Impact of the Blended Learning Station Rotation Model on students' Academic Achievement

Review of the Literature

By

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Introduction

The overarching topic of my study is the impact of the Blended Learning Station Rotation Model on students' academic achievement, specifically in third-grade math classes. I chose this topic because, as a third-grade math teacher, I have observed that some students struggle with understanding certain math concepts, which can impede their overall academic progress. The Station Rotation Blended Learning Model, which combines traditional face-to-face instruction with online learning activities, presents a structured yet flexible approach that may address these learning challenges. This model allows for personalized learning paths and the integration of technology, catering to diverse student needs and learning styles. The reason for my study is to explore whether implementing this model can help improve my students' understanding and retention of math concepts, ultimately leading to higher academic achievement. Therefore, my specific research question is: What is the impact of the Blended Learning Station Rotation Model on students' academic achievement in third-grade math classes?

Review of the Literature

Definition of the Blended Learning Station Rotation Model

Blended learning can be defined in multiple ways, such as combining instructional methods, delivery media, or face-to-face instruction with computer-mediated instruction (Boelens et al., 2015). The Station Rotation model is a blended learning approach that combines face-to-face instruction with online learning activities in a rotating format. This model has been shown to enhance higher-order thinking skills, including problem-solving and critical thinking, in elementary school science education (S. Christina et al., 2019). It creates engaging, productive, and goal-oriented learning environments by leveraging technology (V. Anagnostopoulou et al., 2023). In a study with Grade 10 mathematics students, the Station

Rotation model significantly improved performance and attitudes towards the subject compared to traditional teaching methods (Mondragon, 2018). Similarly, research on fourth-grade students demonstrated that this model positively affected critical thinking skills, with students exposed to the Station Rotation model outperforming those in conventional learning settings (Nugraha, n.d.). These studies collectively suggest that the Station Rotation model is an effective approach for enhancing student engagement, critical thinking, and academic performance across various grade levels and subjects.

Types of Blended Learning

Blended learning models combine online and face-to-face instruction in various ways. Sari and Asmendri (2019) discuss three models used in US educational institutions: rotation, flex, and enriched-virtual.

Rotation

Blended learning, particularly the rotation model, has gained attention in educational research. The rotation model involves cycling through different learning modalities, including online and face-to-face instruction (Yang & Newman, 2019; I. A. Kömür et al., n.d.). This approach can enhance student engagement and develop critical transferable skills in higher education (Yang & Newman, 2019). Various rotation models exist, such as station rotation and flipped classroom, which have been implemented in different contexts (Mahalli et al., 2019; H. Tkachuk, 2017). Station rotation typically involves three cycles: teacher-led instruction, independent or collaborative work, and online learning (Mahalli et al., 2019). The flipped classroom model reverses traditional teaching by introducing content online before face-to-face sessions (Mahalli et al., 2019; H. Tkachuk, 2017). These models offer flexibility and promote active learning (Mahalli et al., 2019). While blended learning presents challenges, it has the

potential to create effective learning environments when implemented thoughtfully (I. A. Kömür et al., n.d.; H. Tkachuk, 2017).

Flex

Blended learning, particularly the flex model, has gained attention in educational institutions for its potential to enhance learning experiences. The flex model combines online and face-to-face instruction, with content primarily delivered through e-learning systems (Siyamta, 2017; Mujacic et al., 2013). This approach offers flexibility and can improve learning effectiveness and efficiency (Siyamta, 2017). The flex model allows for customization based on institutional needs and has shown promising results in improving student outcomes (Rahmadani et al., 2022). A study comparing flex blended learning to conventional methods demonstrated higher learning gains and statistically significant differences in student performance (Rahmadani et al., 2022). As technology continues to advance, blended learning models like flex are becoming increasingly relevant in adapting educational practices to meet modern needs and enhance the overall learning experience (Rahmadani et al., 2022).

Enriched-virtual

The enriched virtual model, implemented through platforms like Google Classroom, has shown superior learning outcomes compared to traditional methods (O'Byrne, 2010). While the Flex Model emphasizes online instruction with on-site support as needed, offering students greater flexibility in their learning paths, the Enriched Virtual Model balances online learning with periodic face-to-face interactions, providing structured opportunities for in-person engagement alongside online coursework (Pina, 2012).

Advantages of Using the Blended Learning Station Rotation Model

The research papers collectively highlight the advantages of the Blended Learning Station Rotation model in education. This approach combines online and face-to-face instruction, allowing for personalized learning sequences and improved student engagement (Lonigro, 2021). Studies have shown positive effects on student performance and attitudes in mathematics (Mondragon, 2018), critical thinking skills (Nugraha, n.d.), and higher-order thinking skills (Christina et al., 2019). The model promotes flexibility, active learning, and curiosity in English as a Foreign Language (EFL) learning (Mahalli et al., 2019). While some research found no significant impact on scientific literacy skills (Hadiprayitno et al., 2021), others reported increased student motivation and character development (Muthmainnah & Suswandari, 2021). Students generally perceive the model positively, citing variety in activities, technology use, and enhanced learning experiences as benefits (Truitt & Ku, 2018).

Liu (2023) found significant improvements in EFL college students' listening skills, while Mondragon (2018) reported enhanced mathematics performance and attitudes among Grade 10 students. Nugraha (n.d.) observed increased critical thinking abilities in fourth-grade students, and Christina et al. (2019) noted improvements in higher-order thinking skills in elementary science education. Truitt & Ku (2018) revealed mostly positive perceptions among third-grade students, with some challenges noted. The model's implementation typically involves rotating through teacher-led instruction, independent work, and online learning (Mahalli et al., 2019). Overall, the Station Rotation model shows promise in enhancing student engagement and learning outcomes across different educational contexts (Ayob et al., 2020).

Barriers to Implementing the Blended Learning Station Rotation Model

While most findings were positive, one study found no significant difference in reading comprehension performance between Station Rotation and traditional lecture methods (Ogude &

Chukweggu, 2019). Hadiprayitno et al. (2021) also found no significant impact on scientific literacy skills, suggesting the need for combining the model with other approaches. Challenges identified include technology issues, the necessity for careful implementation to meet diverse student needs, and the complexity of adapting to varied learning environments (Lim, 2015; Truitt & Ku, 2018; CarolineUnnathamani & Sumanjari, 2020).

Impact of the Blended Learning Station Rotation Model on Students' Academic Achievement in Third Grade Math Classes.

The reviewed studies suggest that the Blended Learning Station Rotation Model generally has a positive impact on students' academic achievement in mathematics, including for third-grade students. Multiple studies reported significant improvements in math performance for experimental groups using this model compared to control groups using traditional methods (Mondragon, 2018; Yaghmour, 2016; Khader, 2016). The model was also found to enhance critical thinking skills (Nugraha, n.d.) and mathematical communication abilities (Suryawati et al., 2022). Students generally perceived the model positively, citing benefits such as variety of activities, technology use, and increased learning opportunities (Truitt & Ku, 2018). The approach showed promise for students with disabilities as well, improving on-task behavior and math achievement in some cases (Johnson, 2020). While most studies focused on upper elementary or secondary students, the findings suggest potential applicability to third-grade math classes.

Summary

In this literature review, I investigate the impact of the Blended Learning Station Rotation Model on academic achievement in third-grade math classes. I begin by defining blended learning and specifically the Station Rotation model, which combines face-to-face instruction

with online activities. I also discuss various types of blended learning models, including rotation, flex, and enriched virtual, highlighting their flexibility and ability to cater to diverse learning needs. I emphasize the advantages of the Station Rotation model, showing its positive effects on student engagement, critical thinking, and academic performance across different subjects and grade levels. However, I also identify barriers to implementation, such as technology issues and the need for careful adaptation to varied learning environments. Despite some studies reporting no significant impact on certain skills, the overall findings suggest that the Blended Learning Station Rotation Model generally enhances students' math performance, critical thinking abilities, and learning experiences, making it a promising approach for third-grade math classes.

This Review and the Field of Education

This literature review adds to the field of education by providing a focused analysis of the Blended Learning Station Rotation Model's impact on third-grade math achievement, a relatively under-explored area. By synthesizing existing research, I highlight how this model can enhance student engagement, critical thinking, and overall academic performance. Additionally, I identify specific advantages and challenges associated with its implementation, offering practical insights for educators seeking to adopt this approach. This review underscores the need for careful adaptation to diverse learning environments and suggests that integrating technology with traditional instruction can create more effective learning experiences. This contribution is particularly valuable for elementary educators looking to improve math outcomes through innovative teaching strategies, providing a foundation for further research and practical applications in blended learning.

Strengths and Weaknesses of this Body of Literature

The body of literature on the Blended Learning Station Rotation Model reveals several strengths. Firstly, numerous studies highlight the model's positive impact on student engagement, critical thinking, and academic performance across various subjects and grade levels. Research consistently shows that integrating face-to-face instruction with online activities fosters a dynamic and interactive learning environment, accommodating a wide range of student learning styles and abilities. Furthermore, the flexibility of the model allows for personalized learning paths, enabling students to progress at their own pace. The literature also provides robust evidence supporting the model's effectiveness in enhancing higher-order thinking skills, problem-solving abilities, and mathematical communication skills. These strengths collectively suggest that the Blended Learning Station Rotation Model is a promising approach for improving educational outcomes and adapting to the evolving demands of modern education.

Despite the positive findings, the literature also exhibits some weaknesses. A significant limitation is the scarcity of research specifically focused on the impact of the Blended Learning Station Rotation Model in third-grade math classes, leaving a gap in understanding its effectiveness at this educational level. Additionally, some studies report no significant differences in outcomes between the Station Rotation model and traditional teaching methods, indicating that the benefits may not be universally applicable or may depend on other factors such as implementation quality and contextual variables. The literature also highlights challenges such as technology issues, the need for substantial teacher training, and the complexity of adapting the model to diverse learning environments. Moreover, there is a lack of long-term studies assessing the sustained impact of the model on student achievement. These weaknesses point to the need for more targeted research, particularly in elementary education, to fully understand the potential and limitations of the Blended Learning Station Rotation Model.

Focus of the Current Study

From this body of literature, I have gained valuable insights that will directly inform my action research project. Understanding the strengths of the Blended Learning Station Rotation Model, such as its ability to enhance student engagement, critical thinking, and personalized learning, encourages me to integrate these elements into my third-grade math classes. I will carefully implement this model to create a dynamic and interactive learning environment that addresses the diverse needs of my students. Additionally, the identified weaknesses, such as technology issues and the need for thorough teacher training, have highlighted the importance of addressing these challenges proactively. I plan to ensure that both my students and I are well-equipped with the necessary technological tools and training. Furthermore, recognizing the gap in research specifically focused on third-grade math, my project will contribute to filling this void by providing targeted data on the model's effectiveness at this educational level. This will help me refine my teaching practices and potentially offer valuable insights for other educators looking to adopt similar approaches.

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