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Status and Personal Study Habits of Students in Science During Blended Learning

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Abstract:
Blended learning has emerged as a key instructional approach in the post-pandemic educational landscape, yet its effects on students' study habits and engagement in science remain underexplored at the secondary level. This study investigated the technological access, learning environment, study habits, and class participation of Grade 10 students from different public schools during blended learning. A structured survey and Likert scale were used, with data analyzed through descriptive statistics and Pearson correlation. Results revealed that students generally had sufficient technological resources, with smartphones and essential learning software being the most accessible tools. However, access to devices such as tablets and laptops was limited. Students also agreed that their home environments were somewhat conducive to learning, though distractions remained a challenge. Study habits were rated positively, particularly in terms of assignment completion and adherence to class schedules. Class participation was the strongest among the measured variables, with students showing active collaboration in group activities, although a lack of confidence in asking questions was noted. Correlation analysis showed that while some relationships between variables such as technological access, learning environment, and study habits with class participation were moderate to weak, none were statistically significant. These findings suggest that while students are adapting to the blended learning environment, additional support is needed to address gaps in device access, study strategy development, and classroom engagement. This study provides valuable insight for educators and policymakers seeking to enhance the effectiveness of blended science education at the secondary level.

Keywords: blended learning, technological access, learning environment, study habits, class participation, science education

1. Introduction

As the educational landscape significantly transforming, blended learning emerge as a prominent instructional approach. Blended learning, which combines online and face-to-face learning experiences, has gained a significant role in adopting this approach as a way to provide students with flexible and personalized learning opportunities. This shift has been particularly notable in science education, where hands-on activities, experiments, and collaborative projects are essential components of the learning process. The implementation of blended learning has brought about new challenges and opportunities for students. One of the primary challenges is ensuring equitable access to technology and a conducive

learning environment. Technological access encompasses the availability of devices, internet connectivity, and digital literacy skills. The learning environment, on the other hand, encompasses the physical space, resources, and support systems that facilitate learning. The status of students in terms of technological access and learning environment can significantly impact their ability to engage with the curriculum and achieve learning outcomes. In light of this technological development, the existing traditional learning cannot be overlooked or ignored, and e-learning cannot be a substitute for traditional learning or discard and ignore modern electronic technology. Ati (2016) and Saqaria (2018) state that technological development, no matter how advanced and developed, will not substitute for the traditional methods of teaching and learning, as well as e-learning, cannot be a substitute for traditional learning based on classroom encounters.

In our time, it is impossible to dispense with and ignore modern electronic technology, and as a result, the idea of merging between regular education and e-learning appeared, and a new type of education known as Blended Learning has appeared by employing e-learning and reducing the number of weekly classroom meetings. In addition, study habits play a crucial role in student success in science during blended learning. Study habits refer to the strategies and behaviors that students employ to learn and retain information. Effective study habits include time management, organization, note-taking, and active learning techniques. The development of effective study habits is particularly important in blended learning environments, where students are often required to take greater responsibility for their own learning. According to Shibli (2017) the blended learning strategy provides a self-learning environment rich in its resources (Images, texts, graphics, video, electronic libraries, Internet portals…etc), and the advantages and benefits of the blended learning strategy in the process of acquiring learning .

Furthermore, class participation is a key indicator of student engagement and understanding in science during blended learning. Class participation can take various forms, including asking questions, contributing to discussions, and collaborating with peers. The level of class participation can reflect students' interest in the subject matter, their confidence in their abilities, and their willingness to engage with the learning process. The researchers believe that blended learning is an educational necessity to achieve the desired academic goals, solve many educational problems, improve learning outcomes, save time and effort, and instill self-reliance and self-confidence. (Jordan et al., 2021)

In other hand the diversity of knowledge sources provided by blended learning stimulates students to think in multiple directions, which develops flexibility of thought, the plurality of visions, and perseverance in achieving goals, thus developing their ability to think reciprocally and interact with others, work with them and accept feedback, and raise motivation to achieve tasks. Also, Hazmi (2018) study results provide valuable insights of the blended learning strategy, which has aroused their interest and increased their learning motivation, the study results show that the use of blended learning increases the motivation and achievement of students, and learning through the blended learning strategy is based on the merging between abstract theoretical knowledge and practical application with what it provides in terms of colors, animations, and sounds.

This study aims to investigate the status and personal study habits of students in science during blended learning. Specifically, it seeks to identify the status of students in terms of technological access and learning environment, determine their study habits, and evaluate their level of class participation. The findings of this study will provide valuable insights into the experiences of students in science during blended learning and inform the development of effective instructional strategies and support systems.

2. Methodology

This study utilized a quantitative descriptive-correlational design with a structured survey questionnaire as the primary data-gathering instrument. The questionnaire focused on three areas: (1) the status of students during blended learning in terms of technological access and learning environment, (2) their study habits in Science, and (3) their level of class participation. It employed a 5-point Likert scale with response options from 5 (Strongly Agree) to 1 (Strongly Disagree), interpreted using the following ranges: 4.21–5.00 (Strongly Agree), 3.41–4.20 (Agree), 2.61–3.40 (Neutral), 1.81–2.60 (Disagree), and 1.00–1.80 (Strongly Disagree). The instrument was validated by experts and pilot-tested, yielding a Cronbach's alpha value of 0.83. A random sampling method was used to select respondents coming from Grade 10 students of various public high schools in the municipality of Sipocot, ensuring diversity in learning conditions. Questionnaires were distributed in both online and printed formats to address accessibility differences in the blended learning environment, defined here as a combination of traditional classroom instruction and online learning. After securing administrative permissions and conducting participant orientations, data collection was completed within one week. Responses were tallied, and the Weighted Mean was used for descriptive analysis, while Pearson correlation tested the relationships between variables. A significance level of 0.05 was used; p-values below this threshold indicated statistically significant relationships.

3. Results

This section outlines the findings of the study conducted among 30 Grade 10 students, focusing on their technological access, learning environment, study habits in Science, and level of class participation during blended learning.

Table 1: Status of Students During Blended Learning in terms of;

A. Technological Access

Statement	Weighted Mean (WM)	Rank	Inter.
1. I have reliable access to a smartphone for online learning.	4.43	1	Strongly Agree
2. I have reliable access to a tablet for online learning.	3.23	10	Neutral
3. I have reliable access to a laptop for online learning.	3.87	4	Agree
4. I have reliable access to a desktop computer for online learning.	3.43	9	Agree
5. My internet connection at home is stable enough for online classes.	3.77	6	Agree
6. I have the necessary software and apps for my online learning.	4.30	2	Strongly Agree
7. I rarely experience technical issues during my online classes.	3.83	5	Agree
8. I have access to a printer or other devices needed for my studies.	3.73	7	Agree

9. I can access online learning platforms without difficulties.	3.47	8	Agree
10. I experience technical issues during my online classes .	3.90	3	Agree
Overall Mean (OM)	3.80	-	Agree

Legend:
4.21 - 5.00 – Strongly Agree
3.41 - 4.20 – Agree
2.61 – 3.40 – Neutral
1.81 – 2.60 – Disagree
1.00 – 1.80 – Strongly Disagree

Findings indicate that most students had sufficient technological resources, as reflected by an overall mean of 3.80, which corresponds to an Agree interpretation. The item rated highest was "I have reliable access to a smartphone for online learning" with a weighted mean of 4.43, followed closely by "I have the necessary software and apps for my online learning" (WM = 4.30), both falling under Strongly Agree. On the other hand, access to tablets was the lowest-rated item (WM = 3.23), indicating a Neutral response.

Table 2: Status of Students During Blended Learning in terms of;

B. Learning Environment

Statement	**Weighted Mean (WM)**	**Rank**	**Inter.**
1. I have a quiet and comfortable place to study at home.	3.77	3	Agree
2. My study area is free from distractions and equipped with necessary materials.	3.50	7	Agree
3. I enjoy a peaceful and quiet place in my study room at home.	3.70	5	Agree
4. I have a study table for my learning materials.	3.73	4	Agree
5. I get distracted by family members while attending online classes.	3.77	3	Agree
6. I find it difficult to focus when my siblings are studying with me.	3.57	8	Agree
7. I am easily distracted from studying at home.	3.63	6	Agree
8. I have enough lighting in my study area for effective learning and online class viewing.	4.10	2	Agree
9. I can maintain a focused environment during my online classes.	3.70	5	Agree
10. I find it difficult to focus when my study environment is not suitable for learning.	4.20	1	Agree
Overall Mean (OM)	3.77	-	Agree

Legend:
4.21 - 5.00 – Strongly Agree
3.41 - 4.20 – Agree
2.61 – 3.40 – Neutral
1.81 – 2.60 – Disagree
1.00 – 1.80 – Strongly Disagree

Students generally agreed that their learning environment supported their online learning needs, with an overall mean of 3.77. The statement "I find it difficult to focus when my study environment is not suitable for learning" ranked highest (WM = 4.20), emphasizing the impact of environmental distractions. Adequate lighting was also rated positively (WM = 4.10). Meanwhile, "My study area is free from distractions and equipped with necessary materials" received the lowest score in this category (WM = 3.50), pointing to common challenges at home.

Table 3: Study Habits of Students in Science During Blended Learning

Statement	Weighted Mean (WM)	Rank	Inter.
1. I set a regular study schedule for reading and studying lesson in science.	3.93	7	Agree
2. I prepare for my science classes by reviewing notes and textbooks.	4.13	5	Agree
3. I regularly complete my assignment for my science subjects.	4.33	1	Strongly Agree
4. I follow my class schedule for online science classes.	4.27	2	Strongly Agree
5. I review recorded lessons to prepare for quizzes and exams.	4.20	4	Agree
6. I attend my online classes on time and stay until dismissal.	4.23	3	Strongly Agree
7. I use a schedule to organize my study time effectively	3.73	9	Agree
8. I use study tools like flashcards, diagrams, or practice tests.	3.83	8	Agree
9. I take a break during my study sessions to stay focused.	4.23	3	Strongly Agree
10. I collaborate with my classmates to share and gain ideas from them.	4.10	6	Agree
Overall Mean (OM)	3.80	-	Agree

Legend:
4.21 - 5.00 – Strongly Agree
3.41 - 4.20 – Agree
2.61 – 3.40 – Neutral

1.81 – 2.60 – Disagree
1.00 – 1.80 – Strongly Disagree

The results revealed that students practiced effective study habits during blended learning, averaging an overall mean of 3.80 (Agree). The most strongly agreed-upon habit was regularly completing science assignments (WM = 4.33), followed by adhering to class schedules (WM = 4.27). The habits with the lowest, yet still positive, ratings included organizing study time using a schedule (WM = 3.73) and using study tools like flashcards or diagrams (WM = 3.83).

Table 4: Class Participation During Blended Learning

Statement	Weighted Mean (WM)	Rank	Inter.
1. I actively participate in online class discussions.	3.93	5	Agree
2. I feel comfortable asking questions in my online science classes.	3.50	9	Agree
3. I regularly ask questions after the lesson to clarify my doubts.	3.63	8	Agree
4. I raise my virtual hand, if I want to ask or clarify something.	3.93	5	Agree
5. I respond to my teachers' questions during online classes.	4.10	3	Agree
6. I collaborate well with my classmates in group activities.	4.27	1	Strongly Agree
7. I share my ideas and thoughts during class discussions.	3.90	6	Agree
8. I participate in group chats and forums during our discussions.	4.20	2	Agree
9. I seek feedback from my teachers to improve my performance.	3.87	7	Agree
10. I am confident in my overall participation in science classes during blended learning.	4.00	4	Agree
Overall Mean (OM)	3.93	-	Agree

Legend:
4.21 - 5.00 – Strongly Agree
3.41 - 4.20 – Agree
2.61 – 3.40 – Neutral
1.81 – 2.60 – Disagree
1.00 – 1.80 – Strongly Disagree

Among the four measured aspects, class participation received the highest overall mean at 3.93 (Agree), indicating a strong level of student involvement. The top-rated response was "I collaborate well with my classmates in group activities" (WM = 4.27), highlighting effective peer interaction. Participation in group chats and forums followed (WM = 4.20). However, the item "I feel comfortable asking questions in my

online science classes" rated lowest (WM = 3.50), suggesting that student confidence in voicing questions remains an area for growth.

Table 5: Correlation of the Status of Technological Access of Students and their Level of Class Participation

Indicators	r-value	Strength of correlation	Interpretation	p-value	Decision	Interpretation
Status of Technological Access of Students and their Level of Class Participation	0.502	Moderate	Moderate relationship	0.139	Failed to reject Ho	Not Significant

Legend

Pearson r Value	Strength of Correlation	Interpretation
±0.90 to ±1.00	Very high (very strong)	Very strong relationship
±0.70 to ±0.89	High (strong)	Strong relationship
±0.50 to ±0.69	Moderate	Moderate relationship
±0.30 to ±0.49	Low (weak)	Weak relationship
±0.10 to ±0.29	Very low (very weak)	Very weak relationship
0.00	None	No relationship

The result shows a moderate positive relationship between students' access to technology and their level of class participation, with an r-value of 0.502. This means that students who have better access to technology tend to participate more in class. However, the p-value is 0.139, which is higher than the standard level of 0.05, so the result is not statistically significant. In simple terms, even though there seems to be a connection, we can't be sure that access to technology really affects how much students participate. Therefore, the null hypothesis is not rejected, and it's possible that other factors are influencing class participation.

Table 6: Correlation of the Status of Technological Access of Students and their Level of Class Participation

Indicators	r-value	Strength of correlation	Interpretation	p-value	Decision	Interpretation
Status of Learning Environment and their	0.420	Low (weak)	Weak relationship	0.227	Failed to reject Ho	Not Significant

Level of Class Participation						

Legend

Pearson r Value	Strength of Correlation	Interpretation
±0.90 to ±1.00	Very high (very strong)	Very strong relationship
±0.70 to ±0.89	High (strong)	Strong relationship
±0.50 to ±0.69	Moderate	Moderate relationship
±0.30 to ±0.49	Low (weak)	Weak relationship
±0.10 to ±0.29	Very low (very weak)	Very weak relationship
0.00	None	No relationship

The results of the correlation analysis show a slight positive link between the status of the learning environment and how actively students participate in class, with an r-value of 0.420. However, this link is not statistically significant, as the p-value of 0.227 is higher than the commonly accepted level of 0.05. In simpler terms, even though it seems that students in better learning environments may participate more, the relationship isn't strong or consistent enough to draw solid conclusions. However, the null hypothesis is not rejected, meaning we can't confidently say that the learning environment has a meaningful effect on student participation. This implies that other factors may be more influential in shaping student engagement and should be explored further in future research.

Table 7: Correlation of the Study Habits of Students and their Level of Class Participation

Indicators	r-value	Strength of correlation	Interpretation	p-value	Decision	Interpretation
Status of Learning Environment and their Level of Class Participation	-0.211	Very low (very weak)	Very weak relationship	0.559	Failed to reject Ho	Not Significant

Legend

Pearson r Value	Strength of Correlation	Interpretation
±0.90 to ±1.00	Very high (very strong)	Very strong relationship
±0.70 to ±0.89	High (strong)	Strong relationship
±0.50 to ±0.69	Moderate	Moderate relationship
±0.30 to ±0.49	Low (weak)	Weak relationship
±0.10 to ±0.29	Very low (very weak)	Very weak relationship
0.00	None	No relationship

The result shows a very weak negative relationship between students' study habits and their level of class participation, with an r-value of -0.211. This means that students who have better study habits may actually participate a little less in class, but the relationship is very weak and likely not meaningful. The p-value is 0.559**,** which is much higher than the usual cutoff of 0.05, so the result is not statistically significant. In simple terms, there's no strong evidence that study habits affect how much students participate in class. Because of this, the null hypothesis is not rejected**,** and other factors may better explain class participation.

4. Discussion

This study examined the status and personal study habits of Grade 10 students in science during blended learning, with specific attention to technological access, learning environment, study habits, and class participation. The results reveal both the progress and limitations faced by students adapting to this hybrid educational model. In terms of technological access, students generally indicated that they had the necessary devices and software for online learning, with smartphones being the most widely available tool. However, access to larger devices like tablets and laptops was comparatively lower, which may affect productivity during activities requiring multitasking or detailed input.

This finding is consistent with the observations of Borup et al. (2020), who noted that although mobile technology is prevalent, it may not always be the most effective medium for deep academic engagement. Furthermore, the variability in device access points to persistent equity issues in digital learning environments, as highlighted by Trust and Whalen (2020), who stressed that insufficient access to reliable devices and internet hinders student performance in online settings. Regarding the learning environment, students generally agreed that their study environments were conducive to learning, though distractions—especially from family members—were notable.

This supports the idea that while blended learning provides spatial flexibility, it also imposes challenges when home conditions are not optimized for focused academic work. According to Means et al. (2014), the success of blended learning environments depends not only on instructional design but also on the quality of the physical learning space at home. The high rating of environmental distractions in this study echoes the findings of Garbe et al. (2020), who reported that many students struggled to maintain focus at home during remote or blended learning due to family noise, lack of dedicated space, or competing responsibilities.

As for study habits, the data showed that students were generally consistent in completing assignments and following their class schedules—habits associated with academic success in blended learning contexts. These results affirm previous research by Broadbent and Poon (2015), who found that self-regulated learning strategies, such as time management and assignment completion, significantly predict achievement in blended and online courses. However, the relatively lower use of study aids like diagrams or flashcards, and weak use of personal scheduling tools, may suggest a gap in students' metacognitive strategies. Zimmerman (2002) emphasized that students must not only manage their time but also develop effective learning strategies to succeed in self-paced or hybrid formats. This suggests a need for teacher guidance or school-based training on how to study effectively within blended setups.

In terms of class participation, students showed strong engagement, particularly in collaborative tasks and group chats. This is consistent with studies by Hrastinski (2009), who argued that online interaction fosters a sense of community and learning engagement when structured properly. However, the lower comfort levels in asking questions during class may indicate limited student-teacher interaction or a lack of confidence in the virtual setting. According to Martin and Bolliger (2018), students' willingness to

participate vocally in virtual classes can be hindered by lack of immediacy or fear of judgment, which points to the need for developing a psychologically safe environment in online learning.

The significance of these findings lies in their practical implications: while students are adjusting well to the blended learning environment in science, certain challenges remain that must be addressed by educators and policy-makers. For instance, improving equitable access to technology and supporting students in developing effective study strategies are vital. Moreover, enhancing the quality of the home learning environment and promoting inclusive communication practices in online classrooms could lead to better engagement and learning outcomes. Future research could expand on these findings by including students from multiple grade levels or comparing blended learning outcomes across public and private institutions. It may also be beneficial to explore specific interventions—such as study skills training or teacher mentoring programs—to enhance study habits and class participation in science during blended instruction. In conclusion, the results of this study contribute to the growing body of research on blended learning by highlighting the balance students must strike between independence and support. While the flexibility and technological integration of blended learning show promise, the approach must be backed by equitable access, environmental readiness, and guided learning strategies to truly be effective.

5. Conclusion

The findings of this study reveal that students generally possess adequate technological access and conducive learning environments, which are essential for effective participation in blended learning (Singh et al., 2021; Rasheed et al., 2020). The overall agreement among students regarding their access to technology and the quality of their learning spaces suggests a positive foundation for online educational engagement. Specifically, the technological access aspect yielded an overall mean of 3.80 ("Agree"), with the highest-rated statement being "I have reliable access to a smartphone for online learning" (WM = 4.43), followed by "I have the necessary software and apps for my online learning" (WM = 4.30). In terms of learning environment, students also registered an overall mean of 3.77 ("Agree"), with “I find it difficult to focus when my study environment is not suitable for learning” receiving the highest weighted mean of 4.20 (Adedoyin & Soykan, 2020).

Moreover, students demonstrated commendable study habits in science, such as timely attendance in online classes, adherence to study schedules, and active review of lessons and materials (Chung et al., 2020; El-Sayad et al., 2021). These behaviors were reflected in an overall mean of 3.80 for study habits, with top scores on “I regularly complete my assignment for my science subjects” (WM = 4.33), and “I follow my class schedule for online science classes” (WM = 4.27). Class participation was also found to be relatively high, with an overall mean of 3.93, and the highest-rated statement being “I collaborate well with my classmates in group activities” (WM = 4.27), reflecting strong student engagement during blended learning (Hazmi, 2018; Almahasees et al., 2021).

Despite these positive indicators, the statistical analysis revealed no significant relationships among technological access, learning environment, study habits, and class participation. While moderate to weak correlations were observed—technological access and participation ($r = 0.502$), learning environment and participation ($r = 0.420$), and study habits and participation ($r = -0.211$)—all p-values exceeded the 0.05 threshold, indicating that these factors did not significantly predict levels of participation in this sample (Al-Fraihat et al., 2020). These results highlight the complexity of blended learning environments and suggest that other unmeasured variables may influence student engagement and academic performance (Wang et al., 2021; Alzahrani & O’Toole, 2019).

In conclusion, while the technological and environmental conditions appear favorable, and students exhibit productive study behaviors, educators and policymakers should consider a broader range of influences—such as motivation, instructional quality, and individual learning preferences—when designing and implementing blended learning strategies. This supports recent assertions that while technology can enhance learning, it cannot fully replace the role of traditional classroom interactions and face-to-face engagement (Jordan et al., 2021; Aguilera-Hermida, 2020; Saqaria, 2018). Continued research is essential to explore these dimensions and support the academic success of students in evolving educational settings.

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