

# The Impact of Introductory Anatomy Laboratory Videos on Medical Students' Laboratory Quiz Performance

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## Abstract

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## Background:

This study examined the association between viewing introductory anatomy laboratory videos and quiz performance among medical students at the Faculty of Medicine, Universitas Pelita Harapan.

## Methods:

Using observational design with a cross-sectional approach of secondary data from 180 students in the Skin and Special Senses course.

## Result:

Students who watched the introductory video were significantly more likely to achieve quiz scores of  $\geq 60$  than those who did not. Chi-square analysis demonstrated a significant association between video viewing status and quiz performance ( $\chi^2(1)=40.36$ ,  $p<0.001$ ), with a moderate relationship strength (Cramér's  $V=0.474$ ). Students who watched the video were nearly eight times more likely to achieve passing scores ( $OR=7.91$ , 95%  $CI: 4.06-15.42$ ).

## Conclusions:

Watching introductory anatomy laboratory videos was significantly associated with better laboratory quiz performance. It may support self-directed learning and enhance the academic performance.

## Introduction

The Faculty of Medicine at Universitas Pelita Harapan implements a competency-based curriculum that emphasizes student-centered learning and the development of self-directed learning (SDL) skills. Anatomy is one of the fundamental medical sciences taught through a combination of lectures and laboratory sessions. Prior to laboratory activities, students are provided with preparatory materials, including introductory videos and written guides accessible through Moodle. These resources are intended to support independent learning and help students familiarize themselves with laboratory content before attending

practical sessions.<sup>1,2,3</sup>

Students' achievement of the expected laboratory competencies is evaluated through multiple choice quizzes. In addition to assessing competency attainment, quiz results can serve as a form of self-assessment, enabling students to evaluate their understanding of the laboratory material. According to Mayer's Cognitive Theory of Multimedia Learning (CTML), learning is enhanced when information is processed through both visual and verbal channels. In anatomy education, introductory videos may facilitate students' understanding of anatomical structures and laboratory procedures

by providing visual and auditory representations of the learning content.<sup>4,5</sup>

Previous research by Adhywira Mursalin and colleagues demonstrated that educational videos could improve students' understanding and practical examination performance. However, their study employed an experimental pre-test/post-test design and involved first-year medical students enrolled in the Digestive System course. Unlike the study by Mursalin et al., the present study focused on students in the later stages of anatomy education. Because these students have had extensive experience with the learning management system throughout their training, potential bias related to unfamiliarity with the platform is likely to be minimal. In addition, their self-directed learning habits are expected to be well established.<sup>2,6</sup>

This study aimed to examine the association between viewing introductory anatomy laboratory videos and laboratory quiz performance among medical students at the Faculty of Medicine, Universitas Pelita Harapan. The findings may also provide preliminary evidence for future investigations of other factors influencing quiz performance, such as academic ability, learning motivation, and the complexity of the learning material.

## Material And Methods

This study employed an observational design with a cross-sectional approach and purposive sampling. Secondary data were collected from the 2020 cohort of medical students. Information on whether students had viewed the

introductory videos was obtained through Panopto, a video management platform integrated with the institution's learning system. Panopto records students' access to instructional videos, allowing researchers to determine whether each participant had watched the assigned content. The Panopto video links were made available to students through the Moodle learning management system.

Students completed the laboratory quiz through Moodle immediately after the practical session concluded. The quiz consisted of eight multiple-choice questions with a maximum total score of 100. Secondary data on quiz performance in the Skin and Special Senses course were retrieved from Moodle by the researcher in their role as the laboratory course coordinator.

Quiz scores were classified into two categories:  $<60$  and  $\geq 60$ . This cut-off was based on the faculty's minimum passing standard, with a score of 60 or higher considered the minimum level required to demonstrate adequate achievement of the assessed competencies. For the purposes of this study, the analysis was therefore conducted using these two performance categories.

Data analysis was performed using statistical software. The association between introductory video viewing status and quiz score category ( $\geq 60$  vs.  $< 60$ ) was evaluated using the Chi-square test. The strength of the association was assessed using Cramér's V coefficient, while the likelihood of achieving a quiz score of  $\geq 60$  among

students who watched the introductory video compared with those who did not was estimated using the Odds Ratio (OR) with a 95% confidence interval (95% CI). A p-value of  $<0.05$  was considered statistically significant.

**Inclusion criteria:** Medical students from the Class of 2020 who had access to Moodle, participated in the Skin and Special Senses laboratory sessions in 2023, and completed the laboratory

**Exclusion criteria:** Students who repeated the academic year, repeated the course, or completed or submitted the quiz outside the scheduled time (including late or rescheduled quiz attempts).

## Result

A total of 180 respondents from the secondary data of the Universitas Pelita Harapan Faculty of Medicine Class of 2020 were included in the study, comprising 41 male students and 139 female students.

The relationship between introductory laboratory video viewing status and quiz performance is presented in the following table:

**Table 1.** Association video and quiz scores

| Video Viewing Status | Quiz Score       |               | Total     |
|----------------------|------------------|---------------|-----------|
|                      | $\geq 60$ n, (%) | $< 60$ n, (%) |           |
| Watched              | 58 (72,5)        | 22 (27,5)     | 80 (100)  |
| Did not watched      | 25 (25)          | 75 (75)       | 100 (100) |
| Total                | 83 (46,1)        | 97 (53,9)     | 180 (100) |

Among the 80 students who watched the introductory video, 58 (72.5%) achieved quiz scores of  $\geq 60$ , while 22 (27.5%) scored  $< 60$ . In contrast, among

the 100 students who did not watch the video, only 25 (25.0%) obtained scores of  $\geq 60$ , whereas the remaining 75 students (75.0%) scored  $< 60$ . These findings indicate that the proportion of students achieving satisfactory quiz scores was substantially higher among those who watched the video than among those who did not.

Overall, of the 180 respondents, 83 students (46.1%) obtained quiz scores of  $\geq 60$ , while 97 students (53.9%) scored  $< 60$ . Although more students fell into the  $< 60$  category, the distribution of scores according to video viewing status showed a clear pattern. Students who watched the introductory video were predominantly represented in the  $\geq 60$  category, whereas those who did not watch the video were predominantly represented in the  $< 60$  category. This distribution suggests an association between watching the instructional video and better quiz performance.

Students who watched the introductory video were nearly three times as likely to achieve quiz scores of  $\geq 60$  as those who did not watch it (72.5% vs. 25.0%). This finding suggests that introductory instructional videos may serve as an effective learning resource to help students better understand the material assessed in the quiz.

## Discussion

From a descriptive perspective, the findings suggest that students who engaged with the instructional videos tended to achieve better academic outcomes. By presenting information through both visual and auditory channels, instructional videos can facilitate concept acquisition more effectively than relying on either modality alone. As such, the use of educational videos may be considered a valuable strategy for promoting self-directed learning among medical students.<sup>2,5</sup>

Chi-square analysis demonstrated a

statistically significant association between viewing the introductory laboratory video and quiz performance ( $\chi^2(1) = 40.36$ ;  $p < 0.001$ ). Therefore, the null hypothesis stating that no association exists between the two variables was rejected. These findings indicate that students' quiz performance was significantly associated with their introductory video viewing status.

The strength of this association was further evaluated using Cramér's V coefficient, which showed a value of 0.474, indicating a moderate to strong relationship. This suggests that the observed association is not only statistically significant but also has practical relevance in the context of anatomy education.

Odds Ratio analysis showed an OR of 7.91 (95% CI: 4.06-15.42), indicating that students who watched the introductory laboratory video were nearly eight times more likely to achieve a quiz score of  $\geq 60$  compared with those who did not watch the video.

The 95% confidence interval further supports the statistical significance of this association, suggesting that the use of introductory laboratory videos is associated with a substantially greater likelihood of achieving better performance on anatomy laboratory quizzes.

## **Conclusion**

The findings of this study demonstrate a significant association between viewing introductory anatomy laboratory videos and students' quiz performance. Students who watched the introductory video were nearly eight times more likely to achieve a quiz score of  $\geq 60$  compared with those who did not watch the video.

## **Acknowledgment**

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