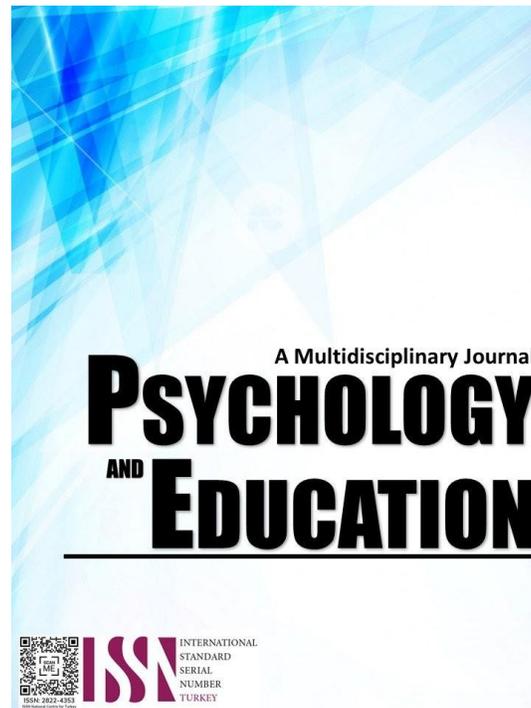


**OUTCOMES OF TECHNOLOGY INTEGRATION ON STUDENT ENGAGEMENT
OF SELECTED PUBLIC HIGH SCHOOL STUDENTS IN CAVITE: BASIS
FOR AN INTERVENTION PLAN**



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Outcomes of Technology Integration on Student Engagement of Selected Public High School Students in Cavite: Basis for an Intervention Plan

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Abstract

This study investigated the impact of technology integration on student engagement in selected public high schools in Cavite, reflecting a global imperative to prepare students for a digitally driven world. Utilizing a descriptive-correlational research design, the study aimed to quantify the relationships between technology use, student engagement, and educational outcomes. The research revealed that digital resources played a crucial role in enhancing students' understanding of educational concepts, as evidenced by a high weighted mean of 4.66 and top-ranking in impact (rank 1). However, access to a diverse range of digital resources was perceived as less comprehensive, receiving a weighted mean of 4.35 and ranking fifth among priorities. Overall, respondents consistently affirmed the significant integration of digital resources in their educational experiences, with a composite mean of 4.52. Similarly, technological tools were highly valued for their efficiency in aiding academic challenges, garnering a weighted mean of 4.71 and top-ranking status (rank 1). Yet, their regular application in coursework received a lower rating, with a weighted mean of 4.03 and a rank of 5. Nonetheless, the composite mean of 4.59 underscored the overall high integration of technological tools among respondents. In terms of student engagement through technology integration, respondents acknowledged its role in improving their comprehension of complex concepts, reporting a weighted mean of 4.73 and top-ranking status (rank 1). However, motivation to participate in class activities when technology was utilized received a lower rating, with a weighted mean of 4.36 and a rank of 9. Despite this, the composite mean of 4.58 indicated a generally high degree of student engagement through technology integration. Correlational analysis further substantiated these findings, revealing significant positive relationships between the level of technology integration and student engagement. The computed correlation coefficients were 0.60 for digital resources and 0.68 for tools (both $p < 0.01$), rejecting the null hypothesis and highlighting technology's transformative potential in enhancing student engagement within educational settings. Based on these results, the study recommends several intervention strategies to optimize technology integration and enhance student engagement. These include ongoing professional development for educators, the expansion and diversification of digital resources, implementation of student-centered learning environments, equitable access to technological tools, establishment of robust assessment mechanisms, and fostering community partnerships.

Keywords: *technology integration, student engagement, public high schools*

Introduction

Technology integration in education emerged as a global imperative, driven by the need to prepare students for an increasingly digital world. Around the world, nations invested significantly in educational technologies to enhance learning outcomes and equip students with essential skills for the 21st century (UNESCO, 2020). This study focused on the outcomes of technology integration specifically on student engagement within selected public high schools in Cavite, aiming to illuminate both local realities and broader national implications.

Globally, the integration of technology in education was recognized as a transformative force. Countries such as Finland and South Korea successfully leveraged technology to enhance student engagement, improve academic performance, and foster innovative thinking among students (OECD, 2021). This global consensus underscored the importance of technology not merely as a tool for content delivery but as a catalyst for active learning and student-centered pedagogies (UNESCO, 2020). The shift towards digital learning environments prompted educators worldwide to explore the nuanced impacts of technology integration on various aspects of student development, including engagement, collaboration, and critical thinking.

The Philippines had prioritized educational reforms aimed at harnessing technology to bridge educational gaps and elevate learning outcomes (DepEd, 2023). In response to the challenges posed by the digital divide, the Department of Education (DepEd) had launched initiatives to equip schools with technological infrastructure and provide training to educators in effective technology integration strategies (DepEd, 2023). This strategic approach reflected the government's commitment to ensuring equitable access to quality education and preparing Filipino students for a future driven by technological innovation.

Cavite epitomized the national efforts towards educational advancement through technological integration. As one of the rapidly developing provinces in the Philippines, Cavite's public high schools had embarked on initiatives to integrate technology into classroom instruction with the goal of enhancing student engagement and academic achievement. The local context in Cavite was shaped by unique socio-economic factors, infrastructure development, and community involvement in education, which collectively influenced the implementation and impact of technology in educational settings. Understanding the outcomes of technology integration in this

specific locale was essential for policymakers, educators, and stakeholders seeking to optimize educational practices and improve student outcomes.

This study specifically focused on exploring the outcomes of technology integration on student engagement within selected public high schools in Cavite. By examining the perceptions and experiences of students, teachers, and administrators, this research sought to uncover the multifaceted impacts of technology on learning environments. Moreover, it aimed to contribute empirical evidence that could inform policy decisions, instructional practices, and future initiatives aimed at leveraging technology to foster student engagement and academic success in Philippine education.

A major significant issue was the digital divide among students, where disparities in access to technology and digital resources could skew the outcomes of technology integration on student engagement. Despite Department of Education (DepEd) efforts to equip schools with technological infrastructure, variations in internet access, device availability, and digital literacy skills among students influenced how effectively they engaged with technology-integrated learning activities. Socioeconomic disparities within Cavite's communities further complicated this, as students from lower-income families faced additional barriers accessing and utilizing digital resources at home, potentially impacting their educational experiences and engagement levels (DepEd, 2023). Addressing this challenge required stratified sampling techniques and qualitative methods to capture how technology impacted students across diverse socioeconomic backgrounds.

Another critical challenge was the varying perceptions and readiness of educators to integrate technology into their teaching practices. While DepEd provided training in technology integration strategies, educators' attitudes, technological proficiency levels, and pedagogical beliefs significantly affected the implementation and effectiveness of technology in classrooms. Some teachers viewed technology as a tool to facilitate active learning and enhance student engagement, aligning with global educational best practices (UNESCO, 2020). In contrast, others perceived technology as a burden or distraction, potentially underutilizing its full potential. Additionally, differences in educators' capacity to adapt teaching methods and curricula to incorporate technology seamlessly led to varied student experiences and outcomes across Cavite's public high schools.

Research Questions

The research embarked on an intriguing exploration into the convergence of technology and student engagement within the unique context of Cavite. Through a targeted approach, this study aimed to accomplish several critical objectives, each serving as a guiding light to reveal the transformative impact of integrating technology on student engagement. These objectives collectively sought to uncover how technology could enrich the learning environment, empower educators, and enhance the levels of student engagement across selected high schools in this dynamic region.

The study aimed to determine the impact of technology integration in enhancing student engagement in selected high schools in Cavite. Specifically, this study pursues to answer the following questions:

1. What is the level of technology integration of the respondents in terms of:
 - 1.1. digital resources; and
 - 1.2. tools?
2. What is the degree of engagement of the respondents?
3. Is there any significant relationship between the level of technological integration of the respondents and the degree of engagement of the respondents?
4. What intervention plan should be proposed to enhance the degree of engagement through utilization of technology?

Methodology

Research Design

In this research, descriptive-correlational research methodologies were employed, integrating a survey tool to assess the impact of technology integration on enhancing student engagement within specific high schools in Cavite. The selection of a quantitative approach was motivated by the aim to quantify and visually depict the feedback gathered from the study's participants.

The adoption of a descriptive-correlational research design was strategic. Descriptive elements facilitated a detailed exploration of current practices, establishing a baseline for understanding technology integration. Correlational analysis provided insights into the relationships between technology usage and academic performance, offering predictive implications for optimizing strategies. The primary objective of this investigation was to systematically capture the associations and interconnections among the key variables, thereby providing a comprehensive understanding of how these elements interact within the educational context under examination.

Respondents

The research focused its analysis on currently enrolled students from selected public high schools in Cavite. Using Raosoft's formula with a confidence level of 95% and a 5% margin of error, the study determined an appropriate sample size of 241 students from an estimated total population of 2,140 students in these schools. This sample size was deemed sufficient to achieve the research objectives.

The research employed a simple random sampling method to select participants, ensuring unbiased representation across the designated locations.

It is important to note that the selected schools included Emilia Ambalada National High School, Tagaytay City Science National High School, Amadeo National High School, and Francisco P. Tolentino Memorial High School among others. These public educational institutions were chosen to provide a representative sample of public high schools in the region. Accessible cooperation from school stakeholders facilitated data collection, enabling analysis of effective practices and variations in technology integration. By selecting these schools, the study aimed to comprehensively examine the impact of technology integration on student engagement within Cavite's public high school system.

However, it was essential to acknowledge that the precise determination of the population size relied on obtaining formal approval for the researcher's request. This underscores the importance of securing the necessary authorization to proceed with the research.

The study aimed to capture a meaningful cross-section of the educational landscape within Cavite. The careful calculation of the sample size, coupled with the random selection process, ensured that the study maintained statistical validity and accurately represented the broader population. Furthermore, including reputable educational institutions in the research enhanced its potential to offer insights relevant to the educational context of the region.

Instrument

The research employed a researcher-designed questionnaire, custom-tailored to evaluate the impact of technology integration on the enhancement of student engagement and learning. This survey was vital for comprehending the intricacies of how technology, when integrated into the learning process, can positively influence student engagement within a specific context.

The self-made questionnaire was composed of 20 items with 2 major categories: level of technology integration and the level of student engagement through technology integration. The level of technology integration was divided into 2 parts: digital resources and tools, each composed of 5 items. On the other hand, the level of student engagement through technology integration was composed of 10 items. The questionnaire, meticulously designed by the researcher, encompasses a series of statements that respondents evaluated using a 5-point Likert Scale. This scale ranges from 1, representing strong disagreement, to 5, indicating strong agreement.

To ensure the precision and validity of the questionnaire, it underwent a rigorous validation process involving a panel of experts from the graduate school of Lipa City Colleges who were experienced in the relevant field. This validation was crucial to ensure that the questionnaire accurately captured the intended information and that the data collected were dependable for the research's analysis. Additionally, the study questionnaire underwent a pilot testing phase to confirm its reliability. Twenty teachers from the same institutions participated in the pilot test, and a test-retest reliability analysis yielded Cronbach's alpha reliability score of .878, indicating that the questionnaire was reliable for use in this study.

Procedure

Upon obtaining approval from the principals and administrators of the selected institutions, the researcher initiated the data gathering process according to a predetermined schedule. Initially, respondents were briefed and oriented to ensure the accuracy of the data they provided. Subsequently, survey questionnaires were distributed during scheduled sessions, each lasting 15 minutes, to ensure careful completion by participants. It was important for the researcher to accompany the respondents, providing guidance throughout the survey process and encouraging them to seek clarification on any questions that arose.

Following the completion of the questionnaires, data collection commenced promptly. This immediacy aimed to capture participants' responses while their perspectives and impressions were still fresh in their minds. Moving swiftly from questionnaire completion to data collection was essential in ensuring a comprehensive and accurate compilation of participants' responses. The researcher's active involvement in administering the surveys facilitated necessary guidance and support, fostering an environment that promoted both efficient survey completion and active participant engagement.

Data Analysis

To interpret the data effectively, the researcher employed the following statistical treatments. The frequency, percentage, weighted mean, ranking, and Pearson's r were utilized to interpret the data.

To identify the level of technology integration of the respondents in terms digital resources and tools, and the degree of student engagement, weighted mean, ranking provided insights into the respondents' perceptions.

To investigate the significant relationship between the level of technology integration and the degree of student engagement, the researcher would use a correlational analysis, such as Pearson's correlation coefficient.

Ethical Considerations

Within the context of the study, ethical considerations were paramount throughout. Informed consent was obtained from all participants, including students, teachers, and school administrators, prior to their involvement. This process involved clearly explaining the study's

purpose, procedures, potential risks, benefits, and their right to withdraw at any time without consequences. Measures to protect confidentiality were rigorously implemented, including the use of pseudonyms or codes and secure storage of data to safeguard participants' identities and sensitive information. Voluntary participation was ensured, respecting participants' autonomy in deciding whether to participate without any form of coercion or undue influence.

Steps were taken to minimize harm by monitoring for any potential negative impacts of technology integration on students' physical or psychological well-being and addressing concerns promptly. The study aimed to maximize benefits by contributing positively to understanding technology's impact on student engagement and potentially informing future educational practices. Ethical approval was obtained from relevant institutional review boards, ensuring that the research adhered to ethical standards and guidelines. Throughout the study, transparency was maintained in research methods, procedures, and data handling practices to uphold credibility and trustworthiness in the research process.

Results and Discussion

This part of the study provided the presentation, analysis, and interpretation of the gathered data from the questionnaires answered by the respondents in accordance with the specific questions posited on the objectives of the study.

Level of Technology Integration of the Respondents

Level of Technology Integration of the Respondents in terms of Digital Resources

Table 1. *Level of Technology Integration of the Respondents in terms of Digital Resources*

	<i>Items</i>	<i>Weighted Mean</i>	<i>Interpretation</i>	<i>Rank</i>
1.	Digital resources were frequently integrated into my classroom activities	4.48	Always	4
2.	I have access to a diverse range of digital resources that enrich my learning experience	4.35	Always	5
3.	Digital resources have enhanced my grasp of educational concepts	4.66	Always	1
4.	I am confident in my ability to utilize digital resources to support my learning	4.64	Always	2
5.	Digital resources enhance student engagement by making learning more interactive and compelling	4.48	Always	3
Composite Mean		4.52	Always	

As presented in Table 1, the respondents assessed that digital resources have enhanced their grasp of educational concepts with the highest weighted mean of 4.66 and the highest rank of 1. The results indicated that digital resources significantly enhanced students' grasp of educational concepts. Students benefited from the interactive and engaging nature of digital tools, which provided them with opportunities to explore concepts through multimedia, simulations, and interactive activities. These resources allowed students to learn at their own pace, revisit challenging topics, and engage in hands-on learning experiences that were both informative and enjoyable. Students reported that digital resources facilitated deeper understanding and retention of educational content, as they could access a variety of learning materials tailored to their individual needs and learning styles. Overall, the findings underscored the positive impact of digital resources in enhancing students' learning experiences and promoting a more comprehensive grasp of educational concepts. Utami et al. (2023) stated that technology integration in language classes for senior high school students is increasingly common, using various tools and platforms to enhance cognitive, affective, and psychomotor learning outcomes.

However, the said group of respondents revealed that they have access to a diverse range of digital resources that enrich their learning experience with the least weighted mean of 4.35 and the least rank of 5. The results showed that students had access to a diverse range of digital resources that enriched their learning experience. These resources included multimedia presentations, interactive simulations, educational apps, and online databases, among others. Students benefited from the versatility and accessibility of these digital tools, which provided them with varied learning opportunities to explore and understand educational concepts more deeply. By using these resources, students were able to engage with content in innovative ways, personalize their learning experiences, and access information from different perspectives. Overall, the findings underscored the positive impact of digital resources in broadening students' educational horizons and enhancing their overall learning journey. Viberg et al. (2020) stated that integrating digital technology in mathematics education is challenging due to a less developed social artifact, hindering student learning and requiring teachers to develop shared practices and actively use the tool.

The composite mean of 4.52 signified that the respondents always affirmed on the level of technology integration in digital resources. The results consistently affirmed the level of technology integration in digital resources among the respondents. Students acknowledged and appreciated the seamless integration of technology into their learning experiences. They reported that digital resources were effectively incorporated into their lessons, enhancing their understanding and engagement with educational content. The respondents highlighted the benefits of technology integration, such as access to interactive learning materials, real-time feedback mechanisms, and opportunities for collaborative learning. Overall, the findings underscored the positive reception and perceived effectiveness of technology integration in digital resources among students, highlighting its role in enriching their educational experiences.

Karkouti (2020) stated that technology integration in higher education is essential for achieving accountability performance measures

and enhancing student outcomes but faces challenges and requires key solutions to improve implementation.

Level of Technology Integration of the Respondents in terms of Tools.

Table 2. *Level of Technology Integration of the Respondents in terms of Tools*

	<i>Items</i>	<i>Weighted Mean</i>	<i>Interpretation</i>	<i>Rank</i>
1.	Tools like graphing calculators and software were regularly employed in my coursework	4.44	Always	5
2.	Technological tools assist me in solving academic challenges more efficiently	4.71	Always	1
3.	I possess the necessary skills to effectively use specific tools	4.70	Always	2
4.	The incorporation of these tools has positively influenced my academic abilities	4.51	Always	4
5.	I prefer utilizing technology tools over traditional methods	4.57	Always	3
Composite Mean		4.59	Always	

As reflected in Table 2, the respondents perceived that the technological tools assist them in solving academic challenges more efficiently which got the highest weighted mean of 4.71 and the highest rank of 1. The results indicated that technological tools assisted students in solving academic challenges more efficiently. Students found that these tools provided them with innovative ways to approach and overcome academic hurdles. By leveraging technological resources such as educational apps, online tutorials, and digital platforms, students were able to access additional support, practice materials, and real-time feedback that enhanced their learning process. The integration of technology also facilitated personalized learning experiences, allowing students to tailor their approaches to suit their individual learning styles and pace. Overall, the findings underscored the beneficial impact of technological tools in helping students navigate academic challenges effectively and improve their overall academic performance. Kuzucu & Kartal (2020) stated that technology-enhanced content integration in foreign language classes significantly improves students' performance compared to regular textbooks in vocational high schools.

Meanwhile, the said group of respondents replied that technological tools like calculators and software were regularly employed in their coursework which got the least weighted mean of 4.03 and the least rank of 5. The results indicated that technological tools like calculators and software were regularly employed in students' coursework. These tools were instrumental in assisting students with complex mathematical calculations, data analysis, and graphical representations. Students reported using graphing calculators and specialized software to visualize mathematical concepts, solve equations, and analyze data sets more effectively than traditional methods alone.

By integrating these technological tools into their coursework, students gained practical skills in utilizing advanced mathematical and analytical tools, which prepared them for higher-level academic challenges and real-world applications. Overall, the findings highlighted the integral role of technological tools in enhancing students' learning experiences and proficiency in mathematics and scientific disciplines. Expert teachers' epistemic beliefs about creativity influence their technology-based creativity fostering practices, but assessment barriers pose a significant barrier. (Bereczki & Kárpát, 2021).

The composite mean of 4.59 implied that the respondents always affirmed on the level of technology integration in tools. The results consistently affirmed the level of technology integration in tools among the respondents. Students acknowledged and appreciated the seamless integration of technological tools into their learning experiences. They reported that these tools were effectively incorporated into their coursework, providing them with enhanced capabilities for problem-solving, data analysis, and conceptual understanding. The respondents emphasized the benefits of technology integration, such as access to advanced features, real-time collaboration, and interactive learning experiences that enriched their academic journey. Boholano et al. (2021) stated that using technology in teaching junior high school improves performance, enhances teachers' productivity skills, and prepares learners for the fourth industrial revolution by acquiring 21st century skills.

Degree of Student engagement Through Technology Integration.

Table 3. *Degree of Student engagement Through Technology Integration*

	<i>Items</i>	<i>Weighted Mean</i>	<i>Interpretation</i>	<i>Rank</i>
1.	Technology enhances my interest in learning.	4.63	Always	3
2.	I feel motivated to participate in class activities when technology is used.	4.36	Always	9
3.	Technology helps me understand difficult concepts better.	4.73	Always	1
4.	Using technology in lessons makes learning more enjoyable.	4.54	Always	6
5.	I find it easier to collaborate with classmates using technology.	4.47	Always	7
6.	Technology allows me to express my ideas more creatively.	4.62	Always	4
7.	I believe technology integration improves my overall learning experience.	4.56	Always	5
8.	I am confident in using technology tools provided in my classes.	4.41	Always	8
9.	Technology helps me stay more focused during lessons.	4.72	Always	2.5
10.	I believe technology integration prepares me better for future challenges.	4.72	Always	2.5
Composite Mean		4.58	Always	

As revealed in Table 3, the respondents agreed that technology helps them understand difficult concepts better which made the highest weighted mean of 4.73 and the highest rank of 1. The results indicated that technology helped students understand difficult concepts better. Students reported that technological tools such as simulations, interactive tutorials, and multimedia resources provided them with visual and interactive representations that clarified complex ideas. By engaging with these digital resources, students were able to explore difficult concepts from multiple angles, experiment with simulations, and receive immediate feedback, which enhanced their comprehension and retention. Technology also enabled personalized learning experiences tailored to individual learning styles, allowing students to progress at their own pace and revisit challenging topics as needed. According to Inkinen et al. (2020), scientific practices related to developing models and constructing explanations in high school science classrooms are associated with higher student situational engagement.

On the contrary, the said group of respondents replied that they feel more motivated to participate in class activities when technology is used with the least weighted mean of 4.36 and the least rank of 9. The results indicated that students felt more motivated to participate in class activities when technology was used. Students reported that the integration of technology, such as interactive presentations, digital discussions, and multimedia resources, made learning more engaging and dynamic. Technology facilitated active participation by providing opportunities for interactive learning experiences, real-time feedback, and collaborative activities that appealed to their interests and learning preferences. Students expressed enthusiasm for using digital tools to explore topics in-depth, share their ideas, and interact with peers and instructors in innovative ways. Overall, the findings highlighted that technology enhanced student motivation and engagement in classroom activities, contributing to a more interactive and stimulating learning environment. Larson et al. (2020) stated that teacher use of positive behavior supports in classrooms is positively associated with student self-reported active engagement in the same classroom.

The composite mean of 4.58 concluded that the respondents' degree of student engagement through technology integration is within high level. The results indicated that the respondents' degree of student engagement through technology integration was consistently within a high level. Students reported being actively engaged with educational content through the use of technology, which provided them with interactive learning experiences and enhanced their participation in classroom activities. They expressed satisfaction with how technology facilitated access to diverse learning resources, collaboration with peers, and opportunities for creative expression. Students appreciated the interactive nature of digital tools, which allowed them to explore concepts in depth, receive immediate feedback, and personalize their learning experiences. Overall, the findings underscored the positive impact of technology integration on student engagement, highlighting its role in fostering a dynamic and participatory learning environment.

High-quality classroom interactions are strongly associated with increased emotional and behavioral engagement in students, with primary school students more engaged emotionally and female students more behaviorally engaged (Havik & Westergård, 2020).

Relationship Between the Variables of the Study.

Table 4. *Relationship Between the Level of Technology Integration and the Degree of Student Engagement*

Variable	r-value	p-value	Decision	Interpretation
Level of Technology Integration and the Efficiency Degree of Student Engagement				
Digital Resources	0.60	0.00046	Reject Ho	Highly Significant
Tools	0.68	0.00004	Reject Ho	Highly Significant

As written in Table 4, when the responses of the respondents on the degree of student engagement through technology integration were compared to the level of technology integration, the computed r-values of 0.60 for digital resources, and 0.68 for tools have corresponding p-values of less than 0.01, thus rejecting the hypothesis.

These safely inferred that the responses of the respondents on the degree of student engagement through technology integration have high significant relationships to the level of technology integration. Based on the findings, a clear and significant relationship emerges between the degree of technology integration and student engagement in learning activities. The data consistently demonstrate that as schools integrate technology more comprehensively, student engagement increases accordingly. This correlation underscores the pivotal role of digital tools, interactive resources, and collaborative platforms in shaping students' educational experiences.

The study consistently found that students who actively interacted with technological resources showed higher levels of satisfaction and greater participation in classroom activities. This active engagement suggests that effective technology integration enriches learning environments and stimulates students' motivation to participate actively in their learning processes.

Moreover, the observed alignment between technology integration and student engagement highlights the transformative impact of digital tools on educational practices. By leveraging technology, educators can create dynamic and interactive learning experiences that cater to diverse learning styles and preferences. These experiences not only enhance the relevance and accessibility of educational content but also empower students to take ownership of their learning journey.

The positive correlation between technology integration and student engagement underscores the potential of technology to foster collaborative learning environments. Platforms that enable peer interaction and real-time feedback can enhance students'



communication skills and critical thinking abilities, preparing them for future academic and professional challenges.

According to Akram et al. (2022), teachers perceive technology integration in teaching-learning practices as beneficial, but barriers like slow internet, load shedding, lack of infrastructure, and training hinder its effective integration. In relation, Deng (2021) stated that higher student engagement in classroom education leads to higher academic success, but more research is needed on the impact of learner engagement in different contexts.

What intervention program is to be proposed to enhance student engagement through technology integration?

Table 5. Proposed Intervention Program

<i>Intervention Program</i>	<i>Objectives</i>	<i>Time Frame</i>	<i>Person In Charge</i>
Professional Development Workshops for Educators	- Enhance educators' proficiency in integrating technology into classroom teaching. - Empower educators to design engaging learning experiences using digital resources.	Ongoing throughout the school year	Head of Curriculum Development or Educational Technology Coordinator
Digital Resource Expansion Initiative	- Acquire and maintain a diverse range of high-quality digital resources aligned with curriculum standards. - Ensure equitable access to digital resources for all students.	Initial setup within 6 months, ongoing updates and maintenance	School Principal or Head of IT Department
Student-Centered Learning Environments Pilot	- Implement adaptive learning pathways and personalized learning experiences through technology. - Foster student agency and ownership of learning.	Pilot phase over one academic year	Lead Teacher for Innovative Learning or Educational Innovation Specialist
Equity in Technology Access Program	- Establish a one-to-one device program to ensure every student has access to necessary digital tools. - Provide digital literacy training to students and teachers.	Implementation within 12 months	Director of Student Services or Equity Coordinator
Assessment and Data-Driven Decision-Making Initiative	- Develop robust assessment mechanisms to evaluate the impact of technology integration on student engagement and learning outcomes. - Use data-driven insights to refine technology integration strategies.	Assessment framework established within 6 months, continuous evaluation and adjustments	Assessment Coordinator or Data Analyst
Community Engagement and Partnerships	- Foster partnerships with parents, caregivers, and community organizations to support technology integration efforts. - Engage industry experts and researchers in discussions.	Continuous engagement throughout the school year	Community Engagement Coordinator or Partnership Liaison

In addressing the outcomes of technology integration on student engagement, several intervention programs were proposed for implementation in selected public high schools in Cavite as presented on Table 5.

The Professional Development Workshops for Educators aimed to enhance teachers' proficiency in integrating technology into classroom instruction and empower them to design engaging learning experiences using digital resources aligned with curriculum standards. These workshops were conducted throughout the school year and overseen by the Head of Curriculum Development or Educational Technology Coordinator.

The Digital Resource Expansion Initiative focused on acquiring and maintaining a diverse array of high-quality digital resources, ensuring equitable access for all students. Initial setup occurred within 6 months, followed by continuous updates and maintenance under the supervision of the School Principal or Head of IT Department.

The Student-Centered Learning Environments Pilot implemented adaptive learning pathways and personalized experiences through technology, fostering student agency and ownership of learning. This pilot phase spanned one academic year and was led by the Lead Teacher for Innovative Learning or Educational Innovation Specialist.

The Equity in Technology Access Program aimed to establish a one-to-one device program and provide digital literacy training to ensure every student had access to necessary tools and skills. Implementation was completed within 12 months, overseen by the Director of Student Services or Equity Coordinator.

The Assessment and Data-Driven Decision-Making Initiative developed robust assessment mechanisms to evaluate technology's impact on student engagement and learning outcomes. An assessment framework was established within 6 months, with continuous evaluation managed by the Assessment Coordinator or Data Analyst.

The Community Engagement and Partnerships program sought to foster partnerships with parents, caregivers, community



organizations, and industry experts. This initiative engaged stakeholders in discussions and collaborative efforts throughout the school year, facilitated by the Community Engagement Coordinator or Partnership Liaison.

These intervention programs were designed to collectively enhance technology integration in Cavite's public high schools, aiming to improve student engagement, ensure equitable access to digital resources, personalize learning experiences, utilize data for informed decision-making, and foster community involvement. Each program's objectives, timelines, and responsible parties were tailored to ensure effective implementation and sustainable impact on student learning outcomes.

Conclusions

Based on the findings, it was inferred that the level of technology integration in terms of digital resources significantly enhanced students' grasp of educational concepts. The results consistently demonstrated that digital tools, such as multimedia presentations, interactive simulations, educational apps, and online databases, played a crucial role in enriching students' learning experiences. These resources provided students with opportunities to explore concepts through diverse media, engage in interactive activities, and access personalized learning materials tailored to their individual needs and learning styles. Students reported that such resources facilitated deeper understanding and retention of educational content, allowing them to learn at their own pace and revisit challenging topics with greater ease. Overall, the findings underscored the positive impact of digital resources in broadening students' educational horizons and enhancing their overall learning journey.

In addition to digital resources, technological tools also played a pivotal role in supporting students' academic endeavors. The integration of tools such as calculators, specialized software for mathematical analysis, and other digital aids enhanced students' ability to solve complex academic challenges effectively. These tools provided students with innovative approaches to learning, allowing them to practice and receive real-time feedback that aided in their understanding of mathematical concepts and data analysis. Students acknowledged the practical benefits of using these tools, noting their enhanced capabilities in problem-solving and conceptual understanding. The seamless integration of technological tools into coursework not only prepared students for higher-level academic demands but also equipped them with essential skills for future academic and professional pursuits.

Furthermore, the degree of student engagement through technology integration emerged as a significant finding in the study. Students reported that technology facilitated their understanding of difficult concepts by providing visual and interactive representations through simulations, tutorials, and multimedia resources. This engagement with digital tools allowed students to explore complex ideas from multiple perspectives, experiment with interactive simulations, and receive immediate feedback that enhanced their comprehension and retention of educational content. Moreover, the integration of technology in classroom activities enhanced student motivation and participation. Students expressed enthusiasm for interactive learning experiences, digital discussions, and collaborative activities that engaged their interests and learning preferences. The use of technology fostered a dynamic and stimulating learning environment where students felt empowered to explore topics deeply, share ideas, and interact with peers and instructors in meaningful ways.

The relationship between the level of technology integration and the degree of student engagement further elucidated the transformative impact of digital tools on educational practices. The study consistently found that as schools integrated technology more comprehensively, student engagement in learning activities increased correspondingly. This correlation underscored the pivotal role of digital tools, interactive resources, and collaborative platforms in shaping students' educational experiences. Students who actively interacted with technological resources showed higher levels of satisfaction and greater participation in classroom activities, indicating that effective technology integration enhanced learning environments and stimulated students' motivation to actively participate in their learning processes.

Moreover, the positive correlation between technology integration and student engagement highlighted the potential of digital tools to foster collaborative learning environments. Platforms that enabled peer interaction and real-time feedback enhanced students' communication skills and critical thinking abilities, preparing them for future academic and professional challenges. The findings underscored the transformative impact of technology on educational practices, emphasizing its role in creating dynamic and interactive learning experiences that catered to diverse learning styles and preferences.

The findings from this study affirmed the significant role of technology integration in enhancing students' educational experiences and promoting higher levels of engagement and motivation. By leveraging digital resources and technological tools effectively, educators could create learning environments that empower students to explore, learn, and succeed in an increasingly digital world. The positive impact of technology on student learning underscored its potential to transform education and prepare students for future academic and professional challenges. As technology continued to evolve, its integration into educational practices would remain essential in fostering a dynamic and inclusive learning environment where all students could thrive and achieve their full potential.

Based on the conclusions drawn from the study, several recommendations can be made to enhance the integration of technology in educational settings. First, it is crucial to promote comprehensive training programs for educators that focus on both technical proficiency and pedagogical strategies. Ongoing professional development opportunities can empower teachers to effectively integrate digital tools such as multimedia presentations, interactive simulations, and educational apps into their teaching practices. Second, fostering collaboration among educators and establishing platforms for sharing best practices can encourage the effective use of

technology across diverse classroom settings. This collaborative approach allows teachers to learn from each other's successes and challenges, promoting continuous improvement in technology integration.

Third, ensuring access to high-quality digital resources is essential. Educational institutions should invest in acquiring and maintaining a diverse range of digital resources that are aligned with curriculum standards and promote interactive and personalized learning experiences. Fourth, promoting personalized learning experiences through technology is critical. Adaptive learning pathways, real-time feedback mechanisms, and differentiated instruction can cater to diverse student needs, preferences, and learning styles, fostering student engagement and academic success.

Fifth, efforts should focus on empowering student-centered learning environments. Encouraging students to actively engage with digital tools in meaningful ways, such as collaborative projects and creative expression, promotes student agency and ownership of their learning journey. Sixth, addressing equity in access to technology is paramount. Initiatives to bridge the digital divide, such as one-to-one device programs and digital literacy training, ensure that all students have equitable access to digital resources both at school and at home.

Seventh, implementing robust assessment mechanisms is essential to evaluate the impact of technology integration on student outcomes regularly. Data-driven insights can inform adjustments to technology integration strategies and ensure continuous improvement. Eighth, staying current with technological advancements in educational technology is crucial. Educational institutions should stay informed about emerging technologies and trends to anticipate future needs and opportunities for innovation.

Ninth, fostering a culture of innovation and experimentation among educators encourages the exploration of new technologies and teaching approaches. Celebrating successes and learning from challenges encountered in technology integration promotes continuous growth and improvement. Tenth, collaboration with stakeholders including parents, caregivers, community organizations, industry experts, researchers, and policymakers is vital. Engaging stakeholders in discussions about the role of technology in education ensures alignment with broader educational goals and promotes informed decision-making.

By implementing these recommendations, educational institutions can leverage technology effectively to create dynamic, inclusive, and forward-thinking learning environments. These efforts aim to prepare students for success in an increasingly digital and interconnected world, equipping them with the skills and competencies needed for future academic and professional pursuits.

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