

# The Impact of the Micro-Lecture Approach on Students' Achievement in a Flipped Classroom Environment

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**Abstract:** *Despite the fact that there have been many innovative and creative teaching pedagogies in recent education, Malaysian higher educational institutions still use a traditional learning method. In traditional classrooms, the lack of interaction between lecturers and students has an effect on students' learning outcomes. Due to instructors' inability to deliver videos effectively in a flipped classroom, students are unable to focus and understand important concepts about the topics. As a result, the purpose of this study was to the impact of micro-lecture approach on students' achievement in a flipped classroom environment. A two-group post-test-only randomized experiment design was used to examine a sample of 80 students taking an Information and Communication Technology (ICT) course at a Malaysian university. Students were divided into two groups: a quiz-based micro-lecture (experimental group) and a discussion-based micro-lecture (control group). Using various online learning tools (Edpuzzle/Padlet), both groups watched and finished the tasks. Prior to class, at the appointed time, students viewed the video lecture. In the following period, they participated in active learning activities. Every week after the lesson, the students took a post-test on the subjects they had just learned. An independent samples t-test demonstrated a significant difference in student achievement between the quiz-based micro-lecture group. The results suggested that the quiz-based micro-lecture improve student learning. The study's contribution is a clear set of guidelines that can help other teachers create and implement the micro-lecture method in a flipped classroom setting to enhance students' learning outcomes. The study's findings have commercialization potential in certain ways. The micro-lecture approach can have a positive impact on the target audience's learning outcomes. It is not only appropriate for the educational field, but also for other sectors such as research and development, as well as business and marketing, because it can provide customers with concise, clear information.*

*Keywords:* Micro-lecture; Flipped Classroom; Students Achievement



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## 1. INTRODUCTION

Malaysia's Education Blueprint 2013-2015 includes a national curriculum that aims to develop active thinkers, communicators, and team players among Malaysian students. In Malaysian higher education, the primary trend of teaching and learning is critical (Grapragasem, et. al, 2014). Teachers can use electronic media to implement learning activities, making information and communication technology (ICT) an important tool for transmitting knowledge and information in higher education. Despite the fact that many public and private colleges and universities in Malaysia still use the traditional method, e-learning, blended learning, and virtual classrooms are gaining popularity. As a

result, curricula at colleges and universities must ensure that graduates have the necessary skills and knowledge to meet current and future industry demands.

The flipped classroom has become increasingly popular in recent years, particularly during Covid -19, to assist students in developing 21st-century skills (Latorre-Coscolluela et al., 2021). The inverted classroom (Christensen et al., 2013; Johnson & Renner, 2012; Lage et al., 2000; Nwosisi et al., 2016) is a blended learning approach in which students watch multimedia video lectures before class, followed by interactive exercises and activities in class (Christensen et al., 2013; Johnson & Renner, 2012; Lage et al., 2000; Nwosisi et al. Educators from various educational levels and contexts have participated in a flipped classroom study, with numerous studies already completed to assess the effectiveness of the flipped classroom (Karabulut-Ilgu et al., 2017; Mandasari & Wahyudin, 2021; Sergis et al., 2018).

In a flipped classroom, an online learning platform is combined with a face-to-face learning environment. As a result, online video has emerged as one of the most crucial components of this method for use as online learning materials. The micro-lecture method is appropriate in a flipped classroom setting. A micro-lecture lasting 60 seconds to three minutes does more than introduce key terms and concepts in a learning topic (Shieh, 2009). According to Educause (2012), a micro-lecture is a brief audio or video presentation that focuses on a single, well-defined topic. According to Sweet (2014), using micro-lectures in a flipped classroom is gaining popularity. Furthermore, the micro-lecture is an effective method that can be used in a variety of settings, such as face-to-face instruction, blended learning, and online learning. Similar to this study, Liu and Xu (2014) define a micro-lecture as a method of using video as the primary barrier to record important teaching and learning contents both inside and outside the classroom. According to recent studies, micro-lecture is a modern technology product because it is a pedagogy that can capture students' attention, facilitate learning, and improve academic achievement (Han, 2019; Tianjiao, 2020).

## **2. METHOD & MATERIAL**

This study is a quantitative investigation into the impact of the micro-lecture approach on students' academic achievement in flipped classroom environment. Due to the study's emphasis on quantitative data, the materials and instruments used were the pre-class micro-lectures, learning activities during and after class, and the post-test. An 80-student sample taking an Information and Communication Technology (ICT) course at a Malaysian university was studied using a two-group post-test-only randomised experiment design. The students were divided into two groups at random and given either the experimental group, which received a micro-lecture with quizzes, or the control group, which received a micro-lecture with discussions. Both groups viewed the micro-lecture prior to class and participated in educational activities during class. Both student groups watched the micro-lecture on a different learning platform. This study covered the subjects of Bloom's Taxonomy, Gagne's Nine Events of Instruction, Instructional Design Principles, Technology Competency Standards, Understanding and Avoiding Plagiarism, and Open Educational Resources. A test was given for each subject to gauge how well the students understood it. Ten multiple-choice questions pertaining to the lecture topic made up each test. Following the lesson in class, each test is completed.

Before class, students who participated in the micro-lecture approach based on quizzes watched them on Edpuzzle, while those who participated in the micro-lecture approach based on discussions watched them on Padlet. This study includes a multiple-choice quiz and short answer questions in the micro-lecture. Students must respond to the questions before moving on to the following slide. As a result, it is referred to as a quiz-based micro-lecture rather than a discussion-based micro-lecture, which is a typical video with a discussion. In this study, a form of micro-lecture was created using a video recording of ICT topics displayed on a computer screen along with audio

narration and images. A micro-lecture with identical content to classroom lectures is prepared at a slower, more deliberate pace. Along with their classmates, they took part in educational activities in class. Each student in each group was required to take a post-test after the topic was introduced. The researcher obtained quantitative data (test results) from the students, combined sets of data, and developed meaningful interpretations to address the research questions. The results of six tests were subjected to quantitative data analysis. SPSS software was used to compare students' achievement between the two approaches by using descriptive and inferential statistics.

### 3. FINDINGS

As a result, there is a significant difference in student achievement for students in quiz-based micro-lecture ( $M=456.00$ ,  $SD=31.61$ ) compared to students in discussion-based micro-lecture ( $M=382.00$ ,  $SD=30.73$ ;  $t(80)=10.62$ ,  $p=.00$ , Cohen's  $d=2.40$ ). Effect sizes are defined as the average percentile standing of the average experimental participant in comparison to the average control participant. Overall, effect size 2.00 is considered large as  $d > 0.8$ . According to Cohen (1988), an effect size of 2.00 meant that the mean of the discussion-based micro-lecture was at the 97.7 percentile. The value of 97.7%, for instance, indicates that for an effect size of 2.00, the average learner in the quiz-based micro-lecture would perform better than 97.7% in the initial discussion-based micro-lecture. Effect sizes are expressed as a percentage of the scores from the discussion-based micro-lecture and the quizzes did not overlap. A non-overlap of 81.1% in the two distributions in this case is indicated by the effect size of 2.00. As a result, there is less overlap between the distributions, which means a larger effect size. This study's findings show that in a flipped classroom environment, students who use a quiz-based micro-lecture approach outperform students who use a discussion-based micro-lecture approach on tests.

### 4. DISCUSSION

Many studies agree that assessment is critical in this case of online learning. According to McKimm et al. (2003), the online quiz was a critical component in online learning environments. Walker et al. (2008) also used an online quiz to help students identify understanding gaps. Both Chen and Tsai (2009) and Dermo (2009) agreed that an online quiz could help students improve the quality of their work. Furthermore, an online quiz, according to Yilmaz (2010), encourages higher-order thinking skills and a better understanding of the lesson. As a result, students benefit greatly from the quiz-based micro-lecture.

This study highlights the use of a quiz-based micro-lecture approach in an online learning environment. This study's findings are comparable to previous studies because the quiz-based micro-lecture approach can improve students' achievement in learning processes. Johnson-Glenberg (2010) claimed that quizzes that were integrated into lecture videos (also known as "in-video quizzes") were beneficial because they enhanced students' learning. Additionally, multimedia modules with integrated quizzes helped students significantly improve their performance, according to Chen et al. (2010). Additionally, according to Roediger and Butler (2011), in-video quizzes encouraged students to test their comprehension of the subject matter, which might increase long-term retention. Similar to this, Gikandi et al. (2011) asserted that an embedded quiz could be used for both teaching and learning. The micro-lectures might also include assessment. According to Bouwmeester et al. (2013), formative assessments and micro-lectures can be used together to monitor students' progress in their learning processes. Additionally, Vural (2013) asserted that using a video-based environment tool with embedded questions improved students' learning outcomes and achievement. Furthermore, students explore learn and gain more pertinent knowledge and information through micro-lecture with quizzes

(Monserrat et al., 2014). As a result, a quiz-based micro-lecture is a useful tool for assessing students' progress during the teaching and learning processes.

The online quiz has a significant impact on teaching and learning. The findings of this study are consistent with previous research, as several researchers discovered that students who participated in online assessments performed better on their final exams (Angus & Watson 2009; Dobson 2008; Gaytan & McEwen, 2009; Kibble et al. 2011). Students in the quiz-based micro-lecture performed better on post-tests than students in the discussion-based micro-lecture. Because the students must answer a variety of quiz questions while watching the micro-lecture, they understand the material better than the control group.

This study found that implementing micro-lectures in a flipped classroom environment can improve students' achievement by allowing them to actively participate in the learning process. Students gain prior knowledge through a micro-lecture before class and can engage in learning activities with their peers during class time (Han, 2019; Tianjiao, 2020; Wu, 2018). The flipped classroom method, according to Ahmed (2016), allows facilitators and students more time in the classroom to ask higher-order questions and receive immediate feedback. The students in this study were able to socialise with the lecturer and their peers in class after learning the quiz-based micro-lecture before class. Aside from that, using micro-lectures in a flipped classroom environment is a good educational idea.

## 5. CONCLUSION

This study can be used as a benchmark for lecturers in higher education institutions who want to improve their learning practises, as well as guidelines for making the learning environment more meaningful to students. The guidelines for designing and developing quiz-based micro-lectures in a flipped classroom setting could be used as a guide to assist lecturers in combining quiz-based micro-lectures outside of class with active learning activities in class. The study's findings have commercialization potential in certain ways. The micro-lecture approach can have a positive impact on the target audience's learning outcomes. It is not only appropriate for the educational field, but also for other sectors such as research and development, as well as business and marketing, because it can provide customers with concise, clear information.

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