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# The influence of workplace professional development on physical and health education teachers' effectiveness and student physical literacy

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## Abstract

This study examines the role of workplace professional development in enhancing the instructional effectiveness of physical and health education teachers and its subsequent impact on student physical literacy, particularly during the transition to the International Baccalaureate (IB) Middle Years Programme (MYP). The research aimed to assess how targeted professional learning initiatives influence teaching performance and foster physical literacy among students. Data were collected from a sample of three physical and health education teachers and 128 MYP Year 1 students, selected from a total population of 391 students across MYP Years 1–4. Quantitative analysis revealed a statistically significant improvement in students' physical literacy after one academic year, with notable differences between Unit 1 and Unit 2 test scores ($M = -3.625$, $SD = 3.76473$, $t(127) = -10.894$, $p < .000$). Improvements included increased physical fitness, enhanced self-confidence, and a deeper understanding of healthy lifestyle practices. The findings provide evidence that comprehensive, context-specific professional development can significantly improve teaching quality and positively influence student outcomes in physical education. The study recommends fostering a collaborative school culture that supports ongoing communication and professional growth tailored to educators' needs. The results of this current study will contribute a useful framework for fair and scalable professional development, giving teachers, school leaders, and policymakers who want to improve teaching quality in difficult situations useful information.

**Keywords:** International baccalaureate, Physical education, Physical literacy, Professional development, Student outcomes, Teacher effectiveness.

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## Contents

**Contribution of this paper to the literature**
This study outlines a framework for enhancing professional development in schools, addressing challenges faced during curriculum transitions. It proposes a transformative workplace concept that includes a needs assessment by school leaders, a collaborative logic model for solutions, and an emphasis on continuous reflection. These elements aim to ensure equitable access to high-quality professional development for both novice and experienced teachers.

## 1. Introduction

This study emphasizes the importance of workplace professional development training for physical health education teachers and students transitioning to the IB curriculum, highlighting its significant impact on academic growth. In this study, workplace professional development training is defined as an instruction program arranged at the school by directors, coordinators, department heads, and teachers based on their needs to assist teachers, students, and the whole school community's improvement. Continuous Professional Development (CPD) quality is linked to improved service delivery, emphasizing knowledge acquisition in work environments. It is crucial to shift from checklists to detailed assessments and address learning requirements. Education systems aim to provide teachers with opportunities for in-service professional development to maintain high standards of teaching and retain a high-quality workforce, despite the potential for inadequacies in pre-service training. The OECD report on professional development for educators stresses the importance of ongoing and structured training to guarantee productive classroom settings, suggesting strategies such as coaching, mentoring, and peer learning (OECD, 2009). This current article provides a concise summary of the significance of workplace professional development for teachers of physical health education and the influence it has on students' performance, particularly during the transition to the International Baccalaureate Curriculum.

The purpose of professional development is to ensure that educators are prepared with the information and skills necessary to effectively teach the curriculum, which ultimately results in improved outcomes for students inside the classroom. Richter and Richter (2024) studied data from more than 7,500 United States (US) teachers. The study sought to validate the instrument and create a tool for routinely evaluating the efficacy and impact of professional development programs for teachers. According to Teslo et al. (2023) a qualitative study was undertaken that examined the attitudes of Norwegian primary and secondary school teachers towards physically active learning, revealing a range of perspectives. Certain professors saw it as challenging, while others regarded it as a powerful tool for improving student involvement and learning. Engaging in professional development activities focused on physical health education may create an atmosphere that improves the skills and knowledge of both teachers and students. Assigning resources to this may enhance classroom performance and competence.

The International Baccalaureate Curriculum provides several choices that have a substantial influence on the effectiveness of teachers and the educational outcomes of students. This cultivates a nurturing and energetic educational atmosphere, fostering advancement and success for everyone engaged. As stated by Skrzypiec, Askell-Williams, Slee, and Rudzinski (2014). Research has shown that the International Baccalaureate Middle Years Programme (MYP) has a beneficial effect on both the social-emotional well-being and academic achievement of students. Students exhibit elevated levels of self-efficacy, motivation, and involvement in the learning process, along with favorable views towards both school and instructors. The MYP's comprehensive methodology, emphasis on the cultivation of interpersonal skills, and integration of service-learning experiences provide a nurturing educational setting. This research explores the impact of workplace professional development on the performance of Physical Education teachers and students, based on the notion that continual training and support for educators must be prioritized.

### *1.1. Statement of Problem*

When teachers convert from a local curriculum to the International Baccalaureate (IB) framework, they face numerous challenges, especially regarding changes in teaching methods and grading practices. There is limited empirical evidence about the correlation between workplace professional development and student academic performance in Physical and Health Education, despite the objective of workplace professional development to support educators during these transitions. It remains uncertain whether professional development enhances instructors' ability to utilize IB assessment standards and results in measurable improvements in student performance across curriculum units. Additional research is essential to comprehensively understand the broader implications of workplace professional development on teachers' instructional methodologies and its influence within the context of curriculum change.

### *1.2. Research Objectives*

The research objectives were created to guide this investigation and provided the basis for developing the research questions. The following research objectives are:

- To investigate the difference in students' academic achievement from Unit One to Unit Three in PHE classes following teachers' participation in workplace professional development training.
- To explore the difference in students' ability to apply and perform Criterion C from Unit One to Unit Three in PHE classes after teachers' participation in PD.
- To explore the extent to which workplace professional development impacts PHE teachers' instructional practices and professional growth during the transition to the IB curriculum.

### *1.3. Research Question*

As a result, the following three research questions are the focus of this study.

1. Is there a difference in students' academic achievement from unit one to unit three in physical and health education classes after teachers' participation in workplace professional development training? (Quantitative)
2. Is there a difference in students' application and performance of Criterion C for units one to three in physical and health education classes after teachers' participation in workplace professional development training?
3. To what extent is the impact of Workplace Professional Development on Physical Health Education Teachers?

## 2. Literature Review

This study's literature review consists of Mezirow's (1991) Transformative Learning Theory defines transformative learning as changing a person's frame of reference through critical reflection, which makes them more open-minded and adaptable. The implication of workplace professional development training for teachers, which is essential in adult education and professional development, promotes reflective practice, empowerment, and adaptation, subsequently improving motivation and job satisfaction. When professional growth aligns with both personal and professional goals, it makes workers feel more valued and capable, leading to long-term engagement (Hayashi, 2014).

### 2.1. Theoretical Concept

The study utilized transformational learning theory to investigate how physical health education teachers might improve their teaching methods through continuous professional development. Through active engagement in seminars, conferences, and other educational events, educators may ensure they remain well-informed on the most recent research findings and optimal methodologies in their sector. Transformative learning of Mezirow (1991). Through the practice of transformational learning, educators may actively question and challenge their current ways of thinking and gain new insights that enhance their ability to teach effectively. See the diagram below for further illustration (Figure 1). Continuous reflection and growth are crucial for educators to adapt to the increasing demands of students and the dynamic field of physical health education.

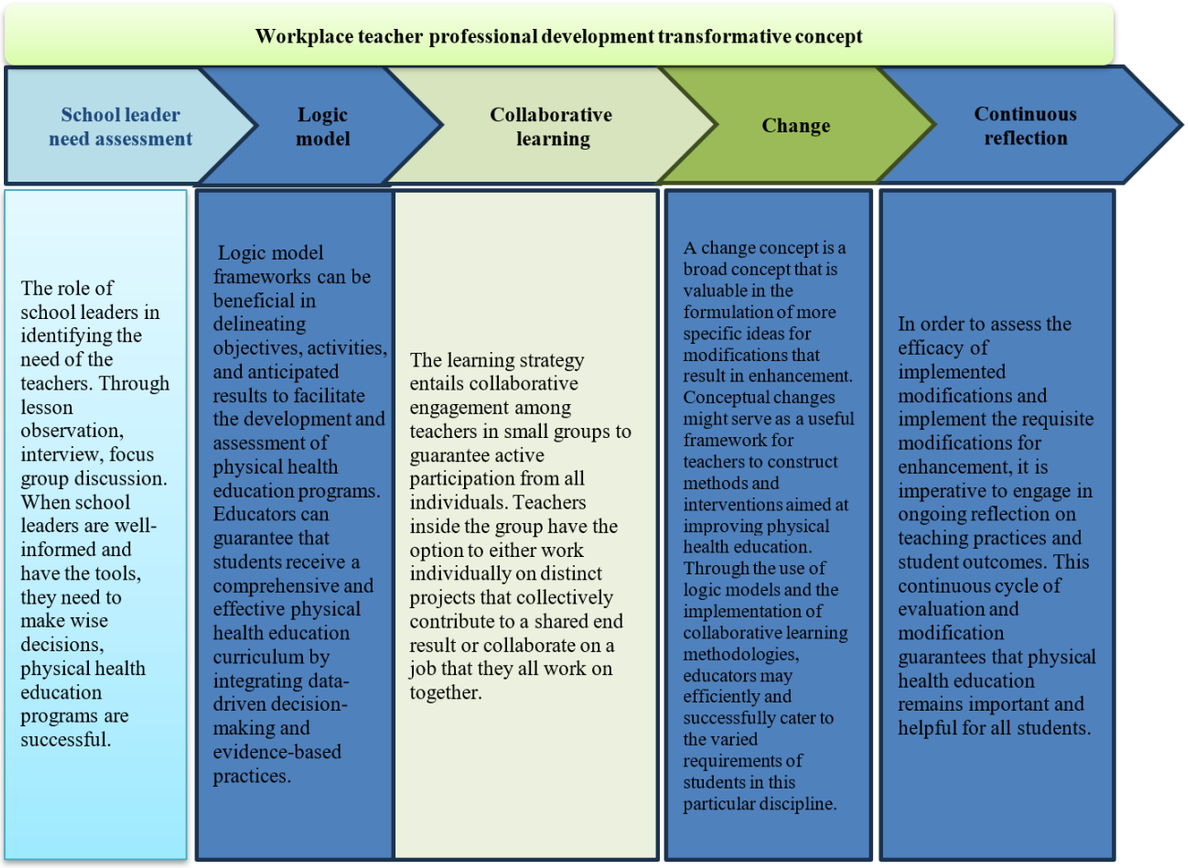


**Figure 1.** Workplace teacher professional development transformative concept.

### 2.2. Implications for Professional Development

Several research findings have shown that teachers who participate in workplace professional development programmes experience a positive impact on their teaching practices in Physical Health Education. For example, according to Walter, Kutscher, Fox, Tuckwiller, and Ball (2023), we conduct an analysis of the potential for this attentiveness to facilitate the development and execution of professional development that is contextually relevant, rooted in the strengths and values of the community, and responsive to the requirements of educators that are being met. Teachers who engage in professional development are more likely to implement new strategies and resources in their classrooms, ultimately leading to improved student success. Our findings indicate that inter-individual differences in constructivist and transmissive beliefs are related to inter-individual differences in professional vision (Eßling, Todorova, Sunder, Steffensky, & Meschede, 2023). The local students engaged in physical education more effectively due to cultural immersion, the PSTs enjoyed professional and personal growth, and the CTs obtained new pedagogical ideas. Despite the advantages for both parties, difficulties arose due to pedagogical disparities, linguistic barriers, and individual hindrances (Wong & Oh, 2023). Providing teachers with the opportunity to learn and grow in their field, professional development programmes contribute to a more dynamic and engaging learning environment for students. Teachers who participate in these programmes are better equipped to address the diverse needs of their students and adapt their teaching methods to meet individual learning styles.

According to Li, Li, and Fu (2022), autoregressive change analysis demonstrated that possibilities for development, job resources, and emotional pressures, work expectations in the educational setting contributed significantly to the observed reductions. Suggestions and consequences are presented for important stakeholders in teacher education programmes and professional development. As a result of the intervention, statistically significant differences in the quality of students' writing were observed across all disciplines in a repeated measures multilevel model, and the quality was maintained over time. Additionally, stakeholders identified specific components as the most effective, and teachers' confidence also increased (Philippakos, MacArthur, & Rocconi, 2023). As a result,

students are more likely to be actively engaged in their learning and achieve better outcomes in Physical Health Education. The continuous improvement and growth of teachers through professional development ultimately benefit the entire school community and help to foster a culture of excellence in education. To facilitate impactful teacher professional development, school administrators must shift their thinking from simply acquiring new skills and knowledge to assisting teachers in rethinking their practice (Patton, Parker, & Tannehill, 2015). Overall, workplace professional development plays a crucial role in enhancing the quality of Physical Health Education teaching.

### 2.3. Professional Development Linked to Job Satisfaction and Motivation

According to the study, there is a strong and significant correlation between teacher-student connections and teacher work satisfaction. Relationships between teachers and their pupils were the study's best predictor of teachers' work satisfaction after adjusting for relevant variables (O'Shea, 2021). Furthermore, the skills and knowledge gained through professional development can also have a ripple effect, spreading to other teachers and staff members within the school. This collaborative approach to professional growth helps to create a supportive network of educators who are committed to improving student outcomes and promoting a culture of continuous learning and development. Ultimately, investing in the professional development of teachers has far-reaching benefits that extend beyond the individual classroom and positively impact the overall success of the school community. According to Zhang, Admiraal, and Saab (2021), the current study has provided a thorough explanation of the elements at the school and individual levels that are highly correlated with teachers' willingness to engage in professional learning activities. Teachers' desire for professional development was correlated with their past experience, teaching experience, self-efficacy, learning beliefs, emotional strain, and principal leadership. Wau and Purwanto (2021) also stated that employee performance and job satisfaction were positively influenced by career development, job satisfaction was positively influenced by employee performance, and work motivation was positively influenced by job satisfaction and employee performance. Whilst Mangaleswarasharma (2017) mentioned that teachers should be provided with pertinent professional development opportunities, salary increases, and respect and recognition in order to enhance their job satisfaction and motivate them. On the other hand, Canrinus, Helms-Lorenz, Beijaard, Buitink, and Hofman (2012) believe that a glimpse into the professional identity of teachers can be gained through the examination of the combined form of motivation, job satisfaction, and occupational commitment that teachers exhibit. On the other hand, looking at the role of school leaders in workplace professional development. Hoppey and McLeskey (2013), the principal viewed his primary role to be "lubricating the human machinery," which implies assisting instructors so that they can do their best work. He fulfilled this job by providing high-quality professional development, allowing teachers to take on leadership responsibilities in the school, and loving and caring for his team. He also protected his teachers from the external pressures that come with high-stakes responsibility. Whilst Kooy and van Veen (2012) opinion on workplace professional development and school as a learning-centered environment: the education of teachers is important on a global scale because they are the conduits through which every attempt for change and reform is brought into fruition. It is important to recognize that a highly trained teaching force is essential to increasing student achievement. This recognition adds significance to the process of establishing dynamic conversations on teacher learning all around the world.

### 2.4. Literature Review Summary

The papers focus on several facets of professional growth in the field of education. Several publications address the significance of student well-being and social-emotional growth, while others analyze the efficacy of various professional development methods in enhancing student achievement and teacher job satisfaction. Several papers also address the distinct difficulties and opportunities of delivering professional development in diverse geographical and cultural settings, such as in foreign schools or in South Korea. Furthermore, they stress the need for delivering tailored and relevant professional development to meet the needs and objectives of teachers, while also offering opportunities for collaboration and support among educators. Additionally, the examination of various leadership styles and practices, such as the active participation of principals and the influence of school culture, will be included in the discussion on the effects they have on teacher professional development. Furthermore, many sections emphasize the need for effective assessments and measures of accountability to guarantee that professional development programs are achieving their intended objectives and results. In summary, the papers indicate that continuous professional development should be a top priority for educators and schools. It should be customized to address the unique requirements and objectives of both instructors and students. Regular evaluation and adaptation of professional development are crucial to enhance its long-term efficacy. The gap in the literature review emphasizes the need for more investigation into professional development in education, specifically focusing on the difficulties and obstacles in establishing and maintaining programs, especially in situations with limited resources. Additionally, there is a deficiency in providing comprehensive techniques for effectively addressing these obstacles and promoting fairness in professional growth.

## 3. Methodology

An exploratory sequential mixed-methods research design is a specific type of research method that starts with collecting and analyzing qualitative data and then employs quantitative methods to test or build on the initial findings. This design is quite useful when researchers want to examine a phenomenon in depth before assessing its effects on a larger scale (Parnitvitidkun, Ponchaitiwat, Chancharat, & Thoumrungroje, 2024). This current study used an exploratory sequential mixed-methods research design. We applied a variety of data gathering methods, including interviews, weekly intervention training, survey observations, and students' unit criteria assessment, to acquire data for both qualitative and quantitative data analysis to investigate the impact of workplace professional development on the performance of physical education teachers and the enhancement of students' physical literacy. The research methodology enabled us to acquire a comprehensive and detailed understanding of the teachers' encounters with workplace professional development and its influence on their performance and the enhancement of students' physical literacy. This method is considered reliable for educational research where student performance and teacher development are important, since it allows the researchers to observe curricular improvement in action.

### 3.1. Research Sample

The participants of this study are teachers and students of a private school in Baku, Azerbaijan. There are a total of n=3 physical and health education teachers (male n=2 and female n=1), along with 128 MYP 1 students, including 79 boys and 49 girls. The participants were selected from a group of 391 pupils in MYP 1-4. We chose to include MYP 1 students in this study since they were unfamiliar with the IB physical and health education curriculum.

### 3.2. Research Procedure

The teachers participated in biweekly training sessions to enhance their expertise and understanding of IB unit design and ideas. Teachers were urged to engage in self-reflection on their teaching methods and work together with their peers to improve their professional development. Additionally, since they are unfamiliar with the IB curriculum, they need to ensure they are thoroughly equipped to execute it successfully in their classrooms. One academic year consisted of four units, and in order for each unit to meet the IB standards and objectives, considerable planning and preparation were needed. Teachers were mandated to participate in training sessions and workshops to acquaint themselves with the curriculum and develop units and assessments in accordance with the IB standards and goals. In addition, teachers were urged to participate in continuous professional development opportunities arranged by the IB school to enhance their comprehension of the IB curriculum and teaching methodologies. After completing each unit, students' performance in criteria A, B, C, and D is recorded in their gradebook. They use this data to contemplate their advancement and establish objectives for future learning. The students' criteria A and C are extracted for this current study and analyzed using SPSS to assess their academic performance and identify areas for improvement.

### 3.3. Qualitative Data Collection

The researchers observed the lessons and conducted interviews with the teachers to understand the problems they face during the transition process with the students. To help the teachers adapt to the IB curriculum, the coordinator organized a training session every week for each department. We interviewed teachers during and after this phase to gather insights about their experiences, points of view, problems, and changes they made to their teaching methods. This step helps identify themes, including changes in teaching approaches, the school environment, students' attendance, and whole school community development.

### 3.4. Quantitative Phase (Sequential)

The quantitative phase: the students' attendance and assessment results for three different units were used to measure the students' performance in order to determine the impact of the curriculum change on student learning outcomes.

### 3.5. Instrument for Data Collection

A total of four instruments were applied in this study: the unit Criterion Objective A: Knowing and understanding, i.e., describing physical and health education factual, procedural, and conceptual knowledge; ii. applying physical and health education knowledge to explain issues and solve problems set in familiar and unfamiliar situations; iii. applying physical and health terminology effectively to communicate understanding of the unit. Criterion C: Applying and performing (i). demonstrating and applying a range of skills and techniques; (ii). demonstrating and applying a range of strategies and movement concepts; (iii). outlining and applying information to perform effectively. Additionally, the teacher's interview and observation checklist were used. As seen below, a sample of Criterion A assessment paper for Unit 1. As seen in Figure 2, Sample Criterion A - Assessment Task. This assessment is intended to evaluate students' comprehension and proficiency with the unit. This type of assessment is unfamiliar to them in the context of physical and health education (PHE). However, the IB curriculum in PHE mandates that students engage in physical performance and display their factual, procedural, and conceptual knowledge and grasp of the unit. The assessment serves as an indicator for evaluating students' overall performance since it expects them to demonstrate mastery in both practical skills and theoretical knowledge. In order to be able to design and develop a quality unit and assessment approach, the teachers need to engage in several IB workplace trainings specifically designed for PHE teachers to meet their needs.

**1. Outline** the benefits of leading a healthy lifestyle.

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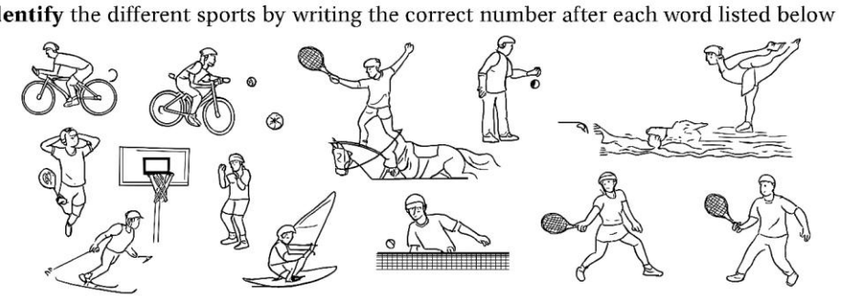
.....

**2. Identify** the different sports by writing the correct number after each word listed below



cycling basketball | tennis | baseball table tennis | figure skating running | soccer | harseball running | golf | swimming

**Figure 2.** Sample criterion a -assessment task.

### 3.6. Criterion C is Applying and Performing in IB PHE

In the context of IB PHE, Criterion C involves the application and execution of knowledge for physical performance. Students are required to demonstrate their understanding by undertaking a physical exam that is relevant to the unit they are presently learning. This evaluation provides students with an opportunity to demonstrate their capacity to apply their knowledge in a real-world context, showcasing their comprehension of the unit's principles through physical execution. Through the incorporation of practical implementation alongside theoretical comprehension, instructors may accurately assess students' holistic understanding of the content and their overall development in the topic. The assessment task requirements can be seen below in (Figure 3) Sample Criterion C Assessment task.

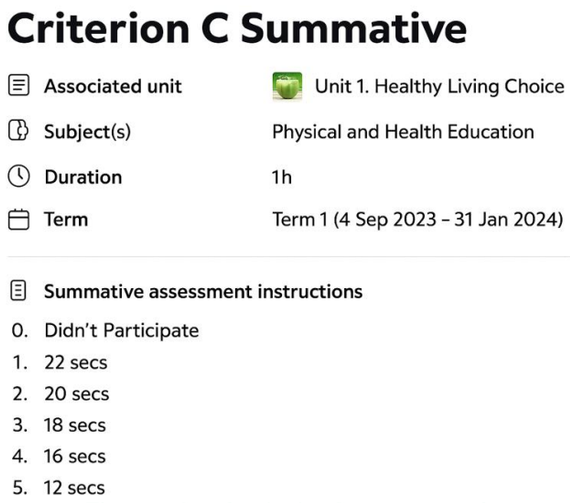



**Figure 3.** Sample criterion C assessment task.

## 4. Results and Discussion

The objective of this study is to offer significant insights into the influence of workplace professional development training on student learning outcomes in physical and health education classrooms. The acquired quantitative data through students' unit assessments for both criterion A and B enable a comprehensive study of any potential fluctuations in the academic performance of students over a period of time, providing concrete evidence of students' academic performance. Through the analysis of this data, the teachers gain a deeper comprehension of how workplace training positively impacts students' development and achievement in the specific topic.

Research question 1 - Is there a difference in students' academic achievement from unit one to unit three in physical and health education classes after teachers' participation in workplace professional development training? (Quantitative).

In order to answer the research question, a descriptive analysis was performed to provide a thorough overview of the obtained data, emphasizing significant themes and patterns that emerge. In addition, the qualitative data collected from interviews with educators and students provided significant insights into the effects of workplace professional development training for teachers on students' academic achievement in the units. This analysis presents the gender distribution of a sample consisting of 128 individuals, comprising 49 females and 79 males. The data reveal that the female population constitutes 38.3% of the sample, whereas the male population accounts for 61.7%. The cumulative proportion amounts to 100%, signifying that the sample comprises individuals of both genders, as seen in the (Table 1 and Figure 4) *Participants' Descriptive Analysis below.*

**Table 1.** Participants' descriptive analysis.

| Students' gender | | | | | |
|---|---|---|---|---|---|
| | | **Frequency** | **Percent** | **Valid percent** | **Cumulative percent** |
| Valid | Female | 49 | 38.3 | 38.3 | 38.3 |
| | Male | 79 | 61.7 | 61.7 | 100 |
| | Total | 128 | 100 | 100 | |

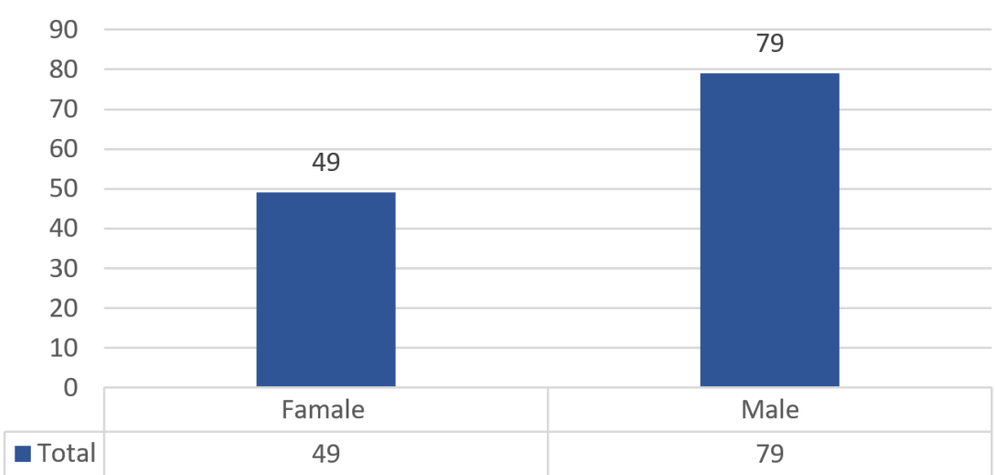



**Figure 4.** Samples by gender.

We performed a descriptive statistical analysis to check the mean and to conduct a paired sample t-test to assess the difference in means and determine the effect of workplace professional training for teachers on students' academic achievement in Units 1, 2, and 3 for the Criterion A Knowing and Understanding test score. The descriptive statistical results for the mean and standard deviation are as follows: Unit 1 Criterion A (M = 3.5; SD = 3.46), Unit 2 Criterion A (M = 7.16; SD = 1.55), and Unit 3 Criterion A (M = 7.18; SD = 1.55) after teachers' training. See (Table 2 and Figure 5 ) below.

**Table 2.** Descriptive analysis for criterion(a) units mean and std. deviation.

| | N | Mean | Std. deviation |
|---|---|---|---|
| Unit 1 criterion A knowing and understanding | 128 | 3.5391 | 3.46842 |
| Unit 2 criterion A knowing and understanding | 128 | 7.1641 | 1.55618 |
| Unit 3 criterion A knowing and understanding | 128 | 7.1875 | 1.55097 |
| Valid N (Listwise) | 128 | | |

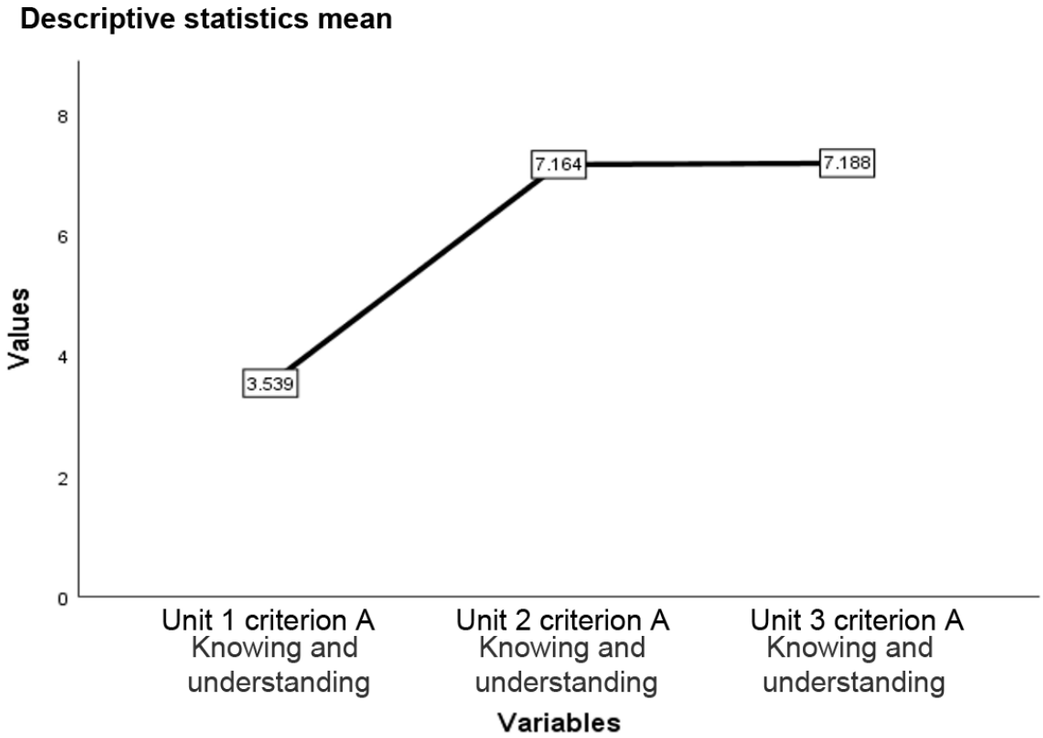



**Figure 5.** Descriptive analysis for criterion(A) units mean and std. deviation.

A paired samples t-test was performed to evaluate whether there was a difference between units one, two, and three (criterion A), based on students' test scores for comparison. The results indicated that there was a significant difference between unit one and unit two of the students' test scores M = [-3.62500], SD = [3.76473], t [127] = [-10.894], p = < .000. Furthermore, the paired sample T-test result for unit one and unit three criterion A knowing and understanding also show a significant difference M = [-3.64844], SD = [3.78474], t [127] = [--10.906], p = < .000. These results suggest an increase in mean scores and a decrease in standard deviation between Units 1 and 2, unit 1 and unit 3 indicating a potential improvement in the students score. Meanwhile, the result of the paired sample T-test for unit 2 and unit 3 shows no significant difference, M = [-.02344], SD = [.19702], t [127] = [-1.346], p = < .181. As seen below in (Table 3), Paired Sample T-test analysis for Criterion A units one, two, and three. This might have implications for how educators approach their teaching methodologies and evaluation procedures in order to guarantee a comprehensive understanding of the subject matter.

**Table 3.** Paired sample T-test analysis for criterion A units one, two, and three.

| | | Mean | Std. deviation | t | df | Sig. (2-tailed |
|---|---|---|---|---|---|---|
| Pair 1 | Unit 1 criterion A knowing and understanding - Unit 2 criterion A knowing and understanding | -3.625 | 3.76473 | -10.894 | 127 | 0 |
| Pair 2 | Unit 1 criterion A knowing and understanding - Unit 3 criterion A knowing and understanding | -3.64844 | 3.78474 | -10.906 | 127 | 0 |
| Pair 3 | Unit 2 criterion A knowing and understanding - Unit 3 criterion A knowing and understanding | -0.02344 | 0.19702 | -1.346 | 127 | 0.181 |

Research question 2 - Is there a difference between students' physical performance in (Criterion C) Apply and performing for units one, two, and three in physical and health education classes after teachers' participation in workplace professional development training? (Quantitative)

We performed a descriptive statistical analysis to check the mean and to conduct a paired sample T-test to assess the difference in means and determine the effect of workplace professional training for teachers on students' academic achievement in Units 1, 2, and 3 for the (Criterion C) applying and performing test scores. The descriptive statistical results for the mean and standard deviation are as follows: Unit 1 Criterion C (M = 5.0; SD = 1.95), Unit 2 Criterion C (M = 4.92; SD = 2.68), and Unit 3 Criterion C (M = 6.11; SD = 1.69), based on the applying and performing test scores after teachers' training (Table 4 and Figure 6) below.

**Table 4.** Descriptive analysis for criterion(C) units mean and std. deviation.

| | N | Mean | Std. deviation |
|---|---|---|---|
| Unit 1 criterion C applying and performing | 128 | 5.0234 | 1.95406 |
| Unit 2 criterion C applying and performing | 128 | 4.9297 | 2.68617 |
| Unit 3 criterion C applying and performing | 128 | 6.1172 | 1.69121 |
| Valid N (Listwise) | 128 | | |

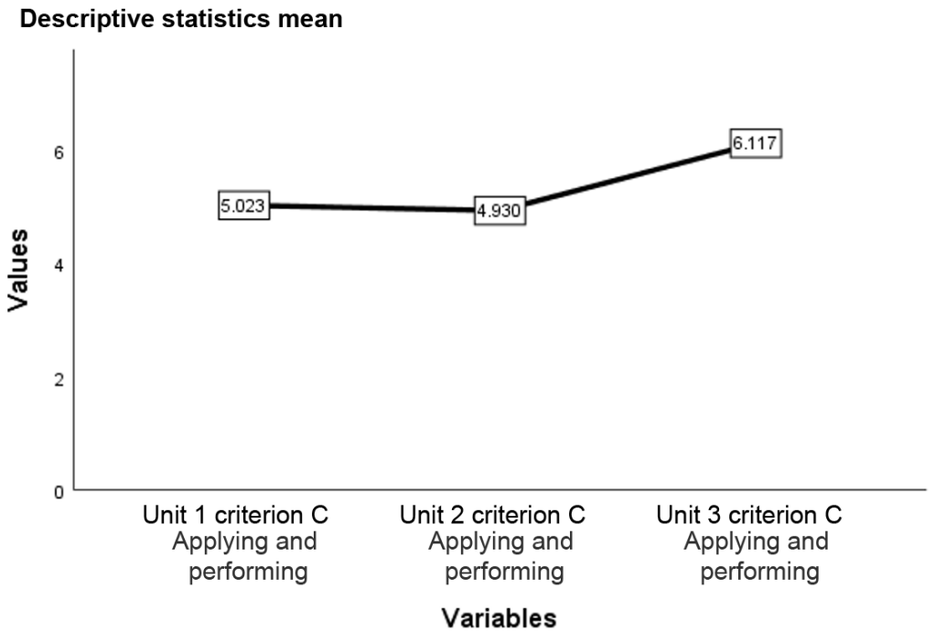



**Figure 6.** Descriptive analysis for the criterion(C) units mean.

A paired samples t-test was performed to evaluate whether there was a difference between units one, two, and three (criterion C) in applying and performing, using the mean scores of students' tests for comparison. The results indicated that there was no significant difference between unit one and unit two in students' performance scores, with a mean (M) of 0.09375, standard deviation (SD) of 2.14600, t-value of 0.494, degrees of freedom (df) = 127, and p-value of 0.622. Furthermore, the paired sample t-test results for unit one and unit three showed a significant difference, with a mean difference of -1.09375, SD of 2.25339, t-value of -5.491, df = 127, and p-value less than 0.000. These results suggest an increase in mean scores and a decrease in standard deviation between unit one and unit three, indicating a potential improvement in students' performance. On the other hand, the paired sample t-test for units two and three also showed a significant difference, with a mean difference of -1.18750, SD of 2.19789, t-value of -6.113, df = 127, and p-value less than 0.000. As seen below in (Table 5, Paired Sample T-test Analysis for Criterion C Unit one, two, and three. The result of this analysis might have implications for how teachers approach their teaching methodologies and assessment procedures. The findings suggest that students exhibited high proficiency in physical assessments, irrespective of the testing technique. Nevertheless, it is probable that these outcomes may be ascribed to other factors. For example, the participation of students in extracurricular activities and organized sports events, which are aimed at promoting a vibrant school environment, may have an impact on their performance in Criterion C assessments.

**Table 5.** Paired sample t-test analysis for criterion C units one, two, and three.

| | | Mean | Std. deviation | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|
| Pair 1 | Unit 1 criterion C applying and performing - Unit 2 criterion C applying and performing | 0.09375 | 2.146 | 0.494 | 127 | 0.622 |
| Pair 2 | Unit 1 criterion C applying and performing - Unit 3 criterion C applying and performing | -1.09375 | 2.25339 | -5.491 | 127 | 0 |
| Pair 3 | Unit 2 criterion C applying and performing - Unit 3 criterion C applying and performing | -1.1875 | 2.19789 | -6.113 | 127 | 0 |

A Pearson correlation coefficient was computed to determine the relationship between (Criterion A) knowing and understanding, and (Criterion C) applying and performing across all units. Firstly, the results indicate no significant relationship in unit 1 criterion A and unit 1 criterion C, [r(128) = 0.023, p = 0.801]. For unit 2, criterion A and criterion C results show no significant relationship, [r(128) = 0.046, p = 0.605]. In addition, there was also a non-significant relationship between unit 3 criterion A and criterion C, [r(128) = -0.041, p = 0.642].

In contrast, there was a significant positive relationship between unit 2 Criterion (A) and unit 3 Criterion (A), [r(128) = 0.992, p = 0.000]. Unit 1 Criterion (C) and Unit 2 Criterion (C) also showed a significant positive relationship [r(128) = 0.612, p = 0.000]. Additionally, there was a significant positive relationship between unit 2 Criterion (C) and unit 3 Criterion (C), r(128) = 0.577, p = 0.000. Furthermore, unit 3 Criterion (C) and unit 1 Criterion (C) also demonstrated a significant positive relationship [r(128) = 0.242, p = 0.006]. Our findings revealed a significant positive relationship between students' knowledge and comprehension criteria (A) and their performance in the physical skills test for factual, procedural, and conceptual aspects of the International Baccalaureate Physical and Health Education curriculum. The results indicate that the correlation is significant at the 0.01 level (2-tailed). See below in Table 6 for the analysis of knowing, understanding, applying, and performing correlation.

**Table 6.** Correlation analysis for (Criterion A) knowing and understanding, (Criterion C) applying and performing.

| | | **Unit 1 criterion A knowing and understanding** | **Unit 2 criterion A knowing and understanding** | **Unit 3 criterion A knowing and understanding** | **Unit 1 criterion C applying and performing** | **Unit 2 criterion C applying and performing** | **Unit 3 criterion C applying and performing** |
|---|---|---|---|---|---|---|---|
| Unit 1 criterion A knowing and understanding | Pearson correlation | 1 | 0.026 | 0.01 | 0.023 | 0.063 | -0.02 |
| | Sig. (2-tailed) | | 0.773 | 0.908 | 0.801 | 0.478 | 0.821 |
| | N | 128 | 128 | 128 | 128 | 128 | 128 |
| Unit 2 criterion A knowing and understanding | Pearson correlation | 0.026 | 1 | 0.992** | -0.071 | 0.046 | -0.049 |
| | Sig. (2-tailed) | 0.773 | | 0 | 0.425 | 0.605 | 0.581 |
| | N | 128 | 128 | 128 | 128 | 128 | 128 |
| Unit 3 criterion A knowing and understanding | Pearson correlation | 0.01 | 0.992** | 1 | -0.072 | 0.054 | -0.041 |
| | Sig. (2-tailed) | 0.908 | 0 | | 0.422 | 0.543 | 0.642 |
| | N | 128 | 128 | 128 | 128 | 128 | 128 |
| Unit 1 criterion C applying and performing | Pearson correlation | 0.023 | -0.071 | -0.072 | 1 | 0.612** | 0.242** |
| | Sig. (2-tailed) | 0.801 | 0.425 | 0.422 | | 0 | 0.006 |
| | N | 128 | 128 | 128 | 128 | 128 | 128 |
| Unit 2 criterion C applying and performing | Pearson correlation | 0.063 | 0.046 | 0.054 | 0.612** | 1 | 0.577** |
| | Sig. (2-tailed) | 0.478 | 0.605 | 0.543 | 0 | | 0 |
| | N | 128 | 128 | 128 | 128 | 128 | 128 |
| Unit 3 criterion C applying and performing | Pearson correlation | -0.02 | -0.049 | -0.041 | 0.242** | 0.577** | 1 |
| | Sig. (2-tailed) | 0.821 | 0.581 | 0.642 | 0.006 | 0 | |
| | N | 128 | 128 | 128 | 128 | 128 | 128 |

**Note:** **. Correlation is significant at the 0.01 level (2-tailed).

To what extent is the impact of workplace professional development on physical health education teachers? (Qualitative) Thematic coding was conducted to address the research question, utilizing the observation checklist recordings of teachers' workplace professional development training, lesson activities, and student outcomes. Our analysis revealed that workplace professional development had a substantial influence on physical health education teachers, as it equipped them with new strategies and resources to integrate into their lesson plans. This ultimately resulted in an enhancement of student engagement, participation, and overall physical well-being. The thematic coding's qualitative data further demonstrated the significance of continuous professional development in the promotion of a comprehensive educational approach that is advantageous to both students and teachers. The qualitative findings of continuous workplace professional development for teachers identify four categories: teachers' teaching approach, school environment, students' attendance, and whole school community engagement, as seen below (Table 7).

**Table 7.** Qualitative findings continuous workplace professional development for teachers.

| **Continuous workplace professional development for teachers** | **Findings** |
|---|---|
| Teachers' teaching approach (Positive changes) | The beneficial modifications in instructional strategies implemented by teachers during workplace professional development certainly considerably enhanced student accomplishment in both theoretical and practical evaluations. A teacher's capacity to foster confidence in students when confronting problems is a crucial element of student engagement. Through the integration of novel pedagogical ideas and approaches gained through professional development, educators have enhanced their effectiveness in fostering active learning and elevating academic performance. These enhancements signify a transformation in educators' convictions, perspectives, and pedagogical philosophies, allowing them to more effectively tackle real-world classroom obstacles. This study's results demonstrate a significant association between the level of professional development pursued by teachers and the establishment of a classroom culture based on inquiry and reflective practice. |
| School environment (More equipment was provided) | The purchase of new gym equipment, the renovation of sports facilities, and the provision of additional teaching resources have all significantly improved the school's physical education environment. In addition to producing measurable improvements in students' physical assessment scores, the infrastructure improvements gave students a greater sense of purpose and self-worth. Improved resources and a more conducive learning environment are responsible for the positive correlation between student engagement and performance in physical activities. This emphasizes how crucial a supportive and well-equipped learning environment is for encouraging participation and success in physical education. |
| Students' attendance (Increase in students' attendance at PHE lessons) | The results of this study demonstrate the positive impacts of continuous professional development on teacher effectiveness and student performance, underscoring its critical role in physical and health education. The study shed light on the perspectives and |

| Continuous workplace professional development for teachers | Findings |
|---|---|
| | experiences of district-level administrators and principals with regard to professional development initiatives. Educational leaders can better create a nurturing and engaging learning environment that supports students' overall well-being by remaining up to date on the latest research and evidence-based practices. Professional development is also seen as a strategic opportunity and a shared responsibility that serves as a basis for pedagogical change and the validation of existing teaching practices. It encompasses both social and personal elements and has emerged as a top priority for teachers committed to enhancing students' attainment of learning objectives. |
| Whole school community engagement (Teachers vs Students) Volleyball, Football, Marathon race. Students' service learning on BMI and SHIELD Awareness. | Students' academic performance is improved, and their general well-being is greatly enhanced when physical education and health education are approached holistically. Teachers equip students with the knowledge and abilities they need to live active, health-conscious lives by integrating a variety of physical activities and service-learning opportunities into the curriculum. Nearly 90% of student-led "Service as Action" projects this academic year were centered around sports and physical activity, demonstrating the high level of participation from the school community. This widespread participation highlights students' commitment to promoting wellness in the classroom and reflects a growing awareness of healthy lifestyle choices. This proactive involvement underscores the vital role that physical education plays in creating well-rounded individuals and fosters a culture of health and well-being. According to a large study conducted in the US, children who participated in interschool sports and had more opportunities for physical education were less likely to experience issues related to overweight and obesity. |

## 5. Discussion and Conclusion

The finding of this article emphasizes the importance of providing teachers with ongoing professional development and the need to allocate funds for resources and support to ensure that teachers have access to opportunities for ongoing learning. This chapter explores the idea that professional development is a potent instrument for enhancing education and raises concerns about its capacity to influence student performance and alter teacher conduct. According to Bailey (2018) the field of physical and health education (PHE) is influenced by a multitude of disciplines, which are reflected in a diverse array of research questions. It is challenging to identify an additional field of educational research and practice that boasts a similarly diverse array of contributory collections of knowledge. Positively, the majority of teachers engage in some form of training, which may be considered a systemic asset that should be strengthened. García and Weiss (2019) also contributed to the body of knowledge by emphasizing the importance of ongoing professional development for physical health education teachers and students. According to the research question of this current study, is there a difference in students' academic achievement from unit one to unit three in physical and health education classes after teachers' participation in workplace professional development training? As seen in (Table 2). The descriptive statistical results for the mean and standard deviation between Unit 1 criterion A ($M = 3.5$; $SD = 3.46$), Unit 2 criterion A ($M = 7.16$; $SD = 1.55$), and Unit 3 criterion A ($M = 7.18$; $SD = 1.55$) for the Knowing and Understanding test scores after teachers' training indicate notable differences. The paired sample t-test result in (Table 4) shows a significant difference, with $M = [-3.62500]$, $SD = [3.76473]$, $t [127] = [-10.894]$, $p < .000$. Workplace professional development has likely enhanced teachers' knowledge and abilities, leading to the adoption of more effective teaching approaches that specifically target and address students' required areas of knowledge and comprehension. Consequently, students in Units 2 and 3 may have experienced improved learning outcomes due to teachers providing more targeted instruction, resulting in a higher average score and a reduced variation in results, such as a smaller standard deviation compared to Unit 1. Additionally, the teaching staff's increased self-confidence resulting from professional growth in the workplace may have inspired them to employ innovative and creative instructional strategies, potentially leading to greater student engagement and improved educational achievements. In their study, Steyn and Van Niekerk (2005) professional development is instrumental in enabling educators to acquire the most current knowledge of the subjects they instruct and to implement effective learning strategies. The research indicates that the school community can foster a supportive professional community by promoting collaboration and networking. This can facilitate the exchange of best practices and resources. Additionally, see the study of Newmann, King, and Youngs (2000). They suggested that professional development should concentrate on five critical components of school capacity: teachers' knowledge, skills, and dispositions; professional community; program coherence; technical resources; and principal leadership. This implies that when educators feel more confident, it may lead to significant advantages in the classroom. The correlation between teacher confidence and student performance underscores the need for continuous professional development and support for educators. Current research shows that investing in professional development programs for teachers in the workplace can ultimately enhance student achievement, as evidenced by these two studies. The study's findings led to the conclusion that when teachers participated in workplace professional development training, students' academic success significantly increased. This implies that funding for teachers' professional growth may directly affect student performance. According to Gaikhorst, März, du Pré, and Geijsel (2019), school principals prioritize the structural and cultural conditions for Teacher Development Programs (TDP), with a particular emphasis on the learning attitudes, differentiation, and knowledge sharing of teachers. Nevertheless, they encounter difficulties in executing these conditions, particularly in the context of internal learning activities. By giving teachers the chance to advance their knowledge and abilities, we can build a more efficient educational system that is advantageous to teachers as well as students. To promote a culture of quality and continual progress in education, it is critical to acknowledge the significance of continuing professional development and support for teachers (Supovitz & Turner, 2000).The study of Dahlqvist (2023) it is vitally important to provide

primary teacher students with the requisite abilities, particularly information-seeking skills, as they play a significant role in influencing learners' development. This current study demonstrates that when teachers have appropriate training and resources, they have the ability to make a considerable effect on the learning process of students. The outcome of this impact is significant, as it leads to a major improvement in students' academic performance. Furthermore, when teachers receive adequate training and are supported by an ongoing workplace professional development program tailored to their needs, they are able to implement effective teaching methods, which ultimately produce a positive impact on students' academic achievement as seen in this study. Our argument is supported by the study of Bortes and Giota (2024). The findings confirm the advantages of both teacher- and student-centred teaching practices in terms of academic achievement, while also advising against the overuse of self-directed instruction. It is crucial to emphasise that the study underscores the impact of instructional methods on the mental health of students, in addition to academic outcomes. Effective workplace professional development training helps teachers improve their techniques and confidence. *Is there a difference in students' applying and performing Criterion C for units one to unit three in physical and health education classes after teachers' participation in workplace professional development training?* Following teachers' involvement in workplace professional development training, there was an increase in students' application and performance of Criterion C for units one to three in physical and health education classes. Teachers' improved knowledge and instructional skills as a result of their professional development training might be credited with this progress. The results indicated that there was no significant difference between unit one and unit two of the students' performance score M = ⌈.09375⌉, SD = ⌈2.14600⌉, t ⌈127⌉ = ⌈.494⌉, p = < .622. Furthermore, the paired sample T-test result for unit one and unit three (Criterion C) applying and performing shows a significant difference M = ⌈-1.09375⌉, SD = ⌈2.25339⌉, t ⌈127⌉ = ⌈-5.491⌉, p = < .000. These results suggest an increase in mean scores and a decrease in standard deviation between unit 1 and unit 3, indicating a potential improvement in the students' performance score. On the other hand, the result of the paired sample T-test for unit 2 and unit 3 shows a significant difference M = ⌈-1.18750⌉, SD = ⌈2.19789⌉, t ⌈127⌉ = ⌈-6.113⌉, p = < .000. see (Table 5). The findings of the independent samples t-test indicated that there was no statistically significant disparity between the performance scores of units 1 and 2 among the students. This suggests that there was no significant difference in the performance levels of the two units. However, the paired sample t-test results for criterion C in units 1 and 3 showed a substantial difference between the average scores and standard deviation. This indicates a potential improvement in students' performance scores in Unit 3. The paired sample t-test results also show a significant difference in the means and standard deviations between units 2 and 3, implying that unit 3's performance score has increased. These statistics suggest that students may have achieved higher performance in Unit 3 compared to Units 1 and 2. Additional investigation is required to identify the components contributing to this improvement in performance. According to the study of Kipping et al. (2014) the study intervention included teacher training, lessons and child-parent interactive homework plans, all resources needed for lessons and homework, and written materials for school newsletters and parents. The intervention was given to children in school year 5 (age 9-10 years). Schools assigned to control received regular classes. The conclusions and arguments of this current study are supported by their results. Teacher training is crucial and has a substantial influence on students' mastery of the factual, procedural, and conceptual knowledge of the units in physical and health education classes. The beneficial effect that students' application and performance of running, basketball dribbling abilities, and football dribbling skills had on the Criterion C skills assessment emphasizes how crucial it is for educators to receive continual support to improve student results. *To what extent is the impact of Workplace Professional Development on Physical Health Education Teachers?* Teachers of physical health education benefit greatly from workplace professional development because it provides them with the skills and information needed to engage and instruct students. Teachers were able to design relevant and engaging units for classes that motivate students to improve by enhancing their own abilities and subject matter knowledge. Ultimately, this results in better student performance and a more enjoyable learning environment for all parties. As argued by Alhababy (2016), anyone teaching physical education must be competent, meaning they must possess the abilities, know-how, comprehension, and experience required to organise, carry out, and assess the students' work in an atmosphere that is safe and appropriately challenging. Because of the importance of physical and health education teachers' competency, workplace professional development plays a major role in raising teachers' proficiency levels across all educational contexts. Similar to the results of this study, Dwiyogo and Cholifah (2016) further supported the idea that one way to raise the effectiveness of physical education teachers in elementary schools is to implement CPD that is integrated with ICT. In order to become a lifelong teacher and learner, CPD aims to improve and develop professional competence in terms of a teacher's knowledge, attitude, and abilities. Yoon and Armour (2017) additionally validated how professional development training affected teachers' pedagogies and student outcomes. Overall, the impact of workplace professional development on health and physical education teachers is significant. Teachers are crucial to fostering a culture of excellence and continuous advancement in the field of education. Through workplace professional development, teachers can stay current on innovative teaching methods and best practices, which ultimately benefits their students. A happier and more effective learning environment may result from instructors' increased motivation and sense of self-worth as a result of ongoing professional development. This study's findings contribute to our understanding of the disputed nature of inclusion in modern PE and underscore the importance of conducting research with different stakeholders in physical education teaching and CPD. This study suggests that CPD providers play an important role in expanding teachers' understanding of inclusive pedagogy (Makopoulou, Penney, Neville, & Thomas, 2022).

### 5.1. Conclusion

The necessity of ongoing professional development for teachers of physical health education is emphasized by this study. To encourage collaboration and networking among members of the school community, it suggests hosting conferences, seminars, and networking events. This could facilitate the exchange of best practices and useful resources and promote the growth of a positive professional network. To improve their teaching methods and advance the welfare of their students, educators can overcome obstacles like time and resource limitations, resistance to change, and the adoption of sustainable practices. Students benefit from teachers' ongoing education and development because it ensures they receive an innovative education and promotes the formation of lifelong healthy habits. Teachers are able to adapt to changing student needs and offer a comprehensive education, which benefits both students' and teachers' overall success and well-being. According to the study, encouraging networking and cooperation within the school community can help spread resources and best practices and create a positive

professional environment. Physical health education teachers should participate in continuous professional development to maintain relevance, innovation, and effectiveness. Investing in teachers' professional development directly influences students, leading to increased engagement, motivation, and achievement. Cooperating on instructional ideas and exchanging best practices ensures a well-rounded and thorough education for all students and teachers.

### 5.2. Implications and Future Research

This article aims to contribute to the existing literature by offering comprehensive descriptions of workplace professional development for novice IB physical and health education teachers. The focus is on continuous data collection of their teaching practices through high-quality unit preparation, the use of ATL skills, the provision of feedback, and the implementation of quality assessment methods to enhance students' academic performance. We acknowledge the impact of workplace professional development for physical and health education teachers of IB curriculum (Wong & Oh, 2023). All of these highlight the importance of devoting resources and time to reducing challenges. A call to action for educational institutions and educators is to prioritize opportunities for in-service teachers to participate in workplace professional development and to invest in these events. Future research might focus on identifying the most effective techniques and approaches that improve professional development outcomes. Additionally, studying how different types of professional development influence student achievement could provide valuable data for educators and policymakers.

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