The Impact of Classroom Technology Integration on Students' Engagement and Academic Achievement

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Abstract

Effective technology integration is crucial for equipping students with the 21st-century skills necessary to thrive in an increasingly digital and interconnected world. This study investigated the impact of classroom technology integration on student engagement and academic achievement among Grade 5 students in the District of Tarangnan, Schools Division of Samar during the School Year 2024-2025. A quantitative research design employing descriptive-correlational methods was utilized. Findings revealed a significant and moderate relationship between students' perceived classroom technology integration and their level of engagement and academic achievement. Furthermore, the study identified key factors influencing student perceptions of technology integration, including fathers' occupation, student sex, home technology access, and student attitudes towards technology. Teacher experience emerged as a significant predictor of student perceptions. Key challenges to effective technology integration included slow or unreliable internet connections and hardware issues. The study recommends prioritizing teacher professional development, enhancing technology infrastructure, addressing student profile variables, fostering positive student attitudes, and continuously monitoring and evaluating technology integration strategies to maximize student learning outcomes.

Keywords: Classroom Technology Integration, Student Engagement, Academic Achievement, Teacher Professional Development, Educational Technology

1. Introduction

The integration of technology in educational settings has been a significant focus in recent years, driven by the potential to enhance teaching and learning processes. With the increasing availability of digital tools and resources, educators are exploring innovative ways to integrate technology into the classroom to improve student engagement and achievement.

The rapid evolution of educational technology has led to a transformative shift in teaching methodologies. According to Cox (2018), technology integration in the classroom can provide interactive and engaging learning experiences that cater to diverse learning styles and needs. This shift is particularly pertinent in the context of elementary education, where foundational skills are developed. However, despite the widespread adoption of technology, there remains a critical need to empirically examine its actual impact on student outcomes, especially among younger learners (Smith & Jones, 2020).

Engagement is a crucial factor in the learning process, as it significantly influences students' motivation and academic success. Research by Fredricks et al. (2017) emphasizes that engaged students are more likely to experience higher levels of achievement and satisfaction with their learning experiences. In this context, technology can play a pivotal role in fostering engagement by providing interactive and personalized learning experiences. This study aims to investigate how the use of technology in the classroom affects the engagement levels of Grade 5 students, considering factors such as attention, participation, and enthusiasm for learning.

Furthermore, academic achievement is often used as a key indicator of educational effectiveness. The relationship between technology integration and student achievement has been the subject of extensive research, with mixed findings. Some studies suggest that technology can enhance learning outcomes by providing access to diverse resources and enabling differentiated instruction (Higgins, Xiao, & Katsipataki, 2018). However, other studies caution that without proper implementation and support, technology may not lead to significant improvements in academic performance (Tamim et al., 2021). This study seeks to contribute to this ongoing debate by exploring the specific impact of technology on the academic achievement of Grade 5 students.

Meanwhile, Department Order Number 16 series of 2023 also known as the “Revised Guidelines on the Implementation of the Department of Education Computerization Program” aims to integrate information and communication technology (ICT) in public schools. Its primary goal is to enhance education quality by providing students and teachers with modern digital tools and resources. The program equips schools with necessary computer hardware and software, supports infrastructure development, and includes comprehensive teacher training for effective ICT integration into the curriculum. This directive emphasizes the importance of teachers integrating technology as a teaching aid in schools, aiming to enhance student engagement and achievement (DepeEd Order No, 16. S 2023).

In the District of Tarangan, according to District Promeds (2024), the average grade for Grade 5 students dropped from 77.54 in the School Year 2020-2021 to 77.78 in School Year 2022-2023, with only a slight increase to 78.74 in School Year 2021-2022. Although these grades meet the passing percentage mandated by national standards, the stagnant or declining trend calls for a more robust approach to enhancing student performance. One area that warrants exploration is the integration of technology into the classroom, particularly since students today are growing up surrounded by various forms of technology that can serve as valuable tools for learning.

Despite the availability of technology outside the classroom, district data reveals significant challenges in implementing technology-enhanced teaching. Only 46 percent of teachers in the district own laptops, and a large majority of classrooms lack essential technological tools such as television sets (Promeds, 2024). These limitations indicate that technology integration in the teaching and learning process is not yet fully realized across all classrooms. Financial constraints among teachers, coupled with limited school funding for equipment purchases, hinder the widespread adoption of digital tools that could potentially enhance both student engagement and academic achievement.

Additionally, these results may be linked to the level of student engagement during instruction, as the pervasive presence of technology today is making traditional teaching methods less effective. Embracing new educational trends, such as incorporating technology into classroom discussions, should be prioritized to enhance learning outcomes.

In light of the aforementioned reasons, this research aims to provide a comprehensive analysis of the impact of classroom technology integration on the engagement and achievement of Grade 5 students in the District of Tarangnan, Schools Division of Samar. Examining these two critical aspects, the study seeks to offer valuable insights for educators, policymakers, and stakeholders on the effectiveness of technology in enhancing educational outcomes. The findings of this study will contribute to the growing body of literature on educational technology and its implications for teaching and learning in elementary education.

1.1. Research Questions

The study aimed to find out the impact of classroom technology integration on engagement and academic achievement among Grade 5 students in the District of Tarangnan, Schools Division of during the School Year 2024-2025. Specifically, this study sought answers to the following questions:

1.What is the profile of the student-respondents in terms of the following variates:
1.1 age and sex;
1.2 parent's highest educational attainment;
1.3 gross monthly family income;
1.4 parents' occupation;
1.5 attendance during the First and Second Quarters;
1.6 technology utilized at home;
1.7 number of times that technology is used; and
1.8 attitude toward classroom technology integration?

2.What is the profile of the teacher-respondents in terms of the following variates:
2.1 age and sex;
2.2 civil status;
2.3 gross monthly family income;
2.4 highest educational attainment;
2.5 number of years as elementary teacher;
2.6 relevant in-service trainings attended;
2.7 latest performance rating based on IPCRF; and
2.8 attitude toward technology integration?

3. What is the perception of student- and teacher- respondents with regard to classroom technology integration according to the following:
3.1 ease of use;
3.2 confidence and comfort;
3.3 perceived benefits;
3.4 relevance to learning;
3.5 accessibility and availability;
3.6. support and guidance;
3.7 online safety and responsibility; and
3.8 collaboration and interaction?

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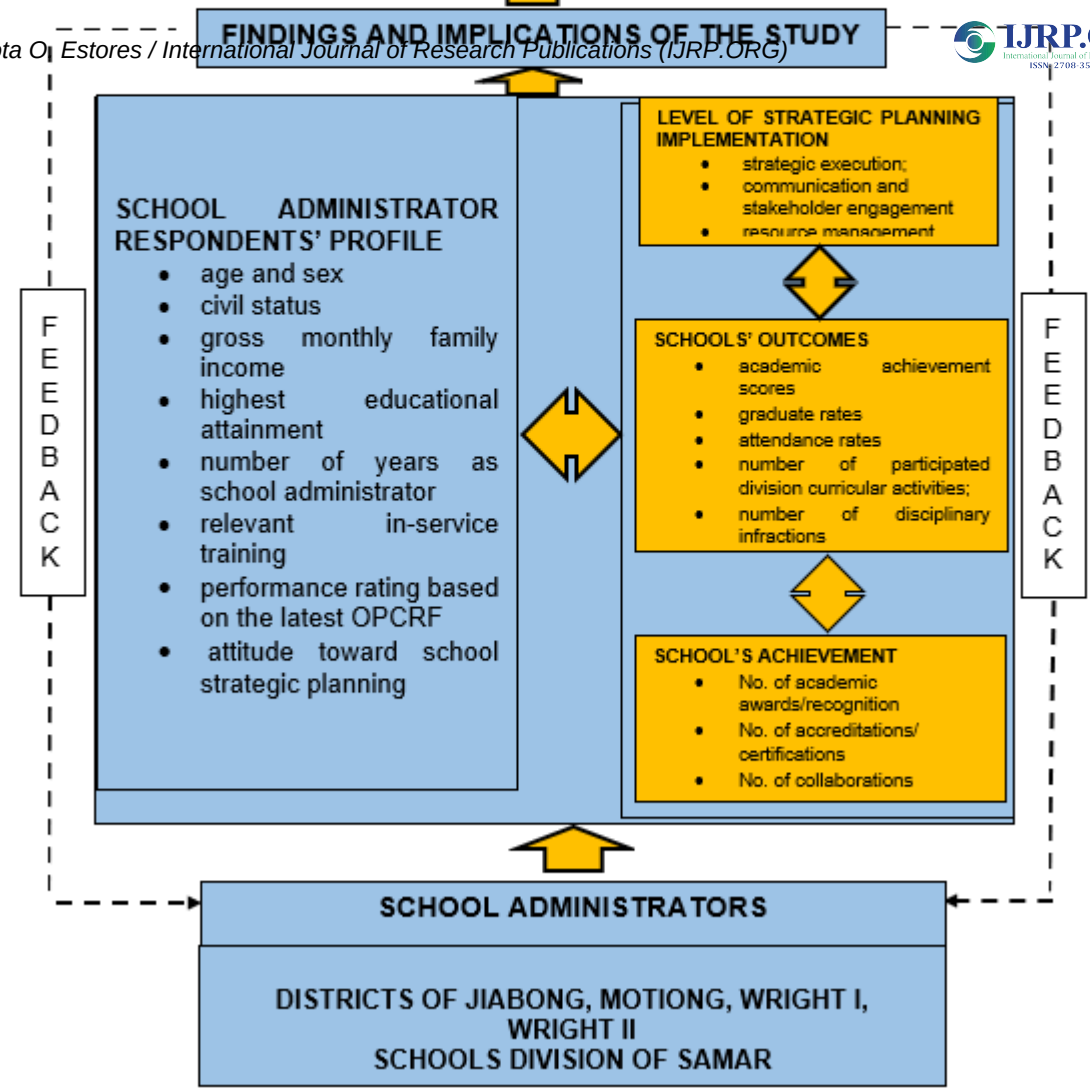

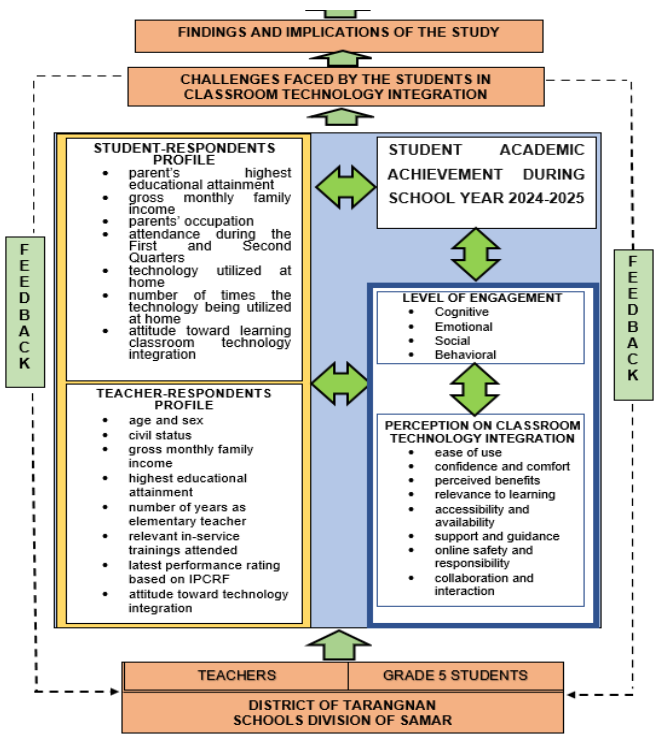

Fig. 1. Research Paradigm

Positioned at the center of the investigation is the research locale, situated in the District of Tarangnan, Schools Division of Samar, with the participation of Grade 5 students as study respondents for the School Year 2024-2025, illustrated in the lower portion of the schema.

Ascending from this foundational locale are converging research elements, visually depicted through an upward-pointing arrow. The framework meticulously dissects the profiles of student respondents, scrutinizing age and sex, parent's highest educational attainment, gross monthly family income, parents' occupation, attendance during the First and Second Quarters, technology present at home, number of times that technology is used, and attitude toward classroom technology integration. These variables are meticulously positioned in the upper-left quadrant of the schema.

Positioned in the lower left quadrant are the teachers-respondents profile variables which were also appraised in this study to include age and sex, civil status, gross monthly family income, highest educational attainment, number of years as elementary teacher, relevant in-service trainings attended, latest performance rating based on IPCRF, and attitude toward technology integration.

Moreover, the study also appraised the perception of student- and teacher- respondents with regard to classroom technology integration according ease of use, confidence and comfort, perceived benefits, relevance to learning, accessibility and availability, support and guidance, online safety and responsibility; and collaboration and interaction positioned on the upper-right box of the schema.

Simultaneously, the study delves into the student-respondents' level of engagement according to cognitive, emotional, social; and behavioral dimensions, as shown in the second small box located at the center of the bigger box in the right quadrant.

The framework facilitates correlation analyses, employing double-headed arrows to interlink these segments, aiming to unveil the intricate interrelationships between student profiles, classroom technology integration, level of engagement and level of achievement.

The study endeavors to identify challenges faced by student respondents in learning classroom technology integration, striving to design effective intervention program. Data collection occurs through a structured research questionnaire.

Feedback mechanisms, represented by broken loops flanking the larger frame, ensure continuous assessment and refinement of these efforts, guaranteeing the successful achievement of the research aims which is to improve students' engagement and academic achievement.

Ultimately, the research findings and their extensive implications, depicted in the third tier, play a pivotal role in shaping a targeted intervention program showcased in the fourth tier. This research lies at the core of its mission to enhance the students' engagement and achievement, symbolized at the apex of the schema.

1.3. Theoretical Framework

This study is rooted in three fundamental theoretical frameworks: the Self-Determination Theory developed by Ryan and Deci (2017), the Constructivist Learning Theory pioneered by Piaget (1950), the Confucian Theory of Education, and the Situated Learning Theory by Lave and Wenger (1991). They form the guiding principles that shape the investigation into different learning styles among intermediate students within the context of this study.

SDT focuses on the motivation behind choices people make without external influence and interference. It emphasizes three basic psychological needs: autonomy, competence, and relatedness (Ryan & Deci, 2020). When these needs are fulfilled, individuals experience more intrinsic motivation, higher engagement, and better performance (Ryan & Deci, 2017).

In the context of technology integration, providing students with choices in how they learn (autonomy), using technology that helps them feel competent (competence), and fostering online collaboration and communication (relatedness) can increase their intrinsic motivation, leading to greater engagement and academic achievement.

Constructivist learning theory posits that learners actively construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences (Tam, 2000). In the context of classroom technology integration, this theory supports the idea that technology can provide interactive and experiential learning opportunities, allowing students to engage actively with the content, experiment, and learn from their interactions.

The use of digital tools, interactive software, and online resources can facilitate a constructivist approach by allowing students to explore concepts, engage in problem-solving activities, and collaborate with peers, thus enhancing engagement and learning outcomes (Philipps, 1995).

Confucian educational theory emphasizes the importance of moral development, self-cultivation, and the pursuit of knowledge (Zhao, 2017). It encourages active learning, reflective thinking, and the harmonious development of an individual's character and intellect (Kajawo, 2019).

Classroom technology can be seen as a modern tool to support the Confucian emphasis on active learning and self-cultivation. Interactive technologies can provide students with opportunities for self-directed learning, reflection, and critical thinking. The focus on character and moral development can also be supported by using digital tools that promote ethical use and responsible online behavior.

Situated Learning Theory was developed by Jean Lave and Etienne Wenger in 1991. This theory posits that learning is fundamentally a social process and occurs most effectively when situated in the context in which it will be applied. According to Lave and Wenger (1991), learning happens when learners engage in a "community of practice," where they participate in shared activities, solve problems, and interact with others who have varying levels of experience. They argue that knowledge is constructed through the process of social interaction and participation, and not merely acquired in a decontextualized manner, such as through traditional instruction. Instead, learning is embedded in the social and cultural context of the community, where learners gradually move from peripheral participation to full participation as they gain expertise (Lave & Wenger, 1991).

In the context of the present study, Situated Learning Theory provides a valuable framework for understanding how technology can enhance student engagement and academic achievement. Technology creates opportunities for students to engage in authentic, real-world tasks that are closely tied to the context of their learning. For instance, when students use digital tools for collaborative projects, simulations, or research, they are participating in practices that resemble those in real-life professional or academic environments. By doing so, students not only acquire knowledge but also learn how to apply it in meaningful ways, aligning with the principles of situated learning.

The theories mentioned provide a robust framework for understanding the potential impact of technology on student engagement and achievement, emphasizing active participation, intrinsic motivation, and holistic development.

2. Methodology

2.1. Research Design

This study employed a quantitative methodology, utilizing a descriptive-correlational research design to comprehensively investigate the impact classroom technology integration on engagement and achievement of Grade 5 students within the District of Tarangnan, Schools Division of Samar, during the School Year 2024-2025.

The research design employed a descriptive approach to delineate the multifaceted profiles of student respondents. This encompassed a broad spectrum of factors, including demographic details such as age and sex, parent's highest educational attainment, gross monthly family income, parents' occupation, attendance during the First and Second Quarters, technology utilized at home, number of times that technology is used, and attitude toward classroom technology integration. The same research design was also used in determining the personal profile of the teacher-respondents according to age and sex, civil status, gross monthly family income, highest educational attainment, number of years as elementary teacher, relevant in-service trainings attended, latest performance rating based on IPCRF, and attitude toward technology integration.

Furthermore, the descriptive research design was adeptly utilized to gauge student- and teacher-respondents' perception with regard to classroom technology integration according to ease of use, confidence and comfort, perceived benefits, relevance to learning, accessibility and availability, support and guidance, online safety and responsibility, and collaboration and interaction.

Additionally, this descriptive research design was employed to comprehensively evaluate student respondents' levels of engagement examining critical parameters encompassing cognitive, emotional, social, and behavioral dimensions.

To establish meaningful connections and relationships, correlation analysis will be conducted, delving into the associations between respondents' perceptions on classroom technology integration, levels of engagement, and achievement. This analytical approach aims to unveil the intricate interrelationships and potential influences among these key aspects within the context of education.

In terms of data analysis, the study will employ quantitative techniques and a variety of descriptive statistical tools, including Frequency Count, Percentage, Median, Mean, Mean Absolute Deviation, Weighted Mean, Chi-Square (χ^2) Test, and Cramer's V-Test. Meanwhile, inferential statistical methods, such as the Spearman's Rank Coefficient of Correlation, and Fisher's t-Test, are effectively utilized to rigorously test the study's hypothesis.

2.2. Locale of the Study

Figure 2 shows the map of the locale of the study, the District of Tarangnan, Schools Division of Samar.

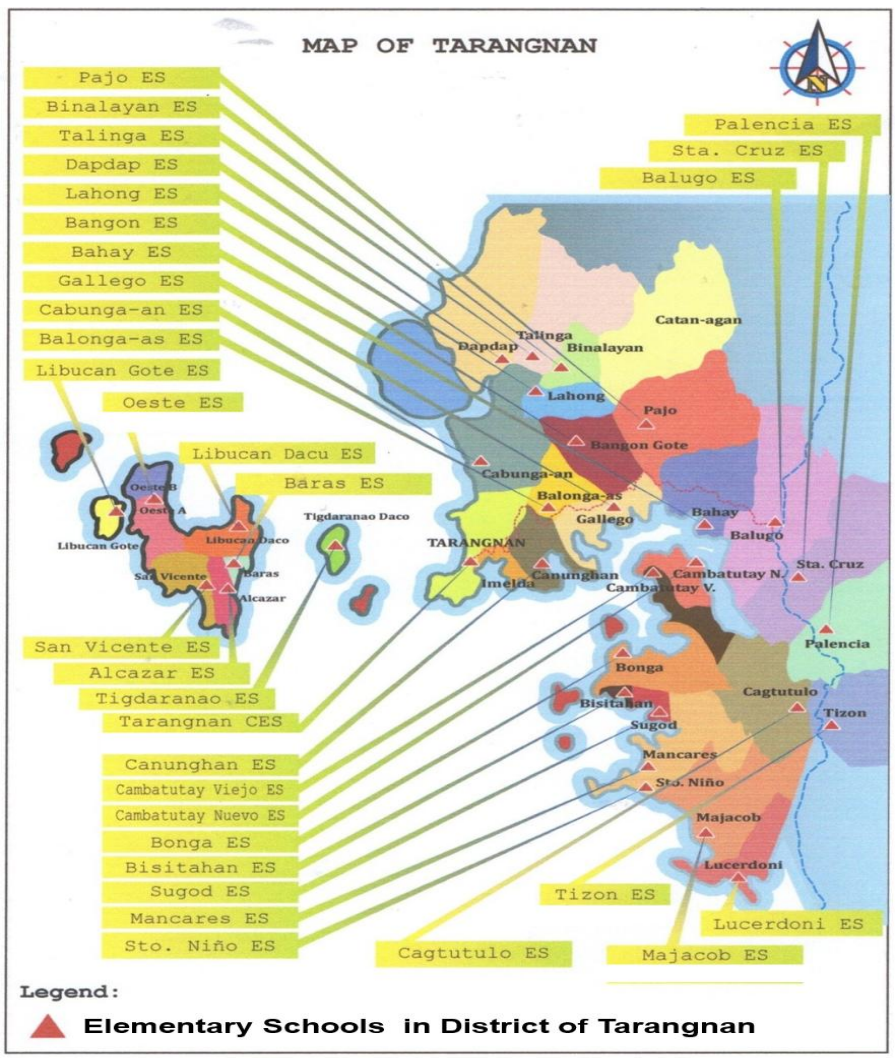

Fig. 2. The Map Showing the Municipality of Tarangnan

2.3. Sampling Procedure

The respondents of the study were the Grade 5 students and teachers in District of Tarangnan, Schools Division of Samar, during the School Year 2024-2025.

The random sampling procedure with replacement was employed, utilizing the fishbowl technique in selecting the student respondents. The sample size was determined using the Sloven's formula (Sevilla et al., 1992), considering the desired level of precision. Once the sample size is determined, it was converted into a sample proportion, and the number of respondents per school was calculated accordingly. For the teacher-respondents, total enumeration was employed in selecting the respondents. This means that all the Grade 5 teacher within the district, regardless of tenure and position were included as sample. The researcher coordinated with the research statistician with respect to how a 100 percent response rate will be achieved, and to identify the normalcy of the distribution of students per grade level.

2.4. Instrumentation

The researcher utilized a research questionnaire as a central instrument to assess the impact of classroom technology integration on engagement and achievement of Grade 5 students in the District of Tarangnan, Schools Division of Samar. This questionnaire constitutes the primary tool for data collection in this study.

The structure and content of this survey questionnaire were inspired by a previous study conducted by Anihenya and Agah (2021) titled, " The Impact of Technology Integration to Students Engagement and Achievement in English and Mathematics in MUBI South Local Government, Adamawa State." Relevant sections and items from this study have been adapted to form the core of the questionnaire, ensuring its alignment with the current research objectives. The questionnaire comprises four main parts:

Part I encompassed the demographic profile of the student-respondents, including age and sex, parent’s highest educational attainment, gross monthly family income, parents’ occupation, attendance during the First and Second Quarters, technology present at home, number of times that technology is used, and attitude toward classroom technology. For teacher-respondents, it encompassed their demographic profile including age and sex, civil status, gross monthly family income, highest educational attainment, number of years as elementary teacher, relevant in-service trainings attended, latest performance rating based on IPCRF, and attitude toward technology integration.Respondents provided the required information in the blank lines or indicate their answers by checking the appropriate boxes.

Part II focused on gathering responses regarding the attitudes of respondents toward classroom technology integration. Respondents will be presented with ten (10) attitudinal statements in this section. They will use a five-point Likert scale, where 5 indicates "Strongly Agree", 4 denotes "Agree", 3 signifies "Neutral", 2 stands for "Disagree", and 1 represents "Strongly Disagree" by putting a checkmark on the box the correspond their answer. This part was intended to be answered by the student-and teacher-respondents.

Part III encompassed various aspects related to respondents' perception on classroom technology integration, along with several parameters including according to ease of use, confidence and comfort, perceived benefits, relevance to learning, accessibility and availability, support and guidance, online safety

and responsibility, and collaboration and interaction. Respondents will use a five-point Likert scale ranging from 5 means "Strongly Like", 4 means “Like” 3 means “Neutral”, 2 means “Dislike, and 1means “Strongly Dislike”. Student-respondents were instructed to put a checkmark on the box that corresponds to their answer. This part was answered by the student-and teacher-respondents.

Part IV of the questionnaire elicited responses regarding students’ level of engagement, considering parameters like cognitive engagement compose of five (5) statements, emotional engagement composed of seven (7) statements, social engagement composed of seven (statements), and behavioral engagement composed of five (5) statements. Respondents used a five-point Likert scale where 5 means “Highly Engaged”, 4 means “Moderately Engaged”, 3 means “Engaged”, 2 means “Slightly Engaged”, and 1 means “Not Engaged”. Student-respondents were instructed to put a checkmark on the appropriate box that corresponds to their answer.

Part V elicited answer on the academic achievement of the student-respondents. In this part, they would be instructed to write down the general average they obtained during School Year 2023-2024. With the help and of their respective advisers, they would need to write their answer on the space provided.

Part VI served as a checklist to identify the challenges faced by the respondents toward classroom technology integration. Respondents would use a five-point Likert scale, where 5 indicates "Highly a Challenge", 4 denotes "Moderately a Challenge”, 3 represents "A Challenge", 2 indicates "Not much of a Challenge", and 1 signifies "Not a Challenge at all". Student-respondents were instructed to put a checkmark on the appropriate box that corresponds to their answer

2.5. Validation of the Instrument

The foundation of the questionnaire utilized in this study stems from the groundwork laid by Anihenya and Agah (2021) in their study entitled, " The Impact of Technology Integration to Students Engagement and Achievement in English and Mathematics in MUBI South Local Government, Adamawa State." Though meticulously adapted to align with the specific research focus, the questionnaire is slated to undergo a robust validation process overseen by the distinguished Panel of Oral Examiners from Samar College's College of Graduate Studies. This stringent validation aims to fortify the questionnaire's reliability and validity within the distinctive local context, meticulously scrutinizing facets such as face validity, content validity, and construct validity.

Furthermore, the validation process for the respondents' personal profiles would receive equally thorough scrutiny under the guidance of the esteemed Panel of Oral Examiners. This meticulous evaluation intends to ensure the suitability and relevance of each profile item, aligning them precisely with the study's objectives and the local context. Through this discerning review, any items requiring refinement, elimination, or inclusion would be thoughtfully identified and addressed. This exhaustive validation process aimed to yield a comprehensive and contextually pertinent profile tailored seamlessly to the study's specific aims within the local setting.

2.6. Data Gathering Procedure

The primary method for collecting data in this study is through a meticulously structured survey questionnaire designed to assess the impact of classroom technology integration on engagement and achievement among Grade 5 students in the District of Tarangnan, Schools Division of Samar. The researcher personally administered the survey in various elementary schools across the district. To ensure the study's credibility and reassure participants that their involvement is solely for research purposes, prior approvals from relevant authorities within the Schools Division of Samar were obtained.

The process began with sending formal letters to the Schools Division of Samar and the District Supervisor of Tarangnan, seeking permission to conduct the study in public elementary schools within the district. Additional request letters were sent to the principals of the identified schools to obtain permission for administering the questionnaire to teachers and students. Once the necessary approvals were secured, the researcher collaborated with school authorities and teachers to plan the survey's schedule and timeline. An established sampling strategy was used to select participating teachers and Grade 5 students, ensuring a representative sample.

The survey was conducted according to the planned schedule, with respondents provided one to two hours to complete the questionnaire. This time allowed students to carefully consider their responses, particularly concerning their engagement with classroom technology and its perceived impact on their academic performance. Adequate assistance and clarifications regarding the questionnaire, especially the checklist scale, were provided to ensure comprehensive and accurate responses. Upon completion, a preliminary review of the responses ensured adherence to the instructions and overall completeness of the data.

Following data collection, the responses were analyzed using scoring guides and interpretation rubrics to provide a thorough understanding of the dataset. Data tabulation, computation, and statistical analysis were conducted in consultation with a research statistician, aiming to yield a comprehensive analysis of the impact of classroom technology integration on student engagement and achievement.

3. Results and Discussion

This section presents the findings of the study:

1. The majority of student-respondents are 10 years old, comprising 60.89% of the total. The average age of the student population is 10.87 years, while the median age is 10 years, indicating that the distribution of ages is slightly skewed. The mean absolute deviation of 1.0772 years suggests a moderate level of variability in the ages of the students. Furthermore, the data shows a slight gender imbalance with 125 female students and 100 male students, resulting in a female-dominated student body.

2. The majority of student-respondents' fathers have an elementary school education, with 22.22% having graduated and 21.78% having attended but not completed elementary school. In contrast, the majority of mothers have a high school diploma, accounting for 19.56% of respondents.

3. The economic background of the student-respondents reveals that the majority (40.89%) have a gross monthly family income ranging from 1,000 to 4,999.

4. 4. The primary occupations of the student-respondents' parents reveal distinct patterns. The majority of fathers are involved in the primary sector, with 26.67% working as fishermen and 17.78% as farmers. In contrast, the majority of mothers are engaged in domestic work, with 54.22% being house helpers. A smaller proportion of mothers (13.33%) work as teachers.

5. The majority of student-respondents (79.56%) have a good attendance record during the first quarter, with the number of days present during the first quarter falling between 36-40. A smaller proportion (16.00%) were present for 41-45 days, while only 4.44% had a lower attendance rate, ranging from 30-35 days.

6. The majority of student-respondents (53.78%) attended school for 41-45 days during the second quarter. A significant portion (36.89%) were present for 46-50 days, while a smaller proportion (8.44%) had attendance between 36-40 days.

7. The majority of student-respondents have access to various digital devices and internet connectivity at home. A very high percentage (99.11%) have internet connectivity, while nearly all (97.78%) own smartphones. The majority (94.22%) also have Smart/LED televisions. Additionally, a significant portion (37.78%) have computers (laptops or desktops), while 24.00% have tablets.

8. The majority of student-respondents (67.56%) use technology once a week, indicating a moderate level of technology integration in their daily lives. A smaller proportion (18.22%) use it twice a week, while 9.33% use it five or more times a week.

9. The overall student attitude towards classroom technology integration is positive, with a grand weighted mean of 3.93, indicating general agreement. This suggests that students generally favor the use of technology in their learning. The highest agreement was observed for the statement "I like it when my teacher uses videos and interactive tools to teach," with a weighted mean of 4.24. Conversely, the lowest agreement was found for the statement "I feel confident when I use technology to solve problems," with a weighted mean of 3.51.

10. The majority of teacher-respondents fall within the 32-36 age range, comprising 31.58% of the sample. The average age of the respondents is 41.24 years, while the median age is 38.00 years. The mean absolute deviation of 8.9986 years indicates a moderate spread of ages within the teaching staff. Furthermore, the data reveals more female teachers (25) compared to male teachers (13).

11. The majority of teacher-respondents are married, constituting 71.05% of the sample. Single teachers make up the second-largest group at 18.42%, followed by widowed teachers at 7.89%, and separated teachers (2.63%).

12. The majority of teacher-respondents have a gross monthly family income in the range of 30,000 to 34,999, accounting for 39.47% of the respondents. This income bracket is followed by those with incomes between 40,000 and 44,999 (15.79%) and between 25,000 and 29,999 (15.79%).

13. The majority of teacher-respondents are currently pursuing graduate studies, with 52.63% enrolled in graduate programs. This is followed by teachers who have already completed their graduate degrees, representing 18.42% of the sample.

14. The majority of teacher-respondents have less than 5 years of experience as elementary teachers, comprising 26.32% of the sample. This group is followed by teachers with 6-10 years of experience, accounting for 23.68% of the respondents.

15. The weighted mean for teacher-respondents' relevant in-service trainings attended at the school level is 3.61, indicating that these trainings are perceived to be "always" relevant. For district-level trainings, the weighted mean is 2.76, suggesting they are considered "oftentimes" relevant. In contrast, division-level, regional-level, and national-level trainings have lower weighted means (1.97, 1.55, and 1.50, respectively), indicating they are perceived to be "sometimes" relevant by the teachers.

16. The majority of teacher-respondents received a "Very Satisfactory" rating on their latest Individual Performance Commitment Review and Assessment (IPCRF), with 78.95% falling within the 3.50-4.49 range. A smaller proportion (21.05%) achieved an "Outstanding" rating, scoring between 4.50 and 5.00. These results indicate a high level of performance and achievement among the teaching staff.

17. The grand weighted mean for teacher-respondents' attitude toward technology integration is 4.41, which is interpreted as "agree." This indicates a generally positive attitude among teachers towards the integration of technology in their teaching practices. The highest weighted mean (4.66) is associated with the statement "I believe that ongoing professional development in technology is essential for enhancing my teaching effectiveness". Conversely, the lowest weighted means (both 4.26) are associated with the statements "I feel comfortable using technology in my teaching practice" and "I believe technology can improve the assessment process and provide more accurate feedback on student performance".

18. The student-respondents' overall perception of classroom technology integration along with ease of use was found to be "neutral," with a grand weighted mean of 3.45. This suggests that while the students generally accept the integration of technology, they may not perceive it as entirely seamless or effortless. A closer look at the individual statements reveals that students felt most comfortable using touch screens on tablets, with a weighted mean of 3.77, indicating "agreement" with this aspect. Conversely, the lowest weighted mean (3.23) was observed for the statement "I can easily use the computers and tablets in our classroom".

19. The student-respondents' overall perception of classroom technology integration, specifically in terms of engagement and interest, was found to be positive, with a grand weighted mean of 3.98, which is interpreted as "agree." This indicates that students generally find the integration of technology in the classroom to be engaging and interesting. Further analysis reveals that students particularly enjoy watching educational videos in class, with the highest weighted mean of 4.28, also interpreted as "agree". While overall engagement is high, the lowest weighted mean was observed for the statement "I like it when we have online quizzes and games," with a score of 3.55, still interpreted as "agree".

20. The student-respondents' overall perception of their own confidence and comfort in using classroom technology was found to be "neutral," with a grand weighted mean of 3.45. This suggests that while

students generally feel comfortable with the integration of technology in the classroom, they may not always feel fully confident or comfortable with all aspects of its use. Further analysis revealed that students felt most comfortable when their teachers created opportunities for student collaboration and learning through technology, with the highest weighted mean of 3.76, interpreted as "agree". Conversely, the lowest weighted mean (3.22), interpreted as "neutral," was observed for the statement "I can use the computer without needing much help".

21. Student-respondents generally perceive the benefits of classroom technology integration, with a grand weighted mean of 3.85, interpreted as "agree." This indicates that students largely recognize the positive impact of technology on their learning experience. Students strongly believe that technology aids in their understanding of difficult topics, with the highest weighted mean of 4.04, also interpreted as "agree". While students generally perceive benefits, they reported slightly lower agreement for the statements "I find it easier to do my assignments with technology" and "I find it easier to complete projects using technology," both with a weighted mean of 3.72, also interpreted as "agree".

22. Student-respondents strongly perceive classroom technology integration as relevant to their learning, with a grand weighted mean of 3.95, interpreted as "agree." This indicates that students generally recognize the importance and value of technology in their educational journey. Students strongly agree that using technology is crucial for their education, with the highest weighted mean of 4.25, also interpreted as "agree". While students generally perceive technology's relevance to their education, they expressed slightly lower agreement regarding its relevance to their future careers, with the lowest weighted mean of 3.71, still interpreted as "agree".

23. Student-respondents' perception of the accessibility and availability of technology for classroom integration was found to be "neutral," with a grand weighted mean of 2.97. This suggests that while students generally have access to technology, they may encounter some challenges or limitations in its availability and accessibility within the learning environment. Students reported having somewhat better access to technology at home, with the highest weighted mean of 3.35, still interpreted as "neutral". The lowest weighted mean (2.73), also interpreted as "neutral," was observed for the statement "We have access to the right software and apps for learning".

24. Student-respondents generally perceive that they receive adequate support and guidance regarding classroom technology integration, with a grand weighted mean of 3.64, interpreted as "agree." Students highly value the support provided by their teachers, with the highest weighted mean of 4.16, also interpreted as "agree," for the statement "My teacher helps me understand how to use technology". While students generally perceive adequate support, they reported slightly lower agreement regarding the availability of technical support within the school, with the lowest weighted mean of 3.18, interpreted as "neutral," for the statement "Our school has people who can fix technology problems".

25. Student-respondents generally demonstrate an understanding of online safety and responsibility in the context of classroom technology integration, with a grand weighted mean of 3.83, interpreted as "agree." This suggests that students are generally aware of the importance of safe and responsible online behavior. Students strongly agree on the importance of responsible technology use, with the highest weighted mean of 4.10, also interpreted as "agree," for the statement "I understand why it's important to use technology responsibly". While students generally understand the importance of

responsible online behavior, they reported slightly lower agreement regarding consistently seeking permission before downloading content, with the lowest weighted mean of 3.48, interpreted as "neutral".

26. Student-respondents strongly perceive that classroom technology integration facilitates collaboration and interaction among peers, with a grand weighted mean of 3.83, interpreted as "agree." Students particularly appreciate how technology enables easy sharing of ideas, with the highest weighted mean of 4.11, interpreted as "agree," observed for the statements "Technology helps us share ideas easily" and "I enjoy group activities that use technology". While students generally perceive technology as facilitating collaboration and interaction, they expressed slightly lower agreement regarding learning from and feeling connected to their classmates through technology, with the lowest weighted mean of 3.89, also interpreted as "agree," observed for the statements "I learn from my classmates when we use technology together" and "I feel connected to my classmates through technology".

27. The study revealed that teacher-respondents' overall perception of classroom technology integration, particularly in terms of ease of use, was "neutral," with a grand weighted mean of 3.15. A notable finding was that teachers strongly "agreed" with the statement "My students feel comfortable using the touch screen on tablets," as evidenced by the highest weighted mean of 3.87. Conversely, the lowest weighted mean of 2.55 was observed for the statement "My students can easily use the computers and tablets in our classroom".

28. The study revealed that teacher-respondents "agreed" that classroom technology integration effectively enhances student engagement and interest, with a grand weighted mean of 3.91. The highest weighted mean of 4.26 for the statement "My students enjoy watching educational videos in class" further supports this finding. Conversely, the lowest weighted mean of 3.24 for the statement "My students like it when we have online quizzes and games" indicates a more neutral perception among teachers.

29. The study revealed that teacher-respondents' perception of classroom technology integration in terms of student confidence and comfort was "neutral," with a grand weighted mean of 3.33. The highest weighted mean of 3.61 for the statement "My students feel confident using technology in class" indicates that teachers generally perceive a positive impact of technology on student self-assurance. Conversely, the lowest weighted mean of 2.97 for the statement "My students can use the computer without needing much help" indicates a more neutral perception regarding student independence with technology.

30. The study revealed that teacher-respondents "agreed" that classroom technology integration offers significant perceived benefits, with a grand weighted mean of 4.04. The highest weighted mean of 4.11 for the statement "My students believe technology helps me be more creative" suggests that teachers perceive technology as a powerful tool for fostering creativity and innovation in their teaching practices. While the lowest weighted mean of 3.97 for the statement "My students learn better with the help of technology" also falls within the "agree" category.

31. The study revealed that teacher-respondents "agreed" that classroom technology integration is highly relevant to student learning, with a grand weighted mean of 4.02. The highest weighted mean of 4.11 for the statement "My students think learning with technology is useful for their future career" highlights the perceived importance of technology skills in preparing students for the demands of the

modern workforce. While the lowest weighted mean of 3.89 for the statement "My students think using technology is important for my education" also falls within the "agree" category.

32. The study revealed that teacher-respondents "disagreed" with the statement that classroom technology integration is readily accessible and available, with a grand weighted mean of 2.43. The highest weighted mean of 2.82 for the statement "My students have access to technology at home for my schoolwork" indicates a more neutral perception regarding student access to technology outside of the school environment. The lowest weighted mean of 2.18 for the statement "We have enough computers and tablets for everyone in class" strongly "disagrees" with the adequate availability of technology within the classroom.

33. The study revealed a "neutral" perception among teacher-respondents regarding the level of support and guidance available for classroom technology integration, with a grand weighted mean of 3.28. The highest weighted mean of 3.92 for the statement "I help my students understand how to use technology" indicates that teachers actively play a crucial role in supporting student learning and use of technology. Conversely, the lowest weighted mean of 2.84 for the statement "Our school has people who can fix technology problems" indicates a more neutral perception regarding the availability of technical support within the school.

34. The study revealed that teacher-respondents "agreed" that classroom technology integration effectively addresses online safety and responsibility, with a grand weighted mean of 3.64. The highest weighted means, both at 3.74, were observed for the statements "My students know not to share personal information online" and "My students understand why it's important to use technology responsibly." While the lowest weighted mean of 3.53 for the statement "My students always ask for permission before downloading anything" also falls within the "agree" category, it indicates that students may not consistently seek permission before downloading content online.

35. The study revealed that teacher-respondents "agreed" that classroom technology integration effectively facilitates collaboration and interaction among students, with a grand weighted mean of 3.57. The highest weighted mean of 3.74 for the statement "Technology helps my students to communicate with each other" strongly supports this finding. While the lowest weighted mean of 3.45 for the statement "My students like working with their classmates using technology" falls within the "neutral" category, it suggests that while technology can facilitate collaboration, students may have mixed feelings about the experience.

36. The study revealed that student-respondents "often" experience cognitive engagement during classroom technology integration, with a grand weighted mean of 2.78. This suggests that students generally perceive technology as a tool that can enhance their cognitive engagement in learning. The highest weighted mean of 3.12 for the statement "I focus better when we use computers or tablets in class" indicates that students "often" find that technology helps them maintain focus and concentration during learning activities. Conversely, the lowest weighted mean of 2.43 for the statement "I am curious about new things we learn using technology" indicates that students "rarely" experience a strong sense of curiosity and excitement when learning new concepts through technology.

37. The study revealed that student-respondents "often" experience emotional engagement during classroom technology integration, with a grand weighted mean of 2.55. The highest weighted mean of 2.90 for the statement "I feel excited when we use new gadgets or apps in class" indicates that students

"often" experience excitement and enthusiasm when introduced to new technologies. Conversely, the lowest weighted mean of 2.39 for the statement "I look forward to classes where we use technology" indicates that students "rarely" anticipate or eagerly await classes that incorporate technology.

38. The study revealed that student-respondents "often" exhibit behavioral engagement during classroom technology integration, with a grand weighted mean of 2.74. This suggests that students generally demonstrate active participation and willingness to engage in learning activities that involve technology. The highest weighted mean of 2.88 for the statement "I am willing to try new activities that use technology" indicates that students "often" demonstrate a willingness to experiment with and explore new technology-based learning experiences. While the lowest weighted mean of 2.57 for the statement "I participate more actively in lessons that involve technology" also falls within the "often" category.

39. The study revealed that student-respondents "often" experience social engagement during classroom technology integration, with a grand weighted mean of 2.65. This suggests that students generally interact and collaborate with their peers during technology-based learning activities. The highest weighted mean of 2.93 for the statement "I often ask for help from my peers when using new technology" indicates that students "often" seek assistance and support from their classmates when encountering challenges with technology. Conversely, the lowest weighted mean of 2.35 for the statement "I enjoy working with my friends on technology-based projects" indicates that students "rarely" express a strong preference for collaborative projects that involve technology.

40. The study revealed that teachers "often" perceive their students as experiencing cognitive engagement during classroom technology integration, with a grand weighted mean of 2.55. This suggests that teachers generally believe that technology can stimulate and challenge students' thinking. The highest weighted mean of 2.66 for the statement "My students feel challenged in a good way when we use technology in class" indicates that teachers "often" observe that technology presents students with intellectually stimulating challenges. Conversely, the lowest weighted mean of 2.29 for the statement "My students pay close attention during lessons that use technology" indicates that teachers "rarely" observe consistent close attention from students during technology-based lessons.

41. The study revealed that teachers "often" perceive their students as experiencing emotional engagement during classroom technology integration, with a grand weighted mean of 2.51. This suggests that teachers generally believe that technology can evoke positive emotions and feelings among students. The highest weighted mean of 2.68 for the statement "My students feel excited when we use new gadgets or apps in class" indicates that teachers "often" observe excitement and enthusiasm among students when introduced to new technologies. Conversely, the lowest weighted mean of 2.32 for the statement "My students enjoy using technology for school projects and assignments" indicates that teachers "rarely" observe consistent enjoyment among students when using technology for academic tasks.

42. The study revealed that teachers "often" perceive their students as exhibiting behavioral engagement during classroom technology integration, with a grand weighted mean of 2.59. This suggests that teachers generally believe that students demonstrate active participation and willingness to engage in technology-based learning activities. The highest weighted mean of 2.87 for the statement "My students like helping their classmates with technology during group work" indicates that teachers

"often" observe students willingly assisting their peers with technology-related tasks. Conversely, the lowest weighted mean of 2.45 for the statement "My students like to join discussions when we use technology in class" indicates that teachers "rarely" observe students actively participating in discussions that are facilitated or enhanced by technology.

43. The study revealed that teachers "often" perceive their students as experiencing social engagement during classroom technology integration, with a grand weighted mean of 2.86. This suggests that teachers generally believe that technology effectively facilitates social interaction and communication among students. The highest weighted mean of 2.95 for the statement "My students enjoy discussing class topics with their classmates online" indicates that teachers "often" observe students engaging in meaningful online discussions with their peers. While the lowest weighted mean of 2.76 for the statement "My students develop social skills through group activities and collaborative learning" also falls within the "often" category.

44. The majority of student-respondents achieved a general average between 90 and 95, representing 68.44% of the total, during the School Year 2023-2024. This was followed by a significant portion of students with an average between 85 and 89 (28.00%), while a smaller percentage (3.55%) fell within the 80-84 range.

45. The study found a significant relationship between student-respondents' perceived classroom technology integration and their level of engagement. The null hypothesis, which stated no significant relationship, was rejected as the calculated p-value of 0.000 was significantly lower than the alpha level of 0.05. Furthermore, the strength of this relationship was determined to be moderate, as indicated by a Spearman Rho value of 0.496.

46. The study found a significant relationship between student-respondents' perceived classroom technology integration and their academic achievement during the 2023-2024 school year. The null hypothesis, stating no significant relationship, was rejected as the computed p-value of 0.003 was significantly lower than the alpha level of 0.05. This indicates strong evidence supporting a connection between the two variables. Furthermore, the strength of this relationship was determined to be moderate, as indicated by a Spearman Rho value of 0.410.

47. The survey results revealed that six student profile variables significantly correlated with how students perceived classroom technology integration. Fathers' occupation demonstrated the strongest correlation (p-value = 0.000, Cramer's V = 0.81). Additionally, strong correlations were observed for sex (V = 0.72, p-value = 0.000), technology utilized at home (V = 0.74, p-value = 0.000), mothers' occupation (V = 0.69, p-value = 0.000), and student attitudes toward classroom technology integration (Spearman rho = 0.728, p-value = 0.000). In contrast, mothers' highest educational attainment exhibited a very weak correlation (p-value = 0.027, Spearman rho = 0.147).

48. The remaining profile variables, including sex, fathers' highest educational attainment, gross monthly family income, attendance, and frequency of technology use, showed no correlation with students' perceived classroom technology integration.

49. The survey results indicated that only one teacher profile variable, the number of years as an elementary teacher, showed a significant correlation with student-respondents' perceived classroom

technology integration. This significance is supported by a computed p-value of 0.015, which is lower than the conventional significance level of 0.05. The strength of this correlation is moderate, as indicated by a Spearman rho value of 0.491.

50. In contrast, other teacher profile variables, including age, sex, civil status, gross monthly family income, highest educational attainment, relevant in-service trainings attended, latest performance rating based on IPCRF, and attitude toward technology integration, showed no significant correlation with students' perceived classroom technology integration.

51. The study revealed that student-respondents perceived "challenges" in classroom technology integration, with a grand weighted mean of 2.72. Notably, "slow or unreliable internet connections" emerged as the most significant challenge, considered "a challenge" by students with a weighted mean of 2.80. While "problems with hardware, such as computers or tablets not working properly" were also identified as a challenge, they were perceived as "slightly a challenge" with the lowest weighted mean of 2.47.

4. Conclusion

Based on the findings, it can be concluded that both students and teachers generally recognize the value and potential of classroom technology integration in enhancing learning experiences. The student population is predominantly young and slightly female-dominated, coming largely from low-income families where fathers are more involved in manual labor and mothers in domestic roles. Interestingly, mothers tend to have higher educational attainment than fathers. Students show positive attitudes towards technology and perceive its relevance and benefits to their learning, especially in understanding difficult concepts and fostering collaboration. However, they often need more support in developing confidence and independent skills in using technology. While students find classroom technology engaging, particularly educational videos, they show only moderate cognitive, emotional, and social engagement, indicating a need for more stimulating and collaborative tech-based learning experiences.

Teachers, who are mostly experienced, female, and well-educated, also view technology integration as beneficial to student learning and engagement. They agree that technology supports creativity, collaboration, and relevance to workforce preparation. However, both students and teachers express concerns over access to technology, particularly the limited availability of devices in schools and unreliable internet connectivity, which is the most significant challenge. Although technical support exists, its availability remains inadequate.

Correlational analysis highlights that student perceptions of technology integration are significantly influenced by parental occupation, particularly the fathers, as well as gender and home access to technology. Notably, a positive perception of technology integration is moderately linked to higher student engagement and academic performance. On the teacher's side, only the number of years of teaching experience significantly correlates with student perceptions, suggesting that more experienced teachers may integrate technology more effectively. Other teacher-related variables such as age, income, and education do not appear to significantly affect student perceptions. Overall, while there is strong potential and positive reception toward technology in education, there is a clear need for enhanced infrastructure, targeted training, and support systems to address access disparities and further empower both teachers and students in making the most of digital learning tools.

5. Recommendations

Based on the conclusions drawn from the findings of the study, the following recommendations are offered:

1. Provide targeted professional development for teachers with fewer years of experience, focusing on effective technology integration strategies.

2. Implement mentorship programs where experienced teachers can guide and support colleagues in effectively integrating technology.

3. Design and implement engaging and interactive learning experiences that effectively utilize technology to enhance student learning and motivation.

4. Invest in improving internet connectivity within schools to ensure reliable and high-speed access for all students and teachers. Regularly maintain and upgrade school technology equipment, including computers, tablets, and other devices, to ensure they are functioning properly and readily available for use.

5. Actively address student concerns regarding technology use, such as slow internet speeds and hardware issues.

6. Acknowledge and address the potential impact of factors like fathers' and mothers' occupations on student perceptions of technology integration. This may involve providing additional support and resources to students from diverse backgrounds. Encourage and support efforts to increase access to technology and internet connectivity in students' homes.

7. Conduct regular surveys and assessments to monitor student perceptions of classroom technology integration and identify areas for improvement. Collect data on student engagement and academic achievement to evaluate the effectiveness of technology integration strategies.

8. Further research using experimental or quasi-experimental designs is needed to establish causal relationships between technology integration, student engagement, and academic achievement.

9. For future researchers, explore the impact of specific technologies. This study examined technology integration broadly. Future research should investigate the impact of specific technologies (e.g., educational software, interactive whiteboards, virtual reality) on student learning outcomes.

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