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The Relationship between Students' Technology Use and Academic Performance in Mathematics

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Abstract: Technology use refers to how students utilize online resources and tools to enhance their learning. This study examines the relationship between technology use and academic performance in mathematics among Grade 10 students at Bangcud National High School. It emphasizes the significance of digital literacy and the effective application of information and communication technology (ICT) in education. The research involved 203 Grade 10 students during the 2024-2025 school year, using a descriptive correlational design. Data were collected through a structured questionnaire to assess both students' technology use and their mathematics performance. Results indicate moderate engagement with ICT tools, with a mean score of 2.41 for frequency of use and 2.87 for agreement on their importance. While students frequently use smartphones and social media, other technologies like blogs and podcasts remain underutilized. Students' academic performance in mathematics was rated as satisfactory, with an average score of 83.15. However, the study found a very weak correlation between students' frequency of technology use and their perception of its importance in mathematics achievement. This suggests that other factors significantly impact student performance. Based on these findings, the study recommends enhancing ICT integration in the curriculum, providing teacher training, and developing engaging digital resources to improve student learning experiences.

Keywords: Academic Performance, Descriptive-correlational, Mathematics, Relationship, Technology Use.

INTRODUCTION

In modern classroom, technology has become a key part of the way we learn and teach. More and more teachers and schools are using ICT or information and communication technology to improve the educational experience. As digital tools and resources grow quickly, it's clear that integrating technology into our lessons can really benefit everyone involved. Celeste and Nimfa, (2024) states that integrating technology in the classroom may increase the engagement of students as well as their achievement in academic.

In addition to fulfilling the current demands of the society, the increasing adoption of technology in education assists both teachers and students meet their changing needs. Teachers use technology to instruct, mentor, and support students, while students use it to support learning, research, and performance evaluation (Mdhlalose & Mlambo, 2023). This collaboration between technology and education has important implications, especially in subjects such as mathematics, where digital resources can provide diverse methods for understanding complex concepts.

In line with this, the Department of Education's (DepEd) MATATAG 2023 provides the Order of the Dept. Of Education No. 016, s., also called the "Revised Guidelines on the Implementation of the DepEd Computerization Program (DCP)." It seeks to equip the public education system with suitable, outstanding, and equitable technologies that will boost educational experiences and help them meet the 21st century challenges. Instructional experts and educators are dedicated to making sure that using technology in the classroom is effective and helps students do better in all subjects.

However, there's still a long way to go. A recent report from the Programme for International Student Assessment (PISA) in 2022 revealed that the Philippines ranked near the bottom, coming in sixth from last out of 81 countries in math, with an average score of just 355. Moreover, Region X, particularly Bukidnon, struggle in mathematical performance as indicated in the National Achievement Test results released by the 2012 National Education Testing and Research Centre and cited by Cordova and Tan (2018). With a Mean Percentage Score (MPS) about 48.92, the region is below 50% across MPS. This result shows that even though we are working to integrate technology in learning, we still need to think of ways to help our students and improve their performance.

In the current educational environment, the National Council of Teachers of Mathematics (2023) highlights how important technology is to enhance student learning. It not only increases a greater interest in math but also helps students become more competent in the subject. Research shows that students' comprehension and performance in mathematics are improved when they use technology in their studies (Liburd & Jen, 2021). While there are multiple studies that point

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out the technological effects in the academic performance of students (Courtney, *et al*., 2022), there are limited studies that have been conducted inside the Division of Malaybalay. The goal of this research was to closely investigate the correlation between math performance and the use of technology by students. Thus, the research study will explore how Grade 10 students at Bangcud National High School in Malaybalay City, Bukidnon, academic performance and technology use during the school year 2024-2025. Specifically, it will focus on answering these questions: What is the level of Technology Use of Grade 10 students? What is the level of Academic Performance Grade 10 students' in mathematics? Is there a significant relationship between Grade 10 students' Technology Use and their Academic Performance in Mathematics?

METHODOLOGY

Descriptive correlational design of research were used to examine the technology use and academic performance in mathematics among 203 Grade 10 students at Bangcud National High School, Malaybalay City, Bukidnon, during the first quarter of the school year 2024-2025 and explore any potential relationships between them. The interpretation of the data was based on the existing data of the subject teacher's first grading grades and the results of the survey questionnaire about students' technology usage. Slovin's equation was used to determine the overall quantity of responders who were then randomly chosen. The researchers used the lottery method to determine the respondents. For privacy reasons, the names of the subjects were not disclosed; instead, code-names were used to represent them in a particular order.

To gather relevant data for the quantitative study, approach a structured survey was administered. The survey includes two Likert scale, that is frequency scale and agreement scale on the use of technology. After getting the necessary permissions, the researcher handed out the survey to Grade 10 students at a scheduled time and place within the school. Once completed, the survey data is gathered, safely stored, and then digitally transcribed for analysis. To preserve the integrity of the study, ethical considerations such as participant rights and confidentiality are closely always monitored.

Moreover, the mean along with a standard deviation of the scores in the survey questionnaire was computed to identify the students' level of technology use, and their academic performance in mathematics. Pearson Product-Moment Correlation Coefficient was calculated to assess whether there is a substantial connection between students' usage of technology and their academic performance in mathematics.

Table below are the rubrics used for interpretation.

Table 1: Frequency Interpretation Scale for Students' Use of ICT Tools

Mean Interval	Scale	Qualitative Description	Interpretation
3.26 – 4.00	4	Almost always	Students consistently use ICT tools in their learning process and demonstrate a strong reliance on technology. They actively use these resources and see them as key to their success in school.
2.51 – 3.25	3	Often	Students often use ICT tools and see how these can help them learn. While they're comfortable with technology, they might not always take full advantage of everything it has to offer.
1.76 – 2.50	2	Sometimes	Students occasionally use ICT tools, but they often don't show much enthusiasm or a clear understanding of how beneficial these tools can be for their learning. It appears they only turn to technology when necessary, suggesting they might need more motivation and support.
1.00 – 1.75	1	Almost never	Students rarely use ICT tools and seem to have little knowledge or interest in how technology can enhance their learning. This underscores the significant need for initiatives that can increase students' engagement and understanding of ICT in education.

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Table 2: Agreement Interpretation Scale for Students' Use of ICT Tools

Mean Interval	Scale	Qualitative Description	Interpretation
3.26 – 4.00	4	Agree	Students strongly believe in the importance of ICT tools for their learning and express high levels of satisfaction and enjoyment derived from using them. They support the idea of bringing technology into the classroom.
2.51 – 3.25	3	Partly Agree	Students usually understand how important ICT tools are for their learning and feel somewhat satisfied with using them. While they value these tools, they might not fully take advantage of everything they can offer or have some mixed feelings about them.
1.76 – 2.50	2	Partly Disagree	Students have mixed feelings about how ICT tools fit into their learning. While they recognize that there are some benefits, they're not entirely convinced about how important these tools really are. This suggests that there are potential challenges that could be tackled.
1.00 – 1.75	1	Disagree	Students don't see ICT tools as important for their learning and often express disappointment or a lack of interest in using them. This suggests a critical need for education and engagement strategies to highlight the benefits.

Table 3: Overall Interpretation Scale for Students' Use of ICT Tools

Mean Interval	Scale	Qualitative Description	Qualitative Interpretation	Interpretation
3.26 – 4.00	4	Almost Always/Agree	Fully Agree	Students regularly and actively use ICT tools and truly believe in their value. They incorporate technology into their learning, showing a great deal of comfort and excitement. There's room to encourage even more of this engagement.
2.51 – 3.25	3	Often/partly Agree	Moderately Agree	Students frequently use ICT tools and usually see their value in learning. Even though they are aware of the benefits, there's still room to support in making the most of these resources. We may enhance their entire experience by emphasizing on giving more guidance and help.
1.76 – 2.50	2	Sometimes/Partly Disagree	Slightly Disagree	Students occasionally use ICT tools even when they don't understand fully the value of this tool. This shows that students may not be exposed enough with these tools, or they have a little motivation to use them. There is a need for targeted educational support to help students understand the importance of ICT in enhance their learning.
1.00 – 1.75	1	Almost Never/Disagree	Strongly Disagree	Students rarely use these ICT tools and strongly believe that it had a little impact to their education. This highlights the importance of introducing these tools and emphasizing their advantages to help increase students' to be more open to integrating technology into their studies.

RESULTS AND DISCUSSIONS

Students' Technology Use

The Use of ICT Tools questionnaire was adapted from the questionnaire developed by Nagy, Judit, and Habók, Anita in September 2018. Table 4 presents the Students' ICT Use Frequency scale. According to this table, the students' overall mean on the ICT Use Frequency scale is 2.41 and their standard deviation is 0.08. Technology tools are utilized by the students on occasion. Additionally, this implies that the students may use ICT devices occasionally but not fully grasp their importance in education.' Those who use technology only when it's convenient may require more motivation and support.

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Table 4: Students' Level of ICT Use Frequency Scale

Indicator	Mean	SD	Quantitative Description
How frequently you use social media (e.g. Facebook)?	3.37	0.87	Almost always
How frequently you use social media (e.g. Facebook, Twitter) in mathematics learning?	3.07	0.99	Often
How frequently you use instant messaging/text chat (e.g. Facebook Messenger, Hangouts) in mathematics learning?	3.01	1.05	Often
How frequently you use translation software (e.g. Google Translate)?	2.94	1.00	Often
How frequently you use films/videos with subtitles in learning?	2.85	0.97	Often
How frequently you use films, videos?	2.83	0.99	Often
How frequently you use photo editing?	2.79	1.01	Often
How frequently you use text editing?	2.75	0.95	Often
How frequently you use search engines (e.g. Google, Bing)?	2.73	1.04	Often
How frequently you use audio/video chat (pl. Skype, Hangouts)?	2.69	0.96	Often
How frequently you use internet browsers?	2.67	1.02	Often
How frequently you use word games in learning?	2.65	1.00	Often
How frequently you use films/videos with original subtitles in learning?	2.63	1.02	Often
How frequently you use smartphone apps in mathematics learning?	2.61	1.13	Often
How frequently you use internet browsers in mathematics learning?	2.56	1.01	Often
Virtual learning environments are used in the courses I'm enrolled in.	2.55	1.02	Often
How frequently you use films/videos without subtitles Translation software (e.g. Google Translate) in learning?	2.54	1.02	Often
How frequently you use note-taking software in learning?	2.54	1.01	Often
How frequently you use dictionaries in learning?	2.54	0.93	Often
How frequently you use photo editing in learning?	2.50	1.02	Sometimes
How frequently you use text editing in learning?	2.49	1.01	Sometimes
My teachers use a computer during their classes.	2.46	0.83	Sometimes
How frequently you use video chat (e.g. Skype) in mathematics learning?	2.45	1.11	Sometimes
How frequently you use presentations (e.g. PowerPoint, Prezi)?	2.44	1.04	Sometimes
How frequently you use online educational materials?	2.43	1.01	Sometimes
I use a computer as part of my learning process.	2.42	0.83	Sometimes
How frequently you use databases?	2.41	0.92	Sometimes
How frequently you use online storage (e.g. Google Drive, Dropbox)?	2.41	1.04	Sometimes
How frequently you use e-mail?	2.39	0.99	Sometimes
How frequently you use spellcheck?	2.37	0.99	Sometimes
How frequently you use presentations (e.g. PowerPoint, Prezi) in mathematics learning?	2.36	1.04	Sometimes
How frequently you use pronunciation tutorial videos in learning?	2.35	1.02	Sometimes
How frequently you use e-books?	2.33	0.96	Sometimes
How frequently you use excel in mathematics learning?	2.33	1.11	Sometimes
How frequently you use audio chat (e.g. Skype) in learning?	2.32	0.90	Sometimes
How frequently you use bilingual dictionaries (e.g. English-French) in learning?	2.31	0.96	Sometimes
How frequently you use excel?	2.30	1.06	Sometimes
How frequently you use e-mail in learning?	2.27	0.97	Sometimes
How frequently you use programming?	2.26	0.98	Sometimes
How frequently you use e-libraries?	2.25	0.92	Sometimes
How frequently you use technical dictionaries?	2.24	0.90	Sometimes
How frequently you use monolingual dictionaries?	2.23	0.89	Sometimes
My teachers expect me to use a computer as part of my learning process.	2.22	0.83	Sometimes
How frequently you use target language encyclopedias/lexicons (e.g.	2.18	0.91	Sometimes

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Wikipedia) in learning?			
How frequently you use vlogs in learning?	2.18	1.10	Sometimes
How frequently you use vlogs?	2.17	1.10	Sometimes
How frequently you use encyclopedias/lexicons (e.g. Wikipedia)?	2.16	0.88	Sometimes
How frequently you use e-journals?	2.13	0.96	Sometimes
How frequently you use online courses (MOOC) in mathematics learning?	2.13	1.03	Sometimes
How frequently you use programming in mathematics learning?	2.12	1.01	Sometimes
How frequently you use online learning with a native speaker (e.g. Language Exchange Community) in learning?	2.08	0.85	Sometimes
How frequently you use simulations?	2.07	0.92	Sometimes
How frequently you use podcasts?	2.06	0.95	Sometimes
How frequently you use simulations in online learning?	2.05	0.90	Sometimes
How frequently you use monolingual dictionaries (e.g. Cambridge/Oxford/Duden) in online learning?	2.00	0.84	Sometimes
How frequently you use podcasts in online learning?	1.98	0.90	Sometimes
How frequently you use blogs?	1.81	0.85	Sometimes
How frequently you use blogs in online learning?	1.80	0.84	Sometimes
Overall	**2.41**	**0.08**	**Sometimes**

Moreover, the figure of "How frequently you use social media (e.g. Facebook)?" has the highest mean, of 3.37, suggesting that social networking sites are also used by participants. The frequency of its use indicates that people are incorporating social media platforms into their everyday lives, potentially for both socializing and learning. This implies that social media may serve as a bridge between personal interaction and educational engagement, enhancing connectivity and resource sharing. Kumar and Nanda (2022) found that incorporating social media platforms into both structured and unstructured settings for learning can significantly enhance the educational experience in the 21st century. This is followed by the indicator "How frequently you use social media (e.g., Facebook, Twitter) in mathematics learning?" which indicates that the consistent use of social media for mathematics learning underscores its effectiveness and popularity as a resource. Participants likely tap into platforms where they can interact in the target mathematics, access learning materials, or connect with other learners. According to Hidayatulla and Suprapti (2020), social media has changed how society interacts and lives, influencing mathematics learning in the process. The indicator "How frequently you use instant messaging/text chat (e.g., Facebook Messenger, Hangouts) in mathematics learning?" comes after the result, indicating that instant messaging and text chat are clearly recognized tools in the mathematics learning process. This mean indicates that many learners are comfortable utilizing texting as a mode of communication and practice. This level implies that instant messaging provides a handy environment for learners to practice their mathematical skills, fostering greater confidence and enhancing mathematics learning. Furthermore, according to Aunzo (2015), students regardless of gender and age equally agreed that text-messaging is beneficial in learning mathematics.

On the other hand, students' have the lowest mean of 1.80 in the indicator "How frequently you use blogs in online learning?" the findings indicate a significant underutilization of this educational technology, implying that students may not find blogs helpful for their learning needs. This low engagement might result from the specificity and depth of content provided in these blogs, which, if this do not align with learners' needs, it can render them ineffective. In a study by Alsamadani (2018), it was found that 46% of participants had never heard of blogging before being introduced to it. Additionally, 48% exhibited a passive engagement with blogging, while only 14% were familiar with the concept, and just 2% actively created blogs. These indicates that a significant portion of participants were unfamiliar with blogging and tended to use it passively. It is followed by the second lowest mean of 1.81 with the indicator "How frequently you use blogs?" indicating that blog usage is also infrequent among learners, potentially due to the static nature of written content. Blogs may not offer the dynamic, engaging experiences that videos or interactive applications provide, leading to diminished interest. According to Alsamadani (2018), most

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participants initially lacked knowledge about blogging and showed little interest in using it. However, once the researchers introduced the concept of blogging, the participants began to appreciate it and demonstrated significant improvement in their blogging skills. Also, the students have the lowest mean on the indicator "How frequently you use podcasts in online learning?" This indicates that podcasts are rarely utilized in online learning contexts, which may stem from several factors. This could imply that learners prefer more visually engaging or interactive forms of content over auditory inputs. For instance, learners might have varying preferences for auditory compared to visual or interactive learning styles, leading to limited engagement with podcasts. Dede (2008) noted that integrating podcasts into distance teaching and learning often does not achieve the desired outcomes. Additionally, there is evidence that some students have struggled to benefit from this innovation, as cited by Makina (2020).

Furthermore, the overall mean score of 2.41 for ICT use frequency among students indicates a moderate level of engagement with digital tools in their learning processes. This score suggests that students utilize ICT (information and communication technology) supplies, such blogs and podcast, with a frequency characterized as "sometimes." It indicates that students might be recognizing the value of incorporating ICT into their learning but are not fully capitalizing on its potential. While certain tools, like social media, show higher engagement, the overall moderate mean signifies that there is significant room for increased integration and utilization of various ICT resources within the educational framework. Improving the relevance and interactivity of these tools can significantly enhance engagement and mathematics learning outcomes. Additionally, this aligns with Lottering's (2020) findings, which suggest that incorporating social media as an engagement tool can lead to better student performance.

Table 5 shows the Students' Level of ICT Use Agreement scale, the data presented provides insights into students' attitude and perception on the importance of ICT tools in learning. Based on this table, the students ICT Use Agreement scale have a total mean of 2.87 and a standard deviation about 0.05, categorized as "Partly agree". This suggests that students recognize that technological resources are important to their education, although their level of agreement is not particularly strong.

Table 5: Students' Level of ICT Use Agreement Scale

Indicator	Mean	SD	Quantitative Description
Using a smartphone for learning is very important to me.	3.38	0.83	Agree
Teachers guide us on how to use ICT tools for learning.	3.24	0.83	Partly agree
Using ICT tools for learning is very important to me.	3.23	0.84	Partly agree
Teachers support the use of ICT tools for learning.	3.15	0.83	Partly agree
Using a computer for learning is very important to me.	3.14	0.79	Partly agree
I save time if I use a computer for learning.	3.08	0.85	Partly agree
Teachers should incorporate the use of ICT tools into their teaching.	3.04	0.80	Partly agree
Teachers give us guidance on how to use ICT tools for learning tasks to be completed at home.	3.03	0.90	Partly agree
ICT tools play an important role in my learning process.	2.94	0.88	Partly agree
Using a tablet for learning is very important to me.	2.93	0.93	Partly agree
ICT tools make learning faster for me.	2.89	0.81	Partly agree
I save time if I use ICT tools for learning.	2.89	0.86	Partly agree
I can understand the material much more easily, if I use ICT tools.	2.85	0.81	Partly agree
Using a computer for learning makes me happy.	2.84	0.92	Partly agree
Using ICT tools for learning makes me happy.	2.84	0.88	Partly agree
I use ICT tools for learning because I'm very interested in IT.	2.82	0.91	Partly agree
ICT tools improve my grades.	2.79	0.82	Partly agree
Information is much more easily available by using ICT tools than by visiting the library.	2.75	0.95	Partly agree
ICT tools create a better atmosphere in the classroom.	2.68	0.87	Partly agree
I can remember what I've learnt better if I use ICT tools.	2.67	0.87	Partly agree

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I can focus on learning more if I use ICT tools.	2.66	0.92	Partly agree
The material covered does not allow for the use of ICT tools in class.	2.45	0.91	Partly disagree
The material covered does not allow for the use of ICT tools at home.	2.33	0.93	Partly disagree
I cannot learn without using ICT tools.	2.14	0.91	Partly disagree
Overall	**2.87**	**0.05**	**Partly agree**

In considering the statement, "Using a smartphone for learning is very important to me," students register a high average score of 3.38. This implies that the students indeed appreciate the role that smartphones can play in furthering their education. Hence, it can be said here that students use smartphones as essential learning tools, and it is very likely that they require such phones for numerous learning activities. A greater number of students indicated that they consider smartphones a helpful resource for accessing their learning materials (Ifeanyi & Chukwuere, 2018). After that, the statement "Teachers guide us on how to use ICT tools for learning'' attained a mean rating of 3.24, implying that the students value the teachers' input in helping them employ technology appropriately. This showcases the concept of necessity for teaching approaches that effectively embed technology within the lessons. This aligns with the goals of the Teacher Education Council (TEC) as outlined in 2020, which emphasizes that teachers should promote the appropriate, ethical, and responsible use of ICT to enhance and support learning, in accordance with the Philippine Professional Standards for Teachers (PPST). While the average score for the statement "Using ICT tools for learning is very important to me" is 3.23, indicating that students are aware of the role education enhancement tools play in education. This implies that students' values ICT tools and knows its importance in learning process, particularly in mathematics. Nevertheless, since those students' responses generated an image of partial agreement regarding the importance of ICT, it is possible they have not completely explored its potential benefits. All these findings therefore stress the importance of student participation and teacher assist in the operation of implementing any technology-enhanced learning activities. Overall, students acknowledge the advantages and benefits of incorporating ICT into the method of instruction and learning (Tayaban, 2022).

On the other hand, the statement "I cannot learn without using ICT tools" received the lowest average score of 2.14, indicating that most students disagree with this idea. It implies that while they value ICT tools, they don't consider them essential for learning, perhaps reflecting their ability to learn effectively through traditional methods or other resources. Most respondents indicated that ICT was not deemed important in their school due to limited resources and facilities (Benini, 2014). However, they expressed a strong belief that ICT should be promoted and integrated into their learning experiences. The second lowest score of 2.33 from the students pursuing home studies because "The material covered does not allow for the use of ICT tools at home" calls for concern since it shows students' dissatisfaction with the content of their home study materials regarding the incorporation of technology. Implying that students may favor using ICT tools in school than at home. This means that they may feel constrained in their use of ICT for appropriate activities outside school due to content limitations. Research by Engel, *et al*. (2018) demonstrated that participants engaged with ICTs in only a limited number of activities outside of the school environment. Further, the score of 2.45 for "The material covered does not allow for the use of ICT tools in class" also pinpoints a discrepancy between the curriculum and the application of technological devices in class. Implying the need for curriculum revision or provision of additional resources to facilitate technology integration. Overall, these lower scores mean that there might be constraints affecting the total uptake of ICT resources both in the home environment and classroom which would lower the opportunities presented to the learners to strengthen their learning experience with technology. The Teacher Education Council of the Department of Education (2020) underscores the significance of using ICT in an appropriate, ethical, and responsible way. This approach aligns with its goal of enhancing and supporting learning through technology, in accordance with the Philippine Professional Standards for Teachers (PPST).

Table 6 presents a synthesis of data derived from Table 4 (frequency scale) and Table 5 (agreement scale). The qualitative descriptions in the table are classified based on the following mean intervals:

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Table-6: A synthesis of data derived

Mean Interval	Scale	Frequency Qualitative Description	Agreement Qualitative Description	Qualitative Interpretation
3.26 – 4.00	4	Almost Always	Agree	Mostly Agree
2.51 – 3.25	3	Often	Partly Agree	Moderately Agree
1.76 – 2.50	2	Sometimes	Partly Disagree	Slightly Disagree
1.00 – 1.75	1	Almost Never	Disagree	Strongly Disagree

The table below outlines the Students' ICT Use. From this table, we observe that the overall mean falls at 2.54 which is in the 'slightly disagree (SD)' category. This indicates that there is a moderate level of ICT tools use among such students for educational purposes. While some of the tools are viewed as having significance and thus more often used, not all of them appear to be much entrenched in the learning process, thus creating room for improvement.

Table 7: Students' ICT Use

Indicator	Mean	SD	Quantitative Description	Qualitative Interpretation
Using a smartphone for learning is very important to me.	3.38	0.83	Agree	Mostly Agree
How frequently you use social media (e.g. Facebook)?	3.37	0.87	Almost Always	Mostly Agree
Teachers guide us on how to use ICT tools for learning.	3.24	0.83	Partly Agree	Moderately Agree
Using ICT tools for learning is very important to me.	3.23	0.84	Partly Agree	Moderately Agree
Teachers support the use of ICT tools for learning.	3.15	0.83	Partly Agree	Moderately Agree
Using a computer for learning is very important to me.	3.14	0.79	Partly Agree	Moderately Agree
I save time if I use a computer for learning.	3.08	0.85	Partly Agree	Moderately Agree
How frequently you use social media (e.g. Facebook, Twitter) in mathematics learning?	3.07	0.99	Often	Moderately Agree
Teachers should incorporate the use of ICT tools into their teaching.	3.04	0.80	Partly Agree	Moderately Agree
Teachers give us guidance on how to use ICT tools for learning tasks to be completed at home.	3.03	0.90	Partly Agree	Moderately Agree
How frequently you use instant messaging/text chat (e.g. Facebook Messenger, Hangouts) in mathematics learning?	3.01	1.05	Often	Moderately Agree
ICT tools play an important role in my learning process.	2.94	0.88	Partly Agree	Moderately Agree
How frequently you use translation software (e.g. Google Translate)?	2.94	1.00	Often	Moderately Agree
Using a tablet for learning is very important to me.	2.93	0.93	Partly Agree	Moderately Agree
ICT tools make learning faster for me.	2.89	0.81	Partly Agree	Moderately Agree
I save time if I use ICT tools for learning.	2.89	0.86	Partly Agree	Moderately Agree
I can understand the material much more easily, if I use ICT tools.	2.85	0.81	Partly Agree	Moderately Agree
How frequently you use films/videos with subtitles in learning?	2.85	0.97	Often	Moderately Agree
Using a computer for learning makes me happy.	2.84	0.92	Partly Agree	Moderately Agree
Using ICT tools for learning makes me happy.	2.84	0.88	Partly Agree	Moderately Agree
I use ICT tools for learning because I'm very	2.82	0.91	Partly Agree	Moderately Agree

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interested in IT.				
How frequently you use films, videos?	2.83	0.99	Often	Moderately Agree
How frequently you use photo editing?	2.79	1.01	Often	Moderately Agree
ICT tools improve my grades.	2.79	0.82	Partly Agree	Moderately Agree
How frequently you use text editing?	2.75	0.95	Often	Moderately Agree
Information is much more easily available by using ICT tools than by visiting the library.	2.75	0.95	Partly Agree	Moderately Agree
How frequently you use search engines (e.g. Google, Bing)?	2.73	1.04	Often	Moderately Agree
How frequently you use audio/video chat (pl. Skype, Hangouts)?	2.69	0.96	Often	Moderately Agree
ICT tools create a better atmosphere in the classroom.	2.68	0.87	Partly Agree	Moderately Agree
How frequently you use internet browsers?	2.67	1.02	Often	Moderately Agree
I can remember what I've learnt better if I use ICT tools.	2.67	0.87	Partly Agree	Moderately Agree
I can focus on learning more if I use ICT tools.	2.66	0.92	Partly Agree	Moderately Agree
How frequently you use word games in learning?	2.65	1.00	Often	Moderately Agree
How frequently you use films/videos with original subtitles in learning?	2.63	1.02	Often	Moderately Agree
How frequently you use smartphone apps in mathematics learning?	2.61	1.13	Often	Moderately Agree
How frequently you use internet browsers in mathematics learning?	2.56	1.01	Often	Moderately Agree
Virtual learning environments are used in the courses I'm enrolled in.	2.55	1.02	Partly Agree	Moderately Agree
How frequently you use films/videos without subtitles Translation software (e.g. Google Translate) in learning?	2.54	1.02	Often	Moderately Agree
How frequently you use note-taking software (e.g. OneNote, Evernote) in learning?	2.54	1.01	Often	Moderately Agree
How frequently you use dictionaries in learning?	2.54	0.93	Often	Moderately Agree
How frequently you use photo editing in learning?	2.50	1.02	Sometimes	Slightly Disagree
How frequently you use text editing in learning?	2.49	1.01	Sometimes	Slightly Disagree
My teachers use a computer during their classes.	2.46	0.83	Partly Disagree	Slightly Disagree
The material covered does not allow for the use of ICT tools in class.	2.45	0.91	Partly Disagree	Slightly Disagree
How frequently you use video chat (e.g. Skype) in mathematics learning?	2.45	1.11	Sometimes	Slightly Disagree
How frequently you use presentations (e.g. PowerPoint, Prezi)?	2.44	1.04	Sometimes	Slightly Disagree
How frequently you use online educational materials?	2.43	1.01	Sometimes	Slightly Disagree
I use a computer as part of my learning process.	2.42	0.83	Partly Disagree	Slightly Disagree
How frequently you use databases?	2.41	0.92	Sometimes	Slightly Disagree
How frequently you use online storage (e.g. Google Drive, Dropbox)?	2.41	1.04	Sometimes	Slightly Disagree
How frequently you use e-mail?	2.39	0.99	Sometimes	Slightly Disagree
How frequently you use spellcheck?	2.37	0.99	Sometimes	Slightly Disagree
How frequently you use presentations (e.g. PowerPoint, Prezi) in mathematics learning?	2.36	1.04	Sometimes	Slightly Disagree
How frequently you use pronunciation tutorial videos in learning?	2.35	1.02	Sometimes	Slightly Disagree

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How frequently you use e-books?	2.33	0.96	Sometimes	Slightly Disagree
The material covered does not allow for the use of ICT tools at home.	2.33	0.93	Partly Disagree	Slightly Disagree
How frequently you use excel in mathematics learning?	2.33	1.11	Sometimes	Slightly Disagree
How frequently you use audio chat (e.g. Skype) in learning?	2.32	0.90	Sometimes	Slightly Disagree
How frequently you use bilingual dictionaries (e.g. English-French) in learning?	2.31	0.96	Sometimes	Slightly Disagree
How frequently you use excel?	2.30	1.06	Sometimes	Slightly Disagree
How frequently you use e-mail in learning?	2.27	0.97	Sometimes	Slightly Disagree
How frequently you use programming?	2.26	0.98	Sometimes	Slightly Disagree
How frequently you use e-libraries?	2.25	0.92	Sometimes	Slightly Disagree
How frequently you use technical dictionaries?	2.24	0.90	Sometimes	Slightly Disagree
How frequently you use monolingual dictionaries?	2.23	0.89	Sometimes	Slightly Disagree
My teachers expect me to use a computer as part of my learning process.	2.22	0.83	Partly Disagree	Slightly Disagree
How frequently you use target language encyclopedias/lexicons (e.g. Wikipedia) in learning?	2.18	0.91	Sometimes	Slightly Disagree
How frequently you use vlogs in learning?	2.18	1.10	Sometimes	Slightly Disagree
How frequently you use vlogs?	2.17	1.10	Sometimes	Slightly Disagree
How frequently you use encyclopedias/lexicons (e.g. Wikipedia)?	2.16	0.88	Sometimes	Slightly Disagree
I cannot learn without using ICT tools.	2.14	0.91	Partly Disagree	Slightly Disagree
How frequently you use e-journals?	2.13	0.96	Sometimes	Slightly Disagree
How frequently you use online courses (MOOC) in language learning?	2.13	1.03	Sometimes	Slightly Disagree
How frequently you use programming in mathematics learning?	2.12	1.01	Sometimes	Slightly Disagree
How frequently you use online learning with a native speaker (e.g. Language Exchange Community) in learning?	2.08	0.85	Sometimes	Slightly Disagree
How frequently you use simulations?	2.07	0.92	Sometimes	Slightly Disagree
How frequently you use podcasts?	2.06	0.95	Sometimes	Slightly Disagree
How frequently you use simulations in online learning?	2.05	0.90	Sometimes	Slightly Disagree
How frequently you use monolingual dictionaries (e.g. Cambridge/Oxford/Duden) in online learning?	2.00	0.84	Sometimes	Slightly Disagree
How frequently you use podcasts in online learning?	1.98	0.90	Sometimes	Slightly Disagree
How frequently you use blogs?	1.81	0.85	Sometimes	Slightly Disagree
How frequently you use blogs in online learning?	1.80	0.84	Sometimes	Slightly Disagree
Overall	**2.54**	**0.08**	**Sometimes/partly disagree**	**Slightly Disagree**

The indicator "Using a smartphone for learning is very important to me" has the highest mean of 3.38. This indicates that students fully agree that utilizing a smartphone for educational purposes is very essential. It implies that smartphones are a critical and highly valued tool in their learning process, likely due to their accessibility, multi-functionality, and ability to provide immediate access to information and learning resources. This high valuation implies that educational institutions should prioritize integrating smartphone-based learning strategies into their curricula. Talan

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(2020) emphasizes that having the right tech infrastructure, readily available technical support, and carefully reviewed curriculum are all key to successful mobile learning integration and boost the overall learning experience. This is followed by the indicator "How frequently you use social media (e.g., Facebook)?" with a mean of 3.37. This score suggests that students fully agree (FA) the use of social media platforms like Facebook. Social media's pervasive role in communication and information sharing could explain its frequent use as an informal learning tool, offering opportunities for collaboration, resources, and support among peers. It implies a need to explore how these platforms can be leveraged for formal learning, perhaps through dedicated educational groups, collaborative projects, or the sharing of learning resources. Understanding the effects of blending social media with both formal and informal learning environments can work towards a more balanced and improve learning environment (Kumar & Nanda, 2022). In the statement "Teachers give us guidance on how to use ICT tools for learning.", indicating moderately agree (MA), the average score of 3.24 suggests that teachers' assistance in the classroom is vital for students to improve their academic performance. Since teachers depend on professional development opportunities to learn effective strategies for ICT integration, successful ICT integration extends beyond what an individual teacher can do (Ibrahim, *et al*., 2024). Giving teachers the right skills and resources to guide students in using ICT tools is critical for making the most of technology in education. Implying that continuous support and training are needed to keep up with new technologies, so teachers can effectively prepare students for the future.

Students' Academic Performance in Mathematics

The level of academic performance of math in grade 10 students is shown in Table 8. Specifically, the performance is the first quarter grades of the 203 mathematics grade 10 students for the academic year 2024-2025. The grades were interpreted based on the Department of Education's grading system. Based on the table, students' grades have a mean of 83.15 and a standard deviation of 4.17 and are in the range of 80-84%. Based on the Department of Education's grading system, a grade of 83.15 has a corresponding descriptor of Satisfactory.

Table 8: Students' Level of Academic Performance in Mathematics

Variable	N	Mean	Std. Deviation	Qualitative Description
Performance in Mathematics	203	83.15	4.17	Satisfactory

This indicates that students are performing well in mathematics, with a mean of 83.15. Students can comprehend most of the material and meet the requirements, which is why the results are classified as "Satisfactory". Their job is accomplished, and they utilize their valuable skills and knowledge. The data, however, also provides evidence that there is still some ground which can be covered to enhance the students' performance even further.

Relationship between Student's Technology Use Frequency Scale and Academic Performance in Mathematics

Table 9 presents the correlation between the students' ICT Use frequency scale and academic performance in mathematics. The students' academic performance in mathematics is positively correlated with their ICT Use frequency scale, as shown by this table. The correlation between students' ICT Use frequency scale and mathematics academic performance is very weak. Two variables that have a low correlation implies that there is a weak to no linear relationship with one another.

Table 9: The Correlation between the Students' ICT Use Frequency Scale and Academic Performance in Mathematics

Variables	Correlation Coefficient	Sig.
Students' ICT Use Frequency Scale and Academic Performance in Mathematics	0.048	0.495

Furthermore, the significance value of 0.495 indicates that the relationship is not of statistical significant as it surpasses the conventional cut from 0.05. This further reinforces the idea that there isn't a meaningful connection between how frequently students use ICT tools and their academic performance in mathematics.

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Relationship between Student's Technology Use Agreement Scale and Academic Performance in Mathematics

In Table 10, the correlation coefficient between the Students' ICT Use Agreement Scale and Academic Performance in Mathematics is 0.081, accompanied by a significance value (Sig.) of 0.250. The use of ICT tools and students performance in mathematics has a weak correlation. According to Sirug, W.S. PhD (2015), the interpretation of the coefficient 0.081 as 'Very Low Correlation'. A lack of clear correlation between students' agreement with ICT use and math performance suggests that variance in student opinions regarding ICT tools has little impact on math performance.

Table 10: The Correlation between the Students' ICT Use Agreement Scale and Academic Performance in Mathematics

Variables	Correlation Coefficient	Sig.
Students' ICT Use Agreement Scale and Academic Performance in Mathematics	0.081	0.250

Additionally, the significance value of 0.250 is greater compared to the usual cutoff at 0.05, which means that the found correlation isn't statistically significant. This implies that how much students agree with the Students' ICT Use Agreement Scale is not significantly impacted by students' academic performance in math. It also hints that there may be other factors influencing students' success in math that this measure of ICT usage doesn't capture.

Relationship between Student's Technology Use and Academic Performance in Mathematics

In Table 11, the overall correlation between Students' ICT Use, which encompasses both the ICT Use Frequency Scale, and the ICT Use Agreement Scale and Academic Performance in Mathematics is reported as a correlation coefficient of 0.066 having a significance level of 0.351. It shows an unusually weak correlation, indicating there's nearly no direct link among how much students use ICT tools and their performance in mathematics. This finding is consistent with the results from Table 5 and Table 6, which also pointed to similarly low correlations, with coefficients of 0.048 and 0.081. Neither were statistically significant (p = 0.495 and 0.250).

Table 11: The Correlation between the Students' ICT Use and Academic Performance in Mathematics

Variables	Correlation Coefficient	Sig.
Students' ICT Use and Academic Performance in Mathematics	0.066	0.351

The combined results reinforce the conclusion that variations in students' ICT usage, whether in terms of frequency or agreement, do not substantially impact their academic performance in mathematics, suggesting the need for exploration of other contributing factors that may influence student achievement in this subject.

CONCLUSIONS AND RECOMMENDATIONS

The study reveals that students exhibit moderate engagement with Information and Communication Technology (ICT) tools in their learning. This is reflected in their average score of 2.41 for how often they use these tools and a score of 2.87 for their agreement regarding their use. While students utilize certain ICT resources such as smartphones and social media platforms frequently, there is a notable underutilization of other tools, like blogs and podcasts. Moreover, the data shows that students' academic performance in mathematics is satisfactory, with an average score of 83.15. However, the correlation results demonstrate a very low relationship between technology use and academic performance, with coefficients indicating that neither frequency nor agreement on ICT usage significantly affects students' performance in mathematics.

It is advisable for schools to promote the inclusion of ICT tools in the curriculum, while also offering workshops and interactive sessions that encourage students to explore less-used resources. This would enhance the educational experience. Moreover, embracing technology in math education can create interactive and engaging learning environments, enabling students to visualize complex concepts and receive instant feedback. In addition, educators need to be trained to efficiently teach and assist students in utilizing these tools, which will reinforce their role in the learning process. Reviewing the curriculum to ensure it

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works well with ICT can help remove obstacles to using technology in learning. At the same time, fostering a positive attitude toward technology among students can boost their engagement and ultimately enhance their academic performance.

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REFERENCES

1. Alsamadani, H. A. "The effectiveness of using online blogging for students' individual and group writing." *International Education Studies* 11.1 (2018): 44–51.
2. Benini, S. "Is ICT really essential for learning? Perceptions and uses of ICTs for language acquisition in secondary level environments." In S. Jager, L. Bradley, E. J. Meima, & S. Thouësny (Eds.), *CALL Design: Principles and Practice; Proceedings of the 2014 EUROCALL Conference, Groningen, The Netherlands* (2014): 23–28. Dublin: Research-publishing.net.
3. Celeste, R. J. & Nimfa, O. "Challenges and Implementation of Technology Integration: Basis for Enhanced Instructional Program." *American Journal of Arts and Human Science (AJAHS)* (2024).
4. Cordova, C. & Tan, D. A. "Mathematics proficiency, attitude and performance of grade 9 students in private high schools in Bukidnon, Philippines." *Asian Academic Journal of Social Science & Humanities* 5.2 (2018): n.p. https://www.researchgate.net/publication/326649734
5. Courtney, M., Karakus, M., Zara, E. & Nurumov, K. "The influence of ICT use and related attitudes on students' math and science performance: Multilevel analyses of the last decade's PISA surveys." *Large-scale Assessments in Education* 10.1 (2022): 8.
6. Ahmed, M., Hassanein, H. & Mahmoud, A. "Oxidative stress and inflammation in diabetic complications: A review." *Journal of Advanced Research in Medicine* 14.3 (2019): 125–140.
7. Ahmed, M., Raju, S. & Kapoor, P. "The role of saponins in lipid metabolism and cardiovascular health." *Phytotherapy Research* 35.4 (2021): 567–578.
8. Ahmed, R., Raju, J. & Kapoor, R. "Extraction and characterization of saponins from fenugreek seeds and their biological activities." *Journal of Medicinal Plant Research* 15.4 (2021): 123–130.
9. Basch, E., Ulbricht, C., Kuo, G., Szapary, P. & Smith, M. "Therapeutic applications of fenugreek (*Trigonella foenum-graecum* L.)." *Alternative Medicine Review* 8.1 (2003): 20–27.

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10. Patel, D. K., Prasad, S. K., Kumar, R. & Hemalatha, S. "An overview on antidiabetic medicinal plants having insulin mimetic property." *Asian Pacific Journal of Tropical Biomedicine* 11.2 (2021): 1–10.

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