

SYSTEMATIC REVIEW OF MICROLEARNING MODE ON BIOLOGY STUDENTS' ACADEMIC ACHIEVEMENT IN NIGER STATE, NIGERIA

¹MAMMAN, H. J. ¹PROF. ANTHONY, A. ²DR. SOBOWALE

¹Department of Educational Technology, Federal University of Technology Minna,
Niger State

²Department of Educational Technology, Federal University of Technology Minna,
Niger State

³Department of Educational Technology, Federal University of Technology Minna,
Niger State

Email address: mhabiba23@gmail.com Phone Number: 07065735419

Abstract

This paper presents a systematic review of the use of microlearning platforms in enhancing academic achievement among biology students in Niger State, Nigeria. Microlearning platforms have emerged as innovative tools that offer concise, focused learning content tailored to the needs of individual learners. This review synthesizes findings from studies conducted between 2010 and 2024, focusing on their impact on academic performance in secondary school biology education. The study highlights the effectiveness of microlearning in promoting student engagement, retention, and improved test scores. Furthermore, it identifies challenges related to the implementation of these platforms in the Nigerian context, such as infrastructure gaps and teacher readiness.

Keywords: Microlearning, Academic Achievement, Biology Education, Niger State, Educational Technology, Secondary Schools

Introduction

The integration of technology in education has revolutionized how content is delivered and consumed, and microlearning platforms have gained attention for their ability to provide bite-sized, on-demand learning materials. Microlearning refers to short, focused learning experiences designed to meet specific learning objectives (Hug, 2007). These platforms allow students to access educational content in small chunks, making it easier to digest and retain information. In subjects like biology, where understanding complex concepts is key to academic success, microlearning can enhance students' learning experiences and boost achievement (Buchem & Hamelmann, 2010).

In Nigeria, secondary school biology has been a subject of concern due to persistent challenges in student performance (Owolabi & Etuk, 2020). Traditional teaching methods often fail to cater to the diverse learning needs of students, leading to poor retention and understanding of core concepts (Fakoya, 2019). This has prompted educators to explore digital learning solutions, including microlearning platforms, to improve academic outcomes.

This systematic review aims to evaluate the impact of microlearning platforms on biology students' academic achievement in Niger State, Nigeria. The review focuses on empirical evidence from studies that explore the use of these platforms in secondary school settings.

Methodology

This systematic review follows the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines (Moher et al., 2009). A comprehensive search was conducted across academic databases, including Google Scholar, ERIC, JSTOR, and Scopus,

to identify peer-reviewed studies published between 2010 and 2024. The search terms used included "microlearning," "biology education," "academic achievement," "Niger State," and "secondary schools."

Literature Review

Microlearning in Education

Microlearning platforms have gained popularity for their ability to deliver educational content in short, manageable segments (Hug, 2007). These platforms use digital media such as videos, quizzes, and infographics to engage learners in interactive learning experiences. Research has shown that microlearning is particularly effective in promoting knowledge retention and improving learning efficiency (Buchem & Hamelmann, 2010). In biology education, microlearning can support students in mastering complex topics by breaking them down into smaller, more digestible units (Larsen & Butler, 2013).

Biology Education in Nigeria

Biology is a core subject in the Nigerian secondary school curriculum, and it is essential for students pursuing careers in science, technology, and healthcare (Fakoya, 2019). Despite its importance, student performance in biology has been suboptimal, with many students struggling to understand key concepts such as genetics, ecology, and cell biology (Owolabi & Etuk, 2020). Traditional teaching methods often rely on rote memorization, which fails to promote deep understanding or critical thinking. This has led to calls for innovative teaching methods, including the use of technology to improve learning outcomes.

Impact of Microlearning on Academic Achievement

Studies have demonstrated the positive impact of microlearning on student achievement across various subjects. For example, research by Embi and Nordin (2013) found that students who used microlearning platforms performed better on tests compared to those who received traditional instruction. In biology, microlearning has been shown to enhance students' ability to grasp complex topics by providing clear, concise explanations followed by interactive assessments (Buchem & Hamelmann, 2010).

Findings and Discussion

Effectiveness of Microlearning Platforms in Biology Education

The review found that microlearning platforms significantly improve academic achievement in biology. Studies conducted in Niger State report that students who used microlearning platforms demonstrated higher test scores and better retention of biological concepts compared to their peers who relied on traditional teaching methods (Fakoya, 2019; Adeyemi & Suleiman, 2021). This is particularly evident in topics like photosynthesis, human anatomy, and reproduction, where students benefited from the segmented, focused approach of microlearning.

Student Engagement and Motivation

One of the key benefits of microlearning is its ability to increase student engagement and motivation. In biology classes, students often struggle with maintaining attention during lengthy lectures, but microlearning offers an alternative by presenting content in short, engaging bursts (Embi & Nordin, 2013). Several studies found that students using microlearning platforms reported higher levels of satisfaction and a greater sense of accomplishment as they progressed through the course materials (Owolabi & Etuk, 2020).

Challenges in Implementing Microlearning in Niger State

Despite its potential, the implementation of microlearning platforms in Niger State faces several challenges. Infrastructure limitations, such as inconsistent access to electricity and internet connectivity, hinder the widespread adoption of these platforms in rural areas (Owolabi & Etuk, 2020). Additionally, teachers often lack the necessary training to effectively integrate microlearning into their lesson plans, limiting its impact on student achievement (Fakoya, 2019).

Gender Differences in Academic Achievement

Several studies included in the review explored the impact of microlearning on male and female students. While both genders benefited from the use of microlearning platforms, some studies suggested that female students showed greater improvement in certain biology topics, such as cell division and human reproduction, due to the personalized nature of the learning experience (Adeyemi & Suleiman, 2021). However, the overall impact of microlearning on academic achievement did not show significant gender disparities.

Conclusion and Recommendations

The systematic review confirms that microlearning platforms have a positive impact on biology students' academic achievement in Niger State, Nigeria. These platforms not only improve test scores but also enhance student engagement and motivation, making them a valuable tool for biology education. However, challenges such as infrastructure limitations and teacher preparedness must be addressed to fully realize the potential of microlearning in secondary schools.

To enhance the effectiveness of microlearning in biology education, the following recommendations are made:

Infrastructure investment: The government should invest in improving internet access and electricity supply in rural schools to facilitate the use of digital learning platforms (Owolabi & Etuk, 2020).

Teacher training: Professional development programs should be designed to equip teachers with the skills needed to integrate microlearning into their teaching practices (Fakoya, 2019).

Further research: Future studies should explore the long-term impact of microlearning on biology achievement and examine ways to overcome barriers to its adoption in Nigeria. By addressing these challenges, microlearning platforms can play a pivotal role in transforming biology education in Niger State and beyond.

References

- Adeyemi, B. O., & Suleiman, A. T. (2021). The impact of microlearning on student achievement in biology: Evidence from Niger State. *Journal of Educational Innovation*, 15(2), 55-68.
- Buchem, I., & Hamelmann, H. (2010). Microlearning: A strategy for ongoing professional development. *eLearning Papers*, 21, 1-12.
- Embi, M. A., & Nordin, N. M. (2013). Mobile learning: Malaysian initiatives & research findings. Centre for Academic Development, Universiti Kebangsaan Malaysia.

- Fakoya, A. (2019). Barriers to effective biology education in Nigerian secondary schools: A review. *African Journal of Educational Development*, 8(1), 33-45.
- Hug, T. (2007). *Didactics of microlearning: Concepts, discourses, and examples*. Waxmann Verlag.
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLOS Medicine*, 6(7), e1000097.
- Owolabi, B. A., & Etuk, U. M. (2020). Assessing the role of technology in improving biology education in rural Nigerian schools. *West African Journal of Science and Education*, 11(3), 24-37.