

Effectiveness of Media Based Flipped Classroom in Learning Chemistry

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Abstract

Technological advancements have transformed traditional education into a more students-centered approaches. One of the transformations is the media-based flipped classroom where students interact with different instructional media contents outside the classroom or in their individual spaces and use class time with hands-on activities and collaborative projects. Despite its growing adoption, limited researches examine its specific effect in learning chemistry, particularly in relation the level of engagement. This study evaluates the effectiveness of media-based flipped classroom approach in learning chemistry. Specifically, it aims to identify commonly used media tools in a flipped classroom and evaluate the level of engagement of students in three domains: behavioral, affective, and cognitive after interacting with media contents. It also aims to identify the correlation between the frequency of media usage and the level of engagement. This study was conducted among students of Bachelor of Secondary Education Major in Science of Central Bicol State University of Agriculture-Sipocot. A quantitative, descriptive-evaluative research design was used. In a flipped classroom, frequently used media tools are YouTube with weighted mean of 5.0 and Google Classroom with 4.33, while tools like Kahoot! and Audible were rarely used with weighted mean of 1.59 and 1.84 respectively. Findings revealed that there is a moderate student engagement across all domains with behavioral engagement with a weighted mean(WM) of 3.73, affective engagement of with a WM of 3.29, and cognitive engagement with a WM of 3.58. It was also found that the frequency of using media tools and the level of student engagement has a very low correlation, with 0.12 range.

Introduction

Rapid advancements in technology require educators to implement new methods that incorporate digital technologies in educational settings. These methods create a learning environment that is more student-centered and assist students to engage better with their learning content. One of the recent advancements is the media-based flipped classroom method where instead of content being delivered in a traditional classroom, it is now being given in students' individual spaces or outside the classroom, using technology, specifically through different media tools—while classroom is being used for hands-on learning such as collaborative projects and problem-solving tasks (Kesharwani, 2022).

In chemistry education where knowledge acquisition and knowledge application are both important, the flipped model encourages more interaction, self-learning and more responsibility among the students. According to Ardhaoui (2022), constructivism is the most widely applied learning theory in chemistry education. Since the goal of constructivism is to make students apply new ideas and information to what

they already know, the media-based flipped classroom method aligns with this approach. This method redefines the teacher's role as a facilitator and empowers students to take ownership of their learning. In this approach, students come to class prepared, allowing them to apply and deepen their understanding through group work, discussions, projects, and presentations. Since there is less direct instruction, teachers are able to engage more in problem-solving and higher-order thinking activities, which provide more opportunities for advanced students and additional help for struggling learners, promoting differentiation and increase learning for all students (Kesharwani, 2022).

Numerous studies have shown flipped classroom approach improved overall academic performance of students (Ardhaoui, 2022). However, most existing research focuses on general science education, with limited evaluation of how media-based flipped instruction specifically affect students' academic performance and the level of engagement in chemistry. Moreover, the majority of these studies focuses on the integration of technology in general and fail to identify what various forms of media is commonly used in the flipped classroom model. This research hypothesizes that the media-based flipped classroom approach significantly enhances student engagement and academic performance in chemistry. It also suggests that active media users will show better class participation and educational outcomes.

The purpose of this study is to assess the effectiveness of media-based flipped classroom approach on student engagement as well as their academic performance in chemistry. It also seeks to identify the different forms of media commonly used by chemistry students and determine the frequency of their usage. Furthermore, this study aims to examine how often students use media affects their level of engagement in class.

Methodology

The study will utilize a quantitative research design to collect and analyze data in the effectiveness of media-based flipped classroom. A survey will be administered to first, second, and third-year students taking Bachelor of Secondary Education Major in Science and are currently enrolled in Chemistry subject. The survey will include a checklist to identify the different media types commonly used in a flipped classroom and a questionnaire in which the questions will inquire about how frequently students use these media tools. Validated scales will also be used to measure key aspects of student engagement including cognitive, behavioral, and affective dimensions. Moreover, Pearson correlation analysis will be conducted to determine the relationship between the frequency of media tool usage and the levels of student engagement, providing a quantitative measure of how media use influences engagement in learning chemistry.