a topic of debate among educators. Lim et al. reported the perspective of neuroscience students in their study, stating that a third of every lecture should contain videos. This formula means that of the 50 minutes in a conventional lecture, almost 17 minutes should be allocated to videos. However, we suggest creating equilibrium between the didactic and interactive sections of the lecture. Generally, there should be no restriction on the duration of the videos shown and the number of video triggers included in the lectures as long as they are effective and supplement the lecture contents. However, it should be kept in mind that the material presented through video triggers could become excessively fragmented when too many videos are shown, and another type of trigger may thus be required to gain students’ attention.

Many methods of “hooking” students’ attention have been proposed, including narrating a story, introducing humor, and making use of science fiction. In this study, the idea behind introducing video triggers was also to hook students’ attention and determine the effects of such video triggers on their academic performance. Considering that the attention span of learners in a lecture hall is limited to 15-20 minutes, a single lecture should be divided into a series of mini-lectures with attention-gaining methods at various intervals.

The number of students who choose dentistry as a career is on the rise globally, and Saudi Arabia is no exception. Among the reasons reported for pursuing dentistry as a career are high social status, better income than other professions, and self-employment prospects. A similar trend has been observed at the College of Dentistry, University of Dammam, where the number of students applying for admission in the dental undergraduate program is increasing every year. This trend could also be the reason for the difference between the sample sizes of the two groups in this study, which could have tipped the results in favour of group 2 and may be a limitation of this study.

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obligatory for dental instructors to use new teaching resources.

Although the results of our study clearly show a difference in students’ performance after exposure to video triggers, these results cannot be considered conclusive because the sample used was limited to two groups of students taking the same course. There were also other possible factors that could have caused the performance difference between the two groups, such as course load, individual preparation of students for examination, the students’ respective learning abilities, examination anxiety, or the possibility that group 1 shared their experience of the examination with group 2. Comparable studies with other groups of students, other dental colleges, and other courses could provide a more distinct picture of the effectiveness of the use of video triggers in lectures.

Conclusion

This study found that using video triggers in conventional face-to-face lectures resulted in improved final grades of dental students in an oral biology course. These findings suggest that video triggers offer an advantage over conventional teaching methods and their inclusion in lectures may be a way to improve students’ learning capabilities.

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REFERENCES