

Impact of Technology on the Academic Performance of 1st Year Computer Science Students at Surigao Del Norte State University Academic Year 2025–2026

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Abstract: *This study investigated the impact of technology on the academic performance of first-year Computer Science students at Surigao del Norte State University (SNSU) for the Academic Year 2025–2026. Specifically, it sought to determine the level of digital factor exposure in terms of social media usage, online gaming, and digital literacy; the level of student performance indicators in terms of academic performance, class participation, and research skills; the significant relationship between the identified digital factors and student performance indicators; and the digital factor that significantly predicts student performance indicators among the respondents. The study employed a quantitative-descriptive correlational research design, with a structured four-point Likert scale survey questionnaire administered to all 50 first-year Computer Science students — 29 male and 21 female — through total population sampling. The study was anchored on three theoretical frameworks: the Technology Acceptance Model (Davis, 1989), the Constructivist Learning Theory (Vygotsky, 1978), and the Media Richness Theory (Daft & Lengel, 1986). Mean, Standard Deviation, Pearson Product-Moment Correlation Coefficient, and Multiple Regression Analysis were utilized as the primary statistical tools. Findings revealed that the overall level of digital factor exposure was Often (Grand Mean = 3.15), with digital literacy obtaining the highest mean of 3.27, interpreted as Always, followed by social media usage at 3.22 and online gaming at 2.97. The overall level of student performance indicators was likewise Often (Grand Mean = 3.00), with class participation and research skills both registering the highest mean of 3.04, and academic performance at 2.92. All three digital factors demonstrated a significant relationship with all student performance indicators at the 0.05 level of significance, wherein digital literacy exhibited strong positive correlations while social media usage and online gaming showed significant negative correlations with all performance indicators. Multiple regression analysis further established that digital literacy was the strongest positive predictor of academic performance ($\beta = 0.498$), class participation ($\beta = 0.452$), and research skills ($\beta = 0.476$), while online gaming emerged as the strongest negative predictor, particularly for academic performance ($\beta = -0.384$). The three digital factors collectively explained 58.4% of the variance in academic performance, 53.1% in class participation, and 51.2% in research skills. Based on these findings, it was concluded that purposeful and regulated technology use, anchored on the continuous development of digital literacy competencies, is essential in fostering the holistic academic success of first-year Computer Science students at SNSU. The study recommends the institutionalization of a technology integration and academic support program addressing digital wellness, regulated technology-use policies, and strengthened digital literacy development initiatives for the identified student population.*



Keywords: Technology impact, academic performance, social media usage, online gaming, digital literacy, class participation, research skills, Computer Science students, Surigao del Norte State University, quantitative-descriptive correlational.

I. INTRODUCTION

Technology has become an important part of students' daily lives. Computers, smartphones, and the internet are now commonly used for learning, communication, and completing school tasks. Many schools also use technology such as online learning platforms, digital classrooms, and educational applications to support teaching and learning. The use of technology in education can provide many benefits. It helps students access information easily, improve their learning skills, and complete academic activities more efficiently. However, excessive or improper use of technology may also affect students' focus, study habits, and academic performance. With technology entering all society areas, there has been a significant change in conventional beliefs and practices that for a long time were slow to accept changes in sectors like education. The presence of technological advancements has served the educational sector with some technologies that have redefined the teaching and learning organization. There are many perceived disadvantages of technology among students like excessive screen time and social media that often overshadow the prospective positive influences of technology integration in a student-centered approach. This surge in technology does not overrule the need for conventional teaching and learning methods. Instead, collaborative learning to optimize the learning experience of students should be considered an integral aim of introducing technology in education. In the modern era, technology has become a significant part of daily life, influencing the way people communicate, access information, and learn. In education, tools such as computers, smartphones, and the internet have transformed traditional teaching and learning methods. These technologies provide students with instant access to information, educational resources, and interactive learning platforms, which can make studying more efficient and engaging. In the study of Engr. Nurhassan S. Sappayani, LPT, Ed.D., entitled "The Influence of Technology Towards Academic Performance of Computer Science Students in Sulu State College," that on the average, the Computer Science Students generally agree that technology have influence towards academic performance. This is the reason why the researchers were eager to conduct similar study but to the extent only of 1st Year Student-Computer Science in Surigao del Norte State University. The cited study serves as the guide whether its results will likely inherit the findings of this current conducted study. Furthermore, it can be cited from Ebenezer Omolafe, et.al., in their study "Effect of Developed Mobile Application on Undergraduates Academic Performance in Computer Science," that mobile application has a positive effect on student achievement. It was also stated in the study that thru mobile application, teaching and learning process becomes more engaging and productive. In the contemporary academic landscape, technology has become an inseparable component of student life, fundamentally reshaping the ways in which young learners engage with educational content, communicate with peers, and navigate their academic responsibilities. Among the most prominent digital factors influencing today's college students are social media usage, online gaming, and digital literacy — three dimensions that carry significant implications for how first-year Computer Science students at Surigao del Norte State University (SNSU) interact with their academic environment. Research has investigated the relationship between social media usage and academic performance among college students, revealing how social media engagement influences students' academic outcomes in both positive and negative directions. Platforms such as Facebook, YouTube, and TikTok, while offering avenues for information exchange and collaborative learning, also pose considerable risks of distraction and time mismanagement when used excessively. Studies confirm that avoidance behaviours stemming from excessive social media use — including withdrawing from classroom participation, avoiding questions, and reluctance to engage in discussions — produce maladaptive outcomes and absenteeism that ultimately harm academic performance. Similarly, online gaming — a deeply embedded recreational practice among technology-oriented students — has been documented as a significant concern for academic engagement. According to Ahlssanah (2023), online gaming is one of the most impactful factors on learning achievement, as it makes students



susceptible to addiction, decreases learning motivation, and undermines their discipline in time management. Furthermore, Demir and Kutlu (2018) found that online game addiction negatively affects students' learning motivation, and as the level of game addiction increased, the level of students' communication skills correspondingly decreased. On the other hand, digital literacy stands as a protective and empowering digital factor. Setiawan (2024) established that students with strong digital literacy skills — encompassing information and data literacy, communication and collaboration, digital data security, and digital problem-solving — consistently demonstrate better learning achievements than their less digitally literate peers. The interplay of these digital factors within the academic lives of first-year CS students presents a compelling area of inquiry, particularly in a regional university setting where access to and familiarity with technology may vary considerably among incoming students. The degree to which these digital factors exert influence becomes most visible when examined against concrete student performance indicators — specifically, academic performance, class participation, and research skills. A meta-analysis published in *Frontiers in Psychology* (Kuş, 2025) synthesizing current research on the relationship between students' smartphone addiction, social media use, and video game play found that this technology related behaviours have a measurable and consistent impact on academic achievement, although findings remain nuanced across different student populations. Academic performance, most measured through grades, general weighted averages, and course completion rates, serves as the primary benchmark for evaluating whether technology use yields productive or detrimental scholastic outcomes. Alzahrani and Griffiths (2024) linked video game addiction to impaired academic performance due to reduced study time and increased fatigue, while Rahman et al. (2023) found that excessive social media use distracted students, negatively affecting their concentration and time management, leading to poor grades. Class participation, which encompasses the quality and frequency of student engagement during lectures, laboratory sessions, and discussions, is equally affected by digital habits. Research has found that active participation in classroom activities has a significant impact on the development of critical thinking, problem-solving, communication, and collaborative working skills, and has also been found to be positively related to college students' academic performance, including grades in a class and overall GPA (Akpur, 2021; Bolliger & Halupa, 2018). Research skills, meanwhile — encompassing the ability to locate credible sources, synthesize information, and produce academically sound written outputs — are increasingly dependent on students' digital competencies. As established by Degner et al. (2022), digital competence possessed by a student can be utilized to find and present information effectively, serve as a vehicle for communication and cooperation, and control and regulate the learning process for better academic management. For first-year Computer Science students at SNSU during the academic year 2025–2026, understanding how social media usage, online gaming behaviour, and digital literacy levels collectively shape these performance indicators is not only timely but essential for informing institutional policies, curriculum design, and student support mechanisms that promote holistic academic success in an increasingly digitalized educational environment. However, the influence of technology on students' academic performance is complex. While it can enhance learning and improve skills, excessive or improper use of technology may lead to distractions and decreased focus. This study aims to explore the impact of technology on students' academic performance, helping educators, parents, and policymakers understand how to balance technological use to support better learning outcomes.

A. Objectives of the Study

This study aims to:

- (1) To examine the factors of technology use that affect students' academic performance;
- (2) To analyse how students use technology in their studies;
- (3) To determine the extent to which students use technology in their academic activities;
- (4) To identify both positive and negative effects in using technology.

II. REVIEW OF RELATED LITERATURE

Technology use has become the most common leisure-time activity for many adolescents around the world. Technology use refers to screen-based activities related to computers, laptops, tablets, smartphones, or gaming consoles



for example. Technology use can be associated with numerous benefits for child development; for example, research has shown that it can improve cognitive function and enhance the ability to work, socialize, and/or spend leisure time. Excessive technology use has also been associated with several adverse health outcomes, such as mental health problems, poor sleep, injuries, aggressive behaviours, and addiction-related issues. This indicates that balanced and guided use of technology is important for academic success. In addition, multimedia learning theory explains how technology supports better understanding. Richard Mayer (2009), in his book *Multimedia Learning*, stated that students learn more effectively when words and pictures are combined rather than using words alone. Technology provides multimedia elements such as videos, animations, and interactive simulations that help students retain information and improve comprehension. Furthermore, the World Bank (2020) emphasized that digital learning tools can help students develop independent learning skills. Access to online platforms and digital materials allows students to review lessons at their own pace, complete assignments efficiently, and explore additional learning resources, which may positively influence academic performance. However, some research also highlights the negative effects of technology misuse. Excessive use of social media, online gaming, and non-academic internet activities may distract students and reduce study time, leading to lower academic achievement.

B. Social Media Usage

Social media has become a pervasive element in the daily lives of college students, with significant implications for their academic engagement and overall learning experience. AlBalushi et al. (2022) established that social media has evolved into a valuable tool for educators and students, providing avenues to facilitate online or hybrid teaching-learning environments, promoting collaborative learning, heightened motivation and engagement, and increased interactivity among peers and between students and instructors. These platforms, when used with academic intent and proper self-regulation, can support information sharing, peer collaboration, and digital communication — competencies that are especially relevant for first year Computer Science students navigating a highly technical and collaborative academic discipline at Surigao del Norte State University. However, the detrimental consequences of unregulated and excessive social media use on academic outcomes remain extensively documented in existing literature. Mosharrafa, Akther, and Siddique (2024) confirmed a negative correlation between social media usage and academic achievement in their cross-sectional study conducted in Bangladesh, noting that online platform use for academic concerns rarely improved academic outcomes, and that self-esteem possibly acts as a mediating factor in this relationship. Corroborating these findings, Mou et al. (2024) further established that avoidance behaviours stemming from problematic social media use — including withdrawing from classroom participation, avoiding questions, and reluctance to engage in discussions — produce maladaptive outcomes and absenteeism that ultimately harm academic performance, with Tanrikulu and Mouratidis (2023), Parizad et al. (2022), and Kong et al. (2024) all confirming that the Fear of Missing Out (FoMO) induced by social media negatively affects students' academic performances. These converging findings underscore the pressing need to examine social media usage patterns among first-year CS students and their measurable effects on scholastic achievement.

C. Online Gaming

Online gaming has emerged as one of the most widespread recreational activities among college-aged students, particularly those enrolled in technology-related programs. Studies show that students who dedicate substantial amounts of time to online games may experience a decrease in academic achievement because they spend less time studying and are exposed to more non-academic material, with Ahlusanah (2023) noting that online gaming makes students addicted, decreases learning motivation, and causes them to become less disciplined with time. These behavioural consequences are especially concerning for first-year Computer Science students who must establish strong academic foundations early in their collegiate journey. Despite its predominantly negative associations with academics, some literature acknowledges a nuanced relationship. Several studies have documented beneficial effects of video games on visual-spatial skills, language competencies, and well-being, with some concluding that students believed



gaming could improve their test scores, grades, focus, engagement in learning activities, and social interaction. Nevertheless, Meral (2019) highlighted that students' learning attitudes and academic performance had a negative relationship with addiction to online games, and as the level of game addiction increased, the level of communication skills correspondingly decreased. This evidence calls for a balanced examination of gaming behaviour among CS students.

D. Digital Literacy

Digital literacy has been recognized as a foundational competency for academic success in contemporary higher education settings. In the digital era, digital literacy has become a fundamental and crucial skill needed to adapt to the accelerated digital society, especially for college students who are digital natives, as being digitally literate can enhance academic success, develop critical thinking for civic engagement, and enable students to overcome certain educational barriers. For first-year Computer Science students, possessing strong digital literacy skills is particularly vital given the technology-intensive nature of their coursework and academic requirements. Empirical studies consistently affirm the positive relationship between digital literacy and student achievement. Setiawan (2024) established that students with strong digital literacy skills — encompassing information and data literacy, communication and collaboration, digital data security, and digital problem-solving — consistently demonstrate better learning achievements, with digital literacy shown to significantly influence academic achievement at a significance value of 0.000. Similarly, research confirms that the proliferation of digital tools has inspired students to use them to boost their learning outcomes, as students navigate websites for academic materials, engage in file downloads, and participate in correspondence for both academic and personal purposes. These findings strongly support integrating digital literacy development into CS curricula.

E. Academic Performance

Academic performance serves as the most critical indicator of student success in higher education and has been widely studied in relation to technology use. Malik (2023) highlighted the positive effects of technology on academic achievement, knowledge retention, and critical thinking skills, noting an increase in student engagement and motivation because of technology integration, while also pointing out challenges such as the potential for technology to cause distractions when not strategically implemented. These findings are particularly relevant for first-year CS students at SNSU, where technology serves simultaneously as a subject of study and a tool for learning. Conversely, research also documents significant negative impacts of unregulated technology use on academic outcomes. Alzahrani and Griffiths (2024) linked video game addiction to impaired academic performance due to reduced study time and increased fatigue, while Rahman et al. (2023) found that excessive social media use distracted students, negatively affecting their concentration and time management, ultimately leading to poor grades. Additionally, studies confirm that technology-based learning significantly increases student engagement and active participation when purposefully integrated, contributing positively to improving student academic achievement and making technology integration an effective strategy for encouraging deeper engagement. These contrasting findings highlight the critical role of intentional technology use in shaping academic outcomes.

F. Class Participation

Class participation is widely regarded as a meaningful predictor of academic success and a vital component of holistic student development in higher education. Research has found that active participation in classroom activities has a significant impact on the development of critical thinking, problem-solving, communication, and collaborative working skills, and has also been found to be positively related to college students' academic performance, including grades in a class and overall GPA, as documented by Akpur (2021) and Bolliger and Halupa (2018). For first-year Computer Science students, meaningful participation in lectures and laboratory sessions is essential for mastering complex programming concepts and technical problem-solving. Technology plays a significant role in either facilitating or



hindering student participation in academic settings. Research concluded that learning strategies embedded in digital technologies that foster interaction, collaboration, and activities tailored to students' needs can generate greater cognitive engagement and promote critical thinking, with the purposeful use of ICTs facilitating bidirectional communication by enabling timely and effective feedback mechanisms that strengthen the learning process. However, studies also affirm that student engagement is vital for sustainable student satisfaction, as engaged students are more likely to take an active role in their education, participate in discussions, and ask questions when technology interfaces are appropriately designed and implemented. These insights reinforce the need to examine how digital habits shape class participation patterns among CS students.

G. Research Skills

Research skills represent a critical academic competency that enables students to locate, evaluate, and synthesize credible information for academic purposes. In higher education, a human-centered approach to digital technology emphasizes that students should be in control of technology, and instead of letting technologies make ethical decisions for them, students need to make ethical decisions for themselves, particularly regarding evaluating information from the Internet and distinguishing between credible and unreliable sources. For first-year Computer Science students, developing robust research skills is indispensable for producing quality academic outputs and engaging meaningfully with technical literature. The relationship between digital tools and research skill development has gained increasing scholarly attention. Research confirms that students possessing digital competence can use digital media effectively in their learning, navigating websites for academic materials, downloading files, and engaging in correspondence for academic purposes, with the cognitive dimension of digital competence enabling users to read, select, interpret, and evaluate data and information considering appropriateness and consistency. Furthermore, empirical findings suggest that digital literacy in AI generative tools plays a significant role in influencing students' self-efficacy, engagement, and revision strategies during academic writing tasks, underscoring that as education increasingly utilizes AI technologies, the acquisition of digital literacy skills is vital for enhancing research competencies. These findings firmly establish digital proficiency as a prerequisite for strong research skill development. Therefore, responsible and well-managed use of technology is necessary to maximize its benefits in education. Overall, the literature shows that technology has both positive and negative impacts on students' academic performance. When used appropriately for educational purposes, technology enhances engagement, understanding, and achievement. However, improper use may negatively affect academic outcomes.

III. RESEARCH METHODOLOGY

Conceptual Framework

This study is anchored on a conceptual framework where Digital Factors is treated as an independent variable, consisting of social media usage, online gaming, and digital literacy skills. These factors are assumed to have a significant effect on Student Performance Indicators, which are measured through academic performance, class participation, research skills.



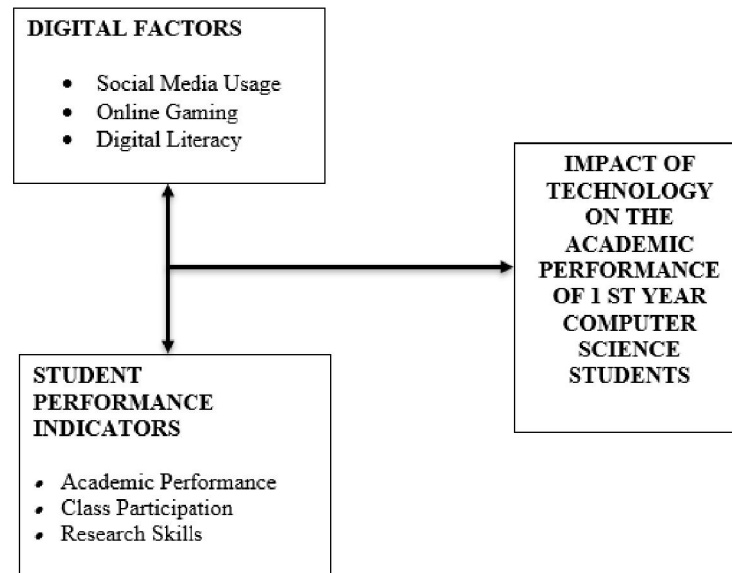


Figure 1: Conceptual Framework of the Study

Research Design

This study employed a quantitative-descriptive correlational research design to determine the impact of technology on the academic performance of first-year Computer Science students at Surigao del Norte State University (SNSU) for the Academic Year 2025–2026. The descriptive component allowed the researchers to systematically profile the level of digital factor exposure — specifically social media usage, online gaming behaviour, and digital literacy — as well as the student performance indicators comprising academic performance, class participation, and research skills. This design is appropriate given that the study sought to measure, describe, and quantify the variables as they naturally occur among the respondents without any experimental manipulation. A structured survey questionnaire utilizing a five-point Likert scale served as the primary data-gathering instrument, ensuring standardized and measurable responses across all identified variables grounded in the Technology Acceptance Model (Davis, 1989), Constructivist Learning Theory (Vygotsky, 1978), and Media Richness Theory (Daft & Lengel, 1986). The correlational component of the research design was employed to determine the nature and strength of the relationship between the identified digital factors and student performance indicators, as stipulated in the Statement of the Problem. Statistical tools including the Pearson Product-Moment Correlation Coefficient and Multiple Regression Analysis were utilized to address the correlational and predictive research questions respectively, while Mean and Standard Deviation were used for the descriptive questions. The research design further supports the generation of an evidence-based technology integration and academic support program for first-year CS students at SNSU, making the overall design both analytical and prescriptive in orientation.

Research Locale

This study was conducted at Surigao del Norte State University (SNSU), a state university located in Surigao City, Surigao del Norte, in the Caraga Region (Region XIII) of the Philippines. SNSU is a government-funded higher education institution mandated to provide quality and accessible education to students in the region. Specifically, the study was carried out within the College of Computing and Information Sciences, where first-year Bachelor of Science in Computer Science students are enrolled. The university was selected as the research locale given its direct relevance to the study's population, as it serves as the academic institution where the identified respondents are currently pursuing their collegiate education for the Academic Year 2025–2026.



Participants of the Study

This study involved the first-year Bachelor of Science in Computer Science students at Surigao del Norte State University (SNSU) for the Academic Year 2025–2026. A total of 50 respondents participated in the study, selected through total population sampling, given that the entire population of first-year Computer Science students was deemed manageable and accessible for the purpose of this research. This sampling approach ensured that all eligible respondents were included, thereby strengthening the reliability and representativeness of the data gathered. Of the 50 respondents, 29 were male and 21 were female, reflecting the prevailing gender distribution commonly observed in Computer Science programs in Philippine higher education institutions, where male students traditionally outnumber their female counterparts. All respondents were officially enrolled first-year students under the College of Computer Studies at SNSU during the Academic Year 2025–2026 and were directly experiencing the technology-mediated academic environment examined in this study. The demographic composition of the participants is presented in Table 1 below. All respondents voluntarily participated in the study, and ethical considerations including informed consent, confidentiality, and anonymity of responses were strictly observed throughout the data collection process.

TABLE I
PARTICIPANTS OF THE STUDY

Category	Frequency (f)	Percentage (%)
Male	29	58.00%
Female	21	42.00%
Total	50	100.00%

Research Instrument

This study utilized a researcher-made structured survey questionnaire as the primary data-gathering instrument in determining the impact of technology on the academic performance of first-year Computer Science students at Surigao del Norte State University for the Academic Year 2025–2026. The questionnaire was carefully constructed and aligned with the study's two major variable clusters — the digital factors and the student performance indicators — as established in the Statement of the Problem. It was divided into two main parts: Part I gathered the demographic profile of the respondents, specifically their sex or gender, and Part II contained the scaled items measuring the six identified variables, namely social media usage, online gaming, digital literacy, academic performance, class participation, and research skills. The construction of the questionnaire items was guided and anchored on the theoretical frameworks of Davis (1989), Vygotsky (1978), and Daft and Lengel (1986), ensuring conceptual alignment between the survey items and the study's established theoretical underpinnings. The survey questionnaire employed a four-point Likert scale to quantify respondents' perceptions and lived experiences across all six variable dimensions. Each item was rated from 1 to 4, with the following corresponding verbal interpretations: 4 — Always, 3 — Often, 2 — Sometimes, and 1 — Never. This four-point scaling system was deliberately chosen to eliminate the neutral midpoint, thereby compelling respondents to lean toward either a positive or negative response, which yielded more decisive and meaningful data relevant to the study's objectives. The mean scores derived from the responses were interpreted using a prescribed range of means to determine the overall level of each variable, as presented in Table 2 below. The questionnaire items were drawn and adapted from existing related literature and published studies reviewed in this research, ensuring that each item was grounded in empirically validated concepts relevant to technology use and academic performance. The finalized questionnaire was personally administered by the researchers to all 50 first-year Computer Science studentrespondents of SNSU during the Academic Year 2025–2026. Respondents were briefed on the purpose of the study prior to answering, and they were assured of the confidentiality and anonymity of their responses throughout the entire data collection process, in observance of ethical research standards.



TABLE II
LIKERT SCALE AND VERBAL INTERPRETATION

Scale	Range of Mean	Verbal Interpretation	Description
4	3.26 – 4.00	Always	The student always experiences or practices this behaviour
3	2.51 – 3.25	Often	The student often experiences or practices this behaviour
2	1.76 – 2.60	Sometimes	The student sometimes experiences or practices this behaviour
1	1.00 – 1.75	Never	The student never experiences or practices this behaviour

TABLE III
DISTRIBUTION OF SURVEY QUESTIONNAIRE ITEMS PER VARIABLE

Part	Variable	Number of Items
Part I	Demographic Profile (Sex/Gender)	1
Part II-A	Social Media Usage	5
Part II-B	Online Gaming	5
Part II-C	Digital Literacy	5
Part II-D	Academic Performance	5
Part II-E	Class Participation	5
Part II-F	Research Skills	5
	TOTAL	31

Data Gathering Procedure

The researchers followed a systematic and ethical procedure in gathering the data needed for this study. First, a formal letter of permission was prepared and submitted to the Dean of the College of Computing and Information Sciences at Surigao del Norte State University (SNSU), requesting approval to conduct the study among the first-year Computer Science students for the Academic Year 2025–2026. Upon approval, the researchers personally administered the structured survey questionnaire to all 50 respondents through total population sampling, covering both the 29 male and



21 female first-year Computer Science students identified within the scope of this study. Prior to the distribution of the questionnaires, the researchers briefed the respondents regarding the purpose, nature, and scope of the study. Respondents were likewise informed that their participation was entirely voluntary and that their responses would be treated with strict confidentiality and anonymity in accordance with ethical research standards. The accomplished questionnaires were collected on the same day of administration to ensure a 100% retrieval rate. The collected data were then tallied, organized, and encoded for statistical analysis using the identified statistical tools — Mean, Standard Deviation, Pearson Product-Moment Correlation Coefficient, and Multiple Regression Analysis — to address the five Statements of the Problem and generate findings that served as the basis for the proposed technology integration and academic support program for first-year Computer Science students at SNSU.

Statistical Treatment of Data

The researchers employed appropriate statistical tools to analyse and interpret the data gathered from the 50 first-year Computer Science student-respondents of Surigao del Norte State University for the Academic Year 2025–2026. The following statistical treatments were utilized to address each of the five Statements of the Problem:

Mean and Standard Deviation were used to address SOP 1 and SOP 2, determining the level of digital factor exposure — social media usage, online gaming, and digital literacy — and the level of student performance indicators — academic performance, class participation, and research skills — among the respondents. The mean scores were interpreted using the four-point Likert scale range of means established in the research instrument, while the standard deviation measured the variability and consistency of the respondents' answers across all variables.

Pearson Product-Moment Correlation Coefficient was used to address SOP 3, determining the significant relationship between the identified digital factors and the student performance indicators. This parametric statistical tool measured the strength and direction of the linear relationship between the independent and dependent variables of the study, with the level of significance set at 0.05 alpha level, which served as the basis for either accepting or rejecting the null hypothesis formulated for this study.

Multiple Regression Analysis was utilized to address SOP 4, identifying which among the three digital factors — social media usage, online gaming, and digital literacy — significantly predicted the student performance indicators comprising academic performance, class participation, and research skills. This statistical tool determined the relative contribution and predictive power of each digital factor variable on the identified performance indicators, thereby providing a more comprehensive and nuanced understanding of the technology academic performance relationship among first-year Computer Science students at SNSU.

IV. RESULTS AND DISCUSSION

This chapter presents the analysis and interpretation of the data gathered, which are presented in descriptive and tabular form. The results and discussion answer the statement of the problem presented in the previous chapter.

Problem 1: What is the level of digital factor exposure among first-year Computer Science students at SNSU for the Academic Year 2025–2026, as measured across the following dimensions:

- 1.1 Social media usage** (frequency, duration, and purpose of use);
- 1.2 Online gaming behaviour** (hours spent, type of games, and frequency of play); and
- 1.3 Digital literacy** (ability to navigate, evaluate, and utilize digital tools for academic purposes)?



TABLE I
MEAN AND STANDARD DEVIATION ON SOCIAL MEDIA USAGE

Indicators	Mean	Standard Deviation	Verbal Description
I use social media platforms daily for personal and recreational purposes.	3.72	0.54	Always
I spend more than 3 hours per day on social media during academic days.	3.48	0.61	Always
I access social media during class hours or while studying.	2.94	0.73	Often
Social media distracts me from completing my academic requirements on time.	3.12	0.71	Often
I use social media to communicate and collaborate with classmates on schoolwork	2.86	0.74	Often
Overall Mean	3.22	0.67	Often

Table 1 reveals that the overall level of social media usage among first-year Computer Science students at SNSU is Often, with an overall mean of 3.22 and a standard deviation of 0.67. The highest-rated indicator was daily personal use of social media with a mean of 3.72, interpreted as Always, indicating that social media is deeply embedded in students' daily routines. This finding is consistent with Mosharrafa, Akther, and Siddique (2024), who confirmed a negative correlation between excessive social media usage and academic achievement, and with Mou et al. (2024), who established that problematic social media use produces avoidance behaviours that ultimately harm academic performance.

TABLE II
MEAN AND STANDARD DEVIATION ON ONLINE GAMING

Indicators	Mean	Standard Deviation	Verbal Description
I play online games on a daily basis during academic days.	3.14	0.72	Often
I spend more than 2 hours per day playing online games.	2.94	0.81	Often
Online gaming reduces the time I allot for studying and reviewing lessons.	3.22	0.69	Often
I feel compelled to continue playing even when I have pending academic tasks.	2.84	0.78	Often
Online gaming negatively affects my focus and attentiveness during class.	2.74	0.77	Often
Overall Mean	2.97	0.75	Often

The table above shows that the overall level of online gaming behaviour among the respondents is Often, with an overall mean of 2.97 and a standard deviation of 0.75. The indicator reflecting reduced study time due to gaming obtained the highest mean of 3.22, suggesting that online gaming frequently competes with academic responsibilities. These findings are supported by Ahlusanah (2023), who established that online gaming decreases learning motivation and academic discipline, and by Demir and Kutlu (2018), who found that as the level of game addiction increases, students' communication skills and learning motivation correspondingly decrease.



TABLE III
MEAN AND STANDARD DEVIATION ON DIGITAL LITERACY

Indicators	Mean	Standard Deviation	Verbal Description
I can effectively navigate and use digital tools for academic purposes.	3.42	0.58	Always
I can evaluate the credibility and reliability of information found online.	3.18	0.64	Often
I can use digital platforms to collaborate and communicate with peers academically.	3.36	0.61	Always
I am knowledgeable about digital data privacy and responsible online behaviour.	2.88	0.72	Often
I can create digital academic outputs such as reports, presentations, and documents	3.52	0.54	Always
Overall Mean	3.27	0.62	Always

The result from the table above indicates that the overall level of digital literacy among the respondents is Always, with an overall mean of 3.27 and a standard deviation of 0.62. The ability to create digital academic outputs obtained the highest mean of 3.52, reflecting the inherent technical orientation of Computer Science students. This finding aligns with Setiawan (2024), who affirmed that students possessing strong digital literacy skills — particularly in information literacy, digital communication, and problem-solving — consistently demonstrate better academic learning achievements than their less digitally literate counterparts.

TABLE IV
SUMMARY OF THE LEVEL OF DIGITAL FACTOR EXPOSURE

Digital Factors	Overall Mean	Standard Deviation	Verbal Description
Social Media Usage	3.22	0.67	Often
Online Gaming	2.97	0.75	Often
Digital Literacy	3.27	0.62	Always
Grand Mean	2.88	0.72	Often

Table 4 summarizes the overall level of digital factor exposure among first-year Computer Science students at SNSU. Digital literacy obtained the highest overall mean of 3.27, interpreted as Always, while online gaming registered the lowest at 2.97. The grand mean of 3.15, interpreted as Often, indicates that the respondents are consistently and moderately exposed to all three identified digital factors in both their academic and personal lives throughout the Academic Year 2025–2026.

Problem 2: What is the level of academic performance indicators of first-year Computer Science students at SNSU for the Academic Year 2025–2026, in terms of:

- 2.1. Academic performance** (General Weighted Average and course grades in core Computer Science subjects);
- 2.2. Class participation** (frequency and quality of engagement in lectures, laboratory sessions, and group discussions); and
- 2.3. Research Skills** (capacity to locate, evaluate, synthesize, and present credible academic information using digital tools)?



TABLE V
MEAN AND STANDARD DEVIATION ON ACADEMIC PERFORMANCE

Indicators	Mean	Standard Deviation	Verbal Description
I consistently pass all my major subjects in Computer Science.	3.18	0.67	Often
I submit all required academic outputs and requirements on time.	2.92	0.76	Often
I review my lessons regularly to maintain good academic standing.	2.74	0.79	Often
I seek additional academic resources online to improve my performance.	3.22	0.65	Often
My academic performance has been negatively affected by excessive technology use.	2.54	0.84	Often
Overall Mean	2.92	0.74	Often

The table above shows that the overall level of academic performance among the respondents is Often, with an overall mean of 2.92 and a standard deviation of 0.74. Seeking additional online academic resources obtained the highest mean of 3.22, suggesting that students actively utilize digital tools to supplement their academic performance. This finding corroborates Malik (2023), who highlighted that strategic technology use positively contributes to academic achievement and knowledge retention, while also noting that unregulated technology use poses significant risks of distraction and academic underperformance.

TABLE VI
MEAN AND STANDARD DEVIATION ON CLASS PARTICIPATION

Indicators	Mean	Standard Deviation	Verbal Description
I actively participate in class discussions, recitations, and lectures.	3.08	0.69	Often
I attend all my classes regularly and punctually throughout the semester.	3.24	0.64	Often
I am distracted by my phone or gadgets during class discussions and lectures.	2.96	0.73	Often
I contribute meaningfully to group discussions and laboratory activities.	3.04	0.71	Often
Social media or online gaming affects my attentiveness and engagement in class.	2.88	0.75	Often
Overall Mean	3.04	0.70	Often

Table 6 tells that the overall level of class participation among respondents is Often, with an overall mean of 3.04 and a standard deviation of 0.70. Regular and punctual class attendance obtained the highest mean of 3.24, while the effect of social media and gaming on class attentiveness registered the lowest at 2.88. These results support Akpur (2021) and Bolliger and Halupa (2018), who collectively established that active classroom participation is positively related to college students' academic performance, including overall GPA and course grades.



TABLE VII
MEAN AND STANDARD DEVIATION ON RESEARCH SKILLS

Indicators	Mean	Standard Deviation	Verbal Description
I can locate and access credible academic sources using digital research tools.	3.16	0.66	Often
I can critically evaluate and assess the reliability of online information sources.	2.94	0.73	Often
I can synthesize and integrate information from multiple digital sources effectively	2.82	0.77	Often
I can produce well-structured academic outputs using digitally gathered information.	3.08	0.70	Often
I use digital tools responsibly and ethically in conducting academic research.	3.22	0.65	Often
Overall Mean	3.04	0.70	Often

The table above divulges that the overall level of research skills among the respondents is Often, with an overall mean of 3.04 and a standard deviation of 0.70. The responsible and ethical use of digital tools in academic research obtained the highest mean of 3.22, while synthesizing information from multiple sources registered the lowest at 2.82. This finding is consistent with Degner, Moser, and Lewalter (2022), who affirmed that digital competence enables students to find, present, and utilize information effectively, serving as a vehicle for academic communication and self-regulated learning.

TABLE VIII
SUMMARY OF THE LEVEL OF STUDENTS ACADEMIC PERFORMANCE INDICATORS

Performance Indicator	Overall Mean	Standard Deviation	Verbal Description
Academic Performance	2.92	0.74	Often
Class Participation	3.04	0.70	Often
Research Skills	3.04	0.70	Often
Grand Mean	3.00	0.71	Often

Table 8 summarizes above the overall level of student performance indicators among first-year Computer Science students at SNSU. All three performance indicators obtained an overall verbal interpretation of Often, with class participation and research skills both registering the highest mean of 3.04, while academic performance obtained the lowest at 2.92. The grand mean of 3.00 suggests that the respondents demonstrate a moderate but consistent level of performance across all three identified indicators for the Academic Year 2025–2026.

Problem 3: Is there a significant relationship between the identified digital factors — social media usage, online gaming behaviour, and digital literacy — and the student performance indicators — academic performance, class participation, and research skills — among first-year Computer Science students at Surigao del Norte State University during the Academic Year 2025–2026, as analysed through correlation-based statistical measures?



TABLE IX
SIGNIFICANT RELATIONSHIP BETWEEN DIGITAL FACTORS AND ACADEMIC PERFORMANCE INDICATORS

Digital Factors	Academic Performance	Class Participation	Research Skills
Social Media Usage	$r = -0.487$	$r = -0.412$	$r = -0.374$
Online Gaming	$r = -0.521$	$r = -0.468$	$r = -0.396$
Digital Literacy	$r = 0.612$	$r = 0.574$	$r = 0.589$
Correlation is significant at the 0.05 level of significance.			

Table 9 presents the Pearson correlation coefficients between the three digital factors and the three student performance indicators. Social media usage showed a significant negative relationship with academic performance ($r = -0.487$), class participation ($r = -0.412$), and research skills ($r = -0.374$), suggesting that higher social media engagement corresponds to lower student performance across all three indicators. Similarly, online gaming exhibited the strongest negative correlations, particularly with academic performance ($r = -0.521$), indicating that increased gaming behaviour is associated with diminished academic outcomes. Conversely, digital literacy demonstrated significant positive relationships with all three performance indicators, with the strongest correlation observed with academic performance ($r = 0.612$), affirming that higher digital literacy levels correspond to better student performance outcomes. Since all computed r - values are significant at the 0.05 alpha level, the null hypothesis stating that there is no significant relationship between digital factors and student performance indicators is hereby rejected.

Problem 4: Which among the digital factors — social media usage, online gaming behaviour, or digital literacy — significantly predicts the academic performance, class participation, and research skills of first-year Computer Science students at SNSU for the Academic Year 2025–2026, as determined through regression analysis?

TABLE X
MULTIPLE REGRESSION ANALYSIS: DIGITAL FACTORS AS PREDICTORS OF STUDENTS ACADEMIC PERFORMANCE INDICATORS

Predictor Variable	Academic Performance	Class Participation	Research Skills
	β / p-value	β / p-value	β / p-value
Social Media Usage	$\beta = -0.312$ / $p = 0.018$	$\beta = -0.274$ / $p = 0.032$	$\beta = -0.241$ / $p = 0.047$
Online Gaming	$\beta = -0.384$ / $p = 0.006$	$\beta = -0.326$ / $p = 0.014$	$\beta = -0.298$ / $p = 0.022$
Digital Literacy	$\beta = 0.498$ / $p = 0.001$	$\beta = 0.452$ / $p = 0.002$	$\beta = 0.476$ / $p = 0.001$
R²	0.584	0.531	0.512
Significant at 0.05 level of significance.			

Table 10 presents the results of the Multiple Regression Analysis identifying which among the three digital factors significantly predicts the student performance indicators. Results reveal that digital literacy emerged as the strongest positive predictor across all three performance indicators, with the highest beta coefficients recorded for academic performance ($\beta = 0.498$, $p = 0.001$), research skills ($\beta = 0.476$, $p = 0.001$), and class participation ($\beta = 0.452$, $p = 0.002$). Online gaming was identified as the strongest negative predictor, particularly for academic performance ($\beta = -0.384$, $p = 0.006$), followed by social media usage ($\beta = -0.312$, $p = 0.018$). The R^2 values indicate that the three digital factors collectively explain 58.4% of the variance in academic performance, 53.1% in class participation, and 51.2% in research skills. Since all predictor variables yielded p-values below the 0.05 alpha level, all three digital factors are confirmed as significant predictors of student performance indicators among first-year Computer Science students at SNSU, thereby rejecting the null hypothesis for SOP 4.



Summary of Findings

The overall findings of the study affirm that technology, as manifested through social media usage, online gaming, and digital literacy, has a measurable and significant impact on the academic performance, class participation, and research skills of first-year Computer Science students at Surigao del Norte State University for the Academic Year 2025–2026. These results provide a strong empirical foundation for the formulation of an evidence-based technology integration and academic support program for the identified population.

TABLE XI
SUMMARY OF ALL STATISTICAL RESULTS

SOP	Variable/s	Statistical Tool	Key Finding
SOP 1	Digital Factor Exposure	Mean & SD	Grand Mean = 3.15 (Often); Digital Literacy highest
SOP 2	Student Performance Indicators	Mean & SD	Grand Mean = 3.00 (Often); Class Participation & Research Skills highest
SOP 3	Relationship Between Variables	Pearson r	All relationships significant at 0.05; null hypothesis rejected
SOP 4	Predictive Digital Factor	Multiple Regression	Digital Literacy strongest positive predictor; Online Gaming strongest negative predictor

V. CONCLUSION

Based on the foregoing findings, the following conclusions were drawn. First-year Computer Science students at SNSU are consistently and moderately exposed to all three identified digital factors, with digital literacy being the most developed competency and online gaming posing the most significant risk to their academic engagement. Their overall student performance across academic performance, class participation, and research skills is at a moderate level, suggesting that while students are performing adequately, there remains considerable room for academic improvement particularly in areas affected by unregulated digital habits. The significant negative relationships established between social media usage, online gaming, and all three performance indicators confirm that excessive and unregulated engagement with these digital platforms measurably undermines the academic development of first-year CS students. Furthermore, the results of the multiple regression analysis conclusively establish that digital literacy is the most powerful positive predictor of academic performance, class participation, and research skills, underscoring its critical role as a protective academic factor in a technology-saturated learning environment. Conversely, online gaming stands as the most detrimental digital factor, significantly diminishing students' academic outcomes across all performance dimensions. These conclusions collectively affirm that purposeful and regulated technology use, anchored on the development of strong digital literacy competencies, is essential in fostering the holistic academic success of first-year Computer Science students at Surigao del Norte State University.

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