Dental students’ learning attitudes and perceptions of YouTube as a lecture video hosting platform in a flipped classroom in Korea

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Purpose: The aim of this study was to confirm the applicability of YouTube as a delivery platform of lecture videos for dental students and to assess their learning attitudes towards the flipped classroom model. Methods: Learning experiences after using the YouTube platform to deliver preliminary video lectures in a flipped classroom were assessed by 69 second-year students (52 males, 17 females) at Dankook University College of Dentistry, Korea, who attended periodontology lectures during 2 consecutive semesters of the 2016 academic year. The instructor uploaded the lecture videos to YouTube before each class. At the end of the second semester, the students were surveyed using a questionnaire devised by the authors. Results: Of the students, 53 (76.8%) always watched the lecture before the class, 48 (69.6%) used their smartphones, and 66 (95.7%) stated that they watched the lectures at home. The majority of the students replied that the video lectures were easier to understand than face to face lectures (82.6%) and that they would like to view the videos again after graduation (73.9%). Conclusion: Our results indicate that YouTube is an applicable platform to deliver video lectures and to expose students to increased learning opportunities.

Keywords: Flipped learning; Dental education; Educational technology; Smartphone; Republic of Korea

Introduction

Dental education has undergone unprecedented changes to more directly involve students in learning by focusing on critical thinking, problem-solving skills, and student-centered learning [1]. These innovations became possible due to refinements in information and communication technology and the increased prevalence of e-learning or online learning platforms [2]. One result has been the emergence of the 'flipped classroom' model as an alternative to conventional one-to-many lecture-based teaching. The flipped classroom is a teaching method that promotes the learning of basic concepts through pre-learning and concentrates on in-depth learning activities in class through actual problem-solving and clinical exposure. It is a type of blended learning in which in-class learning is integrated with online learning experiences, and students watch pre-recorded lecture videos prior to attending the class [3]. It is critical to provide a flexible environment that is free from time and space constraints to operate a flipped classroom successfully [4]. With this background, we aimed to confirm the applicability of YouTube as a delivery platform of micro-lecture videos to provide the flexible learning environment that is necessary for the flipped classroom.

Case presentation

Ethics statement

This study was approved by the Institutional Review Board of Dankook University Dental Hospital after receiving informed consent from the subjects (IRB approval no., DKU DH 2017-10-002).

Case

The participants were 69 second-year students of Dankook University College of Dentistry who attended a clinical periodontology course (52 males, 17 females). The periodontology course ran from March 2 to December 16, 2016. This course contained 1-hour weekly sessions, comprising a total of 14 hours. The instructor re-
corded the lecture videos using the Screencast application, which records the content of the presentations and the comments of the lecturer in real-time (Camtasia; TechSmith Corp., Okemos, MI, USA). The lecture videos were uploaded to YouTube before the class (https://www.youtube.com/jcparkland), as shown in Table 1 (Supplement 1). On average, the micro-lecture videos did not exceed 20 minutes in consideration of the students’ ability to focus. Abstracts of all micro-lectures were also uploaded as PDF files. The links to the YouTube videos and the PDF files were posted together using G Suite for Education (Google, Mountain View, CA, USA). The students completed pre-learning by watching micro-lecture videos on the YouTube platform and reading the PDF abstract before attending class, and their understanding of the content of the micro-lecture videos was assessed through an in-class quiz related to the pre-learning content. Students’ answers to the quiz were shared in real time on the screen using the smartphone application Socrative (http://socrative.com) [5], which is a cloud-based student response system. For topics for which students’ understanding was considered to be lacking, immediate feedback was provided by introducing major concepts. Through such a process, students could thoroughly learn the basic concepts that they needed to be aware of. After checking and complementing the pre-learning process through the quiz and

| Topic                                | Duration (min:sec) | Direct link                  |
|--------------------------------------|--------------------|------------------------------|
| 1. Periodontal instruments           | 23:26              | https://goo.gl/Md1aWi        |
| 2. Periodontal instrumentation       | 17:55              | https://goo.gl/D6oKXB        |
| 3. Periodontal healing               | 15:00              | https://goo.gl/1bOhYv        |
| 4. Mechanical plaque control         | 12:59              | https://goo.gl/5h8eb         |
| 5. Scaling and root planing          | 16:10              | https://goo.gl/NGE1K         |
| 6. Chemical plaque control           | 13:42              | https://goo.gl/8xkbZ         |
| 7. Principles of surgical treatment  | 14:56              | https://goo.gl/UBRlrH        |
| 8. Emergency treatment               | 12:47              | https://goo.gl/AwWb26        |
| 9. Subgingival curettage             | 17:17              | https://goo.gl/9ZTB1         |
| 10. Gingivectomy and gingivoplasty   | 16:20              | https://goo.gl/vdj2H         |
| 11. Flap operation                   | 28:57              | https://goo.gl/vKODnY        |
| 12. Guided tissue regeneration       | 18:52              | https://goo.gl/vXcZvD        |
| Average running time ± standard deviation | 17:22 ± 4:41    |                              |

**Fig. 1.** Implementation of the flipped classroom.
Fig. 2. Descriptive statistics of the post-course survey items focusing on the learning experience using the YouTube platform. Values are presented as % or mean ± standard deviation. (A) Basic information. (B) Pre-learning environment. (C) Lecture viewing: learning attitude and awareness. (D) Assessment of the YouTube platform. PC, personal computer. *Multiple selection; †Sharing, virtual reality content, replay, feedback using comments, subtitles, and live streaming. *(Continued to the next page)

feedback, theoretical perspectives and clinical practice were integrated by linking the content with treatment/surgery fields through Google Cardboard virtual reality (VR) and live surgery broadcasting. This process enhanced the acquisition of actual knowledge and promoted motivation to learn by helping students indirectly experience how the theories they learned were applied in clinical settings. Moreover,
after the process, in-depth learning of corresponding topics was promoted through various team-based learning activities, such as debates, and projects. The details of the pre-class and in-class process are shown in Fig. 1.

At the end of the second semester, the students were surveyed using the questionnaire devised by the authors. We developed a survey questionnaire to assess the students’ learning attitudes and the applicability of YouTube with a rubric, according to which each item was scored on a 6-point Likert scale. The questionnaire was developed by the researchers in advance and completed by consulting with 2 medical education experts. Students responded to the survey after the final examination using Google Forms with their smartphones in January 2017. We conducted a descriptive statistical analysis, including the frequency and percentage of answers. The raw data of this study are presented in Supplement 2. The major results were as follows (Fig. 2).

First, students usually watched the micro-lecture videos using smartphones (69.6%), at their home (95.7%) in the evening after school.
Supplementary materials

Supplement 1. Sample video file: Lecture no. 10. Gingivectomy
and Gingivoplasty.

Supplement 2. Data files are available from https://doi.org/10.7910/DVN/LTDX5Q

Supplement 3. Audio recording of the abstract.

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