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The Role of Blended Learning in Enhancing Student Engagement at the Secondary School Level

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Abstract

This research investigated the role of blended learning in supporting engagement among secondary school students. Using a mixed-methods exploratory sequential design, we analyzed quantitative data from 100 students and qualitative data from interviews with 10 participants, including both students and teachers. Overall, blended learning led to positive influences on cognitive engagement and behavioral engagement (student attendance), primarily due to self-paced learning opportunities, multimedia and engagement tools, and engagement support and scaffolding provided by the teachers. Despite blending learning being good option educators can use to support engagement, students and teachers faced considerable challenges, many of which were structural, such as digital inequity and teachers feeling overwhelmed with workloads, which detracted from full engagement. Based on the findings, blended learning provided potential participatory engagement and flexibility for students, but its success is dependent on secure and equitable access to devices and the internet and adequate teacher education and training. These findings provide valuable insights and considerations for educators, curriculum developers, and policymakers interested in increasing student engagement through blended learning approaches. However, there were a number of limitations, including a small sample size and lack of generalizability limiting findings - thus the need to continue research in a range of diverse and at-risk contexts.

Keywords: *Blended learning, student engagement, secondary education, cognitive engagement, behavioral engagement, self-paced learning, teacher support, digital divide, mixed-methods research.*

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Introduction

Technology has changed the manner in which teaching and learning occur around the globe. In the past few years, digital learning has become much more common and, in some cases, is beginning to replace traditional classrooms. The increase in access to technology and the changing needs of teaching in a connected world (Bond et al., 2021) can be seen as the driving force behind catalyzing this change. The COVID-19 pandemic also increased the need for schools to adopt digital tools at accelerated rates, showcasing the associated benefits and obstacles of digital tools (Kaden, 2020).

One model that has become more popular is blended learning, which is a combination of traditional classes and online learning (Boelens et al., 2017). The blended model encompassed the best parts of classroom teaching and combined that with the advantages of online digital tools, which offered more flexibility for a more personalized and engaging learning experience. Graham and Halverson (2023) emphasized that blended learning allowed students to become independent of educators, offered a variety of learning styles, and increased students' involvement in lessons.

Keeping secondary school children interested has always been critical to their success in academic achievement, motivation, and long-term goals. However, it proved exceedingly difficult to keep the interest of teenagers during the developmental changes they were going through during this age (Hashmi & Fayyaz, 2022). It has been concluded that when students are disengaged, they are likely to either perform poorly in school or drop out altogether (Bizimana, 2025; Reeve, 2012). For this reason, schools needed to have different ways of teaching that supported student engagement.

Blended learning could assist with these issues of disengagement. Blended learning offers students the flexibility to learn at their own pace while still participating in collaborative classroom activities. Research has demonstrated ways in which blended learning can facilitate learning by increasing engagement through interactive content, videos, and immediate feedback (Cleveland-Innes & Wilton, 2018). Using technology to facilitate blended learning could make learning a more dynamic process and overcome certain disadvantages of traditional teaching.

Although blended learning has many benefits, secondary schools still have a strong reliance on conventional ways of teaching. Traditional approaches, For example, pre-planning lessons and delivering lectures., may not have been sufficiently engaging students (Singh et al., 2017; Zainuddin & Perera, 2018). This emphasizes the need for instructional strategies that are consistent with students' learning preferences and the requirements of the digital age.

While some library research on blended learning was growing, most of the literature was concentrated on higher education colleges and universities, while very little information was available about blended learning and student engagement in middle school and high school settings (Halverson & Graham, 2019). The gap in knowledge would be important to highlight in this study; therefore, studying how blended learning would impact engagement among secondary school students was worthwhile.

Research Objectives:

1. To investigate the impact of blended learning on student engagement.
2. To investigate student and teacher perceptions of blended learning.
3. To determine the challenges and opportunities of implementing blended learning in a secondary context.

Research Questions

1. To what extent does blended learning affect student engagement?
2. What are both students' and teachers' perceptions of blended learning?
3. What challenges in implementing blended learning exist at the secondary level?

This research is significant for teachers, school leaders, and education policymakers, as it provided information on the impact of blended learning on student engagement and supported the design and development of new pedagogical and technology integration strategies in secondary education. The research provided evidence of the implementations that supported contemporary learners, contributing to the broader discussion of innovative pedagogies. Further,

this work may serve as a resource for future researchers exploring effective implementations of blended learning in a variety of educational contexts.

Literature Review

Concept of Blended Learning

Blended learning, or hybrid learning, is an instructional method that combines traditional face-to-face learning with digital or online learning. Graham et al. (2019) explain blended learning as "the intentional fusion of face-to-face and online learning experiences." This approach to teaching and learning draws upon both modalities, with the hope students will be better engaged and ultimately develop a deeper understanding of what they are learning. Blended learning is flexible and adaptable to modern classroom learning, especially at the secondary level when students are learning for varied needs and interests.

In the last few years, many models of blended learning have been introduced. The flipped classroom model alters the traditional learning environment, providing instruction outside of class, usually online, and moving homework and applications into the classroom (Halverson & Graham, 2019). The flipped classroom model increases the time for active learning, allows for more personalized and interactive learning during class, and provides the added benefit of being taught by a qualified instructor. The second model we discuss in this paper, station rotation, is a very common practice in secondary schools and is referred to simply as "rotation." Station rotation is when students begin a lesson moving through different modalities of learning, such as asynchronous online, individual, group work, and/or direct instruction with the teacher in one lesson and/or class period (Maxwell & White, 2017). There are even an additional two models referred to as lab rotation and individual rotation. Both of these models provide students and their instructors with a structure to engage digitally while also providing glimpses of teacher monitoring (Kömür, Kilinç, & Okur, 2023; Powell et al., 2015). All of these models possess some common characteristics, which include setting objectives for adaptability, digital interactive features, and a student-centered learning environment.

Blended learning also supports differentiated instruction, allowing teachers to service the needs of students in various formats and allow student-directed learning experiences. As stated by Yu et al. (2025), blended learning encourages learner autonomy and increases knowledge retention due to increased interactivity and multimodal approaches. These positives are what add to the relevance of blended learning for continued educational reform, specifically with secondary students, where motivation and engagement can prove to be more difficult (Sahni, 2019).

Student Engagement

Student engagement is commonly acknowledged as a critical factor in predicting academic achievement, particularly during secondary school (Akhtar, N., & Tuba, N., 2015). Engagement is commonly classified as behavioral, emotional, or cognitive, and these three types of engagement are interconnected (Hasanov et al., 2021). Behavioral engagement refers to the student's engagement in academic activities, students' effort for academic tasks, and normative behavior of the school. Emotional engagement means the students' affective responses to school. Examples could be a student feeling bored, interested, happy, or anxious about school. Cognitive engagement is measured by students' dedication to learning, metacognitive strategies, and trying to go beyond what is required.

Engagement in high school is especially significant because students are going through major developmental transitions and increased academic workload compared to previous years. Clark et al. (2024) found that students who are more engaged in their school have higher academic success and lower dropout rates, while disengaged students can experience chronic absences, even behavioral issues, and, ultimately, long-term educational consequences. Markowitz (2017) pointed out that emotional engagement is particularly important during adolescence; students' feelings of connectedness and belonging to their school are directly related to their willingness to engage in the curriculum.

Additionally, the structure of secondary schooling, typically comprised of multiple teachers, larger class sizes, and departmentalized delivery, may limit the opportunities for student-teacher relationships, an important component of emotional and cognitive engagement (Klem & Connell,

2004). Therefore, secondary school teachers must use innovative and responsive teaching options, such as blended learning, in order to maintain and promote engagement levels.

Blended Learning and Student Engagement

New studies have sought to establish agreement about the relationships between blended learning environments and student engagement in each of the three domains of engagement - behavioral, emotional, and cognitive, just as with engaged learning strategies in general, blended learning strategies, and especially flipped classrooms with interactive and multimedia content, placed student learning at the forefront and fostered more active engagement (Alizadeh, 2024). The variety in content and strategies opened up opportunities for students to be engaged in a positive construct and have ownership of their learning, ultimately fostering cognitive engagement. For example, blended learning strategies with self-paced modalities helped to reduce cumulative stress and designed learning content was more comprehensible because students can nurse digital content and resurface the content as needed (Halverson & Graham, 2019).

In addition to cognitive engagement, the blending of learning environments provided the potential to grow emotional engagement through a variety of instructional materials (e.g., videos, games, simulations, etc.). These new blended learning formats for instructional content, as well as relational instruction, also appealed to students. Hasanov, Borokhov, and Belenko (2021) studied student emotions in blended classrooms and found that students reported greater positive emotions toward their learning tasks than did students in traditional classrooms. Positively enriching the emotional climate supports potential sustained motivation, ultimately resulting in more substantive engagement.

From a behavioral engagement perspective, blended learning has created an environment that enables collaboration and more active engagement in the classroom. The affordances offered by digital tools such as forums, quizzes, and interactive simulated experiences promote student participation more often in blended environments, with less engaged students speaking more than in traditional classrooms, although this may differ based on classroom norms. For example, the research of Graham and Halverson (2023) indicated that students in blended classrooms had

greater attendance and participation rates due to the ability to participate through the digital medium with more accessibility, flexibility, and opportunities for participation than in a traditional classroom.

Ultimately, the use of blended learning needs to be effectively implemented to engage students. The level of engagement in both virtual and face-to-face blended environments depends on various factors, including teacher preparedness, digital literacy, the emphasis on curriculum design, and access to technology (Halverson & Graham, 2019). In the absence of support and infrastructure for blended learning, its potential for engagement cannot be achieved.

Gaps in the Literature

Although a growing amount of research exists about blended learning and student engagement, there are still many gaps remaining, particularly in secondary school education. Most of the studies identified have focused on higher education and adult learners. These studies have not investigated the secondary school learner and a more typical need for blending learning with this context (Hasanov et al., 2021; Graham & Halverson, 2023). This observation restricts the current findings for secondary school situations and makes it less generalizable.

There is also a gap in research in developing countries, where many conditions exist that can make blended learning very difficult (Zeewaqar, 2024). Conditions such as limited availability of digital devices, unreliable internet access, and inadequate teacher training limit blended learning feasibility (Zeewaqar, 2024). Developing countries still account for the largest proportion of the digital divide and continue to present challenges with equity and access to blended learning (Zeewaqar, 2024). The systemic and contextual limitations become particularly salient for those in charge of policy decisions and scaling the blended learning solutions in an under-resourced context.

Additionally, there is little longitudinal research into the enduring impacts of blended learning on student engagement for long periods of time (Ahmed, Z., Alwi, S. K. K., & Akhtar, R. N. . 2022). Most studies on blended learning provide evaluations that are short-lived and do not

provide information about changes in engagement over time in a blended learning environment. Longitudinal studies would provide important information on how blended learning may alter students' academic pathways, attitudes, and learning behaviors over a longer period.

Finally, more research is needed into teacher perceptions and PD on blended learning in the secondary context. Teacher beliefs, readiness, and attitudes about technology apply to how well-blended strategies are likely to succeed. This is important when we think about scaling blended learning models (Graham & Halverson, 2023).

Research Methodology

This research utilized a mixed-methods explanatory sequential design to examine blended learning and student engagement in secondary schools. The study began with a quantitative phase consisting of data collection and analysis, sufficient enough to later follow up a qualitative phase to further explain and better contextualize the numbers. Understanding both the statistical patterns and students' actual experiences of the blended learning context represented a basis for the mixed-methods inquiry. The population of this study was dependent on secondary school students from Grades 9 to 12, and teachers engaged in a blended learning rationale. For the quantitative phase of the research project, 100 students completed my survey through a convenience sample. For the qualitative phase of the research project, I selected a total sample of 10 participants, which consisted of ten purposive participants: six students and four teachers noted during interviews. My selection of participants was also relatively balanced to reflect diversity among respondents.

Quantitative data were collected by using a structured questionnaire that asked Likert-scale questions about three areas of student engagement: cognitive, emotional, and behavioral. The items were developed from established and validated scales from the student engagement literature. Qualitative data were acquired through semi-structured interviews, which allowed open-ended responses that described in detail participants' experiences, perspectives, and difficulties in relation to blended learning experiences. Quantitative data were analyzed using descriptive statistics (means, standard deviations, and percentages) to understand levels of engagement. Reliability analysis using Cronbach's Alpha determined internal consistency for

engagement sub-scales. Independent samples t-tests determined stated home internet access was the most significant way of understanding engagement—complements used percent of time engaged with learning and comments on internet access and other common engagement influencing variables. Equally, Pearson correlation and linear regression determined relationships and predictors between the components of blended learning and the engagement domains of learning.

Results and Discussion

Descriptive Statistics

To assess overall student engagement within the blended learning environment, descriptive statistics were calculated across three domains: cognitive, emotional, and behavioral.

Table 1
Descriptive Statistics of Student Engagement (N = 100)

Engagement Domain	Mean (1–5)	Standard Deviation	% Agree / Strongly Agree
Cognitive (Understanding)	4.12	0.89	74%
Emotional (Enjoyment)	3.98	0.92	68%
Behavioral (Participation)	4.20	0.85	75%

Students demonstrated the highest levels of engagement in the behavioral and cognitive engagement domains. This means that students were actively involved in class activities and demonstrated an effective understanding of the material taught using a blended learning approach. This finding implies that blended learning effectively supported both students' participation and mental engagement in student learning. While students' emotional engagement, which is a measure of students' motivation and interest in the subject, was slightly lower than behavioral and cognitive engagement, it still scored above the neutral midpoint on the scale. This finding suggests that students tended to have a positive emotional response to blended learning, even if the emotional engagement did not reach the higher levels of behavioral or cognitive engagement. Overall, the results suggest that students perceived blended learning positively and helped students to improve their engagement in class activities and understanding of material presented using blended learning.

Reliability Analysis

The internal consistency of the student engagement scale was assessed using Cronbach's Alpha. All subscales demonstrated acceptable to excellent reliability ($\alpha > 0.70$), as shown below.

Table 2

Reliability Analysis of Engagement Subscales

Subscale	Cronbach's Alpha (α)	Interpretation
Cognitive Engagement	0.82	Good Consistency
Emotional Engagement	0.78	Acceptable Consistency
Behavioral Engagement	0.85	Excellent Consistency

The Cronbach's alpha test showed that all three engagement subscales had the same consistent and trustworthy answers. According to an alpha value of 0.82, students' understanding was consistently evaluated by the items in the test. The internal consistency for items measuring motivation and interest was good, indicated by an alpha of 0.78. The highest stability in scoring was seen with behavioral engagement, with an alpha of 0.85 for measuring students' participation. The findings reflect that the questionnaire could accurately measure different aspects of student engagement in the blended learning setting.

Independent Samples t-Test

To evaluate the influence of digital equity on engagement, an independent samples t-test compared students with and without reliable internet access at home.

Table 3

Engagement by Home Internet Access

Group	Mean Engagement	t(df)	p-value	Cohen's d
Internet Access (Yes)	4.15	t(98) = 3.42	.001*	0.69
No Internet Access	3.60			

The findings uncovered that those without home internet used fewer educational websites than those who do have access. Students who could access the internet online received a mean engagement score of 4.15, while students without the internet received 3.60. The difference between people who received therapy and a control group was indicated by a significant t-test

result (t(98) = 3.42, p = .001). Furthermore, the moderate effect size proves that the difference observed is both significant in research and has practical importance. The findings reveal that having digital equity is key to student participation in blended classrooms.

Pearson Correlation Analysis

Pearson's r was used to explore associations between specific blended learning components and the three dimensions of student engagement.

Table 4

Correlation Matrix Between Learning Components and Engagement Domains

Variable	Cognitive	Emotional	Behavioral
Use of Multimedia (Videos)	.45	.52	.38
Teacher Support	.39	.41	.50
Self-Paced Learning	.55	.48	.32

Note: *p < .05 for all correlations.

Significant, positive links were found through correlation analysis between selected blended learning aspects and each of the three domains of student engagement. When students are able to control the speed of learning, there is a much stronger likelihood that they will be focused mentally (r = .55). A strong link between teacher support and behavioral engagement listed in the report means that teachers can encourage students to participate well. Across all engagement measures, an association was found where the highest impact on emotions came from the addition of videos (r = .52). It shows why meaningful and engaging content can make learning more interesting. In general, this research indicates that various instructional approaches are necessary for all students to participate fully in blended learning.

Regression Analysis

A linear regression analysis was conducted to examine the predictive strength of blended learning components on cognitive engagement.

Table 5
Regression Analysis Predicting Cognitive Engagement

Predictor	Standardized β	p-value
Self-Paced Learning	.40	.000
Multimedia Tools	.28	.002
Teacher Support	.18	.020

Model Summary: $F(3, 96) = 13.59$, $p < .001$, $R^2 = .32$

According to regression, combining self-paced learning, multimedia tools, and support from teachers was associated with better student cognitive engagement, with the model explaining 32% of the differences seen. Educational researchers found that self-paced learning was most important in predicting how much students were involved in understanding the content ($\beta = .40$, $p < .001$). Involving multimedia tools was strongly related to increased cognitive engagement ($\beta = .28$, $p = .002$), pointing out that using visual activities improves understanding. Although the effect was small, teacher support ($\beta = .18$, $p = .020$) showed that instructional assurance is an important factor in boosting mental engagement. It becomes clear from the findings that encouraging learner independence and interesting digital material helps improve cognitive engagement in blended learning.

Qualitative Thematic Analysis

Interviews conducted with 10 participants, including six students and four teachers, highlighted a great deal about the blended learning experience. From these interviews, three particular themes highlighted significant experiences with benefits and challenges for learners and educators in this learning environment.

1. Flexibility and Control

One benefit most often reported for blended learning was students' flexibility. Many participants found it helpful to have recorded lessons available to them anytime so that as they encountered more complex concepts, they could revisit them at their own pace, which contributed to their

learning outside of classroom hours. Students especially appreciated the control over their learning environment, particularly for students who required additional time to process material or had competing priorities.

Student 4 stated: "I'm able to review at any time - it helps me understand better."

This finding fits with the literature that describes how asynchronous resources cater to learner needs in various schedule times and learning styles, which leads to the increased engagement of learners and can lead to autonomous learning (Halverson & Graham, 2019; Cleveland-Innes & Wilton, 2018; Zainuddin & Perera, 2018). Offering students flexible access can also lessen stress or anxiety when students miss the live content, enhancing emotional engagement (Reeve, 2012; Bizimana, 2025).

2. Technology Barriers

While these benefits exist, technological barriers remain a significant issue for some students. Interrupted internet access and unreliable device access limited their ability to participate, which was frustrating and led to them giving up on the class altogether. These barriers demonstrate a digital divide that creates further inequitable outcomes (Zeewaqar, 2024; Bond et al., 2021).

As Student 2 stated:

“I have times when the video won’t load at all. I give up.”

These same issues have been identified as challenges for students in a blended learning environment, with regard to technology making it hard for students to engage or continue their learning (Boelens, De Wever, & Voet, 2017; Sahni, 2019). This clearly indicates a need for infrastructure to address gaps and provide equitable access (Markowitz, 2017; Clark et al., 2024).

3. Teacher Challenges

Teachers expressed considerable challenges with juggling the demands of in-person and online teaching. Many teachers experienced overwhelming dual processes, particularly when there was little to no formal training or current support in digital pedagogies. For example, Teacher 1 specified:

"It's overwhelming to manage both in-person and online work."

The strains of balancing dual modalities may reflect more widely documented effects of the professional fatigue experienced by teachers as they were thrust into blended learning environments (Kaden, 2020; Boelens et al., 2017). The literature identifies instructional professional learning and institutional support as key factors in enabling teachers to develop the expertise to deliver effective blended instructions (Maxwell & White, 2017; Powell et al., 2015). Support is critical to enable effective blended learning environments and to improve student outcomes (Kömür, Kilinç, & Okur, 2023; Graham & Halverson, 2023).

Discussion in Light of Literature

The results of this study support the expanding literature indicating that blended learning is a viable method of improving student engagement. The high levels of cognitive and behavioral engagement students reported align with the previous literature (Alizadeh, 2024; Halverson & Graham, 2019) that blended learning creates additional opportunities for learners to understand the subject matter and be engaged in the subject matter, especially when multimedia is introduced, and students were free to progress through the modules at their own pace. The regression analysis results also highlighted self-paced learning as the most important predictor of cognitive engagement, which aligns with Cleveland-Innes and Wilton (2018) and Zainuddin and Perera (2018) when they emphasized learner autonomy can help foster greater academic engagement.

While self-paced learning was a significant element of cognitive engagement, teacher support was also a significant contributor to behavioral engagement, which aligns with Reeve (2012) and Klem and Connell (2004), who indicated that teacher-student relationships need to be developed in order for students to remain engaged in the classroom. The qualitative data also corroborated this by indicating students reported improved understanding of the material and motivation from available flexible online access to materials.

Nevertheless, digital inequality remains a concern. According to Zeewaqar (2024), students with limited access to the internet, but even more, those who did not have enough digital devices for online learning were quickly disengaged and frustrated. And teachers reported challenges associated with teaching in-person and online at the same time. This is consistent with the work of Boelens et al. (2017) and Kaden (2020), where they characterized obstacles to successful blended learning pedagogy as the lack of training for teachers and no support for the training. Therefore, while some benefits of blended learning are established, its effectiveness in the future rests on addressing technological and pedagogical problems.

Conclusion and Recommendations

Summary of Key Findings

This research revealed that blended learning increases secondary students' engagement, namely cognitive and behavioral engagement. According to the study, multimodal, multimedia learning, and self-paced access were the most effective elements in supporting deeper engagement. Teacher support contributed to engagement, but both inadequate digital access and teacher training were challenges that limited student engagement and connecting with their learning at a greater depth. The implications of the findings are important for educational practice. Schools should consider a blended learning approach as a key mode of instruction to engage students and meet the diversity of learning needs. All educators should consider the use of interactive multimedia content and offer flexibility through self-paced learning modules. Professional development courses should be prioritized to improve a teacher's competency in hybrid learning environments. In addition, schools need to find ways to ensure fair access to devices and reliable internet that meet the requirements of all learners wherever they may need assistance.

Recommendations

Teachers should use student-centered teaching strategies, take advantage of digital tools that allow students to interact with material at their own pace, and continue to develop as

professionals in educational technology. School leaders should provide the necessary infrastructure for ICT and allow for training time for teachers. Curriculum developers should be flexible and propose a curriculum that blends face-to-face and online learning while providing opportunities for students to engage with the material. Policymakers should take steps to close the digital divide by providing resources and infrastructure, especially in disadvantaged areas, to enable blended learning for all students to access.

Limitations of the Study

There are a few limitations to this study. By only using a sample of 100 students and 10 interviewees, the sample does not generalize to the population of all students in secondary school. Longitudinal studies are more useful for examining changes in long-term engagement over time; however, I was unable to do this due to time constraints. Finally, the study took place in a singular context. Therefore, findings cannot be generalized to rural schools or regions with different technological resource availability.

Suggestions for Future Research

Future studies should investigate the long-term impact of blended learning on learner engagement and academic achievement. There is a need to better understand how blended learning takes shape in rural or underserved communities; regionally focused studies may be useful for this endeavor. Continued exploration of the efficacy of teacher training programs as applied in blended learning practices could lead to improved planning and instructional practices. Additionally, the subject-specific investigation would allow researchers to understand which disciplines articulate more distinctive benefits over traditional instruction in the blended context, thereby informing curriculum development targeted at ongoing improvements.

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