Digital Technology: Impact on Students' Learning Process, Social Interaction and Mental Well-Being

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Abstract:

This study aims to explore the impact of digital technology on the educational experiences and mental well-being of students. The rapid development of digital technology has brought substantial changes to various aspects of human life, including education. In an era where smartphones, tablets, laptops, and the internet are common tools, the educational landscape has undergone a fundamental shift. Digital technology has significantly transformed how students interact and communicate with one another. While flexible learning schedules and support services provided by educational technology can help reduce stress levels, excessive screen time and the demands of constant connectivity may contribute to mental health issues such as anxiety and depression. A descriptive correlational research design was employed to explore and describe the relationships between digital technology usage, the learning process, social interaction, and mental well-being among students. The study was conducted at Lake Sebu East District I, within the municipality of Lake Sebu, South Cotabato. The participants were exclusively selected from Grade 12 students who are officially enrolled and 18 years old or older at Lake Sebu National High School during the 2023-2024 school year. The findings of the study conclude that the influence of digital technology on various aspects of student life, including learning processes, social interactions, and mental well-being, is undeniably significant. The research highlights a strong relationship between the respondents' performance and their engagement with digital technology. Furthermore, the study emphasizes the importance of both educational and non-educational activities in shaping learning experiences, particularly in the context of social media usage. Based on these findings, it is evident that digital technology plays a crucial role in shaping the educational and social experiences of students, and its impact on mental well-being must be carefully considered.

Keywords*: Education, Digital technology, Interact, Mental Health, Usage*

Introduction:

Education has been profoundly transformed by the rapid development of digital technology, paralleling changes in other areas of human life. In an era where smartphones, tablets, laptops, and the internet are ubiquitous, the educational landscape has fundamentally shifted. Digital technology's integration into classrooms has altered instructional delivery, student interactions with course materials, peer relationships, and even mental health. Students now transcend the boundaries of physical classrooms and conventional textbooks, engaging in a dynamic learning environment shaped by online communication tools, social media platforms, and virtual collaboration spaces (Hammond et al., 2019).

Beyond classroom walls, students participate in global discussions, debates, and information exchanges, fostering cross-cultural comprehension and preparing them for an interconnected world (Selwyn, 2016). However, the authenticity of online interactions and risks like cyberbullying, privacy violations, and misinformation raise concerns about the quality of interpersonal relationships and students' social development (Subrahmanyam & Greenfield, 2008). Despite the notion of "digital natives," it remains essential for students to navigate the digital world proficiently.

The intricate relationship between digital technology and students' mental health is significant. Excessive screen time, digital multitasking, and the pressure to maintain an online presence contribute

to new mental health challenges (Twenge, 2017). "Technostress" highlights the emotional toll of constant connectivity (Ragu-Nathan et al., 2008). Additionally, digital addiction and declining face-to-face interactions raise concerns about students' overall well-being (Przybylski & Weinstein, 2017). Conversely, digital technology offers opportunities to enhance mental health through programs promoting emotional regulation, stress reduction, and mindfulness (Gaggioli et al., 2019). The challenge lies in balancing the benefits while minimizing mental health risks.

Digital technology's pervasive influence on modern life transforms learning, social interactions, and mental well-being. In Lake Sebu, South Cotabato, Philippines, this impact intertwines global trends with local realities. In this predominantly rural and economically disadvantaged region, digital technology's role in students' learning, social interactions, and mental well-being is complex. The digital divide is evident as gaps in access to technology and the internet emerge. Lake Sebu's remote location and limited technological infrastructure hinder students' access to online resources and e-learning opportunities (Alampay et al., 2019).

The cultural context of Lake Sebu adds complexity to digital technology's impact. Indigenous groups, like the T'boli, have socio-cultural identities deeply connected to their natural surroundings (Soria et al., 2015). For students at Lake Sebu National High School, digital technology reshapes their learning experiences, social interactions, and mental well-being. Social media platforms and mobile games introduce both positive and negative aspects of digital engagement.

Digital technology provides enrichment opportunities through online resources and e-learning platforms, transcending traditional geographical barriers. It also exposes students to a global community, fostering cultural exchange and cross-cultural dialogue (Selwyn, 2016). However, students often prioritize entertainment over academics, engaging in online games and social media, highlighting the need for a balance between leisure and educational responsibilities.

Cellphones, while tools for communication and research, also contribute to neglecting traditional cultural values and indigenous heritage. Responsible digital citizenship and teaching students to navigate the digital world critically and respectfully are crucial. Initiatives should promote digital literacy, responsible behavior, and mental health resources to mitigate technology's potential harms.

Educators, parents, and guardians in Lake Sebu must equip students with the skills to navigate the digital era. Critical digital literacy, open dialogues about digital challenges and opportunities, and a strong sense of cultural identity are essential. Further study is needed to understand the digital revolution's impact on students. This study aims to focus on Lake Sebu National High School, providing concrete and statistical evidence of digital technology's effects on students.

Literature Review:

The integration of digital technology in education has significantly transformed the learning landscape, affecting students' cognitive development, engagement, and academic outcomes. Modern educational environments leverage digital tools to enhance learning experiences, facilitating active learning, collaborative projects, and personalized instruction (Johnson et al., 2019). These technologies enable students to explore content through interactive simulations, multimedia resources, and online platforms, fostering engagement and deeper comprehension.

Adaptive learning platforms are particularly impactful, utilizing data analytics to tailor content and assessments based on individual progress and learning patterns (Bergamin, Tura, & Lepori, 2021). This personalized approach supports differentiated instruction, ensuring students progress at their own pace and receive targeted support.

Digital literacy is crucial in this tech-driven educational landscape. Students must develop critical thinking skills to evaluate online information for accuracy and reliability (Kirschner & van Merriënboer, 2013). Active learning methods, such as interactive simulations and virtual experiments, increase student engagement and promote deeper understanding (Prince, 2004). Online discussion forums and collaborative tools further encourage active participation in knowledge construction.

However, challenges accompany these benefits. Overreliance on technology can hinder students' ability to engage with complex ideas and develop independent thought (Selwyn, 2016). Disparities in access to technology and digital resources can affect students from lower socioeconomic backgrounds, highlighting issues of access and equity (Smith & Caruso, 2010).

Teachers play a pivotal role in technology integration, transforming from knowledge providers to facilitators of learning (Johnson et al., 2019). They guide students in navigating online resources, fostering critical thinking, and creating dynamic learning environments. Digital technology also transforms assessment methods, with online assessments, automated feedback, and learning analytics providing timely insights into student progress (Bergamin et al., 2021).

Digital technology supports student-centered learning approaches, emphasizing individual agency and self-directed learning. It equips students with essential skills for lifelong learning, preparing them for the evolving demands of the digital age (Kirschner & van Merriënboer, 2013). However, maintaining a balance between digital and traditional learning methods remains critical to ensure holistic education.

The integration of digital technology has also redefined social interactions among students. Social media platforms like Facebook and Twitter enable students to connect beyond geographical boundaries, maintaining relationships and engaging in real-time communication (Subrahmanyam & Greenfield, 2008). Online communities centered around shared interests foster intellectual discussions, collaborative projects, and cultural exchange (Selwyn, 2016).

Despite these benefits, concerns arise about the impact of digital technology on face-to-face interactions. Increased digital engagement is associated with lower in-person social interaction, potentially leading to social isolation (Twenge, 2017). Curated online personas can also impact self-esteem and emotional resilience, raising questions about authenticity (Twenge, 2017).

Balancing online and offline interactions is essential for maintaining genuine connections. Educators and parents play vital roles in guiding students toward responsible and meaningful digital engagement, promoting face-to-face interactions and real-world experiences (Subrahmanyam & Greenfield, 2008).

Digital technology's rapid proliferation has significant implications for students' mental well-being. Excessive digital engagement can lead to technostress, psychological distress, anxiety, and burnout (Rozgonjuk et al., 2020). Social media use, while offering avenues for connection, can also lead to perceived social isolation and feelings of loneliness (Primack et al., 2017).

Digital detox practices, such as periods without digital device use, can mitigate potential negative effects on mental health (Naslund et al., 2020). Online support communities provide emotional validation and a sense of belonging for individuals facing mental health challenges (Naslund et al., 2020). However, the use of digital technology, particularly before bedtime, can disrupt sleep patterns and overall mental well-being (Rozgonjuk et al., 2020).

Digital technology offers opportunities for positive mental health interventions, such as mobile apps and online platforms delivering therapeutic interventions for anxiety, stress, and depression (Rozgonjuk et al., 2020). Digital literacy includes awareness of potential negative effects on mental health, ensuring students navigate the online landscape safely and seek credible support (Selwyn, 2016).

Balancing offline and online engagement is crucial for mental well-being. Fostering face-to-face interactions and outdoor activities counteracts the potential negative impacts of excessive screen time (Twenge, 2017). Developing digital resilience, including coping strategies for managing digital stressors, setting boundaries on technology use, and prioritizing self-care, is essential (Rozgonjuk et al., 2020).

The literature review highlights the transformative impact of digital technology on education, social interaction, and mental well-being, emphasizing the need for balanced, responsible, and mindful digital engagement.

Methodology:
Design
The research design chosen for the study was a descriptive correlational. A descriptive correlational design does not assert any cause-and-effect link; instead, it strives to describe the relationship between two or more variables. To determine if there is a relationship between at least two variables, it entails gathering and evaluating data about them. With that, the design will provide insights into the extent of these relationships without manipulating any variables. A descriptive correlational research design would involve collecting data on students' digital technology usage, learning process, social interaction, and mental well-being. By analyzing the correlations between these variables, we could gain insights into how they are related in the specific population of students.

Environment
The study was conducted in Lake Sebu East District I, located in the municipality of Lake Sebu, South Cotabato. The district comprises 6 elementary schools, 2 integrated schools (combining elementary and high school levels), 1 senior high school, and 1 school offering both junior high school and senior high school programs. The presence of a variety of educational institutions across different grade levels adds complexity and diversity to the educational landscape in the area. Lake Sebu National High School serves as the primary focus of the study. The characteristics, environment, and student population of this school will significantly influence the research findings. With approximately 2500 students encompassing both junior and senior high school levels, the school offers a diverse range of academic programs. Its location within Lake Sebu East District I further underscores its importance in the local educational context.

Participants
The participants in this study were exclusively selected from Grade 12 students officially enrolled at Lake Sebu National High School for the school year 2023-2024. To select the participants, the researcher used simple random sampling. In this sampling method, each Grade 12 student in the research environment had an equal chance of being selected. Typically, the maximum sample size for a population in simple random sampling is 10%. As part of this process, the researcher decided on a sample size of 20% of the population, equivalent to 70 students as respondents for this study. The researcher obtained the list of all Grade 12 students from the school guidance counselor's office, assigned numbers to each student, and randomly selected respondents by choosing names corresponding to multiples of five from the list. The respondents were asked to sign a consent form indicating their willingness to participate in the survey, with assurance of confidentiality.

Instrument
The instrument used in this study was a survey questionnaire comprising 20 carefully crafted items, based on the theory of Community of Inquiry to ensure reliability and validity. As per the discussion of the theory, which focused on the cognitive, social, and teaching presence of students along with their learning processes and digital development, these formed the basis of the questionnaire formulation. Therefore, each of the questions was intended to explore the perceptions and experiences of students regarding the effects of digital technology on their educational processes, social interactions, and mental well-being. To capture the full spectrum of responses, a 5-point Likert scale was employed. This scale allowed respondents to express their level of agreement or disagreement with the provided statements, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), with intermediate points of 2 (Disagree), 3 (Neutral), and 4 (Agree). This approach provided the flexibility needed to quantitatively analyze the multifaceted impacts of digital technology on students' lives, offering a comprehensive dataset for a thorough investigation of our research objectives.

Data Gathering
Pre-Data Gathering Procedure
The researcher submitted three title proposals to the Deans' office of graduate studies. Approval for the title was granted to proceed with the study. The researcher then requested an advisor for the research. Next, in developing the research study for Chapters I, II, and III, the researcher underwent a design proposal hearing with the advisor, chairperson, and other members of the research study. After the review, the researcher complied with all suggestions to improve the study before submitting it to the Institutional Review Board (IRB) for further review. If the IRB suggested new changes, the

researcher needed to comply before receiving the Notice to Proceed (NTP). Furthermore, before obtaining approval to conduct the study, the researcher sought permission from the Schools Division Superintendent at the South Cotabato Division Office in Koronadal City and the Office of the District Supervisor in Lake Sebu East District I, Lake Sebu, South Cotabato. A letter was sent to the principal of Lake Sebu National High School, the chosen respondents of the research, requesting approval.

Actual Data Gathering

The researcher visited the classrooms of Grade 12 students to distribute the survey questionnaire to the respondents. The respondents were asked to read and agree to the consent form and the study's data conditions before answering the questionnaire. Additionally, they were provided ample time and given an orientation about the study's conditions before using the survey tools. Participation in answering the tool was voluntary and not compulsory for the respondents.

Post-Gathering

The researcher retrieved all answered questionnaires and tallied, tabulated, analyzed, and interpreted them to ensure the comprehensiveness of the gathered data. The data and information were stored on the researcher's personal computer. After finalizing the research paper, unnecessary electronic information was deleted, and printed copies were shredded and disposed of. The final results were disseminated to higher authorities of the institution, presented at research conventions, or published in a research journal.

Data Analysis

In the process of data analysis, several statistical techniques were employed to gain a comprehensive understanding of the study's research objectives. Pearson correlation coefficients (r) were used to investigate the relationships between digital technology usage, students' social skills, academic learning processes, and their overall well-being. This analysis provided insights into whether and how these variables were interrelated. Additionally, a profile analysis was conducted using frequency distribution and percentage calculations to visualize the distribution of responses across the various questionnaire items. This approach revealed important trends and patterns in participants' responses, shedding light on their perceptions and experiences with digital technology. To understand the central tendency and variability of the data, weighted mean and standard deviation calculations were performed for the variables related to Digital Technology, Social Skills, Academic Learning Process, and Well-being. The weighted mean considered the Likert scale values (ranging from 1 to 5) and their relative importance, while standard deviation helped gauge the spread of responses around the mean. These analytical methods collectively provided a robust foundation for assessing the intricate impacts of digital technology on students' learning processes, social interactions, and mental well-being. This research aimed to offer valuable insights to educators, policymakers, and other stakeholders in the field of education and technology, facilitating informed decision-making and potential improvements in the digital learning environment.

Ethical Consideration

To maintain the integrity and dependability of research findings, ethical norms were an essential part of the research process. Participants were informed about and voluntarily consented to their engagement, with researchers obtaining unambiguous and voluntary consent from them before including them in the study. This adherence to recognized ethical standards was maintained throughout. Participants' privacy and confidentiality were protected by the researchers through the use of pseudonyms to conceal participant names, de-identification of data, and protection against unwanted access. Researchers ensured they were prepared to provide support or referral services in case of any issues that arose. Ethical considerations were carefully addressed in the formulation and implementation of the investigation. After completing the survey, the researcher took several actions to address ethical issues, focusing on maintaining the secrecy and privacy of respondents' answers, which were compiled, assessed, and analyzed.

Results and Discussion:

Standard Deviation and Variation

The sample's moderate standard deviation of 0.839 indicates some variation in the responses given by different individuals. This variation can be attributed to the diverse experiences and perceptions of digital technology among the participants.

Impact of Digital Technology on Entertainment and Education

Digital technology has significantly impacted the entertainment industry, revolutionizing consumption and production methods, leading to substantial transformations (Rezigue, 2023). Interactive technology in schools has both positive and negative effects on student performance and engagement. It enables access to resources for schoolwork and participation in online classes but also presents distractions and opportunities for procrastination (Anthony, 2021). Advancements like artificial intelligence and virtual reality have enabled media and entertainment firms to produce online content tailored to specific audiences, making entertainment more cost-effective, accessible, and enjoyable (Goyal, 2021).

Learning Process

Use of Digital Resources

Online platforms and tools enable students to work on group projects remotely, receive instant feedback on assignments, and engage in discussions outside of the traditional classroom setting. This fosters a more interactive and collaborative learning environment.

Table 4: Learning Process

Indicator	Mean
Proactive use of digital resources	4.057
Improvement in academic performance	3.886
Effective time management	3.786
Preference for digital tools over traditional methods	3.486
Overall Weighted Mean	3.804

The overall weighted mean of 3.804 indicates agreement among participants on the use of digital resources in their learning process. The data confirms that advancements in technology have made studying easier for students. The integration of ICT in schools has effects beyond just academic performance, influencing other school-related areas and stakeholders (Hingston, 2022; Sharma, 2023).

Social Interaction

Impact on Social Learning

Digital technology has significantly influenced students' social learning experiences. Through social media platforms, students can easily connect with peers, share ideas, and collaborate on projects regardless of physical distance.

Table 5: Social Interaction

dicator	Mean
Staying connected with friends and peers	4.200
Preference for digital over face-to-face interaction	3.800
Shift to digital channels for social interaction	3.371

Enrichment of social life through digital interactions	3.214
Overall Weighted Mean	3.957

The overall weighted mean of 3.957 suggests that students believe digital technology positively impacts their social lives. However, opinions vary on whether social lives have mostly shifted online and whether online interactions enhance the overall quality of life.

Mental Wellbeing

Effects on Wellbeing

Digital technology offers access to information, resources, and communication tools. However, excessive screen time and online engagement can result in challenges such as digital addiction, disrupted sleep patterns, and social withdrawal in students.

Table 6: Mental Wellbeing

ndicator	Mean
Negative impact of excessive screen time	3.257
Feelings of isolation or loneliness	3.014
Active management of screen time for mental health	3.471
Positive impact on overall mental wellbeing	3.386
Overall Weighted Mean	3.282

The overall weighted mean of 3.282 indicates a neutral perception among participants regarding the relationship between digital technology usage and mental wellbeing. This suggests mixed feelings about how digital technology affects mental health, highlighting the need for more research in this area (Dienlin & Johannes, 2020; Small et al., 2020).

Correlation Between Profile and Use of Digital Technology

Understanding the demographic profile of a population can provide valuable insights into how different groups engage with digital technology and help tailor products and services to meet their specific needs.

Table 7: Correlation between Profile and Digital Technology

Variable	Pearson r (Educational)	Pearson r (Non-Educational)
Age	-0.035	0.031
Sex	Negligible	Negligible
Socioeconomic Status	Very Weak	Very Weak

The data suggests that age, sex, and socioeconomic status do not significantly affect how individuals engage with digital technology for educational or non-educational purposes.

Correlation Between Digital Technology and Student Learning

The link between digital technology and student learning is a hot topic in education research. Using digital tools in the classroom allows students to access vast information and interactive resources to boost their learning.

Table 8: Correlation between Digital Technology and Student Learning

Variable	Pearson r
Learning Process	0.383
Social Interaction	0.272
Mental Wellbeing	0.306
Non-Educational Activities (Learning Process)	0.087
Non-Educational Activities (Social Interaction)	0.358
Non-Educational Activities (Mental Wellbeing)	0.251

The findings indicate a moderate positive correlation between digital technology usage and the learning process, social interaction, and mental wellbeing in the educational context. For non-educational activities, the correlations are less significant.

The results indicate that students find digital technology useful for both educational and non-educational activities. This serves as a basis for guidance counselors to consider implementing school regulations that limit students' digital usage to educational purposes only during school hours. The ICT Student Development Program can empower students with essential skills and knowledge crucial for their academic and professional endeavors, fostering innovation, creativity, and problem-solving abilities.

Conclusion:

In conclusion, the influence of digital technology on various aspects of student life, including learning processes, social interactions, and mental well-being, is undeniably significant. The research highlights a strong relationship between the respondents' performance and their engagement with digital technology. Moreover, the study emphasizes the significance of educational and non-educational activities in shaping learning experiences, particularly in the context of social media usage. While certain digital platforms may offer educational benefits, they also pose potential distractions that can adversely affect academic performance. Hence, the research underscores the various impact of digital technology on students and highlights the need for promoting responsible digital habits to mitigate potential negative consequences. By fostering a balanced approach to digital usage and encouraging offline engagement, educators and parents can contribute to the overall well-being and academic success of students in today's digital age.

As per the theory of Community of Inquiry, it is inevitable that students who are using digital technology will be using it for their learning process, social skills, and mental wellbeing. And, according to the results, it was clearly found that, in support of the claim of the theory, the study reveals a robust correlation between the participants' performance and their usage of digital technology. This emphasizes the diverse effects of digital technology on students and emphasizes the necessity of encouraging responsible digital behaviors to minimize possible adverse outcomes. This is for the reason that as per the theory has claimed, these variables are essential to the respondents' lives as students.

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