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Research Article

The role of blended learning in enhancing student engagement: Evidence from high schools in Micronesia

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This study aimed to determine whether blended learning experiences can impact the engagement of high school students in Micronesia in all subjects. Using quantitative descriptive statistics, correlation, and linear regression, the researcher analyzed student engagement as impacted by the blended learning experience in all subject areas. The Student's Blended Learning Experience and the Student's Engagement in School Four-Dimensional Scale were the instruments that were used to find out if blended learning had a significant impact on student's engagement in school. A universal sampling technique was used to analyze the collected data. A total of 102 students were included in the study. The study reveals significant insights into the demographics and experiences of high school students engaged in blended learning. Engagement levels are varied, with strong cognitive and social connections but lower behavioral and agency engagement. Regarding the correlation between demographic variables and blended learning experiences, it was found that demographic variables like age, gender, or educational background do not significantly affect the adoption or efficacy of blended learning designs in this context. Additionally, a substantial correlation has been found between student engagement and the blended learning experience. It emphasizes how crucial it is to properly plan and carry out blended learning experiences to maximize student engagement and academic results. Moreover, the regression analysis of the study shows a strong impact between students' experiences and blended learning courses and their level of participation. The study also underlines the value of well-planned blended learning approaches and recommends mental health services, self-regulation programs, infrastructure support, and professional development. Effective instructional design and technology integration are critical, as seen by the association between engagement levels and blended learning experiences. With proper preparation, implementation, and ongoing support, blended learning can raise student engagement and satisfaction overall.

Keywords: Blended learning experience, High school students, Micronesia, Student engagement

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1. Introduction

The education system is one of the most profoundly affected by COVID-19, with the pandemic dramatically reshaping teaching and learning practices in K–12 schools (National Academies of Sciences, Engineering, and Medicine, 2020). Technology also evolves from time to time. As we move into the digital age, a shift in mindset is needed about schooling, teaching, learning, and assessment (Druva, 2021). Educators can execute an impressive instructional procedure if they incorporate technology and the internet into the educational system. Educators desire to generate learning circumstances that will guarantee proficiency acquisition for all learners (Fazal & Bryant, 2019). The repercussions of automation on education have been intense, causing another demand to utilize information and communication

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technology [ICT] in education and to achieve the competency and apprehension that 21st-century learners require.

With the evolution of technology and its influence on education, the global popularity of using technology as a mechanism in teaching is on the rise. However, effectively deploying technology-based learning resources remains challenging; success depends on having a well-designed learning model rather than relying solely on technological tools (*Campos et al., 2022*). Because of this global use of technology, it becomes fundamental to develop teaching-learning tasks far off the edges of the school.

Blended learning, a pedagogical approach that combines traditional classroom instruction with digital resources and online components, has emerged as a transformative force in the educational landscape. Its potential to engage students in more dynamic and interactive ways has garnered significant attention from educators, researchers, and policymakers. Learning directives, the standard of the learning experience, learning materials, and registered teaching methods are the various qualities that need to be considered when crafting integrated learning. The administration of a blended learning framework in the convention will make it possible to differentiate educational undertakings, decrease students' anxiety, and boost motivation for learning (Graham, 2019).

The classroom is a crucial setting for teachers to impart knowledge and for students to learn. The ability to analyze the effectiveness of classroom instruction is becoming increasingly crucial as society continues to grow and the emphasis on student education increases (Wang & Sheikh-Khalil, 2020). Student engagement, a multifaceted concept encompassing the cognitive, emotional, and behavioral dimensions of learning, is recognized as a key determinant of educational success. It directly influences not only academic achievement but also the development of critical skills and competencies necessary for the 21st century. As institutions strive to meet the evolving needs of a diverse student body, the question of how blended learning experiences impact student engagement becomes increasingly pertinent.

There is rising worry about the lack of agreement on the conceptual underpinnings, even though student involvement is one of the stronger indicators of learning (Burch et al., 2015). With distant learning becoming more common, student engagement has grown to be a significant concern in higher education (Morley & Carmichael, 2020). Additionally, higher education institutions have intentionally integrated and developed blended learning as one of their learning modalities. While blended learning has continued to see increased use and research in higher education, the use of blended learning is still developing in K-12 (Bond, 2020). Because of this aggressive growth, Ahn (2011) found that blended learning in K–12 had not yet been shown to be as effective as it had been in higher education. However, Picciano et al. (2012) believed that blended learning was integral to the development of a new educational paradigm in secondary education and that it would allow high school students to develop the skills needed to be successful in 21st-century careers. Additionally, the impact of blended learning environments on student engagement and academic performance in secondary education reveals compelling evidence supporting the positive influence of blended learning on student outcomes. The findings across various studies consistently indicate that the integration of online and face-to-face instruction correlates with enhanced student engagement and improved academic performance (Cao et al., 2023).

As the fields of increasing technology develop, stakeholders in education are searching for innovative approaches to teaching differentiation and student engagement in learning activities. According to international research, 21st-century classrooms must integrate technology, foster collaboration, encourage reflection and inquiry, support discourse, and be learner-centered to effectively prepare students for modern societal demands (OECD, 2018; Voigt et al., 2020). Additionally, models of blended learning are generally student-centered and incorporate the use of technology (Islam et al., 2022). However, technology alone does not guarantee enhanced student achievement or engagement; rather, when purposefully integrated to supplement direct instruction, it enables deeper thinking and meaningful learning experiences (Harris et al., 2009). The current educational landscape is evolving rapidly, spurred on by technological advancement, changes in student demographics, and an increased emphasis on individualized learning. As the researcher embarks on this exploration of blended learning's impact, it is imperative to acknowledge that there is no one-size-fits-all approach to education. Instead, individuals must recognize the need for a nuanced understanding of how different pedagogical methods, including blended learning, can be tailored to suit the diverse needs and preferences of students. This study represents a step toward achieving this understanding and contributing to the broader discourse on enhancing student engagement and learning outcomes in an ever-changing educational system.

The study aims to delve into the multifarious aspects of blended learning and its impact on student engagement. It seeks to explore the extent to which blended learning environments influence students' motivation, participation, and overall satisfaction with their educational experiences. By investigating these crucial dimensions of engagement, the researcher hopes to gain valuable insights that can inform pedagogical practices and guide institutions in designing effective and engaging learning experiences.

1.1. Review of Related Literature

1.1.1. Blended learning

Blended learning has become a popular trend in present-day education and, according to soothsayers, will endure in later generations. The fundamental concepts of blended learning were popular back in the 1960s in corporate and higher education, but the expression itself was first used in 1999 when the American Interaction Learning Center began to start an operating program plan for teaching in cyberspace (Fuller, 2021; Sing, 2003).

Bryan and Volchenkova (2016), who analyzed the theory of blended learning, found that in the creation of blended learning, the expression could mean 'almost any integration of automation, instructions, and even job tasks.' Technology is not stated specifically, but instead it focuses on blending distinctive abstract approaches. Moreover, Procter (2003) illustrates blended learning as the powerful combination of various styles of delivery, models of teaching, and styles of learning.

Over time, different definitions of blended learning began to merge. Researchers have interpreted blended learning as an instructional module that incorporates electronic materials with standard classroom learning (Al Bataineh et al., 2019; Graham, 2006; Poon, 2013). The theory of blended learning cannot be formulated accurately since different researchers integrate various content into the term. It has also traded from simple integration of classroom and online learning to further compound schemes that integrate synchronous and asynchronous learning processes (Martin, Drew, & Ritzhaupt, 2020; Moorhouse & Wong, 2022). Whatever the combination is, the main purpose is to support an individual to execute comprehension of a subject, become self-sufficient, enhance work performance, and eventually manage outcomes that reinforce learning objectives.

Ashraf et al.'s (2021) methodological review of methodological reviews on blended learning found that most studies did not discuss blended learning from a particular subject area, and the majority of studies discussed blended learning as an inclusive construct and did not focus on the learning models of blended learning. Additionally, most studies conducted a methodological review with qualitative analysis. In the rest of this paper, the definition from Al Bataineh et al. (2019) will be adopted, unless otherwise indicated.

1.1.2. Student engagement

In the subject of education, student engagement is a crucial and extensively researched issue. When it comes to education, it describes how focused, inquisitive, engaged, upbeat, and passionate pupils are during the learning process. The theory of student involvement provides a thorough explanation of this complex phenomenon by including a variety of viewpoints, such as educational, psychological, and social ideas. Chiu (2021) states that several theories of motivation, such as expectancy-value theory (Eccles, 2020), social cognitive theory (Bandura, 1986), and SDT (Ryan & Deci, 2017, 2020), have been developed to explain human behavior. The first two theories place a strong emphasis on how an individual's capacity for learning and goal-achieving influences their decisions and efforts. SDT, on the other hand, is more concerned with intrinsic motivation that is focused on achieving one's interest or goal of mastery.

According to some studies like Fredricks et al. (2004), involvement can be thought of as a "meta construct," or organizing structure, that incorporates several aspects including motivation, self-efficacy, behavioral participation, belongings, school connectedness, and so on. However, some disagree, arguing that engagement needs to have boundaries that are well-defined (Finn & Zimmer, 2012). According to Harper and Quaye (2009) engagement calls for more than just participation or involvement; it also calls for emotions and sense-making in addition to action. Trowler (2010) acknowledged Fredricks et al. (2004) for their insightful identification of three aspects of student participation. According to him, when students exhibit behavioral engagement, they generally adhere to behavioral norms, including involvement and attendance, and they don't exhibit disruptive or negative behaviors. Additionally, students who are emotionally engaged will exhibit affective responses like curiosity, delight, or a sense of community. Moreover, when students are intellectually engaged, they are invested in their education, strive to go beyond the minimum requirements, and welcome challenges.

2. Method

2.1. Research Design

To investigate the impact of blended learning experiences on the engagement of private high school students in Pohnpei, Micronesia, a correlational descriptive research design was applied to examine the relationships between variables without manipulating or controlling them. In this design, the researcher collected the data based on the survey questionnaire and see if there is a relationship between students' engagement. By gathering both types of data and analyzing them in a complementary way, the researcher gained a deeper understanding of the factors that contribute to student satisfaction and success in blended learning courses.

2.2. Participants

The participants of the study were high school students who experienced the blended learning modality and were currently enrolled in a private school in Pohnpei, Micronesia, where the blended learning modality was being implemented. The participants in this study range from grades 9th to 12 and were currently enrolled in Academic Year 2023-2024. This study focused solely on the implementation of blended learning in one of the private high schools in Micronesia to adopt this approach. While the only college on the island must implement blended learning, this study was limited to the high school level, and therefore, the findings may not be generalizable to other educational institutions in the region, particularly elementary schools and other high schools that have not adopted blended learning.

Demographic data collected from the respondents only consisted of 7 items, which are the gender, grade level, age, ethnicity or cultural background, previous academic performance, socio-economic status, and parent involvement of the respondents (see Table 1). 31.4% of the respondents are male students, and more

Table 1
Mean distribution for the student's demographic profiles

	Frequency	*Percent*
Gender		
Male	32	31.4
Female	70	68.6
Grade Level		
9th grade	21	20.6
10th grade	26	25.5
11th grade	29	28.4
12th grade	26	25.5
Age		
14-15 years	31	30.4
16-17 years	59	57.8
18-19 years	12	11.8
Ethnicity or Cultural Background		
Pohnpeian	89	87.3
Chuukese	6	5.9
Kosraean	1	1.0
Other Micronesian	6	5.9
Previous Academic Performance		
High Achievers (GPA 3.5 above)	56	54.9
Average Achievers (GPA 2.0 - 3.49)	45	44.1
Below Achievers (GPA below 2.0)	1	1.0
Socio Economic Status		
Low-income families	17	16.7
Middle-income families	82	80.4
High-income families	3	2.9
Internet Access at home		
Access to reliable internet at home	94	92.2
Limited or no internet at home	8	7.8
Parental Involvement	50	49.0
High parental involvement	46	45.1
Moderate Parental Involvement	6	5.9
Low Parental Involvement		

than half of 68.6% are female students. In terms of grade level, 20.6% of the respondents belonged to 9th grade, 25.5% were 10th and 12th grade, and 28.4% were 11th-grade students. As to age, more than half of 57.8% of the respondents are from 16 to 17 years old, 30.4% are from 14 to 15 years old, and 11.8% are from 18 to 19 years old. In terms of ethnicity or cultural background, most of the respondents—87.3%—are Phonpenian, while 5.9% are Chuukese and another Micronesian, and only 1% is Kosraean. As to previous academic performance, more than half, or 54.9%, are high achievers (GPA 3.5 above), almost half, or 44.1%, are average achievers (GPA 2.0-3.49), while only 1% are below achievers (GPA below 2.0). As to respondents' socio-economic status, 80.4% are in middle-income families, 16.7% are low-income families, and 2.9% are high-income families. In terms of internet access at home, almost all of the respondents have access to reliable internet at home, with 92.2% while only 7.8% have limited or no internet at home. Last, in terms of parental involvement, almost half, or 49%, have high parental involvement, 45.1% have moderate parental involvement, and 5.9% have low parental involvement.

2.3. Instruments

The questionnaires that were used in this study consisted of three parts. The first was the demographic profile, which collects information about the participant's background, including gender, age, grade level, ethnicity or cultural background, previous academic performance, socioeconomic status, internet access at home, and parental involvement. The second part of the instrument used the Blended Learning Course Experience Scale [BL0CES], which assessed the student's perceptions of various aspects of the blended learning experience. The third part comprised the Students' Engagement in School Four-Dimensional Scale [SES-4D], which assessed the levels of participation, motivation, interaction with course content, and sense of belonging within the school community based on the four dimensions of student engagement: cognitive, affective, behavioral, and agency engagement.

2.4. Data Analysis

Before the actual statistical treatment of the data, the researcher first subjected it to a Test of Normality (Shapiro-Wilk Test) for the study to determine what statistical tool to use. As a rule, if the data is normally distributed, the study will use parametric tests (t-test, ANOVA, Pearson-r), and if the data is not normally distributed, the study will use non-parametric tests (Mann Whitney U, Kruskal Wallis H, Spearman rho). In the case of the current study, the researcher employed a non-parametric measure to analyze the gathered data. In order to investigate the connection between the impact of blended learning and the level of student engagement, the analysis mostly used descriptive correlation with regression analysis. Survey questionnaires were used to gather data. The information obtained from the participants was analyzed and interpreted using statistical techniques and procedures. To measure the demographic profile, blended learning experiences, and students' engagement levels of the participants, frequency, percentage, mean, and standard deviation were used. To assess the satisfaction level of high students in blended learning experiences, the following scales below were used.

To measure the demographic profile, blended learning experiences, and engagement levels of the participants, the study employed frequency, percentage, mean, and standard deviation. To assess the satisfaction level of high school students with their blended learning experiences, a five-point scale was used: 4.50–5.00 as "Extremely Effective," 3.50–4.49 as "Moderately Effective," 2.50–3.49 as "Effective," 1.50–2.49 as "Slightly Effective," and 1.00–1.49 as "Not Effective." Similarly, to determine the level of engagement of high school students who experienced blended learning, a five-point scale was applied: 4.50–5.00 as "Extremely Agree," 3.50–4.49 as "Moderately Agree," 2.50–3.49 as "Agree," 1.50–2.49 as "Slightly Agree," and 1.00–1.49 as "Not Agree." To correlate the demographic variables and blended learning experiences on students' engagement levels, the Spearman rho correlation was used. Lastly, to identify the key predictors of demographic variables and blended learning experiences that significantly contribute to variations in students' engagement levels, Mann-Whitney U and Kruskal-Wallis H tests and regression analysis with bootstrapping were used.

3. Results and Discussion

3.1. Level of Satisfaction of Blended Learning

The data in Table 2 illustrate students' satisfaction regarding the implementation of blended learning with respect to course design, resulting in an overall mean score of 3.98, which is categorized as moderately effective. Notably, students rated the instructor's feedback on assignments and quizzes as very helpful (mean = 4.01) and acknowledged the organization and navigability of the Google Classroom site (mean =

4.03). This highlights the importance of effective feedback and structured online environments in enhancing student engagement and satisfaction. Additionally, the instructor's interest in students' learning received a commendable score of 3.97, reinforcing the notion that instructor involvement is crucial in fostering a supportive learning atmosphere. These findings are supported by Bonk and Graham (2020); effective feedback and clear communication from instructors are essential for improving student motivation and learning outcomes in blended environments. Furthermore, Garrison and Vaughan (2020) assert that well-organized online platforms enhance student satisfaction and promote active learning. Collectively, the data underscore that elements such as thoughtful course design, instructor engagement, and effective feedback mechanisms are vital for creating positive learning experiences in blended educational contexts.

Table 2
Mean Distribution for the Student's Level of Satisfaction with the Implementation of Blended Learning in terms of Course Design

Statement	*Mean*	*SD*	*Descriptive Interpretation*
1) The instructor's interest in my learning was good.	3.97	.95	Moderately Effective
2) The instructor's feedback on my performance in assignments and quizzes and my participation in the forums was very helpful.	4.01	1.05	Moderately Effective
3) The instructor's orientation on the use of online resource activities and the learning management systems was very helpful.	3.89	1.10	Moderately Effective
4) The course Google Classroom site is well organized and easy to navigate.	4.03	1.09	Moderately Effective
Overall Mean	3.98	1.05	Moderately Effective

The data in Table 3 reflect students' satisfaction with the learning experience in a blended learning environment, yielding an overall mean score of 3.56, categorized as moderately effective. Notable aspects of this learning experience include the positive impact of multimedia resources (mean = 3.76) and the flexibility of learning at any time and from anywhere (mean = 3.68), both indicating that students perceive these elements as enhancing their engagement and learning outcomes. Additionally, students recognized improvements in their digital literacy (mean = 3.65) and time management skills (mean = 3.46), suggesting that the blended learning model fosters essential competencies that extend beyond academic performance.

Table 3
Mean Distribution for the Student's Level of Satisfaction with the Implementation of Blended Learning in Terms of Learning Experience

Statement	*Mean*	*SD*	*Descriptive Interpretation*
1) Multimedia resources on the learning management system enriched my learning experience.	3.76	1.03	Moderately Effective
2) Communication online with students and the lecturer improved my learning.	3.50	1.11	Moderately Effective
3) Blended learning improves my time management skills.	3.46	1.11	Moderately Effective
4) Blended learning improves my digital literacy.	3.65	1.01	Moderately Effective
5) Blended learning improved my performance in the mid-semester test and end-of-semester exam.	3.23	1.23	Moderately Effective
6) Blended learning enabled me to learn at any time and any pace, from anywhere, using any device.	3.68	1.18	Moderately Effective
7) Using the Google Classroom mobile app for viewing/reading learning resources, interacting with faculty and peers in forums, and submitting assignments and quizzes was all satisfactory.	3.62	1.17	Moderately Effective
Overall Mean	3.56	1.12	Moderately Effective

These findings are consistent with recent studies that explore the efficacy of blended learning in enhancing educational experiences. According to a study by Alammary et al. (2020), multimedia resources in blended courses significantly contribute to improved student engagement and learning outcomes.

Furthermore, research by Garrison and Vaughan (2020) emphasizes that effective online communication and collaboration among peers and instructors are critical in fostering a supportive learning community, which aligns with students' reports of improved learning through online interactions in this study. Overall, the data underscore the potential of blended learning to create a more enriching and flexible educational experience, facilitating both academic performance and skill development.

The data presented in Table 4 indicates that students' satisfaction regarding personal factors in the implementation of blended learning is effective, with an overall mean score of 2.66. While students reported feeling anxious about the course (mean = 2.68) and having trouble using the required technologies (mean = 2.28), both were categorized as effective. Notably, the perception that the course required more time and effort received a higher mean score of 3.009, also classified as effective. This suggests that while students may experience challenges and anxieties related to personal factors, they recognize these factors as manageable and part of their educational experience.

Table 4
Mean Distribution for the Student's Level of Satisfaction with the Implementation of Blended Learning in Terms of Personal Factors

Statement	*Mean*	*SD*	*Descriptive Interpretation*
1) I feel more anxious in this course.	2.68	1.27	Effective
2) I have trouble using the technologies in this course.	2.28	1.29	Effective
3) This course required more time and effort.	3.01	1.41	Effective
Overall Mean	2.66	1.32	Effective

These findings are aligned with current literature that emphasizes the impact of personal factors on student experiences in blended learning environments. A study by Lee and Choi (2020) highlights that anxiety related to new technologies can affect student engagement and satisfaction, which may explain the higher levels of reported anxiety in this study. Furthermore, research by Yılmaz and Keser (2021) supports the notion that the perceived demand for additional time and effort in blended courses can lead to positive outcomes when students engage with the material and technology effectively. Addressing these personal factors through targeted support and resources may further enhance student satisfaction and reduce anxiety in blended learning contexts.

The data presented in Table 5 reflects high levels of student satisfaction with the implementation of blended learning, with an overall mean of 3.36, categorizing it as moderately effective. Specifically, students rated course design most favorably at 3.98, indicating a strong agreement regarding its effectiveness in facilitating their learning. Conversely, while the learning experience received a moderately effective score of 3.56, personal factors were rated significantly lower at 2.66, which was categorized as effective. This discrepancy suggests that while students are generally satisfied with the structural aspects of the course and the learning opportunities provided, personal factors may not be sufficiently addressed to enhance overall satisfaction with blended learning.

Table 5
Summary of the Level of Students' Satisfaction with the Implementation of Blended Learning

Variables	*Overall Means*	*Descriptive Interpretation*
1) Course Design	3.98	Moderately Effective
2) Learning Experience	3.56	Moderately Effective
3) Personal Factors	2.66	Effective
General Average	3.36	Moderately Effective

These findings are consistent with contemporary research highlighting the critical role of course design and learning experiences in student satisfaction within blended learning environments. A study by Kuo et al. (2020) emphasizes that effective course design significantly influences student engagement and satisfaction, which aligns with the high rating received in this area. Furthermore, the importance of addressing personal factors—such as motivation, self-efficacy, and support systems—is underscored by a study from Bawa (2020), which notes that personal variables can significantly impact students' experiences and outcomes in blended learning contexts. Addressing these personal factors could improve student satisfaction and engagement, suggesting areas for potential enhancement in blended learning programs.

3.2. Level of Student Engagement who Experienced Blended Learning

Table 6 indicates that students' cognitive engagement in blended learning environments is relatively positive, with an overall mean of 3.23, signifying general agreement with the statements regarding their cognitive engagement practices. Notably, students expressed a strong tendency to connect their learning across disciplines (M = 3.79) and actively engage with reading materials to extract deeper meaning (M = 3.92). This reflects a commitment to critical thinking and integrative learning, which are essential components of cognitive engagement. However, the lower mean for the statement regarding regular review of notes (M = 2.26) suggests that while students are engaged during learning activities, they may not consistently apply effective study habits outside of the classroom.

These findings resonate with current research emphasizing the role of cognitive engagement in academic success. According to research by Chiu et al. (2020), cognitive engagement is strongly linked to students' academic performance and motivation, highlighting the importance of metacognitive strategies, such as planning and reviewing. Moreover, Wang et al. (2021) argue that fostering cognitive engagement through interdisciplinary connections can enhance students' overall learning experiences, promoting deeper understanding and retention of knowledge. The data suggests that while students demonstrate a commitment to engaging cognitively with their learning, there remains room for improvement in developing consistent study practices that reinforce their cognitive skills in a blended learning environment.

Table 6
Mean Distribution for the Student's Level of Engagement Who Experienced Blended Learning in Terms of Cognitive Engagement

Statement	*Mean*	*SD*	*Descriptive Interpretation*
1) When writing my work, I begin planning for drafting the text.	3.32	1.18	Agree
2) I try to connect what I learn in one discipline with what I learn in others.	3.79	.96	Moderately Agree
3) I spend a lot of free time looking for more information on topics discussed in class.	2.82	1.29	Agree
4) When I'm reading, I try to understand the meaning of what the author wants to transmit.	3.92	1.22	Moderately Agree
5) I review my notes regularly, even if a test is not coming up.	2.26	1.10	Agree
Overall Mean	3.23	1.15	Agree

The data presented in Table 7 reflects students' affective engagement in a blended learning environment, revealing a generally positive emotional connection to their school. The overall mean score of 2.90 indicates that students predominantly feel engaged and integrated within their school community. Specifically, students reported a moderately high agreement (M = 3.94) with the statement that they make friends easily, alongside a strong sense of integration (M = 3.82). These findings suggest that, despite slight feelings of exclusion or loneliness, the majority of students experience a sense of belonging and social connectedness within their educational environment.

Table 7
Mean Distribution for the Student's Level of Engagement Who Experienced Blended Learning in Terms of Affective Engagement

Statement	*Mean*	*SD*	*Descriptive Interpretation*
1) My school is a place where I feel excluded.	1.69	1.16	Slightly Agree
2) My school is a place where I make friends easily.	3.94	1.33	Moderately Agree
3) My school is a place where I feel integrated.	3.82	1.20	Moderately Agree
4) My school is a place where it seems to me that others like me.	3.40	1.19	Agree
5) My school is a place where I feel alone.	1.61	1.09	Slightly Agree
Overall Mean	2.90	1.19	Agree

This aligns with the findings of recent studies highlighting the importance of social connections in enhancing student engagement. For example, research by Zhang et al. (2020) emphasizes that positive

interpersonal relationships significantly contribute to students' emotional well-being and overall engagement in blended learning contexts. Additionally, studies by Christenson and Reschly (2020) assert that fostering a sense of belonging in schools leads to increased affective engagement and improves academic outcomes. The results of this study underscore the necessity for educators to prioritize the development of supportive social environments that facilitate positive peer interactions, ultimately enhancing students' affective engagement in blended learning settings.

Table 8 illustrates students' behavioral engagement in a blended learning context, revealing a generally positive trend toward attendance and classroom conduct. The data indicates that students overwhelmingly do not agree with statements related to being absent without valid reasons (M = 1.20) and being absent from class while at school (M = 1.11), suggesting a strong commitment to attending classes. However, the statement regarding intentional disruption of classes received a slightly higher mean score (M = 1.62), indicating that while most students do not engage in overtly disruptive behavior, there may be some instances of minor distractions. The overall mean score of 1.56 suggests that, while there are some concerns regarding student behavior, the majority of students appear to engage positively with their learning environment.

Table 8
Mean Distribution for the Student's Level of Engagement Who Experienced Blended Learning in Terms of Behavioral Engagement

Statement	*Mean*	*SD*	*Descriptive Interpretation*
1) I am absent from school without a valid reason.	1.20	0.69	Not Agree
2) I am absent from class while in school.	1.11	0.40	Not Agree
3) I deliberately disturb classes.	1.62	0.99	Slightly Agree
4) I am rude toward teachers.	1.27	0.66	Not Agree
5) I am distracted in the classroom.	2.59	1.31	Moderately Agree
Overall Mean	1.56	0.81	Slightly Agree

These findings align with current literature on student behavior in blended learning settings. For instance, Akçayır and Akçayır (2020) emphasize that students who feel more engaged in blended learning environments are likely to exhibit lower rates of absenteeism and disruptive behavior. Furthermore, research by Alqadhib et al. (2021) indicates that distractions in the classroom can stem from various factors, including the integration of technology in learning environments. The relatively moderate agreement on distraction (M = 2.59) points to a need for strategies that enhance student focus and mitigate distractions, thereby fostering a more conducive learning atmosphere. Addressing these behavioral concerns through structured engagement activities and clear expectations can help improve overall student conduct in blended learning contexts.

Table 9 provides a detailed analysis of students' agency engagement within a blended learning context. The data indicates that students feel comfortable asking questions during classes (M = 3.00) and commenting on topics of interest (M = 3.26), both of which are categorized as "Agree." This suggests a proactive attitude toward engaging with teachers, reflecting a level of confidence and willingness to participate in discussions that enhance their learning experience. In contrast, statements related to expressing opinions during lessons (M = 2.38) and making suggestions for class improvement (M = 2.07) received lower scores, categorized as "Slightly Agree." These findings indicate a potential area of concern, as they suggest that while students are willing to engage in dialogue, they may feel less empowered to contribute meaningfully or to suggest improvements in their learning environment.

These results are consistent with contemporary research emphasizing the importance of student agency in blended learning. According to Cheung et al. (2020), agency engagement is critical for students to take ownership of their learning, yet many students feel hesitant to voice their opinions or suggestions. Similarly, Li and Wang (2021) argue that while students may demonstrate engagement through questions and comments, significant barriers still exist that prevent them from fully articulating their thoughts and suggestions. The relatively low scores for expressing opinions and making suggestions highlight the need for educators to create a more inclusive and supportive atmosphere that encourages students to take greater agency in their learning processes. Strategies such as fostering a classroom culture of openness and implementing regular feedback mechanisms may help improve students' sense of agency and willingness to engage actively.

Table 9
Mean Distribution for the Student's Level of Engagement Who Experienced Blended Learning in Terms of Agency Engagement

Statement	*Mean*	*SD*	*Descriptive Interpretation*
1) During classes, I put questions to teachers.	3.00	1.22	Agree
2) I talk to my teachers about my likes and dislikes.	2.72	1.40	Agree
3) I comment with my teachers when something interests me.	3.26	1.37	Agree
4) During lessons, I intervene to express my opinions.	2.38	1.34	Slightly Agree
5) I make suggestions to teachers about how to improve classes.	2.07	1.19	Slightly Agree
Overall Mean	2.67	1.30	Agree

Table 10 summarizes the levels of engagement among students who experienced blended learning, revealing that overall cognitive engagement (M = 3.23) and agency engagement (M = 2.67) received agreement interpretations, indicating positive student attitudes towards their cognitive involvement and their sense of agency in the learning process. Conversely, affective engagement (M = 2.90) also shows agreement, reflecting a generally positive emotional response to the learning experience. However, behavioral engagement is notably lower (M = 1.56), interpreted as slightly agree, which suggests that while students feel cognitively and emotionally engaged, their actual participation in learning activities may be less robust. This discrepancy highlights a critical area for improvement in ensuring that students not only feel engaged but also actively participate in their learning experiences.

Table 10
Summary of the Level of Student's Level of Engagement Who Experienced Blended Learning

Variables	*Overall Means*	*Descriptive Interpretation*
1) Cognitive Engagement	3.23	Agree
2) Affective Engagement	2.90	Agree
3) Behavioral Engagement	1.56	Slightly Agree
4) Agency Engagement	2.67	Agree
General Average	2.60	Agree

These findings align with research indicating that engagement in blended learning environments can vary significantly across different dimensions. According to Zhang et al. (2020), cognitive and emotional engagements are often correlated, as students who feel mentally stimulated tend to have positive affective responses to their learning. However, the lower score for behavioral engagement suggests a gap between perceived engagement and actual participation, a trend that is echoed in studies by Martin et al. (2021), which found that while students may report feeling engaged, they often struggle to translate that engagement into proactive behaviors in a blended learning context. Addressing this disconnect is crucial for educators aiming to foster a more holistic engagement model that supports both emotional and active participation in blended learning settings.

3.3. Level of Satisfaction of HS Students in the Implementation of Blended Learning when Grouped According to Demographic Variables

Table 11 reveals significant differences in the levels of satisfaction among high school students regarding the implementation of blended learning, segmented by various demographic variables. Notably, gender plays a crucial role in shaping students' satisfaction with course design (U = 1529.000, p = .003) and learning experiences (U = 1418.000, p = .031), suggesting that female students may report higher satisfaction levels than their male counterparts in these areas. In terms of grade level, satisfaction with learning experiences also demonstrates a significant correlation (H(3) = 10.907, p = .012), indicating that students in higher grades may experience greater satisfaction with their learning environments. Furthermore, socioeconomic status significantly affects satisfaction with course design (H(2) = 7.568, p = .023), implying that students from varying economic backgrounds have differing perceptions of course quality and support.

Table 11
Differences in the Level of Satisfaction of HS Students in the Implementation of Blended Learning when Grouped According to Demographic Variables

Demographics	*Course Design*	*Learning Experience*	*Personal Factor*
Gender	U= 1529.000*	U= 1418.000*	U= 989.500
	p=.003	*p*= .031	*p*= .343
Grade Level	H(3)= 4.646	H(3)= 10.907*	H(3)= 5.688
	p= .200	*p*= .012	*p*= .128
Age	H(2)= 4.429	H(2)= 1.691	H(2)= 0.792
	p= .109	*p*= .429	*p*= .673
Ethnicity	H(3)= 2.180	H(3)= 5.016	H(3)= 2.198
	p= .536	*p*= .171	*p*= .532
Academic Performance	H(2)= 4.142	H(2)= 10.195*	H(2)= 3.834
	p= .126	*p*= .006	*p*= .147
Socioeconomic Status	H(2)= 7.568*	H(2)= 4.195	H(2)= 0.650
	p= .023	*p*= .123	*p*= .723
Internet Access at Home	U= 361.000	U= 363.500	U= 333.000
	p=.851	*p*=.876	*p*=.590
Parental Involvement	H(2)= 0.172	H(2)= 0.021	H(2)= 1.417
	p= .918	*p*= .990	*p*= .492

Note. $*p < .05$.

These findings are consistent with recent literature emphasizing the impact of demographic factors on student satisfaction in blended learning environments. For instance, a study by Al-Fraihat et al. (2020) highlights that gender differences significantly influence perceptions of course design and overall satisfaction, as female students often report higher levels of satisfaction in collaborative and supportive learning settings. Additionally, the relationship between academic performance and satisfaction with learning experiences aligns with findings from Aguilera-Hermida (2021), which suggest that students with better academic outcomes tend to engage more positively with blended learning. These insights underscore the necessity for educators to tailor blended learning experiences that consider demographic diversity, ensuring that all students find satisfaction and engagement within their educational environments.

3.4. Level of Engagement of HS Students who Experienced Blended Learning Implementation when grouped According to Demographic Variables

Table 12 presents the differences in the level of engagement among high school students who experienced blended learning, categorized by various demographic variables. The results indicate that gender does not significantly affect engagement levels across cognitive (U = 1300.500, p = .191), affective (U = 945.000, p = .203), behavioral (U = 876.500, p = .075), or agency dimensions (U = 1321.000, p = .146). In contrast, significant differences in cognitive engagement are observed across grade levels (H(3) = 21.543, p = .000), suggesting that students' cognitive engagement may vary significantly based on their academic year. Additionally, age also demonstrates a significant influence on cognitive engagement (H(2) = 13.533, p = .001), indicating that older students may engage differently in cognitive tasks compared to their younger peers. Notably, academic performance correlates significantly with both cognitive (H(2) = 7.338, p = .026) and behavioral engagement (H(2) = 8.709, p = .013), highlighting that students with better academic outcomes exhibit higher engagement levels in these areas.

These findings align with current research suggesting that demographic factors can influence student engagement in blended learning environments. For instance, a study by Zhao et al. (2023) emphasizes that age and academic performance significantly impact how students engage with blended learning materials, as older students and those with higher performance levels tend to adopt more effective engagement strategies. Furthermore, parental involvement has been shown to enhance student engagement in blended learning contexts (Baker et al., 2020), aligning with the significant correlation noted in this study (H(2) = 11.782, p = .003) for affective engagement, though it does not reach conventional levels of significance. These results underscore the importance of considering demographic factors when designing and implementing blended learning experiences to enhance engagement among diverse student populations.

Table 12
Differences in the Level of Engagement of HS Students who Experienced Blended Learning Implementation when grouped According to Demographic Variables

Demographics	*Cognitive*	*Affective*	*Behavioral*	*Agency*
Gender	U= 1300.500	U= 945.000	U= 876.500	U= 1321.000
	p= .191	*p*= .203	*p*= .075	*p*= .146
Grade Level	H(3)= 21.543*	H(3)= 2.692	H(3)= 4.705	H(3)= 1.669
	p= .000	*p*= .442	*p*= .195	*p*= .644
Age	H(2)= 13.533*	H(2)= 3.287	H(2)= 3.699	H(2)= 0.515
	p= .001	*p*= .193	*p*= .157	*p*= .773
Ethnicity	H(3)= 0.406	H(3)= 0.465	H(3)= 0.632	H(3)= 2.343
	p= .939	*p*= .927	*p*= .889	*p*= .504
Academic Performance	H(2)= 7.338*	H(2)= 0.300	H(2)= 8.709*	H(2)= 1.463
	p= .026	*p*= .861	*p*= .013	*p*= .481
Socioeconomic Status	H(2)= 0.095	H(2)= 2.319	H(2)= 2.067	H(2)= 4.546
	p= .954	*p*= .314	*p*= .356	*p*= .103
Internet Access at Home	U= 373.500	U= 338.500	U= 497.500	U= 370.500
	p= .975	*p*= .638	*p*= .125	*p*= .945
Parental Involvement	H(2)= 5.568	H(2)= 11.782	H(2)= 0.421	H(2)= 3.736
	p= .062	*p*= .003	*p*= .810	*p*= .154

Note. *$p < .05$.

3.5. Correlation between Demographic Variables and Blended Learning Experience

Table 13 presents a correlation matrix examining the relationship between the level of satisfaction with course design and various dimensions of engagement among high school students. The results indicate that satisfaction with course design has a significant positive correlation with cognitive engagement (Spearman rho = .263, p = .008) and behavioral engagement (Spearman rho = .208, p = .036), suggesting that students who are more satisfied with the structure and content of their courses tend to be more engaged cognitively and behaviorally. However, the correlation with affective engagement is not statistically significant (Spearman rho = −0.103, p = 0.302), indicating that course design may not directly impact students' emotional responses or feelings towards their learning experiences. The agency dimension shows a strong positive correlation (Spearman rho = .374, $p < .001$), highlighting the importance of course design in empowering students to take control over their learning.

Table 13
Correlation Matrix between Level of Satisfaction for Course Design and the Level of Engagement of High School Students

Variable		*Cognitive*	*Affective*	*Behavioral*	*Agency*
Course	Spearman rho Coefficient	.263*	.208*	−.103	.374*
design	Sig. (2-tailed)	.008	.036	.302	.000

Note. n= 102; *$p < .05$.

These findings resonate with recent research emphasizing the critical role of effective course design in promoting student engagement. For instance, a study by Dziuban et al. (2020) found that well-designed courses significantly enhance both cognitive and behavioral engagement by providing students with clear objectives and meaningful tasks. Similarly, research by Chen et al. (2021) indicated that thoughtful course design fosters a sense of agency among learners, as it encourages active participation and ownership of the learning process. The correlations identified in this study underscore the necessity for educators to focus on developing high-quality course designs that not only stimulate cognitive and behavioral engagement but also foster students' sense of agency, ultimately leading to improved educational experiences and outcomes.

The correlation matrix displayed in Table 14 illustrates the relationships between the level of satisfaction for learning experiences and various dimensions of student engagement among high school students. Notably, the cognitive engagement dimension exhibits a significant positive correlation with learning experiences (r = .372, $p < .05$), suggesting that students who are more satisfied with their learning experiences tend to demonstrate higher cognitive engagement. In contrast, the affective engagement level does not show a significant correlation with learning experiences (r = .079, p = .431). However, a significant negative correlation is observed in the behavioral engagement dimension (r = −.166, p = .095), indicating that

students who report higher satisfaction with their learning experiences may exhibit lower levels of behavioral engagement. Furthermore, a strong positive correlation with agency (r = .345, $p < .05$) reinforces the importance of satisfactory learning experiences in fostering students' sense of agency in their educational journey.

Table 14
Correlation Matrix Between Level of Satisfaction for Learning Experience and the Level of Engagement of High School Students

Variable		*Cognitive*	*Affective*	*Behavioral*	*Agency*
Learning experience	Correlation Coefficient Sig. (2-tailed)	.372* .000	.079 .431	−.166 .095	.345* .000

Note. n= 102; *$p < .05$.

These findings are consistent with contemporary research highlighting the importance of learning experiences in enhancing student engagement. For example, a study by Wang et al. (2020) emphasizes that students' perceptions of their learning environment significantly impact their cognitive and agency-related engagement, demonstrating that a supportive and fulfilling learning experience fosters higher levels of engagement. Moreover, research by Schunk and Zimmerman (2021) indicates that satisfaction in learning experiences can facilitate positive academic behaviors and enhance students' agency by encouraging them to take ownership of their learning. The significant correlations observed in this study highlight the necessity for educators to cultivate enriching learning environments that not only enhance cognitive engagement but also promote a sense of agency among students, ultimately leading to improved educational outcomes.

The correlation matrix presented in Table 15 indicates the relationships between various personal factors and the levels of engagement among high school students, measured across cognitive, affective, behavioral, and agency dimensions. The data reveals that none of the personal factors significantly correlate with the cognitive engagement level, as evidenced by a correlation coefficient of −.080 (p = .421). Similarly, the affective engagement level shows no significant correlation (r = .064, p = .521). In terms of behavioral engagement, a moderate correlation (r = .179) is present; however, the significance level (p = .073) indicates that this correlation does not reach the conventional threshold for statistical significance ($p < .05$). Conversely, the agency factor exhibits a stronger correlation with engagement (r = .046) but remains statistically insignificant (p = .649). This suggests that while personal factors may have varying degrees of influence on student engagement, the relationships observed here are not statistically significant, indicating that further exploration is warranted.

Table 15
Correlation Matrix Between Level of Satisfaction for Personal Factor and the Level of Engagement of High School Students

Variable		*Cognitive*	*Affective*	*Behavioral*	*Agency*
Personal factors	Correlation Coefficient Sig. (2-tailed)	−.080 .421	.064 .521	.179 .073	.046 .649

Note. n= 102.

These findings align with recent research on student engagement, which suggests that personal factors such as motivation and self-efficacy can significantly impact various dimensions of engagement. For instance, according to Gummerum et al. (2020), personal attributes often influence cognitive and behavioral aspects of engagement but may not directly correlate with affective dimensions. Additionally, a study by Fredricks et al. (2020) emphasizes the complexity of these relationships, noting that engagement is multifaceted and may be influenced by contextual factors beyond personal characteristics. Given the non-significant results in this study, it may be beneficial for educators to consider a broader range of factors, including social and environmental influences, when seeking to enhance student engagement in the classroom.

3.6. Regression Analysis between Blended Learning Experience and Student Engagement

The linear regression analysis in Table 16 investigates the impact of various course design factors—cognitive, affective, behavioral, and agency—on an outcome variable. The model demonstrates a significant fit,

explaining 18.3% of the variance (R^2 =.183, F(4, 97) = 5.444, p =.001). Among the predictors, agency stands out as a significant contributor (B = 0.263, p =.003), indicating that when students feel a sense of agency in their learning, their overall course experience improves. This finding resonates with research conducted by Martin and Bolliger (2021), which emphasizes the crucial role of student agency in fostering engagement and positive learning outcomes in both traditional and online educational settings. Conversely, cognitive (B = 0.154, p =.123), affective (B = 0.031, p =.838), and behavioral (B = −0.140, p =.320) factors do not reach statistical significance, suggesting that these elements may not have a direct effect on course design effectiveness in this particular analysis.

Table 16
Linear Regression Analysis for Course Design

Model	*B*	*Bootstrap* *Bias*	*SE*	*Sig. (2-tailed)*	*95% Confidence Interval* *Lower*	*Upper*
(Constant)	2.903	−.004	.535	.001	1.822	3.967
Cognitive	0.154	−.003	.098	.123	−0.031	0.337
Affective	0.031	.005	.151	.838	−0.246	0.357
Behavioral	−0.140	.003	.142	.320	−0.389	0.176
Agency	0.263*	-.001	.077	.003	0.107	0.416

Note. Bootstrap Results are based on 1000 bootstrap samples; F(4, 97) = 5.444, p = .001; R^2= .183; *p < .05.

The non-significant results for cognitive, affective, and behavioral factors highlight the complexity of course design and its influence on learning experiences. While cognitive engagement is often touted as a crucial aspect of effective learning (Alqurashi, 2020), this study suggests that, in the context of this analysis, it may not independently drive positive outcomes when agency is also considered. Additionally, the lack of significance for the affective and behavioral dimensions may indicate that these factors need to be integrated in conjunction with strategies that enhance student agency to effectively impact course design outcomes. Overall, the findings underscore the importance of designing courses that promote student agency to enhance the educational experience, while also calling for further investigation into the roles of cognitive, affective, and behavioral dimensions in future research.

The linear regression analysis presented in Table 17 examines the effect of various learning experience factors—cognitive, affective, behavioral, and agency—on an outcome variable. The model explains 21% of the variance (R^2 =.210, F(4, 97) = 6.428, p <.001), indicating a moderate fit. Cognitive and agency factors are significant predictors, with cognitive factors showing a positive effect on the outcome (B = 0.312, p =.004). This suggests that enhanced cognitive engagement is associated with improved learning experiences, aligning with recent research by Alqurashi (2020), which underscores the importance of cognitive involvement for meaningful engagement in online learning. However, affective and behavioral factors show non-significant relationships (B = −0.098, p =.497, and B = −0.120, p = .357, respectively), indicating limited predictive value in this context.

Table 17
Linear Regression Analysis for Learning Experience

Model	*B*	*Bootstrap* *Bias*	*Std. Error*	*Sig. (2-tailed)*	*95% Confidence Interval* *Lower*	*Upper*
(Constant)	2.439	.039	.526	.001	1.462	3.499
Cognitive	0.312*	−.002	.107	.004	0.100	0.532
Affective	−0.098	−.008	.143	.497	-0.393	0.162
Behavioral	−0.120	−.004	.130	.357	-0.404	0.115
Agency	0.217*	.000	.075	.007	0.074	0.363

Agency also emerges as a significant predictor (B = 0.217, p =.007), highlighting that when students feel they have control over their learning processes, their engagement improves. This finding supports studies by Martin and Bolliger (2021), who note that student agency significantly enhances engagement, particularly in blended and online learning environments where self-directed learning is key. The non-significance of affective and behavioral factors suggests that, while they are components of student experience, they may not independently drive engagement without cognitive and agency elements. Overall, the results emphasize cognitive engagement and agency as central to creating positive learning experiences.

The linear regression analysis in Table 18 examines the influence of personal factors—cognitive, affective, behavioral, and agency—on an outcome variable, with results indicating a limited explanatory power (R^2 = .014, F(4, 97) = 0.341, p = .850). The model explains only 1.4% of the variance, and none of the factors are statistically significant predictors. Cognitive engagement has a negative coefficient (B = −0.157, p =.222), indicating a slight but non-significant inverse relationship. This finding aligns with recent studies, like those by Alqurashi (2020), which suggest that cognitive engagement alone may not be a strong driver for personal engagement outcomes in certain learning contexts. Affective and behavioral factors show positive but non-significant relationships (B = 0.169, p =.357, and B = 0.113, p =.589, respectively), suggesting that these personal factors, while relevant in other contexts, may not independently predict engagement or performance in this particular model.

Table 18
Linear Regression Analysis for Personal Factors

				Bootstrap		
Model	*B*	*Bias*	*SE*	*Sig. (2-tailed)*	*95% Confidence Interval*	
					Lower	*Upper*
(Constant)	2.456	−.008	.612	.001	1.257	3.664
Cognitive	−0.157	−.003	.129	.222	−0.409	0.125
Affective	0.169	−.011	.179	.357	−0.190	0.511
Behavioral	0.113	.026	.212	.589	−0.249	0.619
Agency	0.026	.005	.108	.797	−0.174	0.243

Agency, with a near-zero and non-significant coefficient (B = 0.026, p =.797), also shows limited influence on the model. This result diverges from findings by Martin and Bolliger (2021), who identified agency as an essential factor in enhancing engagement in blended learning environments. The overall lack of significant predictors in this analysis suggests that additional factors outside of these personal dimensions may be necessary to explain variations in engagement or performance effectively. These findings emphasize the importance of considering other influences, such as environmental or instructional factors, when evaluating predictors of engagement outcomes in blended learning settings.

The linear regression analysis in Table 19 investigates the relationship between components of blended learning experiences—cognitive, affective, behavioral, and agency—and student engagement. The model accounts for 19.6% of the variance in engagement (R^2 =.196, F(4, 97) = 5.916, p <.001). While cognitive engagement shows a positive effect (B =.103), it is not statistically significant (p =.146), suggesting that cognitive aspects alone may not strongly predict engagement. This aligns with studies by Hew et al. (2020), indicating that blended learning fosters cognitive engagement through interactive methods, although its impact may vary based on implementation. Affective and behavioral engagement show minimal, non-significant effects (B =.034, p and B = −.049, p =.669, respectively), implying that emotional and observable behavioral factors might not independently drive engagement in a blended context (Alqurashi, 2020; Dziuban et al., 2020).

Table 19
Linear Regression Analysis between blended learning experience and student engagement

				Bootstrap		
Model	*B*	*Bias*	*SE*	*Sig. (2-tailed)*	*95% Confidence Interval*	
					Lower	*Upper*
(Constant)	2.599	.003	.357	.001	1.897	3.321
Cognitive	.103	.002	.070	.146	.036	.237
Affective	.034	-.003	.096	.741	−.159	.220
Behavioral	− .049	.006	.109	.669	−.254	.178
Agency	.169*	- .002	.058	.005	.054	.278

Notably, agency—students' sense of control over their learning—shows a positive and significant association with engagement (B =.169, p =.005), highlighting it as a crucial predictor in blended learning environments. This suggests that empowering students to have autonomy over their learning experiences can substantially enhance engagement. This finding is consistent with research by Martin and Bolliger (2021), which emphasizes the role of agency in online and blended learning as a means to foster active engagement. Overall, the results highlight that while cognitive, affective, and behavioral elements have

limited effects individually, fostering student agency could be a key strategy for boosting engagement in blended learning environments.

4. Discussion

This study sought to evaluate student satisfaction in a blended learning environment, specifically focusing on three critical dimensions: course design, learning experience, and personal factors. The results revealed that students perceived their overall satisfaction as "moderately effective," with course design receiving the highest mean score, followed by learning experience and personal factors. These findings align with a growing body of global literature underscoring the pivotal role of instructional design in shaping students' engagement, retention, and satisfaction in blended learning contexts (Bonk & Graham, 2020; Garrison & Vaughan, 2020). As higher education institutions continue to embrace digital transformation, it becomes increasingly important to ensure that the structure and delivery of courses are not only accessible but also pedagogically sound and supportive of diverse learner needs.

The high rating in course design suggests that well-organized learning materials, clear instructional goals, timely instructor feedback, and the seamless integration of digital tools are appreciated by learners navigating the complexities of hybrid modalities. This is echoed in the findings of Kuo et al. (2020), who found that course design and interaction quality are strong predictors of student satisfaction in online and blended learning environments. The incorporation of multimedia content, modular design, and flexible pacing can foster a sense of autonomy and control—two components essential for learner motivation, particularly in self-directed environments (Alammary et al., 2020; Deci & Ryan, 2000).

The learning experience dimension, while rated slightly lower than course design, still yielded a positive response. This may be attributed to the interactive elements of blended learning, such as discussion forums, group collaborations, and instructor accessibility, which are known to promote social presence and engagement (Hrastinski, 2019). However, it is worth noting that the effectiveness of these elements can vary widely depending on the frequency, quality, and responsiveness of teacher-student and peer interactions. Study by Sun and Rueda (2012) emphasizes the importance of emotional engagement and instructor presence in sustaining learner participation in blended environments.

Interestingly, the lowest rating was found in the personal factors category, which includes students' emotional readiness, self-efficacy, and technological confidence. While these factors still fall within the "effective" range, their relative weakness indicates the presence of underlying challenges such as anxiety, digital fatigue, and uneven access to resources—issues that have been globally documented since the accelerated shift to hybrid learning models during the COVID-19 pandemic (Bawa, 2020; Lee & Choi, 2020). The findings of this study reinforce the need for holistic support systems that address not just cognitive but also affective and technological needs of learners. Providing orientations on how to navigate digital platforms, offering mental health resources, and scaffolding technology use through guided practice can significantly reduce anxiety and enhance learner confidence (Boelens et al., 2017).

Moreover, the results demonstrate that while course structure and engagement strategies are crucial, they are insufficient in isolation. For blended learning to be truly effective, it must be inclusive and responsive to individual learner differences. Therefore, institutional leaders and educators should adopt a student-centered instructional approach—emphasizing needs assessments, personalized learning pathways, and continuous feedback loops—enabling responsive adaptation of teaching that fosters learner autonomy and deeper engagement through active participation and reflection (Kerimbayev et al., 2023).

Blended learning also offers the opportunity to develop 21st-century skills such as time management, digital communication, critical thinking, and self-regulated learning. These competencies are vital not only for academic success but also for employability in the digital economy (OECD, 2018). Therefore, higher education institutions have a responsibility to integrate skill-building activities within blended curricula and to ensure that all learners—regardless of socioeconomic or technological background—can participate meaningfully in the learning process.

In conclusion, this study adds to the growing corpus of evidence affirming the efficacy of blended learning models in higher education. While students perceive blended learning as generally effective—especially in terms of course design and learning experience—there is a clear need to strengthen the support mechanisms addressing personal and emotional challenges associated with digital learning environments. Future research should consider longitudinal analyses to explore how student satisfaction evolves over time and across different disciplines. Additionally, integrating qualitative methodologies could enrich our understanding of how learners navigate the cognitive and emotional landscapes of blended education.

Policymakers and educational leaders are urged to invest in professional development, digital infrastructure, and learner support services to create a more inclusive, engaging, and effective blended learning ecosystem.

5. Recommendations

To enhance the effectiveness of blended learning in Pohnpei, Micronesia, several key recommendations emerge from the study. Schools should invest in robust instructional design that seamlessly integrates traditional and digital learning resources, ensuring that content is interactive and engaging to accommodate diverse learning styles. Continuous professional development for educators is essential, with a focus on effective technology use in teaching, classroom management within a blended learning environment, and strategies to foster student engagement. Additionally, comprehensive support services, including mental health and self-regulation programs, are crucial to helping students manage the demands of blended learning. Providing access to counselors and mental health professionals will address any additional or psychological challenges students may face.

Infrastructural investments are necessary to ensure all students have access to the required technology and reliable internet connectivity, particularly for those from low socioeconomic backgrounds. Encouraging and facilitating greater parental involvement in their children's education is also vital. Informed and engaged parents can provide additional support and motivation, enhancing the overall learning experience. Regular assessment and feedback mechanisms should be established to monitor student progress and engagement, allowing for timely interventions when needed. Finally, developing personalized learning experiences tailored to individual student needs and preferences can help maintain high levels of engagement and ensure that all students achieve their full potential. By addressing these recommendations, schools in Pohnpei, Micronesia, can create a more effective and engaging blended learning environment, ultimately enhancing student engagement and academic success.

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