INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH AND ANALYSIS

ISSN(print): 2643-9840, ISSN(online): 2643-9875

Volume 09 Issue 11 November 2026

DOI: 10.47191/ijmra/v9-i11-13, Impact Factor: 8.685

Page No. 7362-7381

Digital Innovation Integration in MAPEH Instruction, Engagement and Academic Performance: Inputs for Enhanced Strategic Intervention Materials Development

Jewelyn M. Daet[1], Samboy G. Nabor[2]

[1,2]University of Perpetual Help System Dalta – Las Piñas

ABSTRACT: This study investigates the integration of digital innovations in Music, Arts, Physical Education, and Health (MAPEH) instruction and its effects on student engagement and academic performance among Grade 7 learners at Malabog National High School. Employing a descriptive-correlational research design, the study surveyed 50 students to assess the extent of digital innovation integration in instructional strategies, learning resources, and assessment practices, as well as levels of behavioral, cognitive, and affective engagement. Results revealed that digital tools—such as presentations, videos, and interactive activities—were positively implemented, with students reporting high engagement and very satisfactory academic performance. However, significant differences in perceptions of digital instructional strategies were found based on internet connectivity, and behavioral engagement varied by age. No significant relationships were observed between digital innovation integration and either engagement or academic performance, indicating that technology alone does not guarantee improved outcomes. The study proposes Enhanced Digital Innovation-Based Strategic Intervention Materials (EDIM-SIMs) to address identified gaps, focusing on accessible, interactive, and learner-centered digital resources. These findings underscore the importance of strategic, inclusive, and context-sensitive technology integration to foster meaningful learning experiences and support holistic student development in MAPEH.

KEYWORDS: academic performance, digital innovation, MAPEH, strategic intervention material, student engagement.

I. INTRODUCTION

Education today continues to transform as technology becomes an integral part of classroom instruction. The integration of digital innovations has reshaped how teachers deliver lessons and how students engage with learning materials. Through digital platforms, multimedia content, and interactive applications, learners are now given more opportunities to participate actively in their own learning process. This approach is particularly valuable in subjects that combine knowledge and skills, such as Music, Arts, Physical Education, and Health (MAPEH), where creativity, movement, and self-expression play an important role in holistic development.

Around the world, schools are adopting digital tools to enhance learning experiences. The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2023) emphasized that technology is essential in promoting inclusive and equitable education. Research supports this idea, showing that digital learning tools can improve students' motivation, engagement, and academic outcomes (Chang et al., 2020; Hill and Valdez-Garcia, 2020). Studies using mobile learning and augmented reality have also found improvements in motor skills, creativity, and classroom participation (Sustainability, 2023; Retos, 2022). Despite these advantages, challenges such as lack of teacher training, limited access to resources, and varying levels of technological readiness continue to hinder full implementation (Education and Information Technologies, 2024; Mokmin and Rassy, 2022).

The research is timely and relevant as it aligns with the ongoing efforts to improve the quality of basic education in the country. The 2022 Programme for International Student Assessment (PISA) results showed that Filipino students still perform below global averages in key learning areas such as reading, mathematics, and science. Although MAPEH is not directly assessed in PISA, its role in nurturing creativity, physical well-being, and socio-emotional skills is essential to the overall growth of learners. By improving MAPEH instruction through the use of appropriate digital innovations and localized materials, this study seeks to contribute to developing well-rounded and future-ready students who are actively engaged in their learning journey.

Research Question

This study examined the integration of digital innovation in MAPEH instruction and its effects on student engagement and academic performance. Specifically, it sought answers to the following questions:

1. What is the demographic profile of the respondents in terms of:

1.1 Age;

1.2 Sex;

1.3 Access to Digital Resources (e.g., smartphone, tablet, laptop); and

1.4 Internet Connectivity Level?

2. What is the extent of integration of digital innovation in MAPEH instruction in terms of:

2.1 Instruction Strategies;

2.2. Learning Resources; and

2.3 Assessment Practices?

3. What is the level of student engagement in MAPEH classes in terms of:

3.1 Behavioral Engagement;

3.2 Cognitive Engagement; and

3.3. Affective Engagement?

4. What is the level of learners' academic performance in MAPEH under digital innovation-based instruction?

5. Is there a significant difference between the extent of integration of digital innovation in MAPEH instruction when group according to profile?

6. Is there a significant difference between the level of student engagement in MAPEH classes when group according to profile?

7. Is there a significant difference between the level of learners' academic performance in MAPEH under digital innovation-based instruction when group according to profile?

8. Is there a significant relationship between SOP 2 and 3?

9. Is there a significant relationship between SOP 2 and 4?

10. Is there a significant relationship between SOP 3 and 4?

Hypothesis

Null Hypotheses (H_o)

H_{o1}: There is no significant difference between the extent of integration of digital innovation in MAPEH instruction when group according to profile

H_{o2}: There is no significant difference between the level of student engagement in MAPEH classes when group according to profile.

H_{o3}: There is no significant difference between the level of learners' academic performance in MAPEH under digital innovation-based instruction when group according to profile.

Alternative Hypotheses (H_1)

H_o4: There is no significant relationship between the extent of integration of digital innovation in MAPEH instruction and the level of student engagement in MAPEH classes.

H_o5: There is no significant relationship between the extent of integration of digital innovation in MAPEH instruction and the level of learners' academic performance in MAPEH under digital innovation-based instruction.

H_o6: There is no significant relationship between the level of student engagement in MAPEH classes and the level of learners' academic performance in MAPEH under digital innovation-based instruction.

II. SCOPE AND LIMITATION OF THE STUDY

This study focused on examining the integration of digital innovation in MAPEH instruction and its effects on student engagement and academic performance at Malabog National High School. The participants will be limited to Grade 7 learners during the school year when the study will be conducted. Specifically, the study will measure the extent of digital innovation integration in MAPEH instruction in terms of instructional strategies, learning resources, and assessment practices. It will also assess the level of student engagement in terms of behavioral, emotional, and cognitive engagement, as well as their academic performance under digital innovation–based instruction. The primary goal of the study is to determine whether a significant relationship exists between the extent of digital innovation integration and both student engagement and academic performance.

The study will be delimited to the chosen grade level and school to ensure a more focused and manageable scope. Other year levels and schools will not be covered, as the study aims to provide specific insights into the experiences of Grade 7 learners at Malabog National High School. Furthermore, the research will adopt a descriptive–correlational method, which will describe the current practices in digital innovation integration and establish possible relationships among the variables without manipulating them. The findings of the study will serve as inputs for the development of enhanced Strategic Intervention Materials (SIMs) in MAPEH, but they will not attempt to generalize results beyond the identified participants and locale.

FRAMEWORK

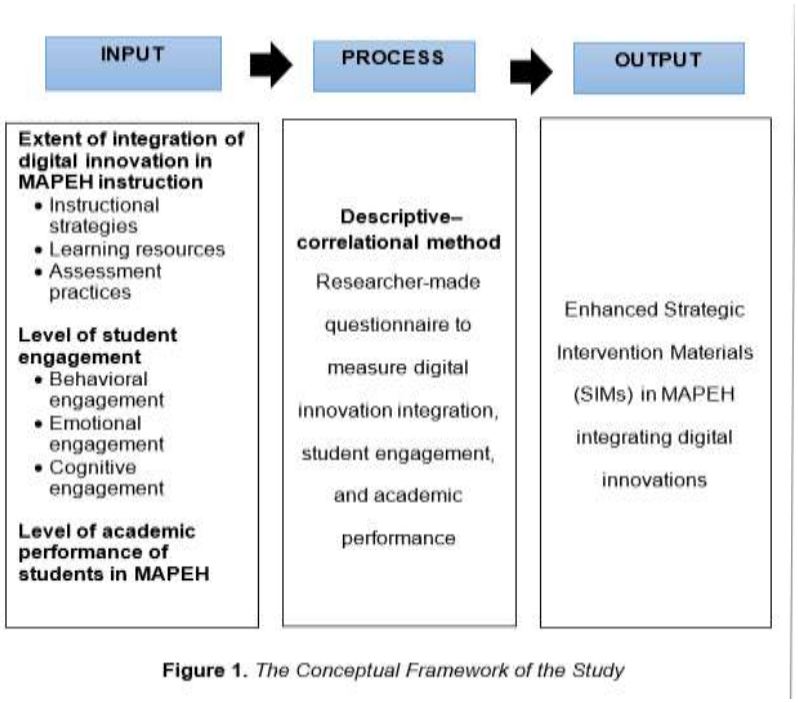


Figure 1. *The Conceptual Framework of the Study*

The conceptual framework of this study was based on the Input–Process–Output (IPO) model, which illustrates the systematic flow of the research from the variables identified, to the methods employed, and finally to the expected results. This model provides a clear structure for understanding how the integration of digital innovations in MAPEH instruction influences student engagement and academic performance, leading to the development of enhanced Strategic Intervention Materials (SIMs).

The study's input consists of three main components: the extent of digital innovation integration in MAPEH instruction, the level of student engagement, and the level of academic performance of students in MAPEH. The integration of digital innovation focuses on how teachers apply technology in their instructional strategies, learning resources, and assessment practices. The level of student engagement refers to the learners' behavioral, emotional, and cognitive involvement in class activities when digital tools are used. The level of academic performance, on the other hand, reflects the students' achievement and mastery of MAPEH competencies as influenced by digital-based instruction. These inputs provide the essential data needed to determine the relationships among the study's key variables.

The process involves the research design and methods used to collect and analyze the data. The study adopts a descriptive–correlational method to describe the existing conditions and examine the relationships among the identified variables. A researcher-made questionnaire serves as the main instrument to measure the extent of digital innovation integration, level of student engagement, and level of academic performance. The process also includes the distribution of survey questionnaires, collection of student performance records, and the statistical analysis of the gathered data to determine significant relationships among the variables.

The study's output is the enhanced Strategic Intervention Materials (SIMs) in MAPEH that integrate digital innovations. These materials are designed to make learning more engaging, interactive, and relevant to students' needs. The SIMs aim to help teachers overcome instructional challenges by utilizing digital tools that support creative and active learning.

Research Design

This study utilized a descriptive–correlational research design using a quantitative approach. According to Nassaji (2015), descriptive research seeks to describe phenomena and their characteristics, focusing on what exists rather than why it occurs.

Correlational research, on the other hand, is used to determine the relationship between two or more variables. In this study, descriptive research was used to determine the demographic profile of the respondents, assess the extent of digital innovation integration, level of student engagement, and students' academic performance in MAPEH. The correlational aspect then determined the relationships between digital innovation integration, student engagement, and academic performance, and its differences between when group according to profile.

This design is appropriate as it allows the researcher to provide a clear description of the existing practices in MAPEH instruction while examining possible connections among the study's variables.

Research Instruments

The main instrument for data collection was a structured survey questionnaire and academic records. The survey consisted of four major parts:

Part I: Profile of respondents (age, sex, access to digital resources, and internet connectivity level);

Part II: This section consisted of statements that measured the extent of digital innovation integration in MAPEH instruction, specifically in terms of instructional strategies, learning resources, and assessment practices. Each indicator included ten (10) items, rated using a four-point Likert scale ranging from 4 (Strongly Agree) to 1 (Strongly Disagree);

Part III: This part included statements evaluating student engagement in MAPEH across behavioral, emotional, and cognitive dimensions. Each indicator also comprised ten (10) items, rated using the same four-point Likert scale; and

Part IV: This section gathered data on the respondents' academic performance in MAPEH during the 3rd Quarter, which included a consent item allowing respondents to permit access to their official MAPEH grades, and, if access was not granted, an alternative item where they could indicate their most recent grade range. This ensured that relevant performance data could still be obtained while respecting the respondents' privacy and preferences.

An Assent Form was also included at the beginning of the survey to ensure that student respondents were fully informed about the nature and purpose of the study. It explained the use of digital innovations in MAPEH, the expected duration of participation, potential minimal risks, voluntary participation, and the confidentiality of responses, including the handling of academic grades with proper permission. Respondents were then asked to indicate their willingness to participate by selecting their response, with an option to provide their signature and date.

Data Gathering Procedures

The researcher prepared formal letters requesting approval from the Schools Division Superintendent, the District Supervisor, and the School Principal of Malabog National High School. Once permission was granted, the researcher personally administered the questionnaires to the Grade 7 students. Prior to answering, the purpose of the study and confidentiality of responses were explained. To ensure accuracy, questionnaires were collected immediately after completion. Academic performance data were obtained from the school registrar or class advisers with proper authorization.

III. RESULTS

This chapter presents, analyzes, and interprets the data gathered in this study on the extent of integration of digital innovation in MAPEH instruction. The presentation of data follows the sequence of the research questions, with corresponding tables used to organize and summarize the responses of the participants. Each set of data is carefully analyzed and interpreted to provide meaningful insights into the respondents' demographic profile, level of access to digital resources, and the extent to which digital tools are utilized in teaching and learning. The findings are further supported by relevant literature to establish connections between the results of the study and existing knowledge in the field. Through this process, the chapter aims to provide a comprehensive understanding of the current status of digital innovation integration in MAPEH instruction and its implications for educational practice.

1. What is the demographic profile of the respondents in terms of:

1.1 Age

Age	Frequency	Percentage
12 years old	35	70.00
13 years old	15	30.00
Total	**50**	**100**

Table 1.1 presents the age distribution of the respondents, consisting of a total of 50 participants. The majority of the respondents are 12 years old, with 35 participants (70.00%), while 15 respondents (30.00%) are 13 years old. This indicates that the study is primarily composed of younger Grade 7 learners, with 12-year-olds representing more than two-thirds of the total respondents.

These findings are consistent with the World Health Organization (WHO, 2023), which emphasizes that children aged 10–14 years experience rapid physical, cognitive, emotional, and social development, making early adolescence a critical period for learning and personal growth. The WHO (2023) further explains that providing age-appropriate educational experiences and supportive learning environments during this stage promotes academic engagement, positive behavior, social competence, and lifelong well-being. Therefore, understanding the age profile of learners enables educators to design effective teaching strategies and interventions that are aligned with the developmental needs of students.

1.2 Sex

Sex	Frequency	Percentage
Male	35	70.00
Female	15	30.00
Total	**50**	**100**

Table 1.2 presents the distribution of the respondents according to sex. Out of the total 50 respondents, 35 (70.00%) are male, while 15 (30.00%) are female. The results indicate that the majority of the participants in the study are male, with males comprising more than two-thirds of the total sample. This distribution demonstrates that male respondents represent the dominant group in the study population.

These findings are supported by the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2023), which emphasizes that sex-disaggregated data play a crucial role in educational research by helping educators and policymakers identify disparities in participation, engagement, and learning outcomes between male and female learners. UNESCO (2023) further highlights that recognizing differences in demographic characteristics enables schools to develop inclusive, gender-responsive educational policies and interventions that promote equal access to quality education and meaningful participation for all students. Such considerations are essential in ensuring that educational programs effectively address the unique needs and experiences of diverse groups of learners.

1.3 Access to Digital Resources

Access to Digital Resources	Frequency	Percentage
Smartphone	37	74.00
Desktop Computer	0	0.00
Tablet	3	6.00
Laptop	6	12.00
None	9	8.00
Total	**50**	**100**

Table 1.3 presents the respondents' access to digital resources. Among the 50 respondents, the majority have access to a smartphone, accounting for 37 respondents (74.00%). This is followed by 9 respondents (18.00%) who reported having no access to any digital resource, 6 respondents (12.00%) who have access to a laptop, and 3 respondents (6.00%) who use a tablet. Notably, none of the respondents (0.00%) reported having access to a desktop computer.

The findings indicate that smartphones are the most commonly available digital device among the respondents, while desktop computers are not utilized by any participant. These findings are consistent with the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2023), which reported that mobile devices, particularly smartphones, have become the most widely used digital tools for learning among students because of their accessibility and affordability. UNESCO (2023) further emphasized that while mobile technology has expanded educational access, disparities in the availability of digital devices continue to create inequalities in learning opportunities. Consequently, schools and education stakeholders are encouraged to implement inclusive digital education strategies that ensure all learners, regardless of their level of access to technology, can participate effectively in technology-enhanced learning.

Table 1.4 presents the respondents' level of internet connectivity. Among the 50 respondents, the majority reported having no internet connection, with 29 respondents (58.00%). This is followed by 13 respondents (26.00%) who indicated having moderate internet connectivity, 5 respondents (10.00%) who reported limited or weak connectivity, and only 3 respondents (6.00%) who have a strong internet connection. The findings indicate that more than half of the respondents experience a lack of internet access, while only a small proportion enjoy reliable and stable connectivity.

1.4 Internet Connectivity Level

Internet Connectivity Level	Frequency	Percentage
No Internet	29	58.00
Mod	5	10.00
Area	13	26.00
Strong	3	6.00
Total	**50**	**100**

The results reveal that internet accessibility remains a significant challenge among the respondents. Although many learners have access to digital devices, as shown in the previous table, the absence or limited availability of internet connectivity may restrict their ability to fully utilize digital resources for educational purposes. Learners without internet access may encounter difficulties in participating in online learning activities, accessing digital learning materials, conducting online research, and communicating through educational platforms. Meanwhile, respondents with moderate and strong internet connectivity may have greater opportunities to engage in technology-supported learning activities. The limited number of students with stable internet access suggests that connectivity remains an important factor affecting the effectiveness of digital learning implementation.

These findings are supported by the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2023), which emphasized that internet connectivity plays a critical role in ensuring equitable access to digital education. UNESCO (2023) highlighted that disparities in internet availability continue to affect learners' ability to participate in technology-enhanced learning, particularly among students from underserved communities. The organization further stressed the importance of developing inclusive digital education strategies that address both device availability and reliable connectivity to ensure that all learners can benefit from digital learning opportunities.

2. What is the extent of integration of digital innovation in MAPEH instruction in terms of:

Table 2.1 presents the respondents' assessment of the instructional strategies used in technology-enhanced MAPEH instruction. The overall weighted mean of 3.13, interpreted as Agree (A), indicates that respondents generally perceive that their teachers utilize digital tools and strategies to support teaching and learning activities in MAPEH.

2.1 Instruction Strategies

Indicators	Mean	VI
1. Our teacher uses videos or digital demonstrations to explain skills or concepts.	2.92	A
2. Our teacher uses digital presentations (slides, visuals) to make lessons clearer.	3.28	SA
3. We use interactive digital activities (quizzes, games, simulations) during lessons.	3.04	A
4. Our teacher gives clear digital instructions or guides for tasks (posted or shared).	3.24	A
5. Our teacher uses technology to show correct techniques or proper form in PE activities.	3.28	SA
6. We use digital tools to collaborate with classmates on MAPEH tasks (group work or sharing).	3.16	A
7. Our teacher uses digital examples (sample outputs, recordings, models) to guide performance tasks.	2.96	A
8. Digital tools are used to support practice and repetition (drills, practice guides, tutorials).	3.28	SA
9. Our teacher adjusts digital activities to match learner needs (simpler or more challenging tasks).	3.04	A
10. Digital activities help increase participation during class discussions or performance tasks.	3.12	A
General Assessment	3.13	**A**

Legend:
3.25 – 4.00 Strongly Agree (SA) 2.50 – 3.24 Agree (A)
1.75 – 2.49 Disagree (D) 1.00 – 1.74 Strongly (SD)

Among the indicators, the highest-rated statements were "Our teacher uses digital presentations (slides, visuals) to make lessons clearer," "Our teacher uses technology to show correct techniques or proper form in PE activities," and "Digital tools are used to support practice and repetition (drills, practice guides, tutorials)", all obtaining a weighted mean of 3.28, interpreted as Strongly Agree (SA). These results suggest that learners strongly recognize the effectiveness of visual and technology-supported materials in improving lesson clarity, demonstrating proper physical education techniques, and providing opportunities for continuous practice. Digital presentations, demonstrations, and tutorials allow learners to better understand abstract concepts, observe correct procedures, and review instructional content at their own pace.

Similarly, Redecker (2020) explained that digitally competent teachers can use technology to design meaningful learning activities that enhance learner engagement and improve educational outcomes. Therefore, the positive assessment of instructional strategies in this study reflects the growing importance of digital integration in creating effective and learner-centered MAPEH instruction.

2.2. Learning Resources

Indicators	Mean	VI
1. I can access teacher-provided digital materials (modules, files, links) for MAPEH.	3.04	A
2. Digital learning materials are easy to understand and appropriate for my grade level.	3.20	A
3. I receive instructional videos or recordings that help me review lessons.	3.12	A
4. We use digital resources for Music (listening tasks, rhythm practice, recordings).	3.12	A
5. We use digital resources for Arts (digital references, examples, tutorials, design tools).	3.48	SA
6. We use digital resources for Physical Education (exercise guides, demonstrations, activity tracking).	4.00	SA
7. We use digital resources for Health (infographics, short videos, credible online materials).	3.20	A
8. The teacher provides online references that are relevant and helpful for tasks.	2.88	A
9. I can access learning resources even with limited internet (offline files, low-data options, printed alternatives).	3.04	A
10. The digital materials used in MAPEH help me practice and improve my skills.	3.16	A
General Assessment	3.22	**A**

Legend:
3.25 – 4.00 Strongly Agree (SA) 2.50 – 3.24 Agree (A)
1.75 – 2.49 Disagree (D) 1.00 – 1.74 Strongly (SD)

Table 2.2 presents the respondents' assessment of the learning resources used in technology-enhanced MAPEH instruction. The overall weighted mean of 3.22, interpreted as Agree (A), indicates that learners generally perceive digital learning resources as accessible, relevant, and helpful in supporting their MAPEH learning experiences.

Among the indicators, the highest-rated statement was "We use digital resources for Physical Education (exercise guides, demonstrations, activity tracking)", which obtained a weighted mean of 4.00, interpreted as Strongly Agree (SA). This indicates that learners strongly recognize the usefulness of digital resources in Physical Education, particularly in providing demonstrations, exercise guidance, and monitoring of physical activities. The use of digital materials allows learners to visualize proper techniques, follow structured activities, and improve their performance through repeated practice.

These findings are supported by UNESCO (2023), which emphasized that digital learning resources play an important role in expanding educational opportunities by providing learners with flexible access to information, interactive materials, and diverse learning experiences. UNESCO (2023) highlighted that effective digital resources should be accessible, inclusive, and aligned with learners' needs to support meaningful learning. Furthermore, Redecker (2020) emphasized that the purposeful use of digital resources enables teachers to create learner-centered environments where technology enhances knowledge acquisition, creativity, collaboration, and skill development. Therefore, the positive assessment of learning resources in this study reflects the potential of digital materials to strengthen MAPEH teaching and learning processes.

2.3 Assessment Practices

Indicators	Mean	VI
1. Digital quizzes or short checks are used to assess learning.	3.16	A
2. The teacher uses digital rubrics or clear criteria for performance tasks.	3.04	A
3. I submit some outputs through digital platforms (photos, videos, files, or online forms).	2.88	A
4. I receive feedback through digital platforms in a timely way.	2.80	A
5. Feedback tells me what I did well and what I need to improve.	3.04	A
6. Digital tools are used for self-assessment or reflection (checklists, journals, forms).	3.16	A
7. Digital tools are used for peer assessment (classmates give feedback respectfully using guides).	3.32	SA
8. The teacher keeps digital records of scores or task completion (as shared with students).	3.08	A
9. Digital assessments match what was taught and practiced in class.	3.06	A
10. When internet access is limited, the teacher provides fair alternatives for assessments.	3.04	A
General Assessment	3.06	**A**

Legend:
3.25 – 4.00 Strongly Agree (SA) 2.50 – 3.24 Agree (A)
1.75 – 2.49 Disagree (D) 1.00 – 1.74 Strongly (SD)

Table 2.3 presents the respondents' assessment of the assessment practices used in technology-enhanced MAPEH instruction. The overall weighted mean of 3.06, interpreted as Agree (A), indicates that learners generally perceive digital assessment practices as being implemented and utilized effectively in evaluating their knowledge, skills, and performance in MAPEH.

These findings are supported by UNESCO (2023), which emphasized that digital assessment tools can enhance educational practices by promoting flexible evaluation, timely feedback, learner reflection, and improved monitoring of student progress. UNESCO (2023) further highlighted that effective technology-supported assessment should be inclusive, accessible, and aligned

with learning objectives to ensure meaningful evaluation of learners' competencies. Additionally, Redecker (2020) explained that digitally competent teachers can use technology to develop innovative assessment strategies that support feedback, self-regulation, and learner-centered evaluation. Thus, the positive assessment of digital assessment practices in this study demonstrates the potential of technology in strengthening assessment processes within MAPEH instruction.

3. What is the level of student engagement in MAPEH classes in terms of:

3.1 Behavioral Engagement

Indicators	Mean	VI
1. I participate actively during class activities, including digital tasks.	3.32	SA
2. I follow instructions during technology-supported lessons and activities.	3.28	SA
3. I complete MAPEH activities that require digital tools on time.	3.30	SA
4. I stay focused during digital learning sessions in MAPEH.	3.08	A
5. I ask questions or seek help when I do not understand digital tasks.	3.08	A
6. I participate in group tasks that involve digital tools (sharing files, planning, presenting).	3.48	SA
7. I submit required outputs (written work, performance evidence) as instructed.	3.06	A
8. I practice skills or review materials outside class when digital resources are provided.	3.00	A
9. I follow class rules for responsible use of devices and digital platforms.	3.20	A
10. I do my best to participate even when the task is challenging.	3.40	SA
General Assessment	3.22	**A**

Legend:
3.25 – 4.00 Strongly Agree (SA) 2.50 – 3.24 Agree (A)
1.75 – 2.49 Disagree (D) 1.00 – 1.74 Strongly (SD)

Table 3.1 presents the respondents' assessment of their behavioral engagement in technology-enhanced MAPEH learning activities. The overall weighted mean of 3.22, interpreted as Agree (A), indicates that learners generally demonstrate positive behavioral participation, compliance, and involvement during digital-supported MAPEH lessons. These findings are supported by Fredricks, Blumenfeld, and Paris (2004), who explained that behavioral engagement is reflected through students' participation, effort, persistence, and involvement in academic activities. Furthermore, UNESCO (2023) emphasized that meaningful integration of digital technologies can enhance learner engagement by promoting active participation, collaboration, and access to diverse learning experiences. Technology-supported instruction, when properly designed and implemented, encourages students to become more active participants in the learning process rather than passive recipients of information. Therefore, the positive assessment of behavioral engagement in this study demonstrates the role of digital tools in strengthening students' participation and involvement in MAPEH learning activities.

3.2 Cognitive Engagement

Indicators	Mean	VI
1. I try to understand the lesson deeply, not just finish the task.	3.00	A
2. I use digital resources to clarify topics I find difficult.	2.66	A
3. I connect what I learn in MAPEH to real-life health, fitness, or daily activities.	3.48	SA
4. I apply feedback to improve my outputs or performance tasks.	3.18	A
5. I plan how to complete tasks (steps, time, materials) before starting.	3.41	SA
6. I check my work for errors and revise before submitting.	2.92	A
7. I try different strategies when I struggle with a skill or task.	2.92	A
8. I pay attention to criteria or rubrics so I know what quality work looks like.	3.18	A
9. I use what I learned in one activity to help me in new activities.	3.06	A
10. Digital learning activities help me think and learn more effectively in MAPEH.	3.50	A
General Assessment	3.13	**A**

Legend:
3.25 – 4.00 Strongly Agree (SA) 2.50 – 3.24 Agree (A)
1.75 – 2.49 Disagree (D) 1.00 – 1.74 Strongly (SD)

Table 3.2 presents the respondents' assessment of their cognitive engagement in technology-enhanced MAPEH learning activities. The overall weighted mean of 3.13, interpreted as Agree (A), indicates that learners generally demonstrate positive cognitive involvement by applying understanding, reflection, problem-solving, and strategic thinking while participating in digital-supported MAPEH activities.

These findings are supported by Fredricks, Blumenfeld, and Paris (2004), who explained that cognitive engagement involves students' investment in learning through effort, strategic thinking, self-regulation, and the desire to understand concepts beyond task completion. Additionally, UNESCO (2023) emphasized that effective digital learning environments should encourage critical thinking, creativity, independent learning, and meaningful application of knowledge. The purposeful integration of technology allows learners to access diverse resources, reflect on their learning experiences, and develop higher-order thinking skills.

Therefore, the positive assessment of cognitive engagement in this study highlights the role of digital tools in promoting deeper and more meaningful MAPEH learning experiences.

3.3. Affective Engagement

Indicators	Mean	VI
1. I enjoy MAPEH activities when digital tools are used appropriately.	3.50	SA
2. I feel interested in lessons that include digital materials (videos, examples, interactive tasks).	3.16	A
3. I feel motivated to participate when technology is part of the activity.	3.36	SA
4. I feel confident using digital tools for MAPEH tasks.	3.08	A
5. I feel satisfied when I complete digital tasks or performance outputs successfully.	3.26	SA
6. I feel comfortable asking questions during technology-supported activities.	3.16	A
7. I value digital learning activities because they help me improve my skills.	3.56	SA
8. I feel encouraged when the teacher uses digital feedback to support improvement.	3.14	A
9. I feel included in class even if my internet access is limited, because alternatives are provided.	3.28	SA
10. I look forward to MAPEH tasks that allow creativity and performance using digital tools.	2.60	A
General Assessment	3.21	**SA**

Legend:
3.25 – 4.00 Strongly Agree (SA) 2.50 – 3.24 Agree (A)
1.75 – 2.49 Disagree (D) 1.00 – 1.74 Strongly (SD)

Table 3.3 presents the respondents' assessment of their affective engagement in technology-enhanced MAPEH learning activities. The overall weighted mean of 3.21, interpreted as Strongly Agree (SA), indicates that learners generally demonstrate positive emotions, interest, motivation, confidence, and appreciation toward digital-supported MAPEH activities. This suggests that the integration of technology contributes to creating a more enjoyable and meaningful learning experience for students.

These findings are supported by Fredricks, Blumenfeld, and Paris (2004), who explained that affective engagement involves students' emotional responses, including interest, enjoyment, belongingness, and motivation toward learning activities. Furthermore, UNESCO (2023) emphasized that appropriate technology integration can enhance learner motivation and create inclusive learning environments by providing diverse opportunities for participation and interaction. When digital tools are thoughtfully implemented, they can promote positive attitudes toward learning and encourage students to become more actively involved in educational experiences. Therefore, the high level of affective engagement observed in this study highlights the potential of digital technologies in fostering positive emotional experiences in MAPEH instruction.

4. What is the level of learners' academic performance in MAPEH under digital innovation-based instruction?

Indicator	Frequency	Percentage
Outstanding (90 – 100)	21	42.00
Very Satisfactory (85 – 89)	25	50.00
Satisfactory (80 – 84)	4	8.00
Fairly Satisfactory (75 – 79)	0	0.00
Did Not Meet Expectation (Below 75)	0	0.00
Total	**50**	**100**
Overall Mean	**Very Satisfactory**	

Table 4 presents the level of learners' academic performance in MAPEH under digital innovation-based instruction. The results show that out of 50 respondents, the majority obtained a Very Satisfactory performance level, with 25 learners (50.00%) achieving scores within the 85–89 range. This was followed by 21 learners (42.00%) who attained an Outstanding performance level with scores ranging from 90–100. Meanwhile, 4 learners (8.00%) were classified under the Satisfactory level with scores between 80–84. No respondents were identified under the categories of Fairly Satisfactory (75–79) and Did Not Meet Expectations (Below 75). The overall mean performance of the learners was interpreted as Very Satisfactory.

These findings are supported by UNESCO (2023), which emphasized that the meaningful integration of digital technologies in education can improve learning outcomes by providing students with flexible access to resources, interactive learning experiences, and opportunities for active participation. UNESCO (2023) highlighted that technology-supported instruction can enhance learners' engagement, knowledge development, and academic achievement when effectively implemented by teachers. Similarly, Redecker (2020) explained that digitally competent educators can utilize technology to design learner-centered activities that promote deeper understanding, collaboration, and improved performance outcomes. Thus, the very satisfactory academic performance of learners in this study demonstrates the potential contribution of digital innovation-based instruction in strengthening MAPEH learning achievement.

5. Is there a significant difference in the extent of digital innovation integration in MAPEH instruction when respondents are grouped according to profile variables?

Demographic Profile	Digital Innovation Integration in MAPEH Instructions	t-value	df	P-value	Remarks	Decision
Age	Instructional Strategies	-0.015	48	0.988	Not Significant	Accept the Ho
	Learning Resources	-0.908	48	0.369	Not Significant	Accept the Ho
	Assessment Practices	1.220	48	0.228	Not Significant	Accept the Ho

Table 5.1 presents the test of significant difference in the extent of digital innovation integration in MAPEH instruction when respondents are grouped according to age. The results show that there is no significant difference in the respondents' assessment of digital innovation integration across the three dimensions: Instructional Strategies, Learning Resources, and Assessment Practices.

These findings are supported by UNESCO (2023), which emphasized that effective digital learning environments should promote equitable access and inclusive learning opportunities regardless of learners' demographic characteristics. UNESCO (2023) highlighted that technology integration should be designed based on learners' educational needs rather than demographic differences alone. Additionally, Redecker (2020) explained that digitally supported learning experiences become more effective when teachers focus on learner-centered approaches, appropriate digital resources, and meaningful learning activities. Therefore, the non-significant differences found in this study indicate that age does not create variations in learners' perceptions of digital innovation integration in MAPEH instruction.

Demographic Profile	Digital Innovation Integration in MAPEH Instructions	t-value	df	P-value	Remarks	Decision
Sex	Instructional Strategies	0.558	48	0.579	Not Significant	Accept the Ho
	Learning Resources	0.621	48	0.537	Not Significant	Accept the Ho
	Assessment Practices	0.959	48	0.342	Not Significant	Accept the Ho

Table 5.2 presents the test of significant difference in the extent of digital innovation integration in MAPEH instruction when respondents are grouped according to sex. The results indicate that there is no significant difference in the respondents' assessment of digital innovation integration in terms of Instructional Strategies, Learning Resources, and Assessment Practices when classified according to sex. These findings are supported by UNESCO (2023), which emphasized that inclusive digital education should provide equitable access and participation opportunities for learners regardless of gender or demographic background. UNESCO (2023) highlighted that technology integration becomes more effective when educational practices are designed to address diverse learner needs and promote equal engagement. Similarly, Redecker (2020) explained that digitally competent teaching practices focus on creating learner-centered environments where technology supports meaningful and inclusive learning experiences.

Demographic Profile	Digital Innovation Integration in MAPEH Instructions	F-value	df	P-value	Remarks	Decision
Access to Digital Resources	Instructional Strategies	2.368	48	0.083	Not Significant	Accept the Ho
	Learning Resources	0.599	48	0.619	Not Significant	Accept the Ho
	Assessment Practices	0.342	48	0.795	Not Significant	Accept the Ho

Table 5.3 presents the test of significant difference in the extent of digital innovation integration in MAPEH instruction when respondents are grouped according to access to digital resources. The results indicate that there is no significant difference in the respondents' assessment of digital innovation integration in terms of Instructional Strategies, Learning Resources, and Assessment Practices based on their level of access to digital resources.

These findings are supported by UNESCO (2023), which emphasized that equitable digital education requires addressing both technological access and the quality of learning experiences provided through digital platforms. UNESCO (2023) highlighted that meaningful technology integration depends on inclusive teaching practices, accessible resources, and supportive learning environments rather than device availability alone. Furthermore, Redecker (2020) explained that effective digital teaching practices involve selecting appropriate technologies and designing learner-centered activities that promote engagement and achievement regardless of learners' technological circumstances. Thus, the non-significant differences found in this study indicate that variations in access to digital resources do not significantly affect learners' perceptions of digital innovation integration in MAPEH instruction.

Demographic Profile	Digital Innovation Integration in MAPEH Instructions	F-value	df	P-value	Remarks	Decision
Internet Connectivity Level	Instructional Strategies	3.694	48	0.018	Significant	Reject the Ho
	Learning Resources	1.577	48	0.208	Not Significant	Accept the Ho
	Assessment Practices	0.312	48	0.816	Not Significant	Accept the Ho

Table 5.4 presents the test of significant difference in the extent of digital innovation integration in MAPEH instruction when respondents are grouped according to internet connectivity level. The results show that there is a significant difference in terms of Instructional Strategies, while no significant differences were found in Learning Resources and Assessment Practices.

These findings are supported by UNESCO (2023), which emphasized that reliable internet connectivity is a critical factor in maximizing the educational benefits of digital technologies. UNESCO (2023) highlighted that unequal connectivity can influence learners' ability to participate fully in digital learning experiences, particularly in activities requiring online access and interaction. Furthermore, Redecker (2020) explained that effective digital education requires not only technological tools but also appropriate infrastructure and inclusive teaching practices that consider learners' varying levels of access. Therefore, the significant difference observed in instructional strategies indicates that internet connectivity influences how learners experience and engage with digital innovation-based instruction in MAPEH.

6. Is there a significant difference in student engagement in MAPEH classes when respondents are grouped according to profile variables?

Demographic Profile	Student Engagement in MAPEH Classes	t-value	df	P-value	Remarks	Decision
Age	Behavioral Engagement	2.108	48	0.040	Significant	Reject the Ho
	Cognitive Engagement	0.091	48	0.928	Not Significant	Accept the Ho
	Affective Engagement	0.836	48	0.408	Not Significant	Accept the Ho

Table 6.1 presents the test of significant difference in student engagement in MAPEH classes when respondents are grouped according to age. The results indicate that there is a significant difference in behavioral engagement, while no significant differences were found in cognitive engagement and affective engagement among respondents with different age groups.

These findings are supported by Fredricks, Blumenfeld, and Paris (2004), who explained that student engagement consists of behavioral, cognitive, and affective dimensions, which may be influenced by learners' developmental characteristics and educational experiences. Additionally, UNESCO (2023) emphasized that learner-centered and technology-supported environments should be designed to accommodate diverse learner characteristics, promoting active participation, meaningful learning, and positive engagement. Therefore, the significant difference in behavioral engagement indicates that age may influence students' participation patterns, while cognitive and affective engagement remain consistent among learners in MAPEH classes.

Demographic Profile	Student Engagement in MAPEH Classes	t-value	df	P-value	Remarks	Decision
Sex	Behavioral Engagement	0.623	48	0.536	Not Significant	Accept the Ho
	Cognitive Engagement	0.722	48	0.474	Not Significant	Accept the Ho
	Affective Engagement	1.411	48	0.165	Not Significant	Accept the Ho

Table 6.2 presents the test of significant difference in student engagement in MAPEH classes when respondents are grouped according to sex. The results indicate that there is no significant difference in the three dimensions of student engagement, namely Behavioral Engagement, Cognitive Engagement, and Affective Engagement, when respondents are classified according to sex.

Furthermore, UNESCO (2023) emphasized that inclusive digital learning environments should provide equitable opportunities for participation and engagement among all learners regardless of gender. Therefore, the non-significant results in this study indicate that sex does not create differences in students' behavioral, cognitive, and affective engagement in MAPEH classes.

Demographic Profile	Student Engagement in MAPEH Classes	F-value	df	P-value	Remarks	Decision
Access to Digital Resources	Behavioral Engagement	0.547	48	0.653	Not Significant	Accept the Ho
	Cognitive Engagement	1.953	48	0.134	Not Significant	Accept the Ho
	Affective Engagement	0.087	48	0.967	Not Significant	Accept the Ho

Table 6.3 presents the test of significant difference in student engagement in MAPEH classes when respondents are grouped according to access to digital resources. The results indicate that there is no significant difference in the three dimensions of student engagement, namely Behavioral Engagement, Cognitive Engagement, and Affective Engagement, when respondents are classified according to their access to digital resources.

These findings are supported by Fredricks, Blumenfeld, and Paris (2004), who emphasized that student engagement is a multidimensional construct influenced by instructional practices, learning environments, motivation, and meaningful classroom experiences. Moreover, UNESCO (2023) highlighted that equitable digital education requires not only access to technology but also inclusive teaching approaches that ensure all learners can participate effectively. Thus, the non-significant results of the study indicate that differences in access to digital resources do not significantly affect learners' behavioral, cognitive, and affective engagement in MAPEH classes.

Demographic Profile	Student Engagement in MAPEH Classes	F-value	df	P-value	Remarks	Decision
Internet Connectivity Level	Behavioral Engagement	0.210	48	0.889	Not Significant	Accept the Ho
	Cognitive Engagement	0.920	48	0.439	Not Significant	Accept the Ho
	Affective Engagement	0.108	48	0.955	Not Significant	Accept the Ho

Table 6.4 presents the test of significant difference in student engagement in MAPEH classes when respondents are grouped according to internet connectivity level. The results indicate that there is no significant difference in the three dimensions of student engagement, namely Behavioral Engagement, Cognitive Engagement, and Affective Engagement, when respondents are categorized according to their level of internet connectivity.

These findings are supported by Fredricks, Blumenfeld, and Paris (2004), who explained that student engagement is influenced by behavioral, cognitive, and emotional factors shaped by classroom experiences, teacher support, and learning environments. Additionally, UNESCO (2023) emphasized that while digital connectivity is an important component of technology-supported learning, meaningful educational experiences depend on inclusive instructional practices and equitable access to learning opportunities. Thus, the non-significant findings indicate that differences in internet connectivity level do not significantly affect learners' behavioral, cognitive, and affective engagement in MAPEH classes.

7. Is there a significant difference in academic performance in MAPEH when respondents are grouped according to profile variables?

Demographic Profile	Academic Performance in MAPEH	t-value	df	P-value	Remarks	Decision
Age		-1.036	48	0.306	Not Significant	Accept the Ho

Table 7.1 presents the test of significant difference in academic performance in MAPEH when respondents are grouped according to age. The results indicate that there is no significant difference in the academic performance of learners when classified according to their age.

These findings are supported by UNESCO (2023), which emphasized that effective technology-supported learning should focus on creating equitable and meaningful learning experiences that address learners' needs rather than relying solely on demographic characteristics. Furthermore, Redecker (2020) explained that learner-centered digital instruction promotes improved learning

outcomes when technology is integrated through appropriate strategies, resources, and assessment approaches. Therefore, the non-significant result of this study indicates that age does not significantly influence learners' academic performance in MAPEH under digital innovation-based instruction.

Demographic Profile	Academic Performance in MAPEH	t-value	df	P-value	Remarks	Decision
Sex		-0.440	48	0.662	Not Significant	Accept the Ho

Table 7.2 presents the test of significant difference in academic performance in MAPEH when respondents are grouped according to sex. The results indicate that there is no significant difference in the academic performance of learners when classified according to sex.

These findings are supported by UNESCO (2023), which emphasized that inclusive education promotes equal learning opportunities by ensuring that learners, regardless of gender, have access to quality instruction, resources, and supportive learning environments. Additionally, Redecker (2020) highlighted that effective digital learning outcomes are influenced by the quality of technology integration, instructional design, and learner-centered approaches rather than demographic factors alone. Therefore, the non-significant findings indicate that sex does not significantly affect learners' academic performance in MAPEH under digital innovation-based instruction.

Demographic Profile	Academic Performance in MAPEH	F-value	df	P-value	Remarks	Decision
Access to Digital Resources		0.996	48	0.403	Not Significant	Accept the Ho

Table 7.3 presents the test of significant difference in academic performance in MAPEH when respondents are grouped according to access to digital resources. The results indicate that there is no significant difference in the academic performance of learners when classified according to their access to digital resources.

These findings are supported by UNESCO (2023), which emphasized that while access to digital technologies is an important component of digital education, improved learning outcomes depend on meaningful technology integration, effective teaching practices, and equitable learning environments. Furthermore, Redecker (2020) explained that digital learning effectiveness is achieved when technology is used strategically to support learner-centered instruction, collaboration, and knowledge development rather than relying solely on the availability of digital devices. Therefore, the non-significant result indicates that access to digital resources does not significantly influence learners' academic performance in MAPEH under digital innovation-based instruction.

Demographic Profile	Academic Performance in MAPEH	F-value	df	P-value	Remarks	Decision
Internet Connectivity Level		1.201	48	0.320	Not Significant	Accept the Ho

Table 7.4 presents the test of significant difference in academic performance in MAPEH when respondents are grouped according to internet connectivity level. The results indicate that there is no significant difference in the academic performance of learners when classified according to their level of internet connectivity.

These findings are supported by UNESCO (2023), which emphasized that although internet connectivity is essential for expanding access to digital learning, educational outcomes are strongly influenced by the quality of instructional design, teacher support, and the effective use of technology. UNESCO (2023) highlighted the importance of developing inclusive digital learning environments that accommodate learners with varying levels of connectivity. Additionally, Redecker (2020) explained that meaningful digital learning depends on how technology is integrated into teaching practices rather than simply on the availability of technological infrastructure. Therefore, the non-significant findings indicate that internet connectivity level does not significantly influence learners' academic performance in MAPEH under digital innovation-based instruction.

8. Is there a significant relationship between the extent of digital innovation integration and student engagement in MAPEH?

Digital Innovation Integration in MAPEH Instructions	Student Engagement in MAPEH Classes	R-value	N	P-value	Remarks	Decision
Instructional Strategies	Behavioral Engagement	-0.105	50	0.446	Not Significant	Accept the Ho
	Cognitive Engagement	-0.096	50	0.508	Not Significant	Accept the Ho
	Affective Engagement	-0.236	50	0.099	Not Significant	Accept the Ho

Table 8.1 presents the test of significant relationship between the extent of digital innovation integration in MAPEH instruction and student engagement in MAPEH classes in terms of Instructional Strategies and the three dimensions of engagement: Behavioral Engagement, Cognitive Engagement, and Affective Engagement.

These findings are supported by Fredricks, Blumenfeld, and Paris (2004), who emphasized that student engagement is a complex construct influenced by behavioral, cognitive, and emotional factors that extend beyond instructional materials alone. Similarly, Redecker (2020) explained that technology integration should focus on enhancing teaching practices and learner experiences rather than simply increasing the amount of digital tools used. Therefore, the non-significant relationship found in this study indicates that instructional strategies, by themselves, do not significantly predict student engagement in MAPEH classes.

Digital Innovation Integration in MAPEH Instructions	Student Engagement in MAPEH Classes	R-value	N	P-value	Remarks	Decision
Learning Resources	Behavioral Engagement	-0.155	50	0.284	Not Significant	Accept the Ho
	Cognitive Engagement	-0.092	50	0.526	Not Significant	Accept the Ho
	Affective Engagement	-0.171	50	0.234	Not Significant	Accept the Ho

Table 8.2 presents the test of significant relationship between the extent of digital innovation integration in MAPEH instruction in terms of Learning Resources and student engagement in MAPEH classes across the three dimensions: Behavioral Engagement, Cognitive Engagement, and Affective Engagement.

These findings are supported by UNESCO (2023), which emphasized that digital learning resources contribute to educational improvement when they are accompanied by effective pedagogical practices, accessibility measures, and meaningful learner interaction. UNESCO (2023) highlighted that simply providing digital materials does not guarantee improved engagement unless learners are actively guided in using these resources for learning. Furthermore, Redecker (2020) explained that digital resources are most effective when integrated into learner-centered approaches that encourage collaboration, reflection, and active participation. Therefore, the non-significant relationship found in this study indicates that digital learning resources alone do not significantly influence student engagement in MAPEH classes.

Digital Innovation Integration in MAPEH Instructions	Student Engagement in MAPEH Classes	R-value	N	P-value	Remarks	Decision
Affective Engagement	Behavioral Engagement	0.178	50	0.217	Not Significant	Accept the Ho
	Cognitive Engagement	-0.075	50	0.605	Not Significant	Accept the Ho
	Affective Engagement	0.174	50	0.226	Not Significant	Accept the Ho

Table 8.3 presents the test of significant relationship between the extent of digital innovation integration in MAPEH instruction in terms of Assessment Practices and student engagement in MAPEH classes across the three dimensions: Behavioral Engagement, Cognitive Engagement, and Affective Engagement.

These findings are supported by Fredricks, Blumenfeld, and Paris (2004), who emphasized that student engagement is influenced by multiple factors, including classroom experiences, motivation, and the quality of interactions between learners and teachers. Additionally, UNESCO (2023) highlighted that digital assessment tools can enhance learning outcomes when they are integrated with effective pedagogical practices that promote feedback, reflection, and active participation.

9. Is there a significant relationship between the extent of digital innovation integration and academic performance in MAPEH?

Digital Innovation Integration in MAPEH Instructions: Instructional Strategies	Academic Performance in MAPEH	R-value	N	P-value	Remarks	Decision
		0.061	50	0.672	Not Significant	Accept the Ho

Table 9.1 presents the test of significant relationship between the extent of digital innovation integration in MAPEH instruction in terms of Instructional Strategies and academic performance in MAPEH. The results indicate that there is no significant relationship between instructional strategies and learners' academic performance.

These findings are supported by Redecker (2020), who emphasized that the effectiveness of digital technologies in education depends on how teachers integrate technology into learning processes rather than on the mere presence of digital tools. Meaningful technology integration requires purposeful instructional design, learner-centered approaches, and appropriate pedagogical practices. Similarly, UNESCO (2023) highlighted that digital technologies can improve learning outcomes when effectively incorporated into teaching strategies that encourage active participation and deeper understanding. Therefore, the non-significant relationship found in this study indicates that instructional strategies alone do not significantly influence academic performance in MAPEH under digital innovation-based instruction.

		R-value	N	P-value	Remarks	Decision
Digital Innovation Integration in MAPEH Instructions: Learning Resources	Academic Performance in MAPEH	0.106	50	0.463	Not Significant	Accept the Ho

Table 9.2 presents the test of significant relationship between the extent of digital innovation integration in MAPEH instruction in terms of Learning Resources and academic performance in MAPEH. The results indicate that there is no significant relationship between the use of digital learning resources and learners' academic performance.

These findings are supported by UNESCO (2023), which emphasized that digital learning resources contribute to improved educational outcomes when they are integrated with effective teaching practices, learner support, and inclusive learning strategies. UNESCO (2023) highlighted that access to digital materials alone does not automatically lead to improved achievement unless learners are guided in using these resources meaningfully. Furthermore, Redecker (2020) explained that digital technologies become effective learning tools when they are strategically incorporated into learner-centered environments that promote engagement, reflection, and knowledge development. Therefore, the non-significant relationship found in this study indicates that digital learning resources alone do not significantly influence academic performance in MAPEH.

		R-value	N	P-value	Remarks	Decision
Digital Innovation Integration in MAPEH Instructions: Affective Engagement	Academic Performance in MAPEH	0.055	50	0.706	Not Significant	Accept the Ho

Table 9.3 presents the test of significant relationship between the extent of digital innovation integration in MAPEH instruction in terms of Assessment Practices and academic performance in MAPEH. The results indicate that there is no significant relationship between digital assessment practices and learners' academic performance.

These findings are supported by Redecker (2020), who emphasized that technology-supported assessment becomes effective when it is purposefully designed to support learning, provide feedback, and promote learner reflection rather than simply replace traditional assessment methods. Additionally, UNESCO (2023) highlighted that digital assessment tools contribute to improved learning outcomes when integrated with comprehensive teaching strategies, accessibility measures, and learner-centered approaches. Therefore, the non-significant relationship found in this study indicates that digital assessment practices alone do not significantly influence academic performance in MAPEH under digital innovation-based instruction.

10. Is there a significant relationship between student engagement and academic performance in MAPEH?

		R-value	N	P-value	Remarks	Decision
Student Engagement in MAPEH Classes: Behavioral Engagement	Academic Performance in MAPEH	-0.076	50	0.599	Not Significant	Accept the Ho

Table 10.1 presents the test of significant relationship between student engagement in MAPEH classes in terms of Behavioral Engagement and academic performance in MAPEH. The results indicate that there is no significant relationship between learners' behavioral engagement and their academic performance.

These findings are supported by Fredricks, Blumenfeld, and Paris (2004), who explained that student engagement is a multidimensional concept consisting of behavioral, cognitive, and affective components, and that academic outcomes are influenced by the interaction of these dimensions rather than participation alone. Furthermore, UNESCO (2023) emphasized that meaningful learning requires instructional practices that promote active participation, deeper understanding, and effective use of learning resources. Therefore, the non-significant relationship found in this study indicates that behavioral engagement alone does not significantly influence academic performance in MAPEH.

		R-value	N	P-value	Remarks	Decision
Student Engagement in MAPEH Classes: Cognitive Engagement	Academic Performance in MAPEH	0.172	50	0.232	Not Significant	Accept the Ho

Table 10.2 presents the test of significant relationship between student engagement in MAPEH classes in terms of Cognitive Engagement and academic performance in MAPEH. The results indicate that there is no significant relationship between learners' cognitive engagement and their academic performance.

These findings are supported by Fredricks, Blumenfeld, and Paris (2004), who explained that cognitive engagement involves learners' willingness to invest effort, use strategies, and develop deeper understanding; however, its effect on achievement depends on the quality of learning experiences and instructional conditions. Additionally, UNESCO (2023) emphasized that meaningful learning outcomes are achieved when engagement is supported by effective pedagogy, appropriate resources, and inclusive learning environments. Therefore, the non-significant relationship found in this study indicates that cognitive engagement alone does not significantly influence academic performance in MAPEH.

		R-value	N	P-value	Remarks	Decision
Student Engagement in MAPEH Classes: Affective Engagement	Academic Performance in MAPEH	0.250	50	0.080	Not Significant	Accept the Ho

Table 10.3 presents the test of significant relationship between student engagement in MAPEH classes in terms of Affective Engagement and academic performance in MAPEH. The results indicate that there is no significant relationship between learners' affective engagement and their academic performance.

These findings are supported by Fredricks, Blumenfeld, and Paris (2004), who emphasized that affective engagement reflects learners' emotional connection, interest, and attitudes toward learning, but its relationship with achievement may depend on how effectively these emotions are transformed into active learning behaviors. Furthermore, UNESCO (2023) highlighted that positive learner experiences and supportive educational environments contribute to meaningful learning; however, academic outcomes are influenced by multiple interconnected factors, including teaching practices, resources, and learner participation. Therefore, the non-significant relationship found in this study indicates that affective engagement alone does not significantly influence academic performance in MAPEH.

11. Based on the findings of the study, what enhanced Strategic Intervention Materials (SIMs) in MAPEH integrating digital innovations may be proposed?

Table 11. Enhanced Strategic Intervention Materials (SIMs) in MAPEH Integrating Digital Innovations

Area of Enhancement	Findings/ Basis of the Study	Enhanced Strategic Intervention Materials (SIMs)	Objectives	Digital Innovation Integration	Estimated Budget	Measurable Expected Outcomes
Instructional Strategies	Learners assessed digital instructional strategies with an overall mean of 3.13 (Agree), indicating that technology-supported teaching practices are present but may still be enhanced.	Interactive Digital MAPEH Learning Modules containing video demonstrations, step-by-step guides, interactive activities, and digital examples for Music, Arts, Physical Education, and Health.	To improve learners' understanding and application of MAPEH concepts through engaging digital instructional approaches.	Digital presentations, QR-coded activities, and interactive multimedia lesson	₱5,000	85%–90% of learners are expected to demonstrate improved understanding of MAPEH concepts and increased participation in technology-supported learning activities.
Learning Resources	Learners rated digital learning resources with an overall mean of 3.22 (Agree), showing that available materials support learning but require further accessibility and improvement.	Digital Resource-Based MAPEH SIM Package consisting of downloadable modules, tutorials, visual references, practice activities, and performance guides.	To provide accessible and learner-centered resources that support independent practice and skill development.	Offline-compatible digital files, multimedia resources, and mobile-accessible materials.	₱4,500	90% of learners are expected to access and utilize digital learning resources effectively, while 80% are expected to improve completion of MAPEH learning tasks.
Assessment Practices	Learners assessed digital	Digital Assessment and Feedback	To strengthen assessment processes	Digital quiz, online submission	₱3,500	85% of learners are expected to

	assessment practices with an overall mean of 3.06 (Agree), indicating the need for improved feedback and assessment engagement.	**SIM Package** containing online quizzes, performance rubrics, self-assessment tools, and digital reflection activities.	through timely feedback, self-monitoring, and continuous improvement.	platforms, and feedback applications.		improve assessment performance and 80% are expected to apply digital feedback in enhancing their outputs.
Behavioral Engagement	Learners showed positive behavioral engagement with an overall mean of 3.22 (Agree), particularly in participation and collaboration using digital tools.	**Collaborative Digital MAPEH Activity SIMs** featuring group-based digital projects, performance tasks, and creative challenges.	To increase learner participation, collaboration, and active involvement during MAPEH activities.	Digital collaboration platforms, multimedia presentations, online sharing tools, and digital performance submissions.	**₱4,000**	90% of learners are expected to actively participate in digital MAPEH activities and complete assigned collaborative performance tasks.
Cognitive Engagement	Learners obtained an overall mean of 3.13 (Agree), indicating positive cognitive involvement but opportunities for deeper learning remain.	**Critical Thinking and Skill Enhancement SIMs** incorporating problem-solving activities, reflection tasks, and application-based exercises.	To develop higher-order thinking skills, creativity, and meaningful application of MAPEH knowledge.	Digital reflection journals, guided learning activities, and online problem-solving tasks.	**₱4,000**	80% of learners are expected to demonstrate improved critical thinking skills, problem-solving abilities, and application of MAPEH concepts.
Affective Engagement	Learners demonstrated positive affective engagement with an overall mean of 3.21 (Strongly Agree).	**Creative Digital Expression SIMs** involving digital music creation, digital artwork, fitness challenges, and health	To enhance learners' motivation, confidence, creativity, and appreciation of MAPEH through digital activities.	Digital creative applications and online creative platforms.	**₱5,000**	90% of learners are expected to demonstrate increased motivation, confidence, creativity, and positive attitudes
	showing interest and motivation toward digital MAPEH activities.	advocacy projects.				toward MAPEH activities.
Digital Accessibility	Majority of learners reported limited internet connectivity, with 58% **having no internet access**, highlighting the need for inclusive learning materials.	**Offline-Compatible Digital SIMs for Inclusive MAPEH Learning** containing downloadable files, printed materials, and low-data resources.	To ensure equitable access to MAPEH learning materials regardless of internet availability.	Offline videos, downloadable resources, and printable activity sheets.	**₱6,000**	95% of learners are expected to access MAPEH learning materials through available formats, reducing barriers caused by limited internet connectivity.
Overall Digital Innovation-Based MAPEH Intervention	Learners achieved a **Very Satisfactory academic performance**, and digital innovation integration was positively assessed across instructional components.	**Enhanced Digital Innovation-Based Strategic Intervention Materials (EDIM-SIMs) for MAPEH** integrating instruction, resources, assessment, and engagement strategies.	To enhance MAPEH learning outcomes through structured, inclusive, and technology-supported intervention materials.	Integrated use of digital instruction, multimedia resources, interactive assessment, and collaborative learning approaches.	**₱32,000 (Estimated Total Budget)**	85%–95% of learners are expected to improve their MAPEH engagement, learning participation, and academic performance after the implementation of the intervention materials.

This study aimed to determine the extent of digital innovation integration in MAPEH instruction and its relationship with student engagement and academic performance among learners. Specifically, it examined the respondents' demographic profile, the level of digital innovation integration in terms of instructional strategies, learning resources, and assessment practices; the level of student engagement in terms of behavioral, cognitive, and affective engagement; the learners' academic performance in MAPEH; the significant differences among variables when grouped according to profile characteristics; and the significant relationships between digital innovation integration, student engagement, and academic performance.

The study involved 50 respondents. A descriptive-correlational research design was utilized, and data were gathered through a researcher-made questionnaire. Frequency, percentage, weighted mean, t-test, one-way ANOVA, and Pearson Product-Moment Correlation were employed to analyze the gathered data.

The major findings of the study were summarized as follows:

1. Demographic Profile of the Respondents

The respondents were mostly 12 years old, consisting of 35 learners (70.00%), while 15 learners (30.00%) were 13 years old. In terms of sex, the majority were male respondents with 35 learners (70.00%), while 15 learners (30.00%) were female. Regarding access to digital resources, most learners used smartphones with 37 respondents (74.00%), followed by laptops with 6 respondents (12.00%), tablets with 3 respondents (6.00%), and learners without digital resources with 4 respondents (8.00%). In terms of internet connectivity, the majority reported no internet access with 29 respondents (58.00%), while others experienced moderate, average, and strong connectivity.

2. Extent of Digital Innovation Integration in MAPEH Instruction

The extent of digital innovation integration in MAPEH instruction was assessed in terms of instructional strategies, learning resources, and assessment practices. The respondents assessed instructional strategies with an overall mean of 3.13 (Agree), indicating that teachers utilize digital tools such as presentations, videos, demonstrations, and interactive activities to support MAPEH instruction. The respondents assessed learning resources with an overall mean of 3.22 (Agree), suggesting that digital materials such as online references, instructional videos, and digital resources support learners' understanding and practice of MAPEH competencies. The respondents assessed assessment practices with an overall mean of 3.06 (Agree), indicating that digital assessments, feedback mechanisms, and technology-supported evaluation practices are implemented in MAPEH classes.

3. Level of Student Engagement in MAPEH Classes

The respondents demonstrated positive engagement in MAPEH classes. Behavioral engagement obtained an overall mean of 3.22 (Agree), showing that learners actively participate, follow instructions, collaborate, and complete digital learning activities. Cognitive engagement obtained an overall mean of 3.13 (Agree), indicating that learners demonstrate understanding, reflection, and application of MAPEH concepts through learning activities. Affective engagement obtained an overall mean of 3.21 (Strongly Agree), showing that learners experience interest, motivation, confidence, and enjoyment in technology-supported MAPEH activities.

4. Level of Academic Performance in MAPEH

The learners' academic performance in MAPEH was generally Very Satisfactory. Out of 50 respondents, 25 learners (50.00%) obtained Very Satisfactory performance, 21 learners (42.00%) obtained Outstanding performance, and 4 learners (8.00%) obtained Satisfactory performance. No learners were classified under Fairly Satisfactory and Did Not Meet Expectations.

5. Significant Differences in Digital Innovation Integration According to Profile Variables

The findings revealed that there were no significant differences in digital innovation integration in terms of instructional strategies, learning resources, and assessment practices when respondents were grouped according to age, sex, and access to digital resources. However, a significant difference was found in instructional strategies when grouped according to internet connectivity level with a p-value of 0.018, indicating that learners' internet connectivity influenced their perception of digital instructional strategies.

6. Significant Differences in Student Engagement According to Profile Variables

The results showed that there were no significant differences in behavioral, cognitive, and affective engagement when respondents were grouped according to sex, access to digital resources, and internet connectivity level. A significant difference was found in behavioral engagement when grouped according to age with a p-value of 0.040, indicating that age differences influenced learners' participation and involvement in MAPEH activities.

7. Significant Differences in Academic Performance According to Profile Variables

The findings revealed that there were no significant differences in academic performance in MAPEH when respondents were grouped according to age, sex, access to digital resources, and internet connectivity level. This indicates that learners' academic performance remained comparable regardless of their demographic characteristics.

8. Relationship Between Digital Innovation Integration and Student Engagement

The results showed that there was no significant relationship between digital innovation integration and student engagement in terms of instructional strategies, learning resources, and assessment practices. All obtained p-values were greater than the 0.05 level of significance.

9. Relationship Between Digital Innovation Integration and Academic Performance

The findings revealed that digital innovation integration in terms of instructional strategies, learning resources, and assessment practices had no significant relationship with academic performance in MAPEH. This indicates that the presence of digital innovation alone does not directly determine learners' academic achievement.

10. Relationship Between Student Engagement and Academic Performance

The findings showed that behavioral, cognitive, and affective engagement had no significant relationship with academic performance in MAPEH. This suggests that academic achievement may be influenced by multiple factors beyond engagement alone.

11. Enhanced Strategic Intervention Materials

Based on the findings, the study the Enhanced Digital Innovation-Based Strategic Intervention Materials (EDIM-SIMs) for MAPEH. The intervention focuses on improving instructional strategies, digital learning resources, assessment practices, learner engagement, and accessibility through technology-integrated activities.

CONCLUSIONS

Based on the findings of the study, the following conclusions were drawn:

1. The respondents were predominantly early adolescents, with most learners being 12 years old and male. Smartphones served as the most common digital resource, while limited internet connectivity remained a challenge among learners.
2. Digital innovation integration in MAPEH instruction was implemented at an Agree level, indicating that teachers utilize technology-supported strategies, resources, and assessment practices in teaching MAPEH.
3. Learners demonstrated positive levels of behavioral, cognitive, and affective engagement, showing that digital innovation contributes to meaningful learning experiences and participation.
4. Learners achieved a Very Satisfactory level of academic performance, indicating that students were able to meet expected learning outcomes in MAPEH.
5. Demographic variables generally did not create significant differences in digital innovation integration, student engagement, and academic performance, except for selected areas such as instructional strategies based on internet connectivity and behavioral engagement based on age.
6. Digital innovation integration alone does not significantly influence student engagement and academic performance. The effectiveness of technology depends on how it is strategically used alongside appropriate teaching approaches and learner-centered practices.
7. 7 Student engagement alone does not significantly determine academic performance, suggesting that achievement is influenced by multiple factors, including teaching strategies, learning environment, motivation, and individual learner characteristics.
8. The Enhanced Digital Innovation-Based Strategic Intervention Materials (EDIM-SIMs) may serve as an appropriate intervention to strengthen digital learning implementation and enhance MAPEH instruction.

RECOMMENDATIONS

Based on the conclusions of the study, the following recommendations are proposed:

1. For MAPEH Teachers: Teachers may continue enhancing the integration of digital innovations by designing meaningful, interactive, and learner-centered activities rather than focusing only on the availability of technology. They may utilize multimedia resources, digital assessments, and collaborative activities to support diverse learning needs.

2. For School Administrators: School administrators may provide continuous support through digital infrastructure development, teacher training, and access to instructional technologies to strengthen technology-integrated MAPEH instruction.

3. For Learners: Learners are encouraged to maximize available digital resources responsibly and actively participate in technology-supported activities to improve their skills, creativity, and understanding of MAPEH concepts.

4. For Teachers and Curriculum Developers: The proposed Enhanced Digital Innovation-Based Strategic Intervention Materials (EDIM-SIMs) may be implemented, evaluated, and improved as supplementary learning materials to support MAPEH instruction.

5. For Future Researchers: Future researchers may conduct similar studies involving larger populations, other grade levels, and additional variables such as digital literacy, teacher competency, learning motivation, and technology acceptance to further understand the role of digital innovation in education.

REFERENCES

1) **Appleton, J. J., Christenson, S. L., & Furlong, M. J. (2008).** Student engagement with school: Critical conceptual and methodological issues of the construct. Psychology in the Schools, 45(5), 369–386. https://doi.org/10.1002/pits.20303
2) **Bond, M., Bedenlier, S., Marín, V. I., & Händel, M. (2021).** Emergency remote teaching in higher education: Mapping the first global online semester. International Journal of Educational Technology in Higher Education, 18, Article 50. https://doi.org/10.1186/s41239-021-00282-x
3) **Dhawan, S. (2020).** Online learning: A panacea in the time of COVID-19 crisis. Journal of Educational Technology Systems, 49(1), 5–22. https://doi.org/10.1177/0047239520934018
4) **Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004).** School engagement: Potential of the concept, state of the evidence. Review of Educational Research, 74(1), 59–109. https://doi.org/10.3102/00346543074001059
5) **Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022).** Understanding the role of digital technologies in education: A review. Sustainable Operations and Computers, 3, 275–285. https://doi.org/10.1016/j.susoc.2022.05.004
6) **International Telecommunication Union. (2023).** Facts and figures 2023: Internet use and digital connectivity. ITU. https://www.itu.int
7) **Koehler, M. J., & Mishra, P. (2009).** What is technological pedagogical content knowledge? Contemporary Issues in Technology and Teacher Education, 9(1), 60–70.
8) **Martin, F., Sun, T., & Westine, C. D. (2020).** A systematic review of research on online teaching and learning from 2009 to 2018. Computers & Education, 159, 104009. https://doi.org/10.1016/j.compedu.2020.104009
9) **Mishra, P., & Koehler, M. J. (2006).** Technological pedagogical content knowledge: A framework for teacher knowledge. Teachers College Record, 108(6), 1017–1054.
10) **OECD. (2021).** OECD digital education outlook 2021: Pushing the frontiers with artificial intelligence, blockchain and robots. OECD Publishing. https://doi.org/10.1787/589b283f-en
11) **Redecker, C. (2020).** Digital education action plan: European framework for the digital competence of educators (DigCompEdu). Publications Office of the European Union. https://doi.org/10.2760/159770
12) **Schindler, L. A., Burkholder, G. J., Morad, O. A., & Marsh, C. (2017).** Computer-based technology and student engagement: A critical review of the literature. International Journal of Educational Technology in Higher Education, 14, Article 25. https://doi.org/10.1186/s41239-017-0063-0
13) **Skinner, E. A., Kindermann, T. A., & Furrer, C. J. (2009).** A motivational perspective on engagement and disaffection: Conceptualization and assessment of children's behavioral and emotional participation in academic activities. Educational and Psychological Measurement, 69(3), 493–525. https://doi.org/10.1177/0013164408323233
14) **UNESCO. (2021).** Reimagining human connections: Technology and education in the post-COVID-19 era. United Nations Educational, Scientific and Cultural Organization. https://www.unesco.org
15) **UNESCO. (2023).** Global education monitoring report 2023: Technology in education: A tool on whose terms? United Nations Educational, Scientific and Cultural Organization. https://www.unesco.org/gem-report/en/technology
16) **Varea, V., González-Calvo, G., & García-Monge, A. (2022).** Exploring the changes of physical education in the age of digitalization. Sport, Education and Society, 27(6), 692–705. https://doi.org/10.1080/13573322.2021.1902980
17) **World Bank. (2021)**. Remote learning during COVID-19: Lessons from today, principles for tomorrow. World Bank Group. https://www.worldbank.org
18) **Zepke, N., & Leach, L. (2010).** Improving student engagement: Ten proposals for action. Active Learning in Higher Education, 11(3), 167–177. https://doi.org/10.1177/1469787410379680