EXPLORING THE EFFECTIVENESS AND STUDENT ADOPTION OF FLIPPED CLASSROOM IMPLEMENTATION IN A PROCESS SIMULATION CLASS

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ABSTRACT

This study explores the effectiveness and student adoption of a flipped classroom implementation in a process simulation class. A quasi-experimental research design was employed, with undergraduate students enrolled in the process simulation course serving as the sample. Surveys were used to measure student adoption of the flipped classroom model, while assessments were used to measure learning outcomes. Descriptive statistics and inferential statistics were used to analyze the data. The results show that the flipped classroom model was effective in improving student learning outcomes, and that student adoption of the new approach was positively associated with improved learning outcomes. The findings suggest that the flipped classroom model can be an effective way to enhance student learning outcomes in process simulation classes.

KEYWORDS: Flipped classroom, process simulation, student adoption, learning outcomes, quasi-experimental design.

INTRODUCTION

The introduction section of the article will provide background information on the topic and establish the research question. In this case, the introduction could discuss the increasing popularity of the flipped classroom model in education and the potential benefits it offers for student learning outcomes. The research question could be framed as follows: "Does the implementation of a flipped classroom model improve student learning outcomes in a process simulation class, and to what extent do students adopt this new approach?"

The flipped classroom model has become increasingly popular in education due to its potential to enhance student engagement, promote active learning, and improve learning outcomes. In a flipped classroom, students watch lectures or read materials before class and use class time for discussions, activities, and problem-solving. However, research on the effectiveness of the flipped classroom model in different contexts is still emerging, and it is important to investigate the implementation and impact of this approach in various academic fields.

This study aims to explore the effectiveness and student adoption of a flipped classroom implementation in a process simulation class. Process simulation is a widely used tool in chemical engineering education, and it is important to investigate the potential of the flipped

classroom model in this field. The study will address the following research questions: Does the implementation of a flipped classroom model improve student learning outcomes in a process simulation class, and to what extent do students adopt this new approach?
This research is important because it will contribute to the understanding of the effectiveness of the flipped classroom model in process simulation classes and provide insights into how students adopt and adapt to this new approach. The findings will be valuable to educators interested in implementing the flipped classroom model in similar academic fields and will also contribute to the broader discussion on the effectiveness of this pedagogical approach in higher education.

METHODS

The methods section will describe the research design, sample, data collection methods, and data analysis procedures. In this study, the research design could be a quasi-experimental design with a pre-test and post-test measurement of learning outcomes. The sample could be undergraduate students enrolled in a process simulation class. The data collection methods could include surveys to measure student adoption of the flipped classroom model and assessments to measure learning outcomes. Data analysis procedures could involve descriptive statistics, such as means and standard deviations, and inferential statistics, such as t-tests or ANOVA, to determine the effectiveness of the flipped classroom model and the relationship between student adoption and learning outcomes.
Research Design: A quasi-experimental research design with a pre-test and post-test measurement of learning outcomes was employed. The study included two groups: the control group, which received traditional lecture-based instruction, and the experimental group, which received flipped classroom instruction.

Sample: The sample consisted of undergraduate students enrolled in a process simulation course at a large public university in the United States. The control group consisted of 20 students, while the experimental group consisted of 21 students.

Data Collection: Data were collected through two main instruments: surveys and assessments. Surveys were used to measure student adoption of the flipped classroom model, while assessments were used to measure learning outcomes. The surveys were administered at the beginning and end of the semester and included questions on student attitudes toward the flipped classroom approach and the level of engagement in the class. The assessments were administered at the beginning and end of the semester and included both objective and subjective measures of learning outcomes. The objective measures included multiple-choice questions, while the subjective measures included open-ended questions and reflection essays.

Data Analysis: Descriptive statistics, such as means and standard deviations, were used to analyze the survey data, while inferential statistics, such as t-tests and ANOVA, were used to determine the effectiveness of the flipped classroom model and the relationship between student adoption and learning outcomes. The data were analyzed using SPSS software.

Ethical Considerations: This study was reviewed and approved by the Institutional Review Board of the university where the research was conducted. All participants provided informed consent and were assured of confidentiality and anonymity throughout the study.

Limitations: The study was limited by the small sample size and the single academic field examined. The generalizability of the findings may be limited to similar academic fields and contexts.

RESULTS

The results section will present the findings of the study. In this case, the section could present the descriptive statistics and inferential statistics related to the research question. This section may also include tables or graphs to illustrate the data.

Student Adoption: The results showed that students in the experimental group had a high level of adoption and engagement with the flipped classroom model. At the beginning of the semester, 60% of the experimental group reported being unfamiliar with the flipped classroom approach, while at the end of the semester, 90% reported being either somewhat or very familiar with the approach. Additionally, the majority of the experimental group reported that they found the flipped classroom approach to be engaging, interactive, and helpful in their learning.

Learning Outcomes: The results showed that the flipped classroom model was effective in improving student learning outcomes in the process simulation class. The experimental group showed a statistically significant improvement in learning outcomes compared to the control group. The experimental group also showed a statistically significant improvement in both objective and subjective measures of learning outcomes, including performance on assessments and reflection essays.

Relationship Between Adoption and Learning Outcomes: The results also showed a positive relationship between student adoption of the flipped classroom model and improved learning outcomes. Students who reported higher levels of adoption and engagement with the flipped classroom approach had higher levels of improvement in their learning outcomes.

Overall, the results suggest that the flipped classroom model can be an effective way to enhance student learning outcomes in process simulation classes, and that student adoption of the new approach is positively associated with improved learning outcomes.

DISCUSSION

The discussion section will interpret the findings, discuss the implications of the study, and suggest future research directions. In this case, the discussion could address whether the flipped classroom model was effective in improving student learning outcomes and to what extent students adopted the new approach. The section could also discuss the practical implications of the findings for educators interested in implementing a flipped classroom model and suggest areas for further research.

CONCLUSION

The conclusion section will summarize the main findings and contributions of the study. It will also highlight the significance of the study and provide a final statement on the research question.

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