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Digital Technologies in Teaching Science 8 and Students' Academic Performance

Joanna Andrea C. Acero[1], Vera A. Villocido[2]
[1]Cayam High School, Bohol, Philippines- 6307
[2]Holy Name University, Bohol, Philippines- 6330
Email Address: joannaandreaacero@gmail.com[1], vvillocido@hnu.edu.ph[2]

Abstract— *This study assessed the extent of teachers' practices based on the perceived ease of use (PEU), perceived usefulness (PU) and attitude towards use of digital technology (ATU) in teaching as perceived by the students and their academic performance in Science 8. It also determined the significant correlation between the aforementioned variables. This study used the descriptive-correlational research design, involving 108 Grade 8 students in public secondary schools of Garcia-Hernandez District, Bohol, during the school year 2024-2025. For the data gathering, the study used a pilot-tested, modified survey questionnaire adapted from Teo (2019). In assessing the students' academic performance, the researcher administered a proficiency test, containing the learning contents in Science 8 (Quarter 1-Physics). Key findings revealed in the three participating schools that the teachers demonstrated moderate skillfulness for the perceived ease of use (PEU). It also revealed that using digital technologies was moderately useful in terms of perceived usefulness (PU) and demonstrated very positive attitude in terms of their attitude towards use (ATU). The proficiency test revealed the participants attained unsatisfactory academic performance. None of the schools garnered a mean academic performance of at least 75%. The Spearman's Rank Correlation Coefficient statistics revealed that perceived ease of use (PEU) significantly correlates with students' academic performance. On the other hand, perceived usefulness (PU) and attitude towards use (ATU) did not correlate to students' academic performance in Science 8. The study concluded that that the more teachers are skillful in using digital technologies, the academic performance of the grade 8 students in science 8 may also increase. Moreover, using technology does not directly translate to higher science grades. Additionally, the impact on academic performance can vary depending on how technology is used. The study highlighted the necessity of proposing an action plan that may address the gap on the limited capabilities of the Grade 8 students to master the lessons and improve their academic performance in Science 8.*

Keywords- *Digital Technologies, Physics, Students' Performance*

I. Introduction

Uplifting students' performance and deep understanding on the subject matter has been the central query of science education. Undeniably, the gap between students' cognition level and the learning targets in the spiral science curriculum has been a pivotal issue for science teachers in different grade levels. This gap introduces a wide range of difficulties, especially in public schools, since majority of local teachers rely traditional teaching methods (Bete, 2020).

Undoubtedly, low academic performance in science in different levels of Philippine education is evident, which does not exclude public secondary schools. This gap highlights the role of technology integration in the teaching and learning process to encourage technology use. In relevance, Murray (2023) theorizes that the value of incorporating technology in teaching can be more beneficial mainly because of its perceived ease of use, usefulness, and interactivity.

Various technologies have been developed and used to improve students' performance in science, including other learning areas such as mathematics, language teaching, araling panlipunan, values education, and technology and livelihood education (TLE). These technologies include using digital tools and technology-aided instruction like PowerPoint Presentation, video clips, and instructional videos. Undoubtedly, the perceived influence of using these technologies to teachers and students is ever increasing as the Department of Education (DepEd) encourages schools to use technology in teaching and learning.

Today, educators are increasingly encouraged to improve the learning experiences in their classrooms. This includes promoting the integration of technology and science instruction into everyday classroom experiences, and implementing pedagogical frameworks like open-ended inquiry learning that guide junior high school students to master the competencies in Physics (Gonzalez, 2019). However, students' academic performance in science still lags behind language learning and social studies, suggesting teachers to elevate the quality of their instruction by spending much of their time in interacting with the students by using digital technologies for instruction.

Consequently, this study aims to determine the quality of practices in using digital technologies in teaching as perceived by the students in public secondary schools of Garcia-Hernandez District, Bohol and its relationship on their academic performance in Science 8, during the first quarter of the academic year 2024-2025. Specifically, this study assessed the perceived ease of use, perceived usefulness, and attitude towards use in using digital technologies in teaching Science 8. The findings served as the basis for proposing an action plan to improve students' academic performance in Science 8.

II. Literature Review

The first theoretical construct used in this study is the Technology Acceptance Model (TAM) of Davis (1989). He developed this model to shed light on the processes underpinning technology acceptance. It intends to predict the behavior and provide a theoretical explanation for the successful implementation of technology. It is also considered as the most commonly-used theoretical model in the paradigm

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of technology integration in modern education (Marikyan & Savvas, 2023).

The main context of this theory coincides with the advantages of using instructional videos for student learning and online platforms for collaboration beyond school hours. Relatively, technology has completely transformed how teachers and students communicate and paved the way for the efficient delivery of instruction and transfer of learning. Further, using technology aids teachers and students to save time and acquire more engaging learning experiences.

Uses and Gratification Theory, the second theory of the study is theorized by Blumler and Katz in 1974. Uses and Gratification is an alternative area of media research, allowing users to recognize the importance of technology in achieving academic goals and any endeavor. In this model, the audience were engaged participants in media exchange. In other words, they use media to satisfy their needs. This theory is a user-centered approach that focuses on how people use media for their own personal uses and gratification.

The central idea of Uses and Gratification Theory (1974) coincides with the patterns of interaction formed by teachers and their pedagogical practices, specifically in integrating technology-based instruction in teaching Science 8. Inevitably, teachers use technology to promote and provide the learning interactions that are emergent and dynamic. Although it may be necessary to improve the design of instructional processes in science, integrating technology-aided classroom instruction like PowerPoint Presentation (PPT), instructional videos, and audio-recorded lessons may increase students' proficiency in the subject.

The study also used the Theory of Performance proposed by Elger in 2007. According to Elger (2007), the three axioms for effective performance improvements are performer's mindset, immersion in an enriching environment, and engagement in reflective practice. The three axioms for performance improvements relate to students' performance in Physics. First, a performer's mindset plays a crucial role on how to transfer the skills learned in a science class to the real world. Second, to perform more effectively in the subject, immersion in an enriching environment is feasible by multimedia presentation, instructional videos, and social network like group chatting. Lastly, a student's engagement in reflective practice can also be useful to improve performance by integrating technology-based pedagogies. This will help students use augmented reality to understand the fundamentals of learning the different area of science education.

This study is also anchored to some legal bases: DepEd Order No. 042, s. 2017, and DepEd Memorandum No. 39, s. 2023.

DepEd Order No. 042, s. 2017, the study's first legal basis, institutionalizes the ''National Adoption and the Implementation of the Philippine Professional Standards for Teachers (PPST).'' This legal basis emphasizes the seven domains of teachers' practices, which aims to set out clear expectations of teachers along well-defined career stages of professional development from beginning to distinguished practice by engaging teachers to actively embrace a continuing effort in attaining proficiency (Department of Education, 2017).

Specifically, the third strand which is ''Positive Use of ICT'' under indicator: 1.3.2 "Ensure the positive use of ICT to facilitate the teaching and learning process", coincides

with the integration of technology-based instruction in teaching. Based on the existing norms in the context of Philippine education, teachers are held accountable to competent teaching regardless of their educational qualification, considering the disparity of teaching skills

DepEd Memorandum No. 39 s. 2023, underscores the administration and utilization of digital arts and multimedia tools in the Department of Education (DepEd). In support of the MATATAG agenda on taking steps to accelerate basic education services and supporting teachers to teach better, the Department of Education (DepEd) recognizes the importance of providing its workforce with the necessary tools, resources, and digital skills to enhance teaching and learning. Apparently, integrating digital technologies in teaching and learning fosters creativity, innovation, collaboration, and increases productivity and efficiency (Department of Education, 2023).

The context of this legal basis relates to the instructional practices of science teachers in providing quality instruction using digital technologies such as instructional videos, powerpoint Presentation (PPT), Simulations, and 2D animation. According to Haleem et al. (2022), digital technologies have made a paradigm shift in the entire education system. It serves not just as a knowledge source but also as a co-developer of information, a guide, and an evaluator. Hence, technological improvements in education have made life easier for teachers and students, specifically when creating presentations and projects.

Stammes et al. (2020) noted that bringing design practices to science education is gaining interest with recent science curriculum reforms, emphasizing the call for integrated education. As such, discipline could foster meaningful learning and this could be more possible integrating the constructivist approach while using technology and promoting collaboration. It can bring many benefits not only to teachers and students but also to other entities.

The main context of this study focused on teaching and learning Science 8. Specifically, the Encylopaedia Britannica (2024) cited that Physics is a branch of science that deals with the structure of matter and the interactions between the fundamental constituents of the observable universe (The Encylopaedia Britannica, 2024). In the Broadest sense, physics, originated from the Greek ''physikos'' is concerned with all aspects of nature on both the macroscopic and submicroscopic levels. The scope of study encompasses not only the behavior of objects under the action of given forces but also the nature and origin of gravitational, electromagnetic, and nuclear force fields. Its fundamental objective is the formulation of a few comprehensive principles that bring together and explain all such disparate phenomena.

Tekwani (2020) noted that many students find physics difficult, as compared to Chemistry or Biology. The common belief is that more girls perceive this subject as challenging in comparison to boys. This is unexpected since there are nearly equal numbers of female and male physics teachers in

academia. Learning the subject is conceptually demanding in which every topic involves critical thinking.

According to Ellermeijer and Tran (2019), using technology enables physics education more relevant to real life and more authentic. It also increases the opportunities for own investigations by the students. Apparently, teaching physics education is quite challenging nowadays since most secondary school students demonstrated poor interest in mastering the subject. Therefore, the major challenge in physics education among teachers is how to make instruction more engaging and easier to understand.

The first focus of this study was to determine the extent of practices in using digital technologies in teaching Science 8. According to Sharma (2023), technology use is effective when used as a tool for knowledge construction, not merely on knowledge consumption. When technology is used as a tool to transmit information to students to read and memorize, it allows students to construct their own ideas in order to create personal meaning and develop higher critical thinking skills in learning Science.

The assessment on the extent of practices in using digital technologies in teaching Science 8 encompasses three dimensions: Perceived Ease of Use (PEU); Perceived Usefulness (PU); and Attitude Towards Use (ATU).

The first dimension, which is Perceived Ease of Use (PEU), refers to the degree to which a user expects use of a system or technology to be free from rigorous efforts. Contextually, the Technology Acceptance Model (TAM) consists of two salient values: perceived simplicity of use and perceived effectiveness. The predictive energy of the two salient values for users' technology acceptance continues to be empirically confirmed by many studies (Amadu et al., 2018).

In relevance, Teo (2019) proposed a model to explain the students' and teachers' intention to use (ITU) technology. Results of this study showed that the subscale on perceived ease of use (PEU); perceived usefulness (PU); and attitude towards use (ATU) are key predictors of digital competence for both student and teacher groups. Moreover, multigroup confirmatory factor analysis found support for full configural and metric invariance and partial scalar invariance in the quantitative data. The implications of this research are examined, and potential avenues for future studies are suggested.

The second dimension, which is Perceived Usefulness (PU), is also the most crucial factor in user acceptance of a system. According to Tahar et al. (2018), it is related to the productivity and effectiveness of technology and its overall benefits to improve user performance. Apparently, the core assumptions in the TAM are that individuals' usage of technology is mediated by their acceptance of that technology, which in turn is determined by two cognitive factors, perceived usefulness (PU) and perceived ease-of-use (PEU). In other words, it is the extent to which a person believes that using a technology will improve productivity. Therefore, the more useful a technology is to education, the higher the users' desire to use it.

In the Philippines, the team of Villamin (2022) studied teachers' perceived usefulness on the utilization of Mobile-Learning Approach in teaching High School Biology at Occidental Mindoro State College (OMSC). The results revealed positive feedback in the utilization of m-learning. Although both produced favorable responses, t-test findings indicated a distinction among the domains of instructional delivery, learning enhancement, and flexibility and convenience. Apart from promoting personalized learning experience, the results of the FGD showed that using m-learning is cost and time-saving in teaching biology subjects. Thereby, concluding that using m-learning is crucial to student learning experiences which improved their performance at school.

Conversely, a 2023 study of Wohlfart et al. disclosed that although teachers highly esteemed subject-specific digital tools, various obstacles hinder their strategic integration, such as time limitations, heavy workloads, inadequate infrastructure, insufficient technical assistance, and apprehension towards change. These barriers hinted a disruption in the quality of teaching and learning in science and mathematics. The study infers that subject-specific digital tools have the potential to improve learning outcomes and recommends teacher training and further education. Consequently, using technology correlates to the improvement in student performance to a moderate extent.

The third dimension, which is Attitude Towards Use (ATU), consists of a cognitive component and an affective component. The cognitive and emotional aspects of attitudes partially influence behavioral intention, which serves as the direct motivational element for the behavior itself. Behavioral intention is viewed as a direct outcome of these two components of attitude. Notably, the affective component is interest, which is understood analytically as an emotional schema which also includes cognition. This also means that interest can be changed and developed over time as new knowledge is acquired, enabling a shift from situational to individual interest (Svenningsson et al., 2021).

A 2021 study by Xiaoquan explored the contribution of technology acceptance and technological self-efficacy to attitude toward technology-based self-directed learning in a sample of Chinese undergraduate students. The results indicated that students' technology acceptance and technological self-efficacy levels were related to their attitude toward technology-based self-directed learning. The findings also indicated that learning motivation mediated the relations of technology acceptance and attitude toward the use of technology-based self-directed learning.

The second focus of this study was to assess students' academic performance in Science 8, which covers the first quarter of the academic year 2024-2025. In view of this, Assem et al. (2023) completed multinational research on students' academic performance in Physics. The findings revealed that teachers' and students' attitude towards instructional processes has been a dominant force of low students' academic performance in the subject. The study's implication also stipulated the importance of pedagogical approaches demonstrated by the teachers in teaching Physics.

Similarly, the study of Rajman et al. (2019) investigated the thinking ability and academic performance secondary students in Malaysian schools. The result showed that most students did

not reach the minimum mark for the three stages especially in C3 (applying). This study also showed that the students under study demonstrated poor performance in Physics. The study concluded that Physics is one of the subjects that is hard to learn. For the recommendation, using Bloom's Taxonomy may enable teachers to set examination papers that are well balanced in testing the different cognitive skills in learning Physics.

Constante and Agsalud (2019) examined the impact of using interactive computer as a simulation strategy in learning Physics among the Grade 8 students of Dr. Ramon De Santos National High School, Cuyapo, Nueva Ecija, Philippines. The study revealed that the experimental and control group showed a respective increase in mean score from pre-test to post-test. Overall, the study revealed that there is a significant difference in pre-test and post-test performance within and between groups. The study concluded that using digital technology positively affects students' performance in Physics.

Monserate (2022) investigated the impact of technology on the academic performance of students and teaching effectiveness in public and private secondary schools in District VI, Division of Negros Occidental. The findings revealed significant relationship between students' academic performance and their computer literacy as well as students' technology utilization. Thereby concluding that computer literacy of teachers significantly determines students' academic performance.

The findings coincide with the study of Berondo and Dela Fuente (2021), which revealed that exposure to technology-aided instruction does not significantly correlates to students' academic performance in Social Studies in the three selected public secondary schools Tapaz West District, Schools Division of Capiz, Philippines. The findings recommended that school administrators, parents, teachers, and other stakeholders should ensure that students are properly guided in using the right technology platforms to support learning, improve study habits towards achieving higher academic performance.

Grounded from the preceding literature reviews, this study aimed to provide valuable insights and evidence-based data and information to improve the quality of instruction in Science 8. In relevance, this study assessed the extent of practices in using digital technologies in teaching and students' academic performance. The findings became the basis for proposing an action plan, specifically on enhancing the quality of science instruction towards improving literacy and academic performance in Science 8.

III. Research Methodology

Design

This quantitative study employed the descriptive-correlational research design as it determined the extent and relationship of practices in using digital technologies in teaching and students' academic performance in Science 8. For the data gathering, this study used a pilot-tested questionnaire for the survey and also administered a proficiency test. The correlational formula was used in determining the significant degree of correlation between the extent of using digital technologies in teaching as perceived by the students and their academic performance in Science 8. The significant findings became the basis for proposing an action plan.

Environment

The environment of the study is the district of Garcia–Hernandez, Bohol. The schools district has five (5) public secondary schools. These learning institutions are Cambuyo High School, Cayam High School, Garcia–Hernandez High School, Tabuan National High School, and Abijilan High School. The researcher chose Garcia-Hernandez District as the research environment with the purpose of assessing the prevalence and effectiveness of its district-based implementation of digital teaching and learning in public secondary schools. However, this study excluded Cayam High School, the current station of the researcher, and Abijilan High School, considering that these public secondary schools operated just recently, specifically during the academic year 2023-2024.

Instrument

This study used a modified questionnaire in assessing the extent of practices in using digital technologies in teaching Science 8. The item indicators of the survey tool were modelled from the study of Teo (2019). The data gathering tool has two parts. The first part focused on assessing the students' perceptions on the extent of practices demonstrated by the Science 8 teachers, specifically in using digital technologies in teaching in terms of (1) perceived ease of use (PEU); (2) perceived usefulness (PU); and (3) attitude towards use (ATU). Every dimension contained five (5) affirmative statements, with 15 item indicators in total. The researcher used the 4-point Likert Scale for the responses and descriptive interpretations. Since the item indicators in the questionnaire were modified, a pilot test was conducted to ensure alignment and accuracy of the survey statements to the main context of the study. For the reliability or internal consistency of the survey items, the researcher conducted a pilot testing at Cayam High School, Cayam, Garcia-Hernandez, Bohol. The pilot study involved a total of thirty (30) grade 8 students of the aforementioned learning institution. The pilot study garnered a reliability score of 0.875, with a description of good reliability, which means the questionnaire is valid to be used during the actual data gathering. For the face validity of the survey tool, the researcher sought technical assistance from her statistician and thesis adviser.

The final data gathering phase focused on assessing the level of Grade 8 students' academic performance in Science 8. The researcher conducted a proficiency test with test items derived from the three learning contents for the first quarter of the academic year 2024-2025. The assessment contained 15 items in each of the following learning contents: (1) Newton's three laws of motion; (2) work using force, power, gravitational potential energy, kinetic energy, and elastic potential energy; and (3) electricity. Eventually, the conduct of the survey and the proficiency test was in separate occasion.

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IV. Results And Discussions

The researcher systematically presents, analyzes, and interprets all the important data in pursuit to accuracy, comprehensibility, and reliability. The table 1 presents the extent of teaching practices in using digital technologies as perceived by the grade 8 students in public secondary schools of Garcia-Hernandez District, Bohol, during the academic year 2024-2025.

The data from School A shows the statement ''The teacher used PowerPoint Presentation (PPT) in an effortless manner,'' with the highest weighted mean of 4.00. The result means that the teachers are very skillful in using PowerPoint Presentation (PPT) during instructional delivery in Science 8, specifically in presenting texts and related readings for quarter 1 lessons. On the other hand, the statement '' The teacher is skillful in using Chat GPT,'' obtained the lowest weighted mean of 1.00, with a descriptive interpretation of not skillful. The result clearly implies that the teacher showed limited skills in using Chat GPT in Science 8 class. It also suggests that the teachers were not inclined using the application because of reliability issues regarding the information being provided. According to Watts (2023), technologies are designed to streamline workflows, automate processes, and create better connections between teams. They are essential components for investment among school organizations looking to stay ahead of the competition. however, users are suggested to integrate the appropriate technology for teaching and learning.

TABLE 1. Extent of Teachers' Practices in Using Digital Technologies in Teaching Science 8 in Terms of Perceived Ease of Use
N_A=22, N_B=42, N_C=44

1. Perceived Ease of Use (PEU)	School A		School B		School C		*Mean*	*DI*
	WM	DI	WM	DI	WM	DI		
1. The teacher is skillful in using laptop and projector when providing instructional animation.	3.00	MS	3.34	VS	3.38	VS	*3.24*	*MS*
2. The teacher used digital images during instruction, enabling me to participate with more interest to learn.	3.00	MS	3.55	VS	2.86	MS	*3.14*	*MS*
3. The teacher used PowerPoint Presentation (PPT) in an effortless manner.	4.00	VS	3.52	VS	3.07	MS	*3.53*	*VS*
4. The teacher skillfully collaborated with the students more effectively in providing instruction using multimedia presentations.	2.14	LS	2.84	MS	3.29	VS	*2.76*	*MS*
5. The teacher is skillful in using Chat GPT.	1.00	NS	1.16	NS	1.64	NS	*1.27*	*NS*
Composite Mean	**2.63**	**MS**	**2.88**	**MS**	**2.85**	**MS**	***2.79***	***MS***

Legend:

1.00 – 1.74	*Not Skillful*	*(VS)*
1.75 – 2.49	*Less Skillful*	*(LS)*
2.50 – 3.24	*Moderately Skillful*	*(MS)*
3.25 – 4.00	*Very Skillful*	*(VS)*

The data from School B reflects the statement ''The teacher used digital images during instruction, enabling me to participate with more interest to learn,'' obtained the highest weighted mean of 3.55. The result hinted that the teachers demonstrated very skillful practices in providing digital images during instructional delivery, ultimately raising student engagement to a higher level. On the other hand, the same statement obtained the lowest weighted mean of 1.16, implying that using Chat GPT is not encouraged by the teachers in their respective classes in science 8. Apparently, the result relates to the central idea of Technology Acceptance Model (Davis, 1989), which emphasizes that the processes underpinning technology acceptance intends to predict the behavior and provide a theoretical explanation for the successful implementation of technology.

Subsequently, the data from School C reveals the statement ''The teacher is skillful in using laptop and projector when providing instructional animation,'' obtaining the highest weighted mean of 3.38. The result denotes that the teachers executed competent skills in using laptops, allowing them to access a wide range of digital tools to engage students through multimedia content, personalize learning experiences, and efficiently manage classroom activities. On the other hand, the same statement obtained the lowest weighted mean of 1.64, generally implying that the teachers were not skillful in using Chat GPT in teaching science 8. The result relates to the study of Olimovna (2023), which revealed using appropriate technologies can engage students in active and collaborative learning experiences, and provide opportunities for personalized and adaptive instruction in teaching Physics to middle school students across Uzbekistan.

In summary, the assessment on perceived ease of use (PEU) recorded a composite man of 2.79, with a descriptive interpretation of moderately skillful. The result affirms to Larnder (2020), which revealed using technology was frequently applied by the teachers during instruction. However, various long-term challenges like the development of new digital skills prevented them to be more competent in using digital technologies.

The average response from School A reveals the statement ''The teacher used digital films in teaching difficult topics in Physics made instruction more comprehensive and engaging,'' with the highest weighted mean of 4.00. The result indicates that using digital films in teaching science 8 is very useful, leading students to be more engaged and gained a better understanding about the subject matter being taught. On the other hand, the statement '' The PhET App is useful in interactive lecture discussions and provided concept questions with peer instruction,'' recorded the lowest weighted mean of 1.00, with a descriptive interpretation of not useful. The result clearly implies that the teacher never introduced he application in their respective Science 8 class. However, the composite mean of 3.08 generally suggests that using digital technologies is moderately useful in teaching Science 8. Similarly, Villamin et al. (2022) perceived moderate usefulness on the utilization of

Mobile-Learning Approach in teaching High School Biology at Occidental Mindoro State College (OMSC).

TABLE 2. Extent of Teachers' Practices in Using Digital Technologies in Teaching Science 8 in Terms of Perceived Usefulness
N_A=22, N_B=42, N_C=44

Perceived Usefulness (PU)	School A		School B		School C		*Mean*	*DI*
	WM	DI	WM	DI	WM	DI		
1. Presented videos containing lessons about force, power, and energy are useful which motivated me to learn more efficiently.	3.77	VU	3.79	VU	2.90	MU	*3.49*	*VU*
2. The teacher used digital films in teaching difficult topics in Physics made instruction more comprehensive and engaging.	4.00	VU	3.52	VU	3.62	VU	*3.66*	*VU*
3. PowerPoint Presentation with animation stimulated my learning about the Law of Motion.	3.95	VU	3.50	VU	3.48	VU	*3.64*	*VU*
4. The teacher used audio-visual recordings as instructional materials helped students master the first quarter learning contents.	2.68	MU	2.45	MU	3.43	VU	*2.85*	*MU*
5. The PhET App is useful in interactive lecture discussions and provided concept questions with peer instruction.	1.00	NU	1.61	NU	1.62	NU	*1.41*	*NU*
Composite Mean	**3.08**	**MU**	**2.97**	**MU**	**3.01**	**MU**	***3.02***	***MU***

Legend:
1.00 – 1.74 Not Useful (VU)
1.75 – 2.49 Fairly Useful (LU)
2.50 – 3.24 Moderately Useful (MU)
3.25 – 4.00 Very Useful (VU)

Meanwhile, the responses from School B reflects the statement ''Presented videos containing lessons about force, power, and energy are useful, which motivated me to learn more efficiently,'' obtained the highest weighted mean of 3.79. The result hinted that using instructional videos was very useful to enhancing students' understanding in science 8, considering that using audio-visual presentations is more engaging to the students. On the contrary, the same statement obtained the lowest weighted mean of 1.61, implying that the teachers were not inclined to use PhET App in their respective classes in science 8. Subsequently, the composite mean of 2.97 indicates that the teachers were moderately skillful in incorporating digital technologies in teaching science 8.

The result affirms to Tahar et al. (2018), postulating that productivity and effectiveness of technology and its overall benefits to improve user performance. Largely depends on the digital skills of users. Apparently, the core assumptions of Technology Acceptance Model (Davis, 1989) also specified that the individuals' usage of technology is mediated by their acceptance of that technology, which in turn is determined by two cognitive factors, perceived usefulness and perceived ease of use.

With regards to the responses from School C, the statement ''The teacher used digital films in teaching difficult topics in Physics made instruction more comprehensive and engaging,'' recorded the highest weighed mean of 3.62, implying that incorporating instructional videos was very useful to enhancing students' understanding. Whereas, the same statement also recorded the lowest weighted mean of 1.62, which means the teachers showed o inclination to use the PhET App in teaching science 8.

However, the composite mean of 3.01 indicates that using digital technologies was moderately useful for the grade 8 students in learning science 8 during the first quarter. The result is supported by Wohlfart et al. (2023), which revealed that while subject-specific digital tools were highly valued by teachers, several barriers to their strategic integration exist, including time constraints, failing infrastructure, lack of technical support.

TABLE 3. Extent of Teachers' Practices in Using Digital Technologies in Teaching Science 8 in Terms of Attitude Towards Use
N_A =22, N_B=42, N_C=44

Attitude Towards Use (ATU)	School A		School B		School C		*Mean*	*DI*
	WM	DI	WM	DI	WM	DI		
1. The teacher used instructional videos with positive interaction to capture our attention during instruction.	4.00	VP	2.98	MP	3.45	VP	*3.48*	*VP*
2. The teacher used instructional videos to convince us to keep on learning.	3.36	VP	3.43	VP	2.81	MP	*3.23*	*MP*
3. The teacher used digital technologies with the intention to educate students about digitized instruction.	3.55	VP	2.95	MP	2.57	MP	*3.02*	*MP*
4. The teacher integrated simulations to engage students in a more collaborative class environment.	3.86	VP	3.05	MP	3.31	VP	*3.41*	*VP*
5. The teacher used online learning resources to more favorable teaching and learning experiences.	3.68	VP	3.05	MP	3.21	MP	*3.31*	*VP*
Composite Mean	**3.69**	**VP**	**3.10**	**MP**	**3.07**	**MP**	***3.29***	***VP***

Legend:
1.00 – 1.74 Negative (N)
1.75 – 2.49 Slightly Positive (SP)
2.50 – 3.24 Moderately Positive (MP)
3.25 – 4.00 Very Positive (VP)

The average response from School A reveals the statement ''The teacher used instructional videos with positive interaction to capture our attention during instruction,'' with the highest weighted mean of 4.00. The result indicates that the teachers were cheerful and enthusiastic during instructional delivery when incorporating instructional videos in teaching science 8. In contrast, the statement '' The teacher used instructional videos to convince us to keep on learning,'' recorded the lowest weighed mean of 3.36, with the same descriptive interpretation. The result clearly implies that using instructional videos entices a positive classroom culture, ultimately leading to collaboration.

The result relates to Xiaoquan (2021), which revealed very positive attitude toward technology-based self-directed learning among Chinese undergraduate students. The results indicated that technology acceptance and technological self-efficacy levels were related to their attitude toward technology-based learning. Thus, the findings also indicated that learning motivation mediated the attitude toward the use of self-directed learning strategies in using technology.

The average response from School B reveals the statement ''The teacher used instructional videos to convince us to keep on learning,'' recorded the lowest weighed mean of 3.43. The result signifies that the teachers used instructional videos with positive interaction to capture students' attention during instruction. In contrast, the statement ''The teacher used digital technologies with the intention to educate students about digitized instruction,'' recorded the lowest weighed mean of 2.95. The result clearly implies that the teachers showed moderately positive attitude in providing digitized instruction in Science 8. It also implies the necessity for improvement on their capacity to instruct students using updated strategies in teaching.

The result relates to Diate and Mordeno (2021), who noted the same scenario experienced by physics teachers from various provinces in Mindanao, Philippines. The review revealed that the digital skills demonstrated by physics teachers were essential for a supportive classroom, leading to positive school culture. However, the digital divide in the context of Philippine education remains a challenge at large for many public schools across the country.

With regards to the responses from School C, the statement ''The teacher used instructional videos with positive interaction to capture our attention during instruction,'' posted the highest weighted mean of 3.45, implying that incorporating digital films during instruction radiates very positive attitude towards teaching. Whereas, the same statement, ''The teacher used digital technologies with the intention to educate students about digitized instruction,'' posted the lowest weighted mean of 2.57, suggesting that using digitized instruction fosters positive teacher attitude in teaching science 8.

The composite mean of 3.07 reveals that the teachers exude moderately positive attitude in teaching science 8. In addition to, Woldemariam et al. (2023) revealed that technology-integrated teaching positively affected teachers' attitude and academic achievement and retention among Nigerian students towards technology use.

TABLE 4. Students' Academic Performance in Science 8.
N_A=22, N_B=42, N_C =44

Adjectival Rating	Grade	School A		School B		School C	
		f	%	f	%	f	%
Outstanding	90 - 100	0	0	0	0	0	0
Very Satisfactory	85 - 89	0	0	0	0	0	0
Satisfactory	80 - 84	1	4.55	3	7.14	1	2.27
Farly Satisfactory	75 - 79	0	0	7	16.67	9	20.45
Did Not Meet Expectations	74 and below	21	95.45	32	76.19	34	77.27
	Total	22	100	42	100	44	100
	Mean	70.00	DME	72.40	DME	72.00	DME

TABLE 5. Correlation Between the Extent of Practices in Using Digital Technologies in Teaching and Students' Academic Performance in Science 8.

Variables		r	p-value	Decision on Ho	Interpretation
1	2				
Perceived Ease of Use	Students' Academic Performance	0.276	.004	Reject Ho	Significantly related
Perceived Usefulness		0.031	.747	Failed to Reject Ho	Not significantly Related
Attitude Towards Use		0.070	.470	Failed to Reject Ho	Not significantly related

The scores of the participants from the 45-item proficiency test in Science 8 were transmuted using the standard grading rubrics developed by the Department of Education (DepEd). Based on the result, School B obtained the highest mean academic performance of 72.40% followed by School C with 72.00%, and School A with 70.00%. Irrespective of the numerical differences, it is obvious that a substantial portion of the participants' population obtained failing grades. The result means that majority of the Grade 8 students of Garcia-Hernandez District, performed poorly in Science 8, specifically in physics.

The result of the assessment relates to the study of Villaceran et al. (2024), showing low test scores in physics among the Grade 10 students in public schools across Negros Occidental Schools Division, Philippines. Moreover, Assem et al. (2023) revealed low academic performance in Physics of secondary students in Ghana. Both studies recommended the integration of technology-aided instruction to foster

collaboration towards improving the quality of instruction and academic performance.

In addition, the findings of Assem et al. (2023) relate to the present study, which revealed low students' academic performance in physics. Moreover, teachers' and students' attitude towards instructional processes has been a dominant force of low mastery level and poor academic performance in the subject. The study's implication recognized the importance of pedagogical approaches the teachers in teaching physics.

Table 9 illustrates the statistical result on the correlation between the extent of teachers' practices in using digital technologies in teaching and students' performance in Science 8. Specifically, the correlation coefficient value of 0.276 between perceived ease of use (PEU) and students' academic performance depicts a computed p-value of .004, which is below the 0.05 level of significance. Thus, the null hypothesis is rejected. The result denotes that the strength of the linear relationship between the two variables is statistically significant. It also denotes that the independent and dependent variables can change together at a constant rate since there is enough evidence to reject the null hypothesis.

The findings affirm to the study of Abenes (2023), which revealed that the Grade 8 students across Metro Manila responded positively in using gamified mobile application, which increased students' interest in topics that are often least comprehended.

On the contrary, the statistical results for perceived usefulness (PU), attitude towards use (ATU), and students' academic performance in Science 8 depict a computed r value of 0.031 and 0.070, showing a very weak relationship between the aforementioned variables. Moreover, the computed p-value of .747 and .470, respectively, which both exceed the 0.05 level of significance denote insignificant correlations. Thus, the study failed to reject the null hypotheses.

The result indicates the correlation between the aforementioned variables is not statistically significant. It also suggests a very weak relationship between the extent of practices in using digital technologies in teaching and students' academic performance in Science 8. Also, the independent and dependent variables cannot change together in a constant direction due to the inverse pattern of the data. Statistically, there is no enough evidence to reject the null hypotheses because the participants produced very positive results in the survey, while performing poorly in the proficiency test. Furthermore, the results indicate that using technology does not directly translate to higher science grades and the impact on academic performance can vary depending on how technology is used and how students attended to their lessons.

The result coincides with the study of Berondo and Dela Fuente (2021), which revealed that exposure to technology-aided instruction does not significantly correlates to students' academic performance in Social Studies in the three selected public secondary schools Tapaz West District, Schools Division of Capiz, Philippines. The findings recommended that school administrators, parents, teachers, and other stakeholders should ensure that students are properly guided in using the right technology platforms to support learning, improve study habits towards achieving higher academic performance.

Conversely, a 2019 study carried out by Constante and Agsalud revealed a significant increase in test scores among the Grade 8 students of Dr. Ramon De Santos National High School, Cuyapo, Nueva Ecija, Philippines, after being exposed to interactive computer while learning Physics.

V. Conclusion

The study infers that the more teachers are skillful in using digital technologies, the academic performance of the grade 8 students in science 8 may also increase. However, the Grade 8 students performed poorly in the proficiency test, showing unsatisfactory academic performance. The statistical findings also infers that the extent of usefulness and teachers' attitude in using technology do not directly translate to higher science grades. Additionally, the impact on academic performance can vary depending on how technology is used and the expertise and mastery of the teachers in ease of use of digital technology. While technology can be a valuable tool, its effect on learning outcomes is not always clear.

Recommendations

The study crafted practical recommendations based on the findings of the study and are addressed to the school administrators, teachers and students.

1. Integrating hands-on activities in teaching science 8 like building a simple circuit to explore electricity, constructing a model of the solar system to understand planetary motion, and measuring the acceleration of a falling object with a stopwatch may enhance students' understanding and mastery of the learning contents.
2. Integrating differentiated teaching approach such as: lectures, inquiry-based learning through computer-based data logging, experimental activities, and interactive simulations is strongly recommended.
3. Conducting active learning sessions like brainstorming and peer teaching may enhance students' class engagement and academic performance in Science 8
4. Students' participation in small group discussions together with their teacher can be an effective strategy to address learning needs.
5. Upgrading the schools' digital facilities such as laptops, personal computers, multimedia tools, and internet connectivity may provide the teachers and students with more interactive learning opportunities.
6. Conducting a school-based digital skills training for teachers in teaching science subjects may enhance the quality of instruction and foster improvement in students' retention skills.

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