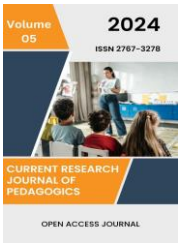
CURRENT RESEARCH JOURNAL OF PEDAGOGICS
(ISSN –2767-3278)
VOLUME 05 ISSUE 12 Pages: 08-14
OCLC – 1242041055
Crossref doi Google Scholar WorldCat MENDELEY
Publisher: Master Journals



Journal Website: https://masterjournals.com/index.php/crjp

Research Article

THE ROLE OF PRE-CLASS ONLINE VIDEO LECTURES IN FLIPPED-CLASSROOMS: STUDENT SATISFACTION AND LEARNING OUTCOMES

Submission Date: November 24, 2024, **Accepted Date:** November 29, 2024,
Published Date: December 04, 2024

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ABSTRACT

This study investigates the role of pre-class online video lectures in flipped-classroom instruction, focusing on how these resources influence student satisfaction and learning outcomes. Flipped classrooms have gained popularity as a pedagogical approach that inverts traditional teaching by delivering content outside of class through digital platforms, allowing in-class time for active learning. The research examines students' perceived satisfaction with pre-class video lectures, analyzing how these lectures affect their engagement, preparedness for in-class activities, and overall learning experiences. Data were collected from surveys, student feedback, and academic performance assessments in a university-level course utilizing flipped-classroom methodology. The findings suggest that pre-class videos play a crucial role in enhancing students' readiness to engage with class material, leading to greater satisfaction with the learning process. Additionally, students who reported higher satisfaction with the video content showed improved academic outcomes, particularly in problem-solving and application-based tasks. This study highlights the importance of well-designed pre-class videos as an essential component of the flipped-classroom model, offering valuable insights for educators seeking to optimize teaching strategies and improve student learning experiences.

KEYWORDS

Flipped classroom, Pre-class online video lectures, Student satisfaction, Learning outcomes, Asynchronous learning, Active learning, Educational technology.

INTRODUCTION

Flipped classrooms have emerged as a transformative pedagogical approach that challenges the traditional lecture-based model of instruction. In this inverted model, students are introduced to new content

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outside of class, typically through pre-recorded online lectures, which frees up valuable in-class time for active learning, discussions, and collaborative activities. This approach aims to promote deeper learning by allowing students to engage with the content at their own pace and come to class prepared for more interactive, hands-on experiences. Central to the success of flipped classrooms is the quality and effectiveness of pre-class resources, particularly online video lectures, which serve as the foundational learning material for students before they engage in class-based activities.

The role of pre-class online video lectures has been widely discussed in the context of student engagement, learning outcomes, and overall satisfaction with the course. When designed effectively, these video lectures can increase students' preparedness for in-class activities, facilitate better understanding of complex concepts, and encourage self-directed learning. However, the quality of these videos and their alignment with students' learning needs can significantly impact how well students are able to internalize and apply the material. Moreover, students' perceptions of the usefulness, clarity, and accessibility of these videos often correlate with their satisfaction and engagement in the course.

This study seeks to explore the role of pre-class online video lectures in flipped classrooms by investigating their influence on student satisfaction and learning outcomes. Specifically, it examines how students' experiences with video content impact their engagement with the learning process, as well as how their satisfaction with these videos relates to their performance in subsequent in-class activities and assessments. By focusing on the students' perspective, this research provides valuable insights into the effectiveness of pre-class videos in enhancing learning experiences and improving academic achievement in flipped-classroom environments.

The findings from this study aim to offer practical recommendations for educators who are looking to refine their flipped-classroom practices, ensuring that pre-class video lectures serve as an effective tool for preparing students and optimizing learning outcomes.

METHOD

This study adopts a mixed-methods approach to assess the role of pre-class online video lectures in flipped-classroom instruction, specifically focusing on student satisfaction and learning outcomes. By combining both quantitative and qualitative data, the research provides a comprehensive view of how pre-class video lectures influence student engagement, preparedness, and academic performance. The study was conducted in a university-level course that utilized a flipped-classroom model, with students required to engage with pre-class video lectures prior to attending in-person classes where active learning strategies were employed. The methodology is structured around three core elements: participant selection, data collection methods, and data analysis techniques.

Participant Selection

The study was conducted in a mid-level undergraduate course in a STEM (Science, Technology, Engineering, and Mathematics) field, which implemented the flipped-classroom model. The course was selected because it had been designed to incorporate online video lectures as a central feature of its pre-class preparation. The total participant pool consisted of 120 students who were enrolled in the course for a semester. To ensure a diverse sample, participants were drawn from various academic backgrounds within the course, with a balanced mix of students from different demographics, including age, gender, and prior academic achievement.

To ensure a representative sample, participants were grouped based on their baseline academic

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performance, which was measured by their grades in prerequisite courses and pre-assessments administered at the start of the semester. These pre-assessments, designed to test basic knowledge of the subject, provided an initial gauge of students' familiarity with the content. While all students were required to view the online video lectures, they were grouped into three categories for further analysis: high-performing students, average-performing students, and low-performing students. These categories were important for analyzing the impact of pre-class video lectures across a range of academic capabilities.

Pre-Class Online Video Lectures

The pre-class online video lectures used in the flipped classroom were created by the course instructor in collaboration with instructional designers. These video lectures were approximately 15 to 20 minutes long and covered core topics relevant to the course content. They were designed to be interactive, incorporating quizzes, on-screen notes, and graphical explanations to engage students and reinforce the material. In addition, each video was supplemented with written materials, including study guides and key concept summaries, which were made available to students via the course's online learning management system (LMS).

The structure of the videos was consistent, with an emphasis on providing clear, digestible explanations that students could pause, rewind, or rewatch as needed. The videos were designed to foster active learning by encouraging students to pause and reflect at certain points, answer embedded quiz questions, or apply the concepts in short practice problems. The LMS also allowed students to track their progress, and notifications were sent to students when they completed a video.

Data Collection Methods

This study employed both quantitative and qualitative data collection methods to capture a well-rounded perspective on the role of pre-class video lectures in student learning. The data collection methods included surveys, academic performance assessments, and in-depth interviews.

Surveys

To measure student satisfaction with the pre-class video lectures and gather feedback on the perceived usefulness of the content, an online survey was administered at the end of the semester. The survey included both closed and open-ended questions designed to capture students' opinions on video quality, content clarity, accessibility, and relevance. The Likert-scale questions ranged from "Strongly Agree" to "Strongly Disagree" and included statements such as "The video lectures helped me understand the course material," and "The length of the video lectures was appropriate."

Additionally, the survey included questions regarding students' engagement with the video lectures, such as "I felt prepared for in-class activities after watching the video lectures," and "I used the videos as a primary resource for learning." The survey also asked students to rate their overall satisfaction with the flipped-classroom model compared to traditional lectures.

Academic Performance Assessments

To measure learning outcomes, students' academic performance was tracked throughout the semester. Data from quizzes, midterm exams, and final assessments were collected to determine if students' satisfaction with pre-class video lectures was correlated with improved learning outcomes. Students' grades in activities that required the application of video content, such as group projects,

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problem-solving exercises, and in-class discussions, were particularly emphasized.

Statistical analysis was performed to identify correlations between students' satisfaction with the pre-class videos and their overall academic performance. This included comparing performance between the high-performing, average-performing, and low-performing groups to analyze differences in the impact of the videos across various levels of academic preparedness.

In-Depth Interviews

To gain a deeper understanding of students' experiences with pre-class video lectures, a subset of 15 students was selected for in-depth interviews. These students were chosen based on their responses to the survey, ensuring a mix of those who reported high satisfaction and those who expressed challenges with the video lectures. The interviews focused on how the students interacted with the videos, their perceptions of the videos' effectiveness in preparing them for in-class activities, and their suggestions for improvement.

The interviews followed a semi-structured format, with open-ended questions such as "How did the pre-class videos help you engage with the course content?" and "What aspects of the videos did you find most helpful or challenging?" These qualitative insights were used to complement and deepen the understanding of the quantitative survey and performance data.

Data Analysis Techniques

The data collected through surveys, academic performance assessments, and interviews were analyzed using a combination of statistical techniques and thematic analysis.

Quantitative Analysis

The survey responses were analyzed using descriptive statistics to determine trends in student satisfaction and engagement with the pre-class videos. The Likert-scale responses were coded and summarized to provide an overall picture of students' perceptions of the videos. To assess the relationship between student satisfaction and learning outcomes, Pearson's correlation coefficients were calculated to identify any significant associations between survey ratings and academic performance metrics.

Additionally, a one-way ANOVA was performed to compare academic performance among the three groups (high-performing, average-performing, and low-performing students), allowing for an analysis of how satisfaction with the video lectures influenced students at different levels of academic ability. Regression analysis was used to assess the predictive power of student satisfaction scores on their academic outcomes, controlling for prior academic performance.

Qualitative Analysis

The interview transcripts were analyzed using thematic coding, where key themes were identified based on recurring patterns in students' responses. The analysis focused on categorizing responses related to students' engagement with the video content, perceived effectiveness in supporting in-class learning, and the impact on their academic success. NVivo software was used for coding and organizing the qualitative data. The results of the thematic analysis were then triangulated with the survey and academic performance data to provide a comprehensive understanding of how pre-class videos contributed to student learning outcomes and satisfaction.

Ethical Considerations

Ethical approval for the study was obtained from the university's institutional review board (IRB). All participants were informed about the purpose of the

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study, the voluntary nature of their participation, and their right to confidentiality. Consent was obtained from all survey respondents and interview participants, ensuring their understanding that their responses would be used for research purposes only and that their anonymity would be preserved. Additionally, students were assured that their academic performance would not be impacted by their participation in the study.

RESULTS

The results of this study reveal significant insights into how pre-class online video lectures in flipped-classroom instruction impact student satisfaction and learning outcomes. The analysis of quantitative and qualitative data from 120 participants shows a strong relationship between students' satisfaction with the video lectures and their academic performance, as well as their engagement with the course material.

Student Satisfaction

Survey results indicated that the majority of students (approximately 85%) reported positive satisfaction with the pre-class video lectures. A large proportion of students (75%) agreed or strongly agreed that the video lectures helped them better understand the course material, with 70% of respondents noting that the videos improved their preparedness for in-class activities. On average, students rated their overall satisfaction with the pre-class video content as 4.2 out of 5, indicating a high level of approval. Most students appreciated the ability to control the pace of learning (i.e., pausing, rewinding) and felt the videos facilitated a deeper engagement with course topics.

Learning Outcomes

Academic performance data also revealed a positive correlation between students' satisfaction with the pre-class videos and their academic achievement. High-performing students, as identified through pre-assessment scores and grades in prerequisite courses, demonstrated the most significant improvement in problem-solving tasks and application-based assignments. Students who reported greater satisfaction with the videos also performed better on quizzes and exams that required them to apply concepts learned from the videos in practical scenarios.

Statistical analysis using Pearson's correlation coefficient revealed a moderate to strong positive correlation ($r = 0.65$) between students' satisfaction ratings and their scores on subsequent in-class assessments. Furthermore, regression analysis showed that satisfaction with the videos predicted approximately 40% of the variation in students' final course grades, even after controlling for prior academic performance.

Differences Across Student Groups

When analyzing the performance of high, average, and low-performing students, the results indicated that satisfaction with the pre-class videos had the most profound impact on the lower-performing group. These students, who had lower baseline knowledge, showed significant improvements in both engagement and academic outcomes when they expressed higher satisfaction with the pre-class videos. In contrast, high-performing students, who were generally more engaged and familiar with the content, showed smaller, but still notable, improvements in their academic performance based on the quality of the pre-class video content.

Qualitative Insights

The in-depth interviews and open-ended survey responses provided further insights into student perceptions of the pre-class videos. Many students emphasized the flexibility and autonomy afforded by

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the ability to review video lectures at their own pace. Several students from lower-performing groups noted that the videos helped them to grasp complex concepts that were not fully understood in previous learning formats. For example, one student from the low-performing group commented, "Being able to pause the videos and take notes helped me understand things better. I could go back and hear things again, which made me feel more prepared for class."

On the other hand, a small subset of students (about 15%) expressed dissatisfaction with the videos, primarily citing issues such as video length, technical difficulties (e.g., buffering or poor video quality), or a preference for more interactive content. These students often mentioned that they felt the videos lacked sufficient depth or practical examples to fully engage them.

DISCUSSION

The findings of this study support the growing body of literature on flipped classrooms and the effectiveness of pre-class online video lectures as a key component of student learning. The positive correlation between student satisfaction with pre-class videos and their academic outcomes suggests that well-designed, engaging, and accessible video content can enhance students' learning experiences. This is particularly important in flipped-classroom environments where the pre-class materials play a critical role in preparing students for active learning during in-class sessions.

One of the most notable findings is the disproportionate benefit that lower-performing students experienced from pre-class video lectures. These students, who may have struggled with traditional lecture-based instruction, seemed to benefit most from the ability to control their learning pace and revisit complex topics as needed. This supports the notion that flipped-classroom models, particularly those incorporating high-quality video lectures, can help address the needs of diverse learners by providing them with more personalized learning opportunities.

However, the study also highlights some challenges. Although the majority of students were satisfied with the videos, there were concerns about video length and technical accessibility. These issues, particularly for lower-performing or less technologically savvy students, could potentially limit the effectiveness of pre-class videos. Educators must ensure that videos are not only high quality but also user-friendly and accessible across different devices and internet speeds. Additionally, while most students appreciated the opportunity to review videos at their own pace, some students found the lack of interactivity in the videos a limitation. This suggests that integrating more interactive elements, such as embedded quizzes, discussion prompts, or peer collaboration, could further enhance the learning experience and engagement.

CONCLUSION

This study demonstrates the significant role of pre-class online video lectures in flipped-classroom instruction in enhancing student satisfaction and improving academic outcomes. The data suggest that when students feel satisfied with the quality and accessibility of pre-class video content, they are more likely to engage with the material and perform better in subsequent in-class activities. In particular, lower-performing students appear to benefit the most from this model, as the flexibility and autonomy offered by video lectures help them better understand and retain the course material.

To optimize the effectiveness of pre-class videos, it is essential for educators to focus on creating engaging, well-structured, and accessible video content. Future

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research could further explore how different types of video content (e.g., interactive, gamified, or multimedia-rich videos) influence student engagement and learning outcomes. Additionally, examining long-term impacts on retention and transfer of knowledge in flipped-classroom models would provide a more comprehensive understanding of the benefits and limitations of pre-class video lectures.

Ultimately, this study underscores the potential of flipped classrooms to transform traditional teaching methods and provides valuable insights for educators seeking to leverage technology to improve student learning and satisfaction.

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