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Impact of Blended Learning on Student Engagement and Academic Performance

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Abstract: **The study examines the impact of blended learning on student engagement and academic performance, considering the ongoing shift from teacher-centred to student-centred learning. The need for blended learning was in response to the growing demand for an educational model that supports learner participation, flexibility, and, in the long run, enhances academic outcomes. Blended learning, an educational model that combines the strengths and strategies of both online instructional models and traditional face-to-face learning, has become an approach with the potential to address the limitations of both online and offline classes. The study examines various blended learning models, including the flipped Classroom, Rotation, flex, and Online-Merge-Offline (OMO) and their influence on students' behavioural, emotional, and cognitive engagement. Blended learning offers several benefits, including increased student independence and motivation, as well as enhanced student collaboration. Despite the benefits of blended learning, challenges still exist and limit its potential; these challenges include limited access to technology, digital literacy gaps, and pedagogical misalignments. The study concludes that while blended learning has significant potential to enhance student engagement and academic performance, its success depends on thoughtful implementation, equitable access to resources, and continuous support for both educators and learners.**

Keywords: **Blended learning, student engagement, academic performance, hybrid education, instructional models, impact.**

I. INTRODUCTION

Student engagement has been significantly linked as a precursor to enhancing academic performance while bearing in mind that education as a whole has gradually shifted from teacher-centred learning to student-centred learning [1]. This shift has led to an urgent need to modify the educational model to accommodate it and to further facilitate more student engagement in education. Student engagement involves a wide range of educational activities or the behavioural disposition of students towards learning, which is not limited to only the cognitive contribution of students but also their emotional and social posture towards their academics. So, in other words, student engagement can be summed up as the total input of students into their academic performance [2]. The limitations of both online and face-to-face teaching in promoting student engagement have necessitated the need for an academic model that augments these weaknesses and leads to enhanced student engagement.

Blended learning has, therefore, emerged as an educational model that is gaining prominence and reshaping teaching methodology globally while also possessing the potential to enhance student engagement. One of the advantages of this educational model for learning is that it combines the strengths of two learning models: traditional face-to-face instruction alongside digital resources, thus leveraging the strengths of both models to improve educational outcomes [3]. Several factors contributed to the surge in the adoption of blended learning, including the COVID-19 pandemic.

The global pandemic of 2020 highlighted the limitations of both conventional face-to-face learning and online learning in terms of student engagement. The pandemic had placed the world's educational institutions in a period of lull. As such, education during that period could only be achieved online, which spotlighted the flaw in traditional face-to-face classes.

As a consequence of this flaw, students worldwide had to turn to online classes to meet their educational needs, thus ensuring the relevance of the online educational model. However, the lack of social interaction within the online educational model also represented a significant challenge that had hampered student engagement. The lack of face-to-face interaction in online settings contributed to feelings of isolation and disengagement among students. This highlighted the need for an instructional model that not only leverages digital tools but also maintains the relational and interactive benefits of in-person learning.

The enhanced need for student engagement in the 21st century and also considering the impact that student engagement would have on the academic output of students, the current study explores the impact of blended learning in enhancing student engagement while also looking at the strengths and weaknesses of blended learning models.

II. STUDENT ENGAGEMENT

Student engagement is pivotal towards the academic development of students. Zepke (2018) defined "student engagement as a construct used to identify what students do, think about, and feel when learning, and how teachers can improve that doing, thinking, and feeling in instructional settings" [4 p. 1]. Deepa *et al.* [5] noted the role and significance of student engagement as it comprises the emotional, cognitive, and behavioural inputs of the students towards their educational outcomes.

Cao [6] also reveals some of the ways students can actively engage in their academics, including the completion and quality of assignments, participation in group assignments and discussions, and the pursuit of additional knowledge beyond the formal curriculum. Engagement extends beyond just student participation, as Chiu [7] noted that it involves students making meaningful connections with their academic activities and developing a sense of ownership and attachment to the learning process.

The dimension of student engagement provides vital information on the extent of student involvement to be categorised. According to Trowler [8] and De Bruijn-Smolders and Prinsen [9], these dimensions are as follows:

i. Behavioural engagement: refers to the conduct, observable actions or attitudes displayed by a student in response to their academic work. Some behavioural engagement of students involves attendance, conduction of assignments, etc.

ii. Emotional engagement: involves the expression of feelings such as interest, enjoyment, frustration, and a sense of belonging.

iii. Cognitive engagement: refers to the mental investment students make in learning. Examples include asking questions and applying prior knowledge.

These dimensions collectively determine how invested students are in their education and serve as key indicators of learning outcomes.

III. BLENDING LEARNING

Blended learning is an educational model that combines the strengths of both traditional face-to-face teaching and online learning. This teaching model has been known by different names, some of which include hybrid or mixed learning. The significance of the blended learning model hinges on its increased flexibility, which ensures that students become more engaged and also plays an active role in their learning experience, making this teaching model suitable for the personalised learning experience of students [3].

Scholars have examined the study of blended learning and its impact on better academic outcomes [6], [10]. These studies have noted that blended learning influences student academic performance by fostering active engagement and collaboration both online and offline. The incorporation of mechanisms such as discussion forums, real-time feedback, and interactive assignments into online environments complements traditional face-to-face activities, hence creating a well-rounded and wholesome educational experience [6], [10].

IV. BLENDING LEARNING MODEL

The different blended learning models reveal how blended learning has been able to cater to the academic needs of diverse learners and also promote student engagement. These models provide various structures for integrating online and face-to-face learning, fostering a deeper understanding and accommodating a range of learning styles. To assess the impact of blended learning on student engagement, it is essential to understand the distinctive characteristics of these models and how

they optimise educational outcomes in today's dynamic learning environments. Below are some of the blended learning models that are currently being used:

A. Flipped classroom

The strength of flipped learning lies in its ability to develop students' self-regulated learning, which is one of the challenges associated with online learning. This model reverses the roles of educational activities that take place inside the classroom with those that take place outside the classroom [4], [11]. This type of blended learning model allows students to complete academic tasks with guidance from the teacher, thereby reducing the cognitive burden that students might experience when working alone. The model supports active, interactive, and collaborative learning, providing greater opportunities for individualised feedback and differentiated instruction [4]. These features contribute to improved student satisfaction and also ensure that students are motivated to learn, as rigid academic activities do not burn them out. Although the flipped learning model is associated with remarkable benefits, challenges persist. Producing high-quality instructional videos is time- and resource-intensive for teachers, and the requirement for students to complete pre-class work can add to their workload and stress levels [12]. The previously mentioned challenge implies that the stress and burden of academic activities are shouldered by the teachers' as such, efforts should be taken to keep teachers motivated.

B. Rotation model

This model emphasises the alternation between online and offline instruction. Students can learn course content online in advance in preparation for offline instruction. Other sub-models under the rotational model include Station rotation (student rotates station within the classroom), Lab Rotation (Student rotates stations, but the online station is conducted in a computer lab), Flipped Classroom (Student access instructional material online prior to offline discussion) and individual Rotation (for personalised rotation schedule for each student) [4].

C. Flex model

The flex model delivers most content online, with teachers available on-site to provide tutoring and support, either individually or in small groups. Li & Xue [4] noted that this model offers students autonomy in how they pace and structure their learning. Learners can access content from any location, such as home or school, using digital devices. The flexibility and self-directed nature of this model promote independent learning and personal accountability [4].

D. Zhu Zhiting Model

Zhu and Hu [13] proposed three models to combat the challenge of when to implement online and offline learning. This model is:

a. Online to Offline (O2O): This model, proposed by Zhu and Hu in 2021, involves learning activities taking place offline, while the online environment helps the tutor understand the priorities that will be addressed offline. Examples include flipped learning.

b. “Online and Offline” (OAO) model: integrating both online and offline academic activities. There is a clear boundary between online and offline learning.

c. “Online merge Offline” model: This model is more student-centred as it leverages the use of technology to combine both online and offline learning. This can be achieved by connecting different types of learning activities. As such, there are no clear boundaries between the instructions that take place online and offline.

V. CHALLENGES OF BLENDED LEARNING IMPLEMENTATION

Blended learning has been successfully integrated into the educational systems of many developed nations, as highlighted in the study by Tonbuloğlu and Tonbuloğlu [13]. However, numerous challenges continue to impede its effective implementation, particularly in developing countries. These challenges include:

Gap in Access to Technological Infrastructure: The technology gap is a major challenge that limits the effectiveness of blended considering that this educational model relies on technology. Issues such as a lack of suitable devices, inadequate technical support and Poor internet connectivity often hinder the seamless adoption of blended learning, especially in rural or underdeveloped regions [3], [15]. The impact of technological gaps and technical glitches on blended learning can reduce students' motivation towards blended learning and further decrease student engagement [16].

Digital Literacy: The effective engagement of both students and teachers requires digital literacy, which, when absent or inadequate, can negatively impact the academic outcomes of blended learning [17]. Bernard *et al.* [18] propose a solution to this challenge by advising educational institutions to conduct training programs for both students and teachers.

Pedagogical Challenges: Pedagogical misalignment represents significant challenges associated with blended learning. This challenge involves the non-alignment of traditional face-to-face instruction with online instruction within a blended learning setting. The impact of poorly designed courses may lead to a lack of coherence between the two modes, diminishing the overall learning experience.

Student Self-Regulation: Blended learning possesses the ability to enable students to learn at their own pace and also manage their time independently. Despite the advantages associated with student self-regulation, there is also the possibility that this advantage may become a disadvantage, as students may struggle with time management, self-discipline, and motivation, particularly in online components where direct supervision is limited. Moreover, distractions from social networking sites and other environmental factors can also be challenging

VI. DISCUSSION

Blended learning positively influences student engagement by combining the strengths of face-to-face interaction with the flexibility and interactivity of digital tools. This model fosters personalised and flexible learning experiences, enabling students to manage their own pace, access materials at any time, and tailor their learning to their styles. Mechanisms such as real-time feedback, interactive multimedia, online discussion forums, and collaborative assignments help students become more actively involved in their learning processes.

Blended learning enables the extension of learning time beyond the allocated timeframe for face-to-face learning. This implies that students can learn independently at their own pace and in their own space, also removing the obstacle of isolation often associated with online learning. The benefits of blended learning have increased involvement that manifests across the three key dimensions of student engagement. It has improved b**ehavioural engagement** through improved participation, attendance, and active completion of tasks, as well as the growth of e**motional engagement** as students feel a stronger sense of belonging, interest, and motivation. Ultimately, it enhances **cognitive engagement** through deeper critical thinking, problem-solving, and the application of prior knowledge.

Different blended learning models further support these engagement dimensions. The **flipped classroom**, for example, fosters student autonomy and self-regulated learning by encouraging preparation before class and deeper involvement during sessions, as students have prior knowledge of the course material, which significantly aids them in discussing the concepts with understanding in the classroom. The **rotation model** supports engagement by alternating instructional formats to accommodate varied learning preferences, further ensuring that education becomes a refreshing experience. The **flex model** empowers students to control the structure and pace of their learning. In contrast, the **Online-Merge-Offline (OMO)** model provides a seamless, immersive experience by eliminating boundaries between online and offline learning. The adoption of a suitable model facilitates collaboration and interaction, which are crucial factors for sustained student engagement, with the ultimate goal of enhancing academic achievement.

Blended learning has also demonstrated a promising impact on academic achievement. Studies, such as those by Bazelais and Doleck [19], show that students in blended environments often outperform their peers in traditional or fully online settings. These gains are attributed to the dynamic learning environment, increased engagement, and opportunities for tailored instruction. However, results are not uniform across contexts. Chang *et al.* [20], for instance, reported that despite students' positive perceptions of blended learning, empirical data did not reflect significant academic improvements. This highlights the importance of well-designed instructional practices and context-specific implementation.

To maximise the benefits of blended learning, the role of educational stakeholders becomes vital as much physical and financial commitment is necessary to ensure continuous improvement in technological infrastructure, teachers' professional training, parental motivation and supervision of students to ensure that students develop self-regulated behaviour. More so, blended learning environments must be inclusive, flexible, and aligned with learners' needs. When implemented thoughtfully and strategically, blended learning has the potential to transform educational experiences that would bring about long-term academic success.

VII. CONCLUSION

Blended learning holds immense potential to transform modern educational practices, offering a flexible approach that encourages active student involvement. Student engagement has become vital for better academic achievement, particularly in light of the shift in academic activities to encourage more student contributions. Blended learning integrates digital tools with face-to-face instruction, creating a learning environment that enables students to take greater ownership of their academic progress, thus promoting student engagement across behavioural, emotional, and cognitive dimensions, which in turn contributes to improved academic outcomes.

However, the implementation of blended learning is not without its challenges. Factors such as unequal access to technology, varying levels of digital literacy, and inconsistencies in instructional design can hinder its effectiveness. As such, successful integration requires a deliberate approach that includes adequate infrastructural development, continuous teacher training, student support systems, and a curriculum designed to align both online and offline components. By addressing the systemic and pedagogical barriers to effective implementation, institutions can leverage blended learning not only as a response to current educational demands but as a sustainable model for long-term academic development.

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