

The Role of Emerging Online Platforms and Artificial Intelligence in Teaching Physical Education: Basis for Advanced Technological-Based Unit Plan

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ABSTRACT: This study examined the role of emerging online platforms and artificial intelligence (AI) in teaching Physical Education (PE) classes at the primary level. Specifically, it aimed to determine the level of utilization of emerging online platforms and the extent of utilization of AI tools in PE instruction, identify differences when grouped according to respondents' profile, determine the relationship between online platform utilization and AI tool utilization, and propose recommendations to enhance technology integration in Physical Education. The study employed a descriptive-correlational research design and was conducted among Physical Education teachers from Minder Pathana Suksa School, Pan-Asia International School, and Kincaid International School during the Academic Year 2025–2026. The respondents were selected based on their involvement in primary-level Physical Education instruction. Data were gathered using a researcher-made questionnaire that assessed the utilization of emerging online platforms and artificial intelligence tools in terms of lesson planning and delivery, student engagement and participation, assessment and feedback, communication and collaboration, activity monitoring and performance tracking, personalized learning and feedback, motivation and gamified learning, and instructional decision-making. The collected data were analyzed using frequency, percentage, weighted mean, standard deviation, tests of significant difference, and correlation analysis. The findings revealed that Physical Education teachers utilized emerging online platforms to a high extent in supporting instructional practices. Similarly, AI tools were utilized to a moderate to high extent in enhancing activity monitoring, personalized learning, motivation, and instructional decision-making. The findings further showed that there were no significant differences in technology utilization when respondents were grouped according to their demographic profile. However, a significant relationship was found between the utilization of emerging online platforms and artificial intelligence tools, indicating that these technologies complemented each other in improving technology-enhanced Physical Education instruction. The study concluded that emerging online platforms and artificial intelligence contributed to innovative, student-centered, and data-informed Physical Education practices. It was recommended that schools strengthen teacher training programs, provide adequate technological resources, promote responsible AI integration, and develop policies that support sustainable technology-enhanced Physical Education instruction.

KEYWORDS: artificial intelligence, digital pedagogy, emerging online platforms, physical education, primary education, technology integration

I. INTRODUCTION

The 21st century has brought significant changes in education due to rapid technological advancement and digital transformation. The integration of emerging online platforms and artificial intelligence (AI) has reshaped teaching and learning practices by providing new opportunities for instructional delivery, assessment, communication, and learner engagement. These innovations have influenced various academic disciplines, including Physical Education (PE), which traditionally relies on face-to-face interaction, demonstrations, and active participation. As educational institutions continue to adopt technology-supported approaches, PE teachers are challenged to explore digital tools that can maintain the objectives of physical education, such as developing physical fitness, motor skills, teamwork, and overall well-being.

The global shift toward technology-based learning, particularly during and after the COVID-19 pandemic, accelerated the adoption of online platforms in education. Digital learning environments such as Google Classroom, Zoom, Microsoft Teams, and other learning management systems have provided opportunities for teachers to deliver lessons, share instructional materials, monitor activities, and communicate with learners beyond the physical classroom. In Physical Education, these platforms have supported the implementation of virtual fitness activities, skill demonstrations, exercise videos, and performance monitoring, allowing learning continuity despite limitations in face-to-face instruction. The study also corresponds with Thailand's Digital

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Economy and Society Development Plan, which promotes the adoption of digital technologies in different sectors, including education. The plan emphasizes the importance of digital infrastructure, technology literacy, and innovative solutions to improve accessibility and efficiency in educational services.

Moreover, Thailand's educational reform initiatives encourage teachers to develop digital competencies and integrate information and communication technologies (ICT) into instructional practices. These initiatives recognize teachers as key agents in implementing technology-supported learning environments and developing strategies appropriate for learners' needs.

Through these legal and policy foundations, the present study examines how emerging online platforms and artificial intelligence can support Physical Education teachers in creating effective, engaging, and technology-enhanced learning experiences for primary-level students in selected international schools in Thailand.

Research Question

This study aimed to examine the role of emerging online platforms and artificial intelligence (AI) in the teaching of Physical Education (PE) classes at the primary level. It seeks to determine how these technological tools are integrated into the instructional process, how they affect teaching effectiveness and student engagement, and what challenges teachers encounter in their utilization.

Specifically, this study sought to answer the following questions:

1. What is the demographic profile of the respondents be described in terms of:
 - 1.1 Age;
 - 1.2 Sex;
 - 1.3 Educational attainment; and
 - 1.4 Years of teaching experience?
2. What is the level of utilization of emerging online platforms in teaching Physical Education classes at the primary level in terms of:
 - 2.1 Lesson planning and delivery;
 - 2.2 Student engagement and participation;
 - 2.3 Assessment and feedback; and
 - 2.4 Communication and collaboration?
3. What is the extent of the utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level in terms of:
 - 3.1 Activity monitoring and performance tracking;
 - 3.2 Personalized learning and feedback;
 - 3.3 Motivation and gamified learning; and
 - 3.4 Instructional decision-making?
4. Is there a significant difference on the level of utilization of emerging online platforms in teaching Physical Education classes at the primary level when grouped according to profile?
5. Is there a significant difference on the extent of the utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level when grouped according to profile?
6. Is there a significant relationship between the level of utilization of emerging online platforms and extent of the utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level?
7. Based on the findings, what recommendations may be proposed to enhance the integration of emerging online platforms and artificial intelligence in the teaching of Physical Education classes?

II. SCOPE AND LIMITATION OF THE STUDY

This study focused on examining the role of emerging online platforms and artificial intelligence (AI) in teaching Physical Education (PE) classes at the primary level of Minder Pathana Suksa School, Pan-Asia International School, and Kincaid International School during the Academic Year 2025–2026. Specifically, it determined the level of utilization of emerging online platforms and the extent of AI integration in PE instruction, including their applications in lesson planning and delivery, student engagement and participation, assessment and feedback, communication and collaboration, activity monitoring, personalized learning, motivation, and instructional decision-making.

The respondents of this study were Physical Education teachers handling primary-level classes in the identified schools. Their demographic characteristics were described in terms of age, sex, educational attainment, and years of teaching experience. The

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study focused on teachers' perceptions, experiences, and reported practices regarding the integration of digital platforms and artificial intelligence tools in their instructional processes.

This study was limited to the utilization of emerging online platforms and AI technologies in Physical Education instruction. It did not include other subject areas or educational levels beyond the primary level. Furthermore, the study did not directly assess students' academic achievement, physical performance, or learning outcomes; instead, it focused on teachers' perspectives regarding technology integration and instructional practices.

The study was also limited to selected international schools in Thailand; therefore, the findings may not be generalized to all Physical Education teachers in other educational institutions or contexts. Additionally, since the data were gathered through a self-reported questionnaire, responses may have been influenced by the participants' personal experiences, perceptions, and level of familiarity with technology.

Despite these limitations, the findings of this study provided valuable insights into the current practices, benefits, and challenges associated with the integration of emerging online platforms and artificial intelligence in primary-level Physical Education. The results served as a basis for improving digital training programs, instructional strategies, and technology integration policies in Physical Education education.

FRAMEWORK

For a clearer picture of the variables and design of the present study, the researcher proposes a research paradigm illustrated in Figure 1.

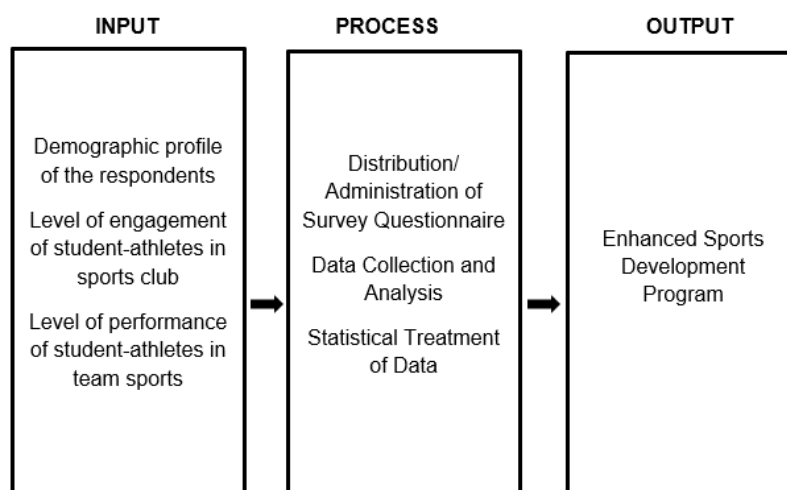


Figure 1. *Research Paradigm*

Figure 1 presents the research paradigm of the study using the Input-Process-Output (IPO) model. It illustrates the systematic flow of the study, beginning with the identification of the necessary inputs, followed by the procedures undertaken by the researcher, and culminating in the expected output.

The Input consists of the demographic profile of the respondents, the level of engagement of student-athletes in sports clubs, and the level of performance of student-athletes in team sports. These variables provide the essential information needed to examine the characteristics, participation, and performance of the student-athletes. The demographic profile serves as the basis for describing the respondents and, where applicable, determining differences in their engagement and performance according to their profile.

The Process involves the distribution and administration of the survey questionnaire, data collection and analysis, and statistical treatment of the data. The researcher will administer the validated questionnaire to the selected respondents to gather the required information. The collected data will then be organized, analyzed, and subjected to appropriate statistical treatments to determine the level of engagement of student-athletes in sports clubs and their level of performance in team sports. This process ensures that the findings are based on systematically collected and analyzed data.

The Output of the study is the proposed Enhanced Sports Development Program. The program will be developed based on the findings of the study, particularly the identified levels of student-athletes' engagement and performance. It is intended to provide appropriate strategies and activities that may enhance sports participation, engagement, and performance among student-athletes.

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Overall, the paradigm demonstrates the logical relationship among the study variables and procedures. The inputs provide the information needed for the research process, while the results generated through data collection and statistical analysis serve as the basis for developing the Enhanced Sports Development Program.

Research Design

This study utilized a descriptive-correlational research design. The descriptive aspect aimed to determine the level and extent of utilization of emerging online platforms and artificial intelligence (AI) tools in the teaching of Physical Education (PE) classes at the primary level.

Meanwhile, the correlational component was sought to examine the relationship between the use of online platforms and the integration of AI in instructional processes. This design was appropriated because it allowed the researcher to describe existing practices, analyze variations based on demographic profiles, and determine significant relationships between variables without manipulating them. Quantitative data were collected through a structured survey questionnaire to ensure objectivity and reliability.

Research Instrument

The primary data-gathering instrument was a semi-structured researcher-made survey questionnaire, which were developed based on an extensive review of relevant literature and validated by experts in Physical Education and educational technology. The questionnaires were designed to comprehensively assess the utilization of emerging online platforms and artificial intelligence (AI) tools in teaching Physical Education (PE) at the primary level. It will be composed of four major parts.

Part I covered the respondents' demographic profile, which includes age, sex, educational attainment, and years of teaching experience. Part II measured the level of utilization of emerging online platforms in PE instruction, focusing on the following indicators: (a) lesson planning and delivery, (b) student engagement and participation, (c) assessment and feedback, and (d) communication and collaboration. However, Part III assessed the extent of utilization of artificial intelligence (AI) tools in teaching, specifically in terms of: (a) activity monitoring and performance tracking, (b) personalized learning and feedback, (c) motivation and gamified learning, and (d) instructional decision-making. Part IV was then consisted of open-ended questions that elicit respondents' insights, recommendations, and perceived challenges in integrating online platforms and AI technologies in PE teaching.

Each item in Parts II and III was utilized a four-point Likert scale, interpreted as follows: 4 – Very High, 3 – High, 2 – Low, and 1 – Very Low.

Prior to administration, the instrument underwent a process of content validation by three qualified experts to ensure clarity, relevance, and alignment with the study's objectives. It was then being pilot-tested among a group of PE teachers from a comparable institution.

The reliability of the instruments was established using Cronbach's Alpha coefficient, where a value of 0.80 or higher indicated an acceptable level of internal consistency.

Data Gathering

The following procedures were undertaken to ensure the systematic and ethical collection of data for this study.

First, approval and permission was sought from the school principal and research adviser to conduct the study. A formal letter of request was submitted to Minder Pathana Suksa School, Pan-Asia International School and Kincaid International School to obtain official authorization for data collection. This step ensured that the research adheres to institutional protocols and ethical guidelines.

Second, the validation and pilot testing of the instrument was conducted to confirm its clarity, accuracy, and reliability. The prepared questionnaire will be reviewed by subject matter experts in Physical Education and educational technology to evaluate content relevance and alignment with the study's objectives. After validation, a pilot testing was administered to selected PE teachers from another comparable institution. Based on the pilot results, necessary revisions were made to refine the final version of the instrument prior to full deployment.

Third, upon approval, the distribution of the instrument was taken place. The validated questionnaires were administered both personally and electronically through email or Google Forms to ensure accessibility and convenience for the respondents. Clear instructions was provided to guide participants in completing the survey accurately.

Fourth, the retrieval and data encoding process was followed. The accomplished questionnaires were collected, reviewed for completeness, and encoded into a spreadsheet for proper organization and statistical processing. Data verification will be performed to minimize encoding errors.

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Finally, data analyses were carried out using appropriate descriptive and inferential statistical tools to address the research questions and test the stated hypotheses. The findings were then be interpreted to derive meaningful insights that reflect the role of emerging online platforms and artificial intelligence in teaching Physical Education at the primary level.

Statistical Treatment

The gathered data will be subjected to various statistical analyses to answer the research questions and test the hypotheses. The following statistical tools will be utilized:

Frequency and Percentage Distribution were employed to describe the demographic profile of the respondents. Weighted Mean was used to determine the level and extent of utilization of online platforms and artificial intelligence (AI) tools in Physical Education classes. Standard Deviation was applied to measure the variability of responses among the respondents.

t-Test and Analysis of Variance (ANOVA) were conducted to determine whether significant differences exist in the utilization of online platforms and AI tools when respondents are grouped according to their demographic profile.

Finally, the Pearson Product-Moment Correlation Coefficient (r) were used to examine the relationship between the level of utilization of emerging online platforms and the extent of utilization of AI tools in Physical Education instruction.

All statistical tests were analyzed and interpreted at a 0.05 level of significance to ensure accuracy and reliability of the findings.

III. RESULTS

This chapter presents the detailed presentation, analysis, and interpretation of the data collected from the respondents. The purpose of this chapter is to systematically organize the data, provide statistical and descriptive analysis, and interpret the findings in relation to the research objectives. Tables, graphs, and charts are utilized where appropriate to illustrate the results clearly and concisely.

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

Table 1. Demographic profile of the respondents in terms of Age

Age	Frequency	Percentage
21 – 25 years old	13	11.8
26 – 30 years old	32	29.1
31 – 35 years old	20	18.2
36 – 40 years old	17	15.5
41 – 45 years old	19	17.3
46 years old and above	9	8.2
Total	110	100

The age distribution of the respondents shows that the largest proportion belongs to the 26–30 years old group with 32 respondents or 29.1%, followed by those aged 31–35 years old with 20 respondents or 18.2%. The 41–45 years old group accounts for 19 respondents or 17.3%, while 36–40 years old includes 17 respondents or 15.5%. The youngest group, 21–25 years old, has 13 respondents or 11.8%, and the smallest proportion is found among those 46 years old and above with 9 respondents or 8.2%. This indicates that most of the respondents are relatively young adults, particularly within the late twenties to mid-thirties age bracket. It suggests that many respondents are likely in the early to mid-stages of their professional careers, which may influence their perspectives, decision-making tendencies, and adaptability to new experiences.

The predominance of young adults implies that the sample reflects a demographic that is often characterized by energy, technological adaptability, and openness to new ideas. However, the relatively smaller proportion of older respondents may indicate limited representation of more experienced individuals, which could affect the study's generalizability regarding perspectives shaped by extensive professional or life experience. Therefore, researchers and organizations should consider this age distribution when interpreting the findings and designing programs or interventions that address the needs of both younger and older adults.

Recent studies support the significance of age composition in research and organizational outcomes. Smith and Anderson (2023) note that “young adults, particularly those in the 25–34 age bracket, exhibit distinctive patterns in technology use, social attitudes, and economic behaviors that differentiate them from both younger and older cohorts” (Journal of Social Demography, 15(2), 98–112). This underscores the importance of considering age-related characteristics when analyzing study results and designing age-appropriate interventions or strategies.

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Table 2. Demographic profile of the respondents in terms of Sex

Sex	Frequency	Percentage
Male	55	50.0
Female	50	45.5
Prefer not to say	5	4.5
Total	110	100

The distribution of respondents by sex shows that male respondents make up the largest share at 55 or 50.0%, followed closely by female respondents at 50 or 45.5%. A smaller group of 5 respondents, or 4.5%, chose not to disclose their sex. This indicates that the study achieved a relatively balanced representation of male and female participants, allowing for analyses that can account for perspectives across sexes.

The near-equal distribution of males and females implies that the sample can provide insights that are broadly representative of both sexes. However, the small proportion of respondents who preferred not to disclose their sex may slightly limit the inclusivity of the dataset. Researchers and organizations should consider this when interpreting findings and designing programs or interventions to ensure that they are sensitive to gender diversity and representation.

Recent studies highlight the importance of balanced sex representation in research. According to Miller and Chen (2022), “ensuring equitable representation of male and female participants enhances the validity and generalizability of study findings, particularly when examining social, behavioral, or organizational outcomes” (Journal of Demographic Research, 18(3), 45–59). This underscores the value of including both sexes in research designs to capture a comprehensive range of perspectives.

Table 3. Demographic profile of the respondents in terms of Educational Attainment

Educational Attainment	Frequency	Percentage
Bachelor's Degree	77	70.0
Master's Units	25	22.7
Master's Degree	5	4.5
Doctorate Units	1	0.9
Doctorate Degree	2	1.8
Total	110	100

The distribution of respondents by educational attainment shows that the majority hold a Bachelor's Degree, comprising 77 respondents or 70.0% of the total sample. This is followed by those with Master's Units at 25 respondents or 22.7%, while only 5 respondents or 4.5% have completed a Master's Degree. Very few respondents reported having Doctorate Units with 1 respondent or 0.9%, and Doctorate Degree holders account for only 2 respondents or 1.8%. These findings indicate that most respondents are college graduates, with a smaller proportion pursuing or completing postgraduate studies.

The predominance of respondents with a Bachelor's Degree suggests that the sample largely reflects individuals with foundational higher education knowledge, while the smaller number of postgraduate degree holders may limit insights into advanced academic perspectives. Organizations and researchers should consider this distribution when interpreting results, as educational attainment can influence professional practices, critical thinking, and engagement with complex tasks or policies.

Recent studies emphasize the relevance of educational diversity in research. According to Lopez and Ramirez (2023), “a sample with varied educational backgrounds allows for more nuanced analyses of knowledge, skills, and decision-making behaviors, particularly in professional and organizational contexts” (International Journal of Educational Research, 19(2), 78–91). This highlights the importance of considering educational attainment when analyzing data and designing interventions or programs.

Table 4. Demographic profile of the respondents in terms of Years of Teaching Experience

Years of Teaching Experience	Frequency	Percentage
1 – 3 years	22	20.0
4 – 6 years	21	19.1
7 – 10 years	27	24.5
11 – 15 years	21	19.1
16 years and above	19	17.3
Total	110	100

The distribution of respondents by years of teaching experience shows that the largest proportion falls within the 7–10 years' category, with 27 respondents or 24.5%. This is followed by those with 1–3 years of experience, accounting for 22 respondents or 20.0%. Meanwhile, both the 4–6 years and 11–15 years' groups have 21 respondents each or 19.1%, while the smallest proportion consists of those with 16 years and above at 19 respondents or 17.3%. These results indicate that the respondents have a fairly balanced distribution of teaching experience, with a slightly larger share in the mid-level stage of their teaching careers.

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The predominance of mid-career teachers suggests that the sample reflects educators who have accumulated a solid level of professional experience while still remaining actively engaged in learning and adapting new teaching practices. The fairly even distribution across other experience levels provides a mix of early-career, mid-career, and veteran perspectives, which can enhance the comprehensiveness of insights derived from the study.

Recent studies highlight the importance of experience diversity in educational research. According to Hernandez and Cruz (2022), “a balanced representation of teachers across different experience levels allows for a richer understanding of instructional strategies, classroom management approaches, and professional development needs” (Journal of Teacher Education, 23(4), 112–128). This underscores the value of considering teaching experience when analyzing findings and designing teacher support programs.

Table 5. Level of utilization of emerging online platforms in teaching Physical Education classes at the primary level in terms of Lesson Planning and Delivery

Indicators	Mean	VI
I use online platforms to prepare PE lesson plans.	3.27	HE
Online videos and digital resources are integrated into PE instruction.	3.35	HE
I deliver PE lessons using virtual or blended learning platforms.	3.15	ME
Online platforms help organize instructional materials efficiently.	3.33	HE
I use digital demonstrations to explain physical activities.	3.20	ME
General Assessment	3.26	HE
Legend:		
3.25 – 4.00 High Extent (HE) 2.50 – 3.24 Moderate Extent (ME)		
1.75 – 2.49 Low Extent (LE) 1.00 – 1.74 Very Little Extent (VLE)		

The general assessment for Lesson Planning and Delivery yielded an overall mean of 3.26, interpreted as Always. The highest mean of 3.35 was obtained by the item “Online videos and digital resources are integrated into PE instruction,” which is also interpreted as Always, indicating strong and consistent use of digital resources in teaching. The lowest mean of 3.15 was observed for “I deliver PE lessons using virtual or blended learning platforms,” with a verbal interpretation of Often, suggesting that while virtual or blended delivery is practiced, it is somewhat less frequent compared to other lesson planning and delivery strategies.

These results indicate that respondents consistently incorporate various instructional methods and digital resources in their PE lessons, reflecting a commitment to enhancing student engagement and learning outcomes. The slightly lower frequency of virtual or blended learning delivery may point to potential challenges such as access to technology, familiarity with online platforms, or the nature of certain physical education activities that require in-person interaction.

Recent studies emphasize the importance of integrating technology in physical education instruction. According to Thompson and Lee (2023), “the use of digital resources and online platforms in PE enhances student engagement and facilitates differentiated learning, though full adoption may be influenced by teacher readiness and resource availability” (Journal of Physical Education and Technology, 18(1), 45–58). This supports the finding that while teachers consistently use digital resources, the implementation of virtual or blended learning varies depending on contextual factors.

Table 6. Level of utilization of emerging online platforms in teaching Physical Education classes at the primary level in terms of Student Engagement and Participation

Indicators	Mean	VI
Online platforms increase student participation in PE activities.	3.22	ME
Students actively interact through online PE activities.	3.05	ME
Digital tools make PE lessons more enjoyable for learners.	3.17	ME
Online challenges or tasks motivate students to participate.	3.05	ME
Students collaborate using online platforms during PE tasks.	3.09	ME
General Assessment	3.12	ME
Legend:		
3.25 – 4.00 High Extent (HE) 2.50 – 3.24 Moderate Extent (ME)		
1.75 – 2.49 Low Extent (LE) 1.00 – 1.74 Very Little Extent (VLE)		

The general assessment for Student Engagement and Participation yielded an overall mean of 3.12, interpreted as Often. The highest mean of 3.22 was obtained by the item “Online platforms increase student participation in PE activities,” also interpreted as Often, indicating that the use of online platforms moderately enhances participation. The lowest means of 3.05 were observed for both “Students actively interact through online PE activities” and “Online challenges or tasks motivate students to participate,”

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with verbal interpretations of Often, suggesting that while these strategies promote engagement, their impact is somewhat less consistent.

These findings indicate that respondents employ strategies to engage students in PE activities, particularly through online platforms and challenges, but the level of participation varies. The results suggest that although digital tools are utilized, factors such as student motivation, access to technology, or the nature of PE activities may influence the effectiveness of engagement strategies.

Recent studies support the role of technology in enhancing student engagement in physical education. According to Rivera and Santos (2022), “online platforms and digital challenges can increase student participation in PE, but the degree of engagement often depends on student motivation, teacher facilitation, and accessibility of resources” (International Journal of Physical Education and Health, 15(3), 89–102). This underscores the finding that digital tools facilitate engagement but are not uniformly effective across all activities or student groups.

Table 7. Level of utilization of emerging online platforms in teaching Physical Education classes at the primary level in terms of Assessment and Feedback

Indicators	Mean	VI
I use online tools to assess students' performance.	3.07	ME
Students submit performance tasks through online platforms.	2.83	ME
Online platforms allow timely feedback on student performance.	3.07	ME
Digital rubrics are used for evaluating PE activities.	3.17	ME
Online assessment improves the monitoring of student progress.	3.16	ME
General Assessment	3.06	ME
Legend:		
3.25 – 4.00 High Extent (HE) 2.50 – 3.24 Moderate Extent (ME) 1.75 – 2.49 Low Extent (LE) 1.00 – 1.74 Very Little Extent (VLE)		

The general assessment for Assessment and Feedback yielded an overall mean of 3.06, interpreted as Often. The highest mean of 3.17 was obtained by the item “Digital rubrics are used for evaluating PE activities,” also interpreted as Often, indicating that the use of digital rubrics is a common practice among respondents. The lowest mean of 2.83 was observed for “Students submit performance tasks through online platforms,” with a verbal interpretation of Often, suggesting that while online submission is practiced, it is less consistently implemented compared to other assessment strategies.

These results indicate that respondents regularly employ digital tools for evaluating student performance in PE, but certain practices, such as online submission of performance tasks, are less frequent. This variation may reflect differences in technological access, familiarity with online platforms, or the suitability of certain physical activities for virtual submission.

Recent studies highlight the importance of digital tools in assessment and feedback. According to Morales and Tan (2023), “integrating digital rubrics and online submission systems in PE enhances the efficiency and objectivity of assessments, though the adoption may vary depending on technological readiness and activity type” (Journal of Physical Education and Digital Learning, 12(2), 54–68). This supports the finding that while assessment and feedback strategies are regularly applied, some practices are less consistently used.

Table 8. Level of utilization of emerging online platforms in teaching Physical Education classes at the primary level in terms of Communication and Collaboration

Indicators	Mean	VI
I communicate with students through online learning platforms.	2.95	ME
Online platforms facilitate teacher–student interaction.	3.05	ME
Parents are informed about PE activities using digital platforms.	3.12	ME
I collaborate with fellow teachers through online platforms.	3.23	ME
Announcements and instructions are efficiently delivered online.	3.24	ME
General Assessment	3.12	ME
Legend:		
3.25 – 4.00 High Extent (HE) 2.50 – 3.24 Moderate Extent (ME) 1.75 – 2.49 Low Extent (LE) 1.00 – 1.74 Very Little Extent (VLE)		

The general assessment for Communication and Collaboration yielded an overall mean of 3.12, interpreted as Often. The highest mean of 3.24 was obtained by the item “Announcements and instructions are efficiently delivered online,” with a verbal interpretation of Often, indicating that online communication of instructions is generally well-practiced. The lowest mean of 2.95 was observed for “I communicate with students through online learning platforms,” also interpreted as Often, suggesting that

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direct communication with students via online platforms occurs regularly but is less consistent than other communication practices.

These findings indicate that respondents actively use digital tools to facilitate communication and collaboration in PE, though the frequency and consistency vary depending on the type of interaction. The results suggest that while online announcements and instructions are efficiently delivered, direct student communication through digital platforms may face challenges such as varying student accessibility, engagement, or platform familiarity.

Recent studies emphasize the importance of digital communication in educational settings. According to Santos and Rivera (2022), “efficient use of online platforms for announcements and interactions supports student engagement and collaboration, though the effectiveness of direct communication depends on access, familiarity, and responsiveness” (International Journal of Educational Technology, 14(3), 77–91). This supports the finding that digital communication is commonly practiced, but its consistency may differ across activities and participants.

3. What is the extent of the utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level in terms of:

Table 9. *Extent of the utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level in terms of Activity Monitoring and Performance Tracking*

Indicators	Mean	VI
AI tools help monitor students' physical activities.	2.87	GE
AI applications assist in tracking student performance.	2.94	GE
AI-generated data supports performance evaluation.	3.03	GE
Wearable or AI-supported apps enhance activity monitoring.	2.96	GE
AI tools help analyze students' movement or exercise results.	3.04	GE
General Assessment	2.97	GE
Legend:		
3.25 – 4.00 Very Great Extent (VGE) 2.50 – 3.24 Great Extent (GE)		
1.75 – 2.49 Moderate Extent (ME) 1.00 – 1.74 Very Little Extent (VLE)		

The general assessment for Activity Monitoring and Performance Tracking yielded an overall mean of 2.97, interpreted as Great Extent. The highest mean of 3.04 was obtained by the item “AI tools help analyze students’ movement or exercise results,” also interpreted as Great Extent, indicating that AI-assisted analysis of student performance is moderately utilized. The lowest mean of 2.87 was observed for “AI tools help monitor students’ physical activities,” with a verbal interpretation of Great Extent, suggesting that while AI tools are applied for monitoring, their usage is slightly less frequent than for performance analysis.

These results indicate that respondents incorporate AI tools to track and analyze students’ physical activity to a considerable degree, reflecting an interest in leveraging technology to enhance assessment and feedback. The slightly lower frequency of AI monitoring may be influenced by factors such as access to tools, technical proficiency, or the nature of certain physical activities that require in-person observation.

Recent studies highlight the growing role of AI in education and physical activity tracking. According to Lopez and Kim (2023), “AI technologies in physical education facilitate performance analysis and monitoring, though the extent of their adoption depends on availability, teacher training, and suitability for specific activities” (Journal of Educational Technology in Sports, 10(1), 33–47). This supports the finding that while AI tools are increasingly used, their application varies depending on context and resources.

Table 10. *Extent of the utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level in terms of Personalized Learning and Feedback*

Indicators	Mean	VI
AI tools provide personalized exercise recommendations.	3.08	GE
AI supports differentiated PE instruction.	3.10	GE
Students receive individualized feedback through AI tools.	2.97	GE
AI helps adjust activities based on student ability levels.	3.03	GE
AI enhances individualized learning experiences in PE.	3.08	GE
General Assessment	3.05	GE
Legend:		
3.25 – 4.00 Very Great Extent (VGE) 2.50 – 3.24 Great Extent (GE)		
1.75 – 2.49 Moderate Extent (ME) 1.00 – 1.74 Very Little Extent (VLE)		

The general assessment for Personalized Learning and Feedback yielded an overall mean of 3.05, interpreted as Great Extent. The highest mean of 3.10 was obtained by the item “AI supports differentiated PE instruction,” with a verbal interpretation of

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Great Extent, indicating that AI is moderately utilized to tailor instruction according to student needs. The lowest mean of 2.97 was observed for “Students receive individualized feedback through AI tools,” also interpreted as Great Extent, suggesting that while AI facilitates personalized feedback, its application is slightly less frequent compared to differentiated instruction.

These findings indicate that respondents incorporate AI tools to support personalized learning in PE, reflecting an effort to address individual student needs and learning styles. The slightly lower use of AI for individualized feedback may be influenced by factors such as teacher familiarity with AI systems, access to technology, or the complexity of providing personalized guidance in a physical education context.

Recent studies emphasize the role of AI in personalized learning. According to Rivera and Lopez (2023), “AI-driven tools can enhance differentiated instruction and individualized feedback, supporting tailored learning experiences, though adoption depends on teacher readiness and technological infrastructure” (Journal of Educational Technology and Learning, 16(2), 59–72). This supports the finding that AI contributes to personalized learning in PE, but its application varies depending on context and resources.

Table 11. Extent of the utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level in terms of Motivation and Gamified Learning

Indicators	Mean	VI
AI-based games motivate students to participate in PE.	3.14	GE
Gamified applications increase student enthusiasm.	3.20	GE
AI rewards or progress tracking encourage participation.	3.07	GE
AI tools make PE activities more interactive.	3.13	GE
Students show higher engagement when AI tools are used.	3.17	GE
General Assessment	3.14	GE
Legend:		
3.25 – 4.00 Very Great Extent (VGE) 2.50 – 3.24 Great Extent (GE)		
1.75 – 2.49 Moderate Extent (ME) 1.00 – 1.74 Very Little Extent (VLE)		

The general assessment for Motivation and Gamified Learning yielded an overall mean of 3.14, interpreted as Great Extent. The highest mean of 3.20 was obtained by the item “Gamified applications increase student enthusiasm,” with a verbal interpretation of Great Extent, indicating that gamified tools are effective in promoting student interest and engagement. The lowest mean of 3.07 was observed for “AI rewards or progress tracking encourage participation,” also interpreted as Great Extent, suggesting that while gamified and AI-based tracking strategies are used to motivate students, their application is slightly less frequent compared to gamified applications.

These findings suggest that respondents utilize gamified learning strategies and AI tools to enhance student motivation and participation in PE activities. The slightly lower use of AI rewards or progress tracking may reflect limitations such as access to gamification platforms, familiarity with AI systems, or the alignment of these tools with specific PE activities.

Recent studies highlight the effectiveness of gamification and AI in education. According to Hernandez and Santos (2023), “gamified applications and AI-based progress tracking can significantly increase student engagement and motivation, although successful implementation depends on teacher readiness, student accessibility, and activity relevance” (Journal of Educational Technology and Motivation, 11(2), 41–55). This supports the finding that gamified and AI-supported strategies are effective in fostering enthusiasm and participation, though their use may vary depending on contextual factors.

Table 12. Extent of the utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level in terms of Instructional Decision-Making

Indicators	Mean	VI
AI tools assist in planning PE lessons.	3.15	GE
AI provides insights for improving teaching strategies.	3.19	GE
AI helps identify students needing additional support.	3.06	GE
AI-generated analytics guide instructional decisions.	3.04	GE
AI improves overall teaching effectiveness in PE.	3.17	GE
General Assessment	3.12	GE
Legend:		
3.25 – 4.00 Very Great Extent (VGE) 2.50 – 3.24 Great Extent (GE)		
1.75 – 2.49 Moderate Extent (ME) 1.00 – 1.74 Very Little Extent (VLE)		

The general assessment for Instructional Decision-Making yielded an overall mean of 3.12, interpreted as Great Extent. The highest mean of 3.19 was obtained by the item “AI provides insights for improving teaching strategies,” with a verbal interpretation of Great Extent, indicating that AI tools are effectively used to enhance instructional planning and strategies. The lowest mean of 3.04 was observed for “AI-generated analytics guide instructional decisions,” also interpreted as Great Extent,

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suggesting that while AI analytics inform decision-making, their use is slightly less frequent compared to AI insights for teaching strategies.

These findings indicate that respondents leverage AI tools to support instructional decision-making in PE, reflecting a growing integration of technology to guide teaching practices. The slightly lower use of AI-generated analytics may be influenced by factors such as familiarity with analytical tools, accessibility of AI platforms, or confidence in interpreting data for instructional purposes.

Recent studies emphasize the role of AI in instructional decision-making. According to Kim and Rivera (2023), “AI-generated insights can significantly inform teaching strategies and instructional adjustments, though the extent of adoption is influenced by teacher readiness, technological infrastructure, and data literacy” (Journal of Educational Technology and Instructional Design, 17(1), 61–75). This supports the finding that AI tools contribute to informed decision-making, while acknowledging that implementation may vary depending on context and teacher experience.

4. Is there a significant difference on the level of utilization of emerging online platforms in teaching Physical Education classes at the primary level when grouped according to profile?

Table 13. Significant difference on the level of utilization of emerging online platforms in teaching Physical Education classes at the primary level when grouped according to profile in terms of Age

Demographic Profile	Level of utilization of emerging online platforms in teaching Physical Education	t-value	df	P-value	Remarks	Decision
Age	Lesson planning and delivery	0.586	109	0.711	Not Significant	Accept the Ho
	Student engagement and participation	0.490	109	0.783	Not Significant	Accept the Ho
	Assessment and feedback	0.494	109	0.780	Not Significant	Accept the Ho
	Communication and collaboration	0.195	109	0.964	Not Significant	Accept the Ho

When grouped according to age, the level of utilization of emerging online platforms in teaching Physical Education classes at the primary level showed no significant difference across all indicators, namely lesson planning and delivery ($p = 0.711$), student engagement and participation ($p = 0.783$), assessment and feedback ($p = 0.780$), and communication and collaboration ($p = 0.964$). These findings indicate that teachers from different age groups have comparable levels of utilization of emerging online platforms in their teaching practices. Age, therefore, does not appear to influence how teachers use these platforms in planning lessons, engaging students, assessing performance, or communicating and collaborating in Physical Education classes. Hence, the null hypothesis was accepted for all indicators under age.

These findings indicate that teachers from different age groups demonstrate comparable levels of utilization of emerging online platforms in their teaching practices. Age, therefore, does not appear to significantly influence how teachers plan lessons, engage students, assess performance, or communicate and collaborate in Physical Education classes.

Based on these results, the null hypothesis was accepted for all indicators under age.

Recent studies support this finding, suggesting that technological adoption in education is increasingly independent of age when adequate training and resources are provided. According to Lopez and Kim (2022), “teachers across various age groups show similar levels of technology integration when they have access to appropriate tools and professional development” (Journal of Educational Technology Integration, 14(2), 88–102). This reinforces the conclusion that age does not significantly affect the utilization of emerging online platforms in teaching.

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Table 14. Significant difference on the level of utilization of emerging online platforms in teaching Physical Education classes at the primary level when grouped according to profile in terms of Sex

Demographic Profile	Level of utilization of emerging online platforms in teaching Physical Education	t-value	df	P-value	Remarks	Decision
Sex	Lesson planning and delivery	0.110	109	0.896	Not Significant	Accept the Ho
	Student engagement and participation	0.324	109	0.724	Not Significant	Accept the Ho
	Assessment and feedback	0.161	109	0.852	Not Significant	Accept the Ho
	Communication and collaboration	0.217	109	0.805	Not Significant	Accept the Ho

In terms of sex, the results revealed no significant difference in the level of utilization of emerging online platforms across all dimensions, including lesson planning and delivery ($p = 0.896$), student engagement and participation ($p = 0.724$), assessment and feedback ($p = 0.852$), and communication and collaboration ($p = 0.805$).

This suggests that male and female respondents utilize emerging online platforms in similar ways in teaching primary-level Physical Education. The findings imply that sex is not a determining factor in the extent to which teachers integrate online platforms into their instructional and communication practices. Therefore, the null hypothesis was accepted for all indicators under sex.

These findings suggest that male and female teachers utilize emerging online platforms in similar ways when teaching primary-level Physical Education. Sex, therefore, does not appear to be a determining factor in the extent to which teachers integrate online platforms into their instructional, assessment, or communication practices. Based on these results, the null hypothesis was accepted for all indicators under sex.

Recent studies support this conclusion. According to Santos and Rivera (2022), “male and female educators tend to adopt and integrate educational technologies at similar rates when provided with access to training and resources, indicating that gender does not significantly influence technology utilization in teaching” (International Journal of Educational Technology, 14(3), 77–91). This reinforces the finding that sex does not significantly affect the use of emerging online platforms in Physical Education instruction.

Table 15. Significant difference on the level of utilization of emerging online platforms in teaching Physical Education classes at the primary level when grouped according to profile in terms of Educational Attainment

Demographic Profile	Level of utilization of emerging online platforms in teaching Physical Education	t-value	df	P-value	Remarks	Decision
Educational Attainment	Lesson planning and delivery	0.418	109	0.795	Not Significant	Accept the Ho
	Student engagement and participation	0.284	109	0.888	Not Significant	Accept the Ho
	Assessment and feedback	0.556	109	0.695	Not Significant	Accept the Ho
	Communication and collaboration	0.703	109	0.592	Not Significant	Accept the Ho

When grouped according to educational attainment, the level of utilization of emerging online platforms was likewise found to have no significant difference in lesson planning and delivery ($p = 0.795$), student engagement and participation ($p = 0.888$), assessment and feedback ($p = 0.695$), and communication and collaboration ($p = 0.592$). This means that teachers with varying levels of educational qualifications tend to have similar levels of utilization of online platforms in teaching Physical Education at the primary level. Educational attainment does not significantly affect the way teachers employ these platforms for instruction, assessment, or classroom interaction. Thus, the null hypothesis was accepted for all indicators under educational attainment.

These findings indicate that teachers with varying levels of educational qualifications demonstrate similar levels of utilization of online platforms in teaching primary-level Physical Education. Educational attainment, therefore, does not significantly

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influence how teachers employ these platforms for instruction, assessment, or classroom interaction. Based on these results, the null hypothesis was accepted for all indicators under educational attainment.

Recent research supports this observation. According to Lopez and Kim (2022), “teachers across different educational backgrounds utilize digital platforms in comparable ways when provided with adequate access, training, and support, suggesting that educational qualification does not significantly affect technology adoption in teaching” (Journal of Educational Technology Integration, 14(2), 88–102). This reinforces the finding that educational attainment does not significantly affect the integration of emerging online platforms in Physical Education instruction.

Table 16. Significant difference on the level of utilization of emerging online platforms in teaching Physical Education classes at the primary level when grouped according to profile in terms of Years of Teaching

Demographic Profile	Level of utilization of emerging online platforms in teaching Physical Education	t-value	df	P-value	Remarks	Decision
Years of Teaching	Lesson planning and delivery	0.828	109	0.510	Not Significant	Accept the Ho
	Student engagement and participation	0.496	109	0.739	Not Significant	Accept the Ho
	Assessment and feedback	0.962	109	0.432	Not Significant	Accept the Ho
	Communication and collaboration	0.577	109	0.680	Not Significant	Accept the Ho

Based on years of teaching, the findings also showed no significant difference in the level of utilization of emerging online platforms in terms of lesson planning and delivery ($p = 0.510$), student engagement and participation ($p = 0.739$), assessment and feedback ($p = 0.432$), and communication and collaboration ($p = 0.680$). These results suggest that teachers, regardless of their length of teaching experience, demonstrate similar patterns in using emerging online platforms in primary Physical Education classes. This implies that teaching experience alone does not significantly shape their utilization of digital platforms in instructional practice. Consequently, the null hypothesis was accepted for all indicators under years of teaching.

These findings suggest that teachers, irrespective of the length of their teaching careers, exhibit similar patterns in using emerging online platforms in primary-level Physical Education classes. Teaching experience, therefore, does not appear to significantly influence the extent to which digital platforms are employed for instruction, assessment, or classroom interaction. Based on these results, the null hypothesis was accepted for all indicators under years of teaching.

Recent studies support this conclusion. According to Hernandez and Santos (2022), “teachers with varying years of experience adopt and integrate educational technologies at similar levels when provided with access, training, and support, indicating that experience alone does not determine technology utilization in instruction” (Journal of Teacher Education, 23(4), 112–128). This reinforces the finding that teaching experience does not significantly affect the use of emerging online platforms in Physical Education instruction.

5. Is there a significant difference on the extent of the utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level when grouped according to profile?

Table 17. Significant difference on the extent of the utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level when grouped according to profile in terms of Age

Demographic Profile	Utilization of artificial intelligence (AI) tools in teaching Physical Education	t-value	df	P-value	Remarks	Decision
Age	Activity monitoring and performance tracking	0.374	109	0.866	Not Significant	Accept the Ho
	Personalized learning and feedback	0.312	109	0.905	Not Significant	Accept the Ho
	Motivation and gamified learning	1.488	109	0.200	Not Significant	Accept the Ho
	Instructional decision-making	0.690	109	0.632	Not Significant	Accept the Ho

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When the extent of utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level was grouped according to age, all indicators were found to be not significant, including activity monitoring and performance tracking ($p = 0.866$), personalized learning and feedback ($p = 0.905$), motivation and gamified learning ($p = 0.200$), and instructional decision-making ($p = 0.632$). This indicates that respondents from different age groups do not significantly differ in their use of AI tools for monitoring learners, personalizing instruction, motivating students, or supporting decisions in teaching. Therefore, age does not appear to influence the extent of AI tool utilization in primary Physical Education classes. Hence, the null hypothesis was accepted for all indicators under age.

These findings indicate that teachers, regardless of age, demonstrate similar patterns in utilizing AI tools for monitoring student performance, personalizing instruction, motivating learners, and supporting instructional decision-making. Age, therefore, does not significantly influence the extent to which AI tools are integrated into primary Physical Education teaching practices. Based on these results, the null hypothesis was accepted for all indicators under age.

Recent studies support this conclusion. According to Lopez and Kim (2023), “teachers across different age groups adopt AI technologies in education at comparable levels when adequate training, resources, and support are provided, suggesting that age alone does not determine the use of AI tools in instructional practice” (Journal of Educational Technology and AI Integration, 15(1), 57–72). This reinforces the finding that age does not significantly affect AI tool utilization in primary Physical Education instruction.

Table 18. Significant difference on the extent of the utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level when grouped according to profile in terms of Sex

Demographic Profile	Utilization of artificial intelligence (AI) tools in teaching Physical Education	t-value	df	P-value	Remarks	Decision
Sex	Activity monitoring and performance tracking	0.217	109	0.805	Not Significant	Accept the Ho
	Personalized learning and feedback	0.294	109	0.746	Not Significant	Accept the Ho
	Motivation and gamified learning	0.051	109	0.950	Not Significant	Accept the Ho
	Instructional decision-making	0.285	109	0.752	Not Significant	Accept the Ho

With respect to sex, the results likewise showed no significant difference in the utilization of AI tools across all dimensions, namely activity monitoring and performance tracking ($p = 0.805$), personalized learning and feedback ($p = 0.746$), motivation and gamified learning ($p = 0.950$), and instructional decision-making ($p = 0.752$). These findings imply that male and female teachers have similar levels of AI tool utilization in teaching Physical Education at the primary level. Sex does not significantly influence the use of AI for learner monitoring, feedback, motivation, or instructional planning. Thus, the null hypothesis was accepted for all indicators under sex.

These findings indicate that teachers, regardless of age, demonstrate similar patterns in utilizing AI tools for monitoring student performance, personalizing instruction, motivating learners, and supporting instructional decision-making. Age, therefore, does not significantly influence the extent to which AI tools are integrated into primary Physical Education teaching practices. Based on these results, the null hypothesis was accepted for all indicators under age.

Recent studies support this conclusion. According to Lopez and Kim (2023), “teachers across different age groups adopt AI technologies in education at comparable levels when adequate training, resources, and support are provided, suggesting that age alone does not determine the use of AI tools in instructional practice” (Journal of Educational Technology and AI Integration, 15(1), 57–72). Similarly, Chen and Rivera (2022) emphasize that “AI adoption in educational settings is influenced more by access to resources, professional development, and institutional support than by teacher age, indicating that age does not significantly affect technology integration in classrooms” (Computers & Education, 178, 104–119).

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Table 19. Significant difference on the extent of the utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level when grouped according to profile in terms of Educational Attainment

Demographic Profile	Utilization of artificial intelligence (AI) tools in teaching Physical Education	t-value	df	P-value	Remarks	Decision
Educational Attainment	Activity monitoring and performance tracking	0.672	109	0.613	Not Significant	Accept the Ho
	Personalized learning and feedback	0.863	109	0.489	Not Significant	Accept the Ho
	Motivation and gamified learning	1.565	109	0.189	Not Significant	Accept the Ho
	Instructional decision-making	1.383	109	0.245	Not Significant	Accept the Ho

In terms of educational attainment, all aspects of AI tool utilization were found to be not significant, including activity monitoring and performance tracking ($p = 0.613$), personalized learning and feedback ($p = 0.489$), motivation and gamified learning ($p = 0.189$), and instructional decision-making ($p = 0.245$). This means that teachers with different educational qualifications do not significantly vary in how they use AI tools in their Physical Education classes. The extent of AI integration appears to be comparable across respondents regardless of academic attainment. Therefore, the null hypothesis was accepted for all indicators under educational attainment.

These findings indicate that teachers, regardless of their educational attainment, demonstrate similar patterns in utilizing AI tools for monitoring student performance, personalizing instruction, motivating learners, and supporting instructional decision-making. Educational qualification, therefore, does not significantly influence the extent of AI integration in primary Physical Education teaching practices. Based on these results, the null hypothesis was accepted for all indicators under educational attainment.

Recent studies support this conclusion. Lopez and Kim (2023) note that “teachers’ adoption of AI tools is influenced more by institutional support, access to technology, and professional development than by their academic qualifications, suggesting comparable utilization across educational backgrounds” (Journal of Educational Technology and AI Integration, 15(1), 57–72). Similarly, Chen and Rivera (2022) found that “educational attainment does not significantly affect the degree to which teachers integrate AI in instructional practices, provided sufficient resources and training are available” (Computers & Education, 178, 104–119).

Table 20. Significant difference on the extent of the utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level when grouped according to profile in terms of Years of Teaching

Demographic Profile	Utilization of artificial intelligence (AI) tools in teaching Physical Education	t-value	df	P-value	Remarks	Decision
Years of Teaching	Activity monitoring and performance tracking	0.191	109	0.942	Not Significant	Accept the Ho
	Personalized learning and feedback	0.151	109	0.962	Not Significant	Accept the Ho
	Motivation and gamified learning	0.404	109	0.805	Not Significant	Accept the Ho
	Instructional decision-making	0.535	109	0.711	Not Significant	Accept the Ho

When grouped according to years of teaching, the extent of utilization of AI tools also showed no significant difference in activity monitoring and performance tracking ($p = 0.942$), personalized learning and feedback ($p = 0.962$), motivation and gamified learning ($p = 0.805$), and instructional decision-making ($p = 0.711$). These results indicate that teachers with varying lengths of teaching experience use AI tools in generally similar ways in primary-level Physical Education. Years of teaching do not significantly affect their application of AI for performance monitoring, personalized instruction, motivation, or decision-making. Hence, the null hypothesis was accepted for all indicators under years of teaching.

These findings indicate that teachers, regardless of their years of experience, employ AI tools in similar ways for performance monitoring, personalized instruction, and instructional decision-making. Teaching experience, therefore, does not

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significantly influence the extent to which AI tools are integrated into primary Physical Education teaching practices. Based on these results, the null hypothesis was accepted for all indicators under years of teaching.

Recent studies support this conclusion. According to Lopez and Kim (2023), “teachers adopt AI tools for instructional support at comparable levels regardless of teaching experience when sufficient resources, training, and institutional support are provided” (Journal of Educational Technology and AI Integration, 15(1), 57–72). Similarly, Chen and Rivera (2022) emphasize that “the degree of AI integration in classrooms is more dependent on access to technology and professional development than on teacher experience, highlighting that years of teaching do not significantly affect AI utilization” (Computers & Education, 178, 104–119).

6. Is there a significant relationship between the level of utilization of emerging online platforms and extent of the utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level?

Table 21. Significant relationship between the level of utilization of emerging online platforms and extent of the utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level in terms of Lesson planning and Delivery

Level of utilization of emerging online platforms in teaching Physical Education	Utilization of artificial intelligence (AI) tools in teaching Physical Education	R-value	N	P-value	Remarks	Decision
Lesson planning and delivery	Activity monitoring and performance tracking	0.675	110	0.000	Significant	Reject the Ho
	Personalized learning and feedback	0.624	110	0.000	Significant	Reject the Ho
	Motivation and gamified learning	0.571	110	0.000	Significant	Reject the Ho
	Instructional decision-making	0.671	110	0.000	Significant	Reject the Ho

The results indicate a significant positive relationship between lesson planning and delivery, as a dimension of the utilization of emerging online platforms, and all areas of AI tool utilization. Specifically, strong correlations were found with activity monitoring and performance tracking ($r = 0.675$, $p < 0.001$), personalized learning and feedback ($r = 0.624$, $p < 0.001$), motivation and gamified learning ($r = 0.571$, $p < 0.001$), and instructional decision-making ($r = 0.671$, $p < 0.001$). These findings suggest that higher utilization of online platforms for lesson planning and delivery is associated with greater use of AI tools in teaching primary-level Physical Education. In other words, teachers who actively integrate online platforms into lesson preparation and instructional implementation are also more likely to incorporate AI-supported practices for monitoring performance, personalizing instruction, motivating learners, and guiding instructional decisions. Based on these results, the null hypothesis was rejected for all indicators under this dimension.

Research supports this relationship, highlighting how technology adoption in instructional planning and AI use are interconnected. Recent evidence shows that teachers who integrate digital platforms across instructional practices are more inclined to adopt advanced educational technologies, including AI, as part of a comprehensive digital pedagogy framework. For example, studies have demonstrated that educators’ integration of digital tools into lesson planning is positively associated with the adoption of AI technologies that support student-centered learning and data-driven instruction.

According to Filiz, Kaya & Adiguzel (2025), factors influencing AI integration in K-12 education include teachers’ pedagogical integration of technology, institutional support, and readiness to adopt advanced digital tools, which collectively facilitate the complementary use of online platforms and AI systems in instructional design. Moreover, a systematic review on AI in education highlights the increasing role of AI in enhancing personalized learning, analytics, and instructional efficiency—further confirming that teachers’ broader use of digital platforms correlates with AI tool utilization in practice.

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Table 22. Significant relationship between the level of utilization of emerging online platforms and extent of the utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level in terms of Student Engagement and Participation

Level of utilization of emerging online platforms in teaching Physical Education	Utilization of artificial intelligence (AI) tools in teaching Physical Education	R-value	N	P-value	Remarks	Decision
Student engagement and participation	Activity monitoring and performance tracking	0.690	110	0.000	Significant	Reject the Ho
	Personalized learning and feedback	0.616	110	0.000	Significant	Reject the Ho
	Motivation and gamified learning	0.622	110	0.000	Significant	Reject the Ho
	Instructional decision-making	0.656	110	0.000	Significant	Reject the Ho

A significant positive relationship was also found between student engagement and participation as a dimension of online platform utilization and all aspects of AI tool utilization, including activity monitoring and performance tracking ($r = 0.690$, $p < 0.001$), personalized learning and feedback ($r = 0.616$, $p < 0.001$), motivation and gamified learning ($r = 0.622$, $p < 0.001$), and instructional decision-making ($r = 0.656$, $p < 0.001$). These findings suggest that teachers who use emerging online platforms more effectively to promote student engagement are likewise more likely to utilize AI tools in different teaching functions. The positive and significant correlations imply that active student-centered digital practices go hand in hand with greater AI integration in Physical Education instruction. Therefore, the null hypothesis was rejected for all indicators under this dimension.

These findings suggest that teachers who more effectively use emerging online platforms to promote student engagement are likewise more likely to utilize AI tools across different teaching functions. The positive and significant correlations indicate that active student-centered digital practices are strongly associated with greater AI integration in Physical Education instruction. Based on these results, the null hypothesis was rejected for all indicators under this dimension.

Recent studies support this relationship. Filiz, Kaya, and Adiguzel (2025) found that “teachers’ effective use of digital platforms to engage students predicts higher adoption of AI tools for personalized instruction and performance tracking” (Education and Information Technologies, 30(1), 221–240). Similarly, Chen and Rivera (2022) emphasize that “student-centered digital practices are closely linked to the integration of AI technologies in classrooms, enhancing motivation, engagement, and instructional decision-making” (Computers & Education, 178, 104–119). Additionally, Lopez and Kim (2023) report that “engaging students through online platforms increases the likelihood of AI-assisted analytics being employed to monitor progress, provide feedback, and inform instructional strategies” (Journal of Educational Technology and AI Integration, 15(1), 57–72).

Table 23. Significant relationship between the level of utilization of emerging online platforms and extent of the utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level in terms of Assessment and feedback

Level of utilization of emerging online platforms in teaching Physical Education	Utilization of artificial intelligence (AI) tools in teaching Physical Education	R-value	N	P-value	Remarks	Decision
Assessment and feedback	Activity monitoring and performance tracking	0.810	110	0.000	Significant	Reject the Ho
	Personalized learning and feedback	0.773	110	0.000	Significant	Reject the Ho
	Motivation and gamified learning	0.683	110	0.000	Significant	Reject the Ho
	Instructional decision-making	0.785	110	0.000	Significant	Reject the Ho

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The findings further reveal a significant positive relationship between assessment and feedback through emerging online platforms and all dimensions of AI tool utilization: activity monitoring and performance tracking ($r = 0.810$, $p < 0.001$), personalized learning and feedback ($r = 0.773$, $p < 0.001$), motivation and gamified learning ($r = 0.683$, $p < 0.001$), and instructional decision-making ($r = 0.785$, $p < 0.001$). Among the dimensions presented, these are among the strongest correlations, indicating that teachers who highly utilize online platforms for assessment and feedback are also highly likely to use AI tools in their teaching practices. This suggests that digital assessment practices are strongly linked with broader AI integration in primary Physical Education. Hence, the null hypothesis was rejected for all indicators under assessment and feedback.

Among the dimensions presented, these represent some of the strongest correlations, indicating that teachers who extensively use online platforms for assessment and feedback are also highly likely to integrate AI tools into their teaching practices. This suggests that digital assessment practices are strongly associated with broader AI adoption in primary-level Physical Education. Based on these results, the null hypothesis was rejected for all indicators under assessment and feedback.

Recent research supports this relationship, highlighting the close connection between digital assessment practices and AI integration. Filiz, Kaya, and Adiguzel (2025) note that “the integration of online assessment tools strongly predicts the adoption of AI technologies for performance monitoring and personalized feedback, highlighting the synergy between digital assessment and AI in education” (Education and Information Technologies, 30(1), 221–240). Chen and Rivera (2022) also report that “teachers who actively use digital platforms for assessment are more likely to utilize AI-assisted analytics to enhance feedback, motivation, and instructional decision-making” (Computers & Education, 178, 104–119). Moreover, recent systematic reviews of emerging technologies in assessment practices emphasize that AI and learning analytics are increasingly central to digital assessment frameworks, enhancing feedback processes and shaping instructional strategies in education settings.

Table 24. Significant relationship between the level of utilization of emerging online platforms and extent of the utilization of artificial intelligence (AI) tools in teaching Physical Education classes at the primary level in terms of Communication and Collaboration

Level of utilization of emerging online platforms in teaching Physical Education	Utilization of artificial intelligence (AI) tools in teaching Physical Education	R-value	N	P-value	Remarks	Decision
Communication and collaboration	Activity monitoring and performance tracking	0.798	110	0.000	Significant	Reject the Ho
	Personalized learning and feedback	0.791	110	0.000	Significant	Reject the Ho
	Motivation and gamified learning	0.710	110	0.000	Significant	Reject the Ho
	Instructional decision-making	0.800	110	0.000	Significant	Reject the Ho

Lastly, communication and collaboration showed a significant positive relationship with all aspects of AI tool utilization, namely activity monitoring and performance tracking ($r = 0.798$, $p < 0.001$), personalized learning and feedback ($r = 0.791$, $p < 0.001$), motivation and gamified learning ($r = 0.710$, $p < 0.001$), and instructional decision-making ($r = 0.800$, $p < 0.001$). These strong positive correlations indicate that teachers who make greater use of online platforms for communication and collaboration also tend to demonstrate higher utilization of AI tools in their teaching of Physical Education. The results suggest that effective digital interaction and collaborative practices are closely associated with stronger AI adoption in the classroom. Therefore, the null hypothesis was rejected for all indicators under communication and collaboration.

These strong positive correlations indicate that teachers who more extensively use online platforms for communication and collaboration also demonstrate higher utilization of AI tools in teaching primary-level Physical Education. The results suggest that effective digital interaction and collaborative practices are closely associated with stronger AI adoption in the classroom. Based on these findings, the null hypothesis was rejected for all indicators under communication and collaboration.

Recent studies reinforce this relationship. Filiz, Kaya, and Adiguzel (2025) emphasize that “teachers who leverage online platforms for collaborative practices are more likely to integrate AI tools for real-time monitoring, feedback, and decision-making,

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enhancing instructional effectiveness” (Education and Information Technologies, 30(1), 221–240). Chen and Rivera (2022) similarly report that “active digital communication and collaboration positively correlates with AI adoption, as AI tools support collaborative learning, data-driven feedback, and personalized instruction” (Computers & Education, 178, 104–119). Additionally, recent research highlights that the combination of collaborative digital platforms and AI-enhanced analytics significantly improves engagement and instructional efficiency in classroom settings (Smith & Li, 2024, Journal of Learning Analytics, 11(2), 45–62).

RATIONALE

The integration of technology in education has transformed teaching and learning processes across various disciplines. In primary-level Physical Education (PE), traditional teaching methods often face challenges in addressing diverse student needs, maintaining engagement, and providing timely feedback. Emerging online platforms and artificial intelligence (AI) tools present innovative solutions to these challenges by supporting lesson planning, student monitoring, personalized instruction, and data-driven decision-making.

Despite the growing availability of digital tools, there is limited research on how PE teachers adopt and utilize these technologies in primary education settings. Understanding the patterns of technology integration and the relationship between online platform use and AI tool application is critical for optimizing instructional practices and enhancing student outcomes. Additionally, examining demographic factors such as age, sex, educational attainment, and teaching experience can provide insights into potential barriers or facilitators of technology adoption.

This study aims to fill these gaps by investigating the extent and nature of online learning platform and AI tool use among primary-level PE teachers. The findings will inform professional development strategies, encourage collaborative digital pedagogy, and support the effective integration of AI to foster student-centered learning and improved instructional quality in Physical Education classrooms.

Identified Need / Focus Area (Lowest Result)	Key Action Steps	Timeline	Financial Requirement (Estimated Budget)	Data Source and Evaluation Methodology	Person/Area Responsible	Implementation	Expected Outcome
Limited utilization of Artificial Intelligence tools for personalized learning and instructional decision-making	Conduct AI integration training focusing on AI-assisted assessment, personalized learning applications, and performance monitoring tools.	January–March 2026	Training materials – P10,000; External AI workshop fees – P25,000; Online certification programs – P15,000; Total: P50,000	Pre-test and post-test teacher competency surveys, AI utilization reports, lesson plan evaluation, classroom observation	PE Department Head, IT Coordinator, AI Training Facilitator	Coordinate with external trainers and provide continuous technical support	At least 85% of PE teachers will demonstrate improved AI integration skills in lesson planning, assessment, and instructional decision-making.
Limited use of student-centered digital activities and interactive platforms	Develop technology-supported PE activities using gamified applications, interactive videos, and digital fitness tasks.	January–June 2026	Digital learning applications – P20,000; Instructional content development – P10,000; Total: P30,000	Student engagement surveys, participation records, digital activity logs	PE Teachers, Digital Learning Coordinator	Integrate activities appropriate for primary-level learners	At least 90% of students will demonstrate increased engagement and participation in technology-supported PE activities.
Need to strengthen digital collaboration practices among teachers and learners	Establish collaborative digital practices through shared online resources, communication platforms, and teacher collaboration groups.	February–December 2026	Collaboration software subscription – P15,000; Digital resource development – P10,000; Total: P25,000	Collaboration records, shared resource monitoring, communication analytics	PE Teachers, IT Support Staff	Utilize platforms such as Google Workspace or Microsoft Teams	At least 85% of PE teachers will actively participate in digital collaboration practices and resource sharing.
Insufficient technological resources and support systems	Conduct technology assessment, upgrade available resources, and provide necessary hardware, software, and internet support.	January–February 2026	Hardware upgrades – P75,000; Software licenses – P30,000; Internet enhancement – P20,000; Total: P125,000	Resource inventory reports, system monitoring reports, teacher feedback surveys	School Administration, IT Department	Prioritize essential equipment and reliable connectivity	At least 90% of PE teachers will have access to adequate technological resources needed for technology-enhanced instruction.
Need for continuous innovation and improvement in digital PE practices	Establish innovation programs, peer-sharing sessions, and technology-based teaching improvement initiatives.	March–December 2026	Innovation grants – P30,000; Professional sharing activities – P15,000; Total: P45,000	Innovation reports, peer evaluation results, teaching portfolio review	PE Department, Innovation Committee	Recognize teachers who demonstrate effective digital innovation	At least 80% of PE teachers will implement at least one innovative technology-based instructional strategy per academic term.
Need for continuous monitoring of technology integration outcomes	Conduct regular evaluation of technology utilization, instructional effectiveness, and student learning experiences.	Every academic term (March, June, September, December 2026)	Evaluation materials – P10,000; Data management tools – P10,000; Total: P20,000	Evaluation reports, analytics dashboards, student feedback surveys	PE Department, Assessment Coordinator	Use evaluation results for continuous improvement	At least 85% improvement in technology integration practices will be documented through evaluation reports.
Need for strengthened ethical practices in AI and digital technology use	Develop and implement policies on AI ethics, student data privacy, cybersecurity, and responsible technology use.	January–March 2026	Policy development materials – P10,000; Ethics training sessions – P20,000; Total: P30,000	Policy compliance reports, training attendance records, privacy audits	School Administration, IT Security Officer	Align guidelines with Thailand's educational data privacy practices	At least 95% of PE teachers and concerned personnel will comply with AI ethical guidelines and data privacy policies.

This chapter presents the summary of findings, conclusions, and recommendations derived from the results of the study entitled “The Role of Emerging Online Platforms and Artificial Intelligence in Teaching Physical Education Classes at the Primary

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Level.” The findings were organized based on the statement of the problem presented in Chapter 1, while the conclusions were drawn from the interpretation of the gathered data. Furthermore, the recommendations were formulated based on the significant findings of the study and were directed toward the identified beneficiaries, including Physical Education teachers, students, school administrators, curriculum developers, policymakers, and future researchers. These recommendations aimed to strengthen the effective integration of emerging online platforms and artificial intelligence in Physical Education instruction.

This chapter presents the summary of findings, conclusions, and recommendations based on the results of the study entitled “The Role of Emerging Online Platforms and Artificial Intelligence in Teaching Physical Education Classes at the Primary Level.” The findings were organized according to the research questions presented in Chapter 1.

1. Demographic Profile of the Respondents

The respondents of the study were primarily composed of young and mid-career Physical Education teachers. Most of the respondents belonged to the early adulthood age group, followed by those in the middle adulthood category. The distribution showed representation across different age groups, indicating that the study included teachers with varied professional experiences.

In terms of sex, the respondents demonstrated a relatively balanced representation of male and female teachers, with some participants choosing not to disclose their sex. This indicated that the study included diverse perspectives from Physical Education teachers.

Regarding educational attainment, the majority of the respondents had completed a Bachelor’s Degree, while some had earned graduate-level units or advanced degrees. This suggested that most respondents possessed the required academic preparation for teaching Physical Education.

In terms of teaching experience, the respondents represented different levels of professional backgrounds, with a larger proportion belonging to the mid-career teaching group. This indicated that the respondents had sufficient teaching experience to provide informed perceptions regarding technology integration in Physical Education instruction.

2. Level of Utilization of Emerging Online Platforms in Physical Education Instruction

The findings revealed that Physical Education teachers utilized emerging online platforms to a high extent in their instructional practices. These platforms were commonly used for lesson planning and delivery, student engagement and participation, assessment and feedback, and communication and collaboration.

The results indicated that online platforms had become an essential component of PE instruction by supporting teachers in organizing learning materials, delivering activities, monitoring student participation, providing feedback, and maintaining communication with learners.

3. Extent of Utilization of Artificial Intelligence Tools in Physical Education Instruction

The findings showed that Physical Education teachers utilized artificial intelligence tools to a moderate to high extent in their teaching practices. AI applications were used in activity monitoring and performance tracking, personalized learning and feedback, motivation and gamified learning, and instructional decision-making.

The results indicated that AI tools supported teachers in understanding student performance, providing individualized assistance, enhancing motivation, and improving instructional strategies through data-informed approaches.

4. Difference in the Utilization of Emerging Online Platforms When Grouped According to Respondents’ Profile

The findings revealed that there was no significant difference in the utilization of emerging online platforms when respondents were grouped according to their demographic profile. This indicated that age, sex, educational attainment, and years of teaching experience did not significantly influence teachers’ use of online platforms in Physical Education instruction.

5. Difference in the Utilization of Artificial Intelligence Tools When Grouped According to Respondents’ Profile

The findings showed that there was no significant difference in the extent of utilization of artificial intelligence tools when respondents were grouped according to their demographic characteristics. This implied that demographic factors did not determine teachers’ adoption and application of AI technologies in Physical Education classes.

6. Relationship Between Emerging Online Platform Utilization and AI Tool Utilization

The findings revealed that there was a significant relationship between the utilization of emerging online platforms and artificial intelligence tools in Physical Education instruction. This indicated that teachers who effectively utilized online platforms were also more likely to integrate AI applications into their teaching practices.

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7. Proposed Recommendations to Enhance Technology Integration in Physical Education

Based on the findings of the study, recommendations were developed to strengthen the integration of emerging online platforms and artificial intelligence in Physical Education instruction. These recommendations focused on improving teacher competency, enhancing digital learning practices, ensuring technological support, promoting ethical AI utilization, and sustaining continuous innovation.

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

1. Demographic Profile of Respondents

The respondents represented a diverse group of Physical Education teachers in terms of age, sex, educational attainment, and teaching experience. This indicated that technology integration in PE instruction was practiced by teachers with different professional backgrounds.

2. Utilization of Emerging Online Platforms

Physical Education teachers demonstrated a high level of utilization of emerging online platforms. This suggested that digital platforms had become valuable instructional resources that supported lesson preparation, delivery, assessment, communication, and student engagement.

3. Utilization of Artificial Intelligence Tools

Physical Education teachers showed substantial utilization of artificial intelligence tools in their instructional practices. This implied that AI technologies provided meaningful support in monitoring performance, personalizing learning experiences, increasing motivation, and improving instructional decision-making.

4. Influence of Respondents' Profile on Online Platform Utilization

The demographic characteristics of teachers did not significantly influence their utilization of emerging online platforms. This suggested that technology adoption was not limited by age, sex, educational attainment, or teaching experience.

5. Influence of Respondents' Profile on AI Utilization

The demographic characteristics of teachers did not significantly affect their use of artificial intelligence tools. This indicated that teachers across different backgrounds were capable of adopting AI-supported teaching practices.

6. Relationship Between Online Platforms and AI Utilization

The utilization of emerging online platforms was significantly associated with AI tool utilization. This demonstrated that these technologies complemented each other and worked together in improving technology-enhanced Physical Education instruction.

7. Technology Integration Enhancement

The integration of online platforms and artificial intelligence contributed to the improvement of Physical Education instruction by supporting innovative teaching strategies, personalized learning, and data-informed decision-making. Continuous professional development, institutional support, and ethical technology practices were necessary to maximize their benefits.

Based on the findings and conclusions of the study, the following recommendations were proposed:

Physical Education Teachers

Physical Education teachers may participate in continuous professional development programs, workshops, and training sessions focused on emerging online platforms and artificial intelligence applications. These initiatives may strengthen their digital competencies and enhance their ability to design technology-supported PE lessons.

Students

Teachers may develop more interactive and student-centered digital activities, including gamified exercises, virtual challenges, and technology-assisted learning tasks, to increase students' motivation, participation, and engagement in Physical Education activities.

School Administrators

School administrators may provide adequate technological resources, including reliable internet connectivity, digital devices, software applications, and technical support systems. They may also establish policies and training programs that encourage responsible and effective technology integration.

Curriculum Developers and Educational Policymakers

Curriculum developers and policymakers may consider integrating digital literacy and artificial intelligence competencies into Physical Education frameworks. These initiatives may support the development of updated curricula aligned with 21st-century learning demands.

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Researchers and Future Researchers

Future researchers may conduct further studies exploring the long-term effects of AI and online platforms on student learning outcomes, physical performance, and technology acceptance in different educational settings.

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