

Pre-service teachers' readiness in implementing adapted physical education in a mainstream classroom

Ronel S. Peromingan¹, Ruben L. Tagare, Jr.², Ma. Flor Jessamine M. Andajao¹, Dexter T. Paclibar¹,
Mary Ann A. Salazar¹, Elmer M. Labad³, Emie S. Misil¹

¹College of Physical Education and Sports, Zamboanga Peninsula Polytechnic State University, Zamboanga City, Philippines

²College of Human Kinetics, University of Southern Mindanao, Kabacan, Philippines

³College of Sports Science and Physical Education, Western Mindanao State University, Zamboanga City, Philippines

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ABSTRACT

This study investigates pre-service teachers' readiness to implement adapted physical education (APE) in mainstream classrooms, focusing on essential competencies such as knowledge, adaptability, empathy, communication, safety awareness, assessment, and resilience. Utilizing a quantitative research design, specifically a correlational approach, the study engaged 112 respondents selected through simple random sampling from a leading state university in Southern Philippines. Data were collected using a researcher-made survey questionnaire that underwent pilot testing and reliability assessment. The analysis employed mean and Spearman's rho correlation coefficient to explore the relationships among the different dimensions of readiness. The findings reveal that pre-service teachers are moderately ready to implement APE, with significant interrelationships identified among all competency areas. These results indicate a need for comprehensive teacher training programs that emphasize the interconnected nature of these competencies, suggesting that improvement in one area could enhance readiness across others. The study concludes that a holistic approach in teacher preparation is essential for developing competent educators capable of promoting equitable participation in physical education (PE) for all students, ultimately enhancing the quality of APE in mainstream settings.

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Corresponding Author:

Ruben L. Tagare, Jr.
College of Human Kinetics, University of Southern Mindanao
Kabacan, Cotabato, Philippines
Email: tagareruben@usm.edu.ph

1. INTRODUCTION

Adapted physical education (APE) is a specialized branch of physical education (PE) designed to meet the diverse needs of students with special needs or those who require modifications to participate successfully in physical activities [1]. APE encompasses a broad range of adaptations and modifications in curricular content, instructional strategies, and assessment methods to ensure that all students, regardless of their physical, cognitive, or emotional challenges, can engage in PE and achieve optimal health and fitness outcomes [2]. It focuses on creating an inclusive environment that promotes participation, enjoyment, and skill development in physical activities tailored to each student's unique abilities [3]. APE not only enhances physical competence but also fosters social interaction, self-esteem, and overall well-being, thereby contributing to the holistic development of students [4]. As educational settings increasingly emphasize inclusion, APE plays a critical role in bridging the gap between traditional PE programs and the varied needs of students, ensuring that every individual could lead an active and healthy lifestyle [5].

Modern education increasingly embraces the integration of APE in mainstream classrooms as a fundamental aspect of promoting inclusivity, equity, and holistic development for all students [6]. This shift is driven by a growing recognition of the rights of individuals with special needs, as articulated in legislation such as the Individuals with Special needs Education Act, which mandates that students with special needs have access to the general education curriculum alongside their peers. Integrating APE into mainstream settings fosters an inclusive environment that not only accommodates the diverse needs of students but also enriches the learning experience for all [7]. This collaborative approach encourages the development of social skills, empathy, and understanding among students, promoting a sense of community and belonging [8]. Further, research has shown that inclusive PE programs enhance physical literacy, self-esteem, and motivation in students with special needs while simultaneously benefiting their peers through exposure to varied perspectives and abilities [9].

Despite the positive intentions behind integrating APE into mainstream classrooms, several challenges impede its effective implementation. One significant issue is the lack of adequate training and professional development for teachers, which can result in insufficient knowledge and skills to address the diverse needs of students with special needs [10]. Many PE instructors report feeling unprepared to modify curricula and adapt teaching strategies, leading to a reliance on traditional practices that may not be inclusive [11]. Resource constraints, including limited access to specialized equipment and support staff, can hinder the ability to create an equitable learning environment. Furthermore, there may be a cultural resistance to inclusion from both educators and peers, as some individuals may hold misconceptions about the capabilities of students with special needs. This can manifest in lowered expectations and social isolation, which ultimately undermines the goal of fostering an inclusive atmosphere [12].

Numerous studies have significantly advanced the understanding of APE and its role in promoting inclusion and development for students with special needs. Research has shown that APE programs contribute positively to the physical, social, and emotional well-being of participants. For example, authors demonstrated that engagement in adapted physical activities leads to improvements in motor skills and fitness levels among children with special needs, highlighting the potential of APE to foster overall physical health. Leyro [13] found that students involved in APE programs experience enhanced self-esteem and a greater sense of belonging within their educational environment. Research by Taylor *et al.* [14] identified effective strategies for implementing APE within general PE classes, emphasizing the importance of teacher training and collaboration with special education professionals.

Despite the wealth of research highlighting the benefits of APE and the effective strategies for its implementation in mainstream classrooms, there remains a significant gap in the literature concerning pre-service teachers' readiness to deliver APE effectively. While previous studies have established the positive impacts of APE on students with special needs and outlined best practices for inclusive PE, they have largely overlooked the preparedness of future educators to integrate these principles into their teaching. This oversight is particularly concerning given the increasing emphasis on inclusive education and the legal mandates requiring equal access to PE for all students. Given the urgency of promoting effective, inclusive practices in PE, this research is timely and necessary to inform teacher education programs and ensure that pre-service teachers are equipped with the knowledge, skills, and confidence to support all students in their PE endeavors.

The novelty of this research lies in its proactive assessment of pre-service teachers' readiness to implement APE in mainstream classrooms, an area often overlooked in teacher education discourse. By examining key competencies and their interrelationships before these educators enter the field, this study provides critical insights for improving training programs, curriculum design, and professional development. Its significance extends to fostering inclusivity in PE by equipping future teachers with the necessary skills and confidence to accommodate diverse student needs, ultimately bridging the gap between policy and practice in inclusive education.

2. METHOD

2.1. Research design

This research employed a quantitative research design, specifically utilizing the correlation approach to examine the readiness of pre-service teachers in implementing APE in mainstream classrooms. Quantitative research is characterized by the systematic investigation of phenomena through the collection and analysis of numerical data, allowing researchers to quantify relationships, behaviors, and attitudes [15]. The correlation approach, as a subset of quantitative research, focuses on assessing the strength and direction of relationships between 2 or more variables. It does not imply causation but rather indicates how changes in one variable may be associated with changes in another [16]. This approach often utilizes statistical techniques to analyze data collected through surveys or assessments, allowing researchers to determine the degree to which different factors are related [17].

The choice of a correlational design for this study is particularly appropriate for examining the inter-relationships among the areas within the context of APE. By exploring how these dimensions relate to one another, the research can uncover potential patterns and associations that may indicate overarching competencies and readiness levels among pre-service teachers. This design allows for a nuanced understanding of the interconnectedness of various competencies essential for effectively implementing APE, providing valuable insights that can inform teacher training and professional development initiatives.

2.2. Respondents and sampling

This research involved 112 respondents; specifically pre-service PE teachers currently enrolled in a leading state university in the Southern Philippines. These respondents were selected through simple random sampling, ensuring that each eligible individual within the population had an equal chance of being chosen for the study. This approach was designed to provide a representative sample of pre-service teachers in the institution, enabling a reliable assessment of their readiness to implement APE in mainstream classrooms. Simple random sampling is a sampling method where every member of the population has an equal and independent chance of being selected [18]. This technique minimizes selection bias and increases the generalizability of the findings, making it particularly suitable for this investigation. The sample size is adequate for correlation analysis, as it allows for the detection of meaningful relationships between variables while providing a stable estimation of correlation coefficients. This sample size thus ensures both the accuracy and robustness of the findings, making it sufficient to achieve the objectives of the research.

2.3. Research instrument

This research utilized a researcher-made survey questionnaire specifically designed to assess pre-service teachers' readiness to implement APE in mainstream classrooms across several key areas: knowledge and understanding, adaptability and flexibility, empathy and patience, communication and collaboration, safety awareness, assessment and evaluation, and passion and resilience. The questionnaire was developed based on an extensive review of relevant literature and standards in the works of Winnick and Porretta [19] ensuring that each item accurately reflected the competencies essential for effective APE implementation.

To verify the questionnaire's reliability and suitability, it underwent pilot testing and a reliability analysis, resulting in a Cronbach's alpha value of 0.985. This high alpha score indicates an excellent level of internal consistency, meaning the items on the questionnaire consistently measure the same underlying constructs across respondents. The reliability test confirms that the instrument is both robust and dependable for gathering accurate data in this study. Given the comprehensive development process and the strong reliability score, this questionnaire is well-suited to capture a nuanced assessment of pre-service teachers' readiness, making it an effective tool to support the study's objectives.

2.4. Statistical analysis

This study utilized mean and composite mean to describe the levels of pre-service teachers' readiness to implement APE across the various areas. The mean was calculated for each item within these areas to provide an average score, giving a clear indication of respondents' general readiness in each specific competency. Composite means were then computed by averaging the mean scores of related items within each area, allowing for an overall understanding of the pre-service teachers' readiness in each category.

For testing the relationships among these areas of APE readiness, Spearman's rho correlation coefficient was employed. Spearman's rho is a non-parametric measure that assesses the strength and direction of association between 2 ranked variables [20]. This method was particularly suitable for this study because it does not assume a normal distribution of the data, making it appropriate for analyzing ordinal or non-normally distributed data that might arise from Likert-scale responses. Spearman's rho allowed for the identification of potential correlations between various readiness areas, providing insights into how these competencies interrelate and contribute to overall APE readiness. The use of this correlation coefficient thus enabled a robust and accurate analysis of relationships within the data, further supporting the study's objective of understanding the interconnectedness of competencies necessary for effective APE implementation.

3. RESULTS

Figure 1 presents the levels of pre-service teachers' readiness to implement APE in mainstream classrooms. The data illustrates the mean scores across various areas, including knowledge and understanding, adaptability and flexibility, empathy and patience, communication and collaboration, safety awareness, assessment and evaluation, and passion and resilience. This Figure 1 provides an overview of the readiness levels in each area, highlighting strengths and potential areas for improvement. Table 1 illustrates the interrelationship of the pre-service teachers' readiness to implement APE, highlighting the significant

correlations among various competencies essential for effective teaching in inclusive settings. The relationships between dimensions such as knowledge and understanding, adaptability and flexibility, empathy and patience, and others underscore the interconnectedness of these skills.

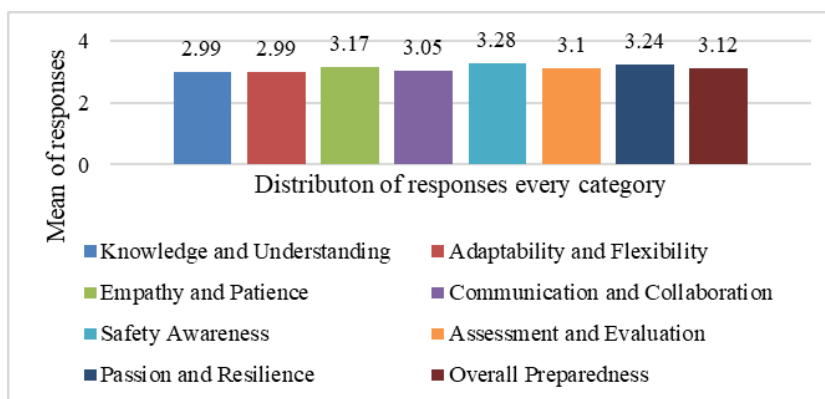


Figure 1. Pre-service teachers' readiness to implement APE in mainstream classrooms

Legend:

4.00-3.50: highly ready—pre-service teachers in this range demonstrate a strong level of readiness and competence in implementing APE. They are well-prepared, with a high level of confidence, understanding, and ability in this area.

3.49-2.50: moderately ready—pre-service teachers in this range have an adequate level of readiness, though there may still be areas for improvement. They are somewhat prepared but may benefit from additional training or support to strengthen specific skills.

2.49-1.50: somewhat ready—pre-service teachers in this range show limited readiness. They may lack confidence or understanding in certain aspects and would benefit from focused training and support to effectively implement APE.

1.49-1.00: not ready—pre-service teachers in this range feel unprepared and lack the necessary skills and understanding to effectively implement APE. This indicates a need for substantial support and targeted training.

Table 1. Interrelationship of the pre-service teachers' readiness to implement APE

Indicators	Passion and resilience	Knowledge and understanding	Adaptability and flexibility	Empathy and patience	Communication and collaboration	Safety awareness
Knowledge and understanding	.540**					
Adaptability and flexibility	.602**	.649**				
Empathy and Patience	.681**	.689**	.689**			
Communication and collaboration	.631**	.663**	.663**	.717**		
Safety awareness	.759**	.626**	.626**	.717**	.656**	
Assessment and evaluation	.769**	.678**	.678**	.810**	.753**	.740**

Note: ** Statistically Significant at p-value <0.05

4. DISCUSSION

Overall preparedness: the overall preparedness of pre-service teachers to implement APE is reflected in a composite mean of 3.12, categorized as “moderately ready.” This indicates that while pre-service teachers possess a foundational understanding and some competencies relevant to APE, there is a notable room for growth and improvement across all assessed dimensions. The moderate readiness suggests that these educators may encounter challenges when faced with the complexities of adapting PE to meet the needs of all students, particularly those with diverse abilities.

This implies a potential gap between theoretical knowledge and practical application, which may affect their confidence and competence in real-world teaching situations. This level of preparedness could

result in a lack of tailored instruction and support for students with special needs, ultimately hindering their participation and success in PE programs. Pre-service teachers often demonstrate only moderate readiness in implementing APE due to inadequate training, limited exposure to inclusive practices, and a lack of confidence in addressing diverse student needs [21]. Many teacher preparation programs do not include comprehensive APE coursework, leading to gaps in knowledge about necessary pedagogical strategies [14]. Pre-service teachers frequently have limited practical experience in inclusive settings, which hampers their ability to engage effectively with students with special needs [22].

Knowledge and understanding: in terms of knowledge and understanding, the pre-service teachers achieved a composite mean score of 2.99, categorized as “moderately ready”. This suggests that while these future educators possess a foundational awareness of APE concepts and principles, their understanding may lack the depth required for fully confident implementation in a diverse classroom setting. A “moderately ready” rating in this area points to a general familiarity with APE’s theoretical aspects, but it may also indicate limited exposure to practical applications and strategies for effectively adapting PE to meet the needs of students with special needs. This level of readiness reflects a basic, though not fully comprehensive, grasp of APE, which is a crucial element for ensuring inclusive and equitable PE environments.

This implies that while pre-service teachers are developing the necessary knowledge base for APE, they may still require more in-depth training and experience to transition smoothly into inclusive PE roles. The moderate readiness in knowledge and understanding could reflect the current curriculum or teacher education programs, which might provide foundational knowledge without extensive focus on the nuances and complexities of APE in practice. Empowering teachers with knowledge and understanding of APE is crucial for creating an inclusive environment that meets the diverse needs of all students, especially those with special needs [3]. APE enables equitable access to physical activities, fostering essential physical, social, and emotional development [23].

Adaptability and flexibility: in terms of adaptability and flexibility, the pre-service teachers received a composite mean score of 2.99, classified as “moderately ready”. This indicates that while these educators are somewhat equipped to adjust their teaching strategies and methods to accommodate the diverse needs of students in APE, their level of preparedness may not be sufficient for effectively managing the varying dynamics of a mainstream classroom. A score reflecting moderate readiness suggests that pre-service teachers recognize the importance of adaptability but may lack the practical experience or specific training necessary to apply flexible teaching methods in real-world scenarios.

This implies that the current training programs may provide a basic understanding of adaptability concepts without adequately preparing future educators to implement these strategies in practice. The moderate score reveals a potential gap between theoretical knowledge and practical application, suggesting that pre-service teachers might find it challenging to modify activities, materials, and instructional approaches on the fly in response to the unique challenges presented by students with varying abilities. This lack of confidence in adaptability could hinder their effectiveness in fostering an inclusive environment where all students can participate and thrive in PE. Research has shown that while teacher preparation programs often provide foundational knowledge about inclusive practices, there is frequently insufficient emphasis on developing the practical skills necessary for effective implementation [24].

Empathy and patience: in terms of empathy and patience, the pre-service teachers attained a composite mean score of 3.17, categorizing their readiness as “moderately ready”. This score suggests that while these educators demonstrate a foundational capacity to understand and relate to the feelings and needs of students with special needs, their ability to exercise patience in diverse learning environments may not yet be fully developed. A moderate readiness level in this area indicates that pre-service teachers may recognize the importance of empathy and patience in fostering inclusive educational practices, yet they might still struggle to consistently apply these qualities in real-life teaching situations where challenges and emotional dynamics are prevalent.

This implies that the current level of empathy and patience among pre-service teachers, while encouraging, reflects a need for further development to enhance their interpersonal skills and emotional intelligence in the context of APE. The findings suggest that although these educators have a general understanding of the significance of empathy and patience, they may lack the experiential learning opportunities that are critical for fully cultivating these traits. As a result, their moderate readiness could impact their effectiveness in building rapport with students, managing classroom behaviors, and creating a supportive environment that encourages participation from all learners. The importance of empathy and patience in teachers handling students with special needs is well-documented. Empathy enables educators to understand and respond to the emotional and educational needs of students, fostering a supportive learning environment [25]. This emotional connection enhances students’ confidence and motivation, leading to better educational outcomes [26]. Patience is equally essential, as students with special needs often require more time and repeated instruction to grasp concepts.

Communication and collaboration: in terms of communication and collaboration, the pre-service teachers achieved a composite mean score of 3.05, categorizing their readiness as “moderately ready”. This score indicates that while these future educators possess a basic understanding of the importance of effective communication and collaborative practices in delivering APE, they may not yet be fully equipped to engage all stakeholders such as students, parents, and other educators, successfully in a collaborative teaching environment. A moderately ready status suggests that pre-service teachers are aware of the need for clear communication and teamwork but may lack the necessary skills or experiences to implement these practices effectively in their teaching.

This implies that the moderate score in communication and collaboration reflects a gap between theoretical understanding and practical application. While pre-service teachers may recognize the value of collaboration in enhancing the educational experience for students with special needs, they might find it challenging to translate this awareness into actionable strategies that foster meaningful dialogue and partnership with various stakeholders. This limitation could hinder their ability to create a cohesive support network that is essential for successfully implementing APE, where collaboration among teachers, parents, and specialists is critical to addressing the diverse needs of learners. Collaboration among educators, professionals, and agencies is vital for enhancing the educational experience of students with special needs by providing a comprehensive support system for their diverse needs. This collaborative approach enables the development of individualized education plans that address each student’s unique challenges [27].

Safety awareness: in terms of safety awareness, the pre-service teachers attained a composite mean score of 3.28, classifying their readiness as “moderately ready”. This score suggests that while these educators have a foundational understanding of safety protocols and considerations essential for conducting APE activities, their readiness may not be sufficient to ensure a consistently safe learning environment for all students. A moderately ready classification indicates that pre-service teachers recognize the importance of safety measures but may lack the comprehensive training and practical experience necessary to identify and mitigate potential risks effectively in various teaching contexts.

This implies that the moderate level of safety awareness among pre-service teachers could lead to challenges in effectively managing the physical and emotional safety of students during APE sessions. The findings suggest that although these educators are somewhat informed about safety practices, their limited readiness may hinder their ability to anticipate and respond to safety concerns that can arise in inclusive settings, particularly when working with students with diverse abilities. This could result in increased vulnerability for both the students and the educators themselves, as safety is a critical component of any effective PE program. Consequently, the study highlights a significant area for growth within teacher education programs, emphasizing the necessity for enhanced training in safety awareness and risk management practices tailored to the unique demands of APE. Equipping teachers with safety awareness is essential for creating a secure and supportive environment for students with special needs. Research shows that teachers with strong safety awareness can better identify and mitigate risks affecting students with special needs [28]. This knowledge is crucial, as students may have unique vulnerabilities requiring specific safety considerations, such as mobility limitations [29]. Training in emergency procedures enhances teachers’ confidence and preparedness to respond effectively in crises, reducing anxiety for everyone involved [30].

Assessment and evaluation: in terms of assessment and evaluation, the pre-service teachers achieved a composite mean score of 3.10, categorizing their readiness as “moderately ready”. This score indicates that while these educators have a basic understanding of assessment techniques and evaluation methods relevant to APE, their preparedness may not be sufficient for effectively measuring student progress and tailoring instruction to meet individual needs. A moderately ready classification suggests that pre-service teachers are aware of the significance of assessment in promoting student growth but may lack the in-depth knowledge and skills necessary to implement varied and adaptive assessment strategies in diverse classroom settings.

This implies that the moderate level of readiness in assessment and evaluation could impede pre-service teachers’ ability to accurately gauge the effectiveness of their instructional methods and understand their students’ unique learning trajectories. While these educators may recognize the importance of evaluating student performance, their limited preparedness may restrict their capacity to use assessment data to inform and adjust their teaching practices effectively. This shortfall can lead to challenges in providing personalized feedback and support, which are crucial for enhancing student engagement and achievement in APE. Consequently, the findings underscore a critical need for comprehensive training in assessment strategies that are not only aligned with the principles of APE but also responsive to the varied needs of learners with special needs. Appropriate assessment practices are essential for identifying students’ strengths and learning needs, facilitating the development of effective individualized education programs [31].

Passion and resilience: in terms of passion and resilience, the pre-service teachers attained a composite mean score of 3.24, categorizing their readiness as “moderately ready”. This score suggests that while these future educators exhibit some enthusiasm and a foundational capacity for resilience in the context

of APE, they may not yet possess the robust commitment and perseverance required to navigate the complexities and challenges of teaching in inclusive environments. A moderately ready classification indicates that pre-service teachers recognize the value of passion and resilience as essential attributes for effective teaching but may lack the experiences and strategies to cultivate these qualities consistently in their practice.

This implies that the moderate level of readiness in passion and resilience reflects a potential barrier to sustaining motivation and overcoming obstacles that may arise in APE settings. Although these educators may show an initial willingness to engage with diverse student populations, their limited resilience could impact their ability to remain committed during challenging situations, such as managing behavioral issues or addressing the unique needs of students with special needs. This shortfall may hinder their overall effectiveness and adaptability as teachers, ultimately affecting the learning experiences of their students. Passionate educators are more likely to create engaging learning environments and advocate for their students, fostering an inclusive atmosphere that encourages participation [32].

4.1. Interrelationship of the pre-service teachers' readiness to implement APE

Table 1 shows the interrelationships among the various dimensions of pre-service teachers' readiness to implement APE. The data indicate that all areas exhibit significant correlations with one another, suggesting a complex interplay between different competencies necessary for effective teaching in inclusive settings. These relationships highlight the holistic nature of readiness in APE, emphasizing that strengths in one domain can enhance performance in another.

The strong correlation observed between safety awareness and assessment and evaluation (0.769**) underscores the critical importance of creating a secure learning environment as a foundation for effective assessment practices. Educators who are well-versed in safety protocols are likely to be more adept at developing appropriate evaluation strategies that consider the diverse needs of students with special needs. This finding suggests that fostering a comprehensive understanding of safety may directly influence educators' capabilities in implementing assessment methods that support student growth and learning. Additionally, the significant relationship between empathy and patience and assessment and evaluation (0.810**) indicates that pre-service teachers who demonstrate greater emotional intelligence are better equipped to assess and respond to their students' unique learning needs. This correlation implies that empathy and patience not only contribute to a supportive learning atmosphere but also enhance educators' ability to tailor their assessments effectively, thus ensuring that all students receive the attention and resources they require to succeed.

Moreover, the relationships between adaptability and flexibility and empathy and patience (0.689**) further reinforce the idea that successful teaching in APE requires a multifaceted skill set. Pre-service teachers who can adapt their instructional strategies to accommodate diverse learning styles are likely to show greater empathy and patience, fostering an inclusive environment where all students feel valued and understood. This dynamic illustrates how adaptability can serve as a catalyst for developing deeper interpersonal connections with students, ultimately benefiting their educational experiences.

The correlations between communication and collaboration and empathy and patience (0.717**) highlight the necessity of effective communication skills in building empathetic relationships within the classroom. Pre-service teachers who excel in collaborating with colleagues, students, and parents may find it easier to cultivate a classroom culture that prioritizes understanding and support. This relationship emphasizes the importance of integrating communication strategies into teacher preparation programs to enhance the overall readiness of future educators.

In summary, the interrelationships depicted in Table 1 illustrate the interconnectedness of the various dimensions of pre-service teachers' readiness to implement APE. The significant correlations suggest that enhancing competencies in one area can lead to improvements in others, highlighting the need for a comprehensive approach in teacher training. By recognizing and nurturing these interconnections, educator preparation programs can better equip future teachers with the skills and knowledge necessary to create inclusive, supportive, and effective learning environments for all students in APE.

The interrelationships among the dimensions of pre-service teachers' readiness to implement APE underscore the necessity of a holistic approach in teacher preparation programs. Research indicates that various competencies in education do not operate in isolation; rather, they are interconnected and mutually reinforcing [33]. For instance, the correlation between empathy and patience and assessment and evaluation highlights how an educator's emotional intelligence can enhance their capacity to tailor assessments to meet diverse student needs. This relationship aligns with findings from Bittner *et al.* [34], who emphasize that teachers who possess strong interpersonal skills are better equipped to create supportive learning environments, ultimately improving student engagement and outcomes in APE settings.

Furthermore, the interrelationships among pre-service teachers' readiness dimensions for implementing APE have significant implications for practice and policy in educator preparation programs. Teacher training curricula should emphasize the development of an integrated skill set that fosters

competencies such as empathy, adaptability, communication, and safety awareness. By focusing on these interconnected areas, teacher education programs can cultivate a more holistic approach to training future educators. This not only prepares them to meet the diverse needs of students in APE settings but also enhances their overall effectiveness in promoting inclusive practices [35]. Despite the insights provided by this study, several limitations warrant consideration. The reliance on self-reported measures may introduce bias, as participants might overstate their competencies in certain areas. Longitudinal studies could also be beneficial in assessing the development of these competencies over time, as well as their impact on actual teaching practices in mainstream classrooms.

5. CONCLUSION

The assessment of pre-service teachers' readiness to implement APE in mainstream classrooms reveals a critical juncture for teacher preparation programs. As future educators prepare to enter increasingly diverse educational environments, the need for comprehensive training that encompasses all dimensions of APE becomes paramount. This study underscores the importance of equipping pre-service teachers with not only foundational knowledge but also practical skills that foster adaptability, empathy, and effective communication. The findings highlight the urgency of enhancing teacher training curricula to address the complexities of inclusive education, thereby ensuring that all students, regardless of their abilities, receive equitable opportunities for participation and success in PE.

Furthermore, the examination of the interrelationship among various dimensions of readiness emphasizes that teacher preparedness is a multifaceted construct. The significant correlations identified among competencies such as knowledge and understanding, adaptability and flexibility, and empathy and patience suggest that strengthening one area can positively influence others, thereby creating a synergistic effect in overall teaching effectiveness. This interconnectedness implies that a holistic approach to teacher training, which fosters the development of a comprehensive skill set, is essential for addressing the challenges of APE implementation. By recognizing and cultivating these interrelationships, educators and policymakers can work collaboratively to create a more inclusive educational landscape, ultimately enhancing the quality of PE for all students in mainstream classrooms.

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AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Ronel S. Peromingan	✓	✓	✓	✓	✓	✓		✓	✓	✓			✓	
Ruben L. Tagare, Jr.	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓		
Ma. Flor Jessamine M. Andajao	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	
Dexter T. Paclibar	✓		✓		✓	✓		✓		✓				
Mary Ann A. Salazar	✓		✓		✓	✓	✓	✓		✓		✓		
Elmer M. Labad	✓	✓		✓	✓	✓		✓		✓			✓	
Emie S. Misil	✓	✓		✓	✓	✓		✓		✓			✓	

C : **C**onceptualization

M : **M**ethodology

So : **S**oftware

Va : **V**alidation

Fo : **F**ormal analysis

I : **I**nterpretation

R : **R**esources

D : **D**ata Curation

O : **O**riginal Draft

E : **E**diting

Vi : **V**isualization

Su : **S**upervision

P : **P**roject administration

Fu : **F**unding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

ETHICAL APPROVAL

The research related to human use has been complied with all the relevant national regulations and institutional policies in accordance with the tenets of the Helsinki Declaration and has been approved by the authors' institutional review board or equivalent committee.

DATA AVAILABILITY

The authors confirm that the data supporting the findings of this study are available within the article.

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BIOGRAPHIES OF AUTHORS



Ronel S. Peromingan    is an assistant professor I at Zamboanga Peninsula Polytechnic State University, with 4 years of dedicated service in the areas of physical education, sports, adapted physical education, and major PE courses. Known for his expertise in creating inclusive and engaging learning environments, he is committed to promoting physical fitness and sportsmanship among his students. He employs a dynamic approach to teaching, aiming to make physical education accessible and enjoyable for all learners. His passion for adapted PE reflects his dedication to ensuring every student can thrive in a supportive and active setting. He can be contacted at email: ronelperomingan@zpps.edu.ph.



Ruben L. Tagare, Jr.    serves as an associate professor IV at the University of Southern Mindanao (USM) in Kabacan, Cotabato, Philippines. He earned his bachelor of PE from USM in 2016 and completed his master of arts in education, majoring in PE from the University of San Carlos in 2020. Currently, he is a candidate for the doctor of Philosophy in Education with a specialization in PE and Sports at Adamson University-Manila. He is dedicated to teaching, community service, and research, focusing on PE, sports pedagogy, curriculum, and assessment, particularly in qualitative research design. He was a recipient of 2 international student exchange programs and contributed to several published articles in Scopus and Web of Science. He also actively presents his research outputs in various international research forums. He can be contacted at email: tagareruben@usm.edu.ph.



Ma. Flor Jessamine M. Andajao    is a dedicated faculty member at the College of Physical Education and Sports at Zamboanga Peninsula Polytechnic State University in Zamboanga City, Philippines, with 13 years of experience in the fields of sports and dance. Known for her expertise, she combines a rigorous approach to fitness with a passion for artistic expression, inspiring students to cultivate both athletic and creative skills. Her teaching emphasizes the importance of discipline, teamwork, and the joy of movement, whether in a competitive sports environment or through the art of dance. Her commitment to student growth extends beyond the classroom, where she actively mentors students to excel in physical education. Through her work, she plays a crucial role in fostering a love for fitness and performance arts. She can be contacted at email: jessamineandajao10@gmail.com.



Dexter T. Paclibar    is a dedicated faculty member at the College of Physical Education and Sports at Zamboanga Peninsula Polytechnic State University in Zamboanga City, Philippines, with 8 years of service. His expertise in physical education and sports allows him to deliver a well-rounded educational experience that emphasizes both physical fitness and personal growth. His teaching focuses on the development of sportsmanship, discipline, and teamwork, qualities he believes are essential for success in both athletics and life. Known for his supportive and motivating approach, he encourages students to challenge themselves, set fitness goals, and cultivate a love for an active lifestyle. His commitment to student achievement extends beyond the classroom, where he actively mentors future leaders in physical education. His contributions have made him a respected figure among his peers and students. He can be contacted at email: dexterpaclibar1014@gmail.com.



Mary Ann A. Salazar    is an instructor I at Zamboanga Peninsula Polytechnic State University, with over a decade of experience as a visiting lecturer and now a permanent faculty member for the past year. Specializing in coaching, particularly in track and field, as well as strength and conditioning, she is dedicated to developing athletic skills and promoting physical fitness among her students. Her extensive background in coaching allows her to deliver effective training programs and foster a supportive environment for aspiring athletes. She can be contacted at email: salazarmaryann656@gmail.com.



Elmer M. Labad    is a highly experienced educator at Western Mindanao State University, with 28 years dedicated to sports and recreation and gender and development. His deep expertise has made him a respected leader in fostering inclusive practices and promoting gender awareness in physical education and recreation. His approach emphasizes the integration of gender-sensitive strategies in sports, ensuring that all students have equitable access to opportunities in physical fitness and recreational activities. With nearly 3 decades of service, he is committed to guiding students toward a balanced, inclusive approach to wellness and sportsmanship. His work not only advances student success but also contributes to a broader understanding of gender dynamics within the context of sports and education. He is widely recognized for his impact in both fields. He can be contacted at email: labadelmer19@gmail.com.



Emie S. Misil    is an accomplished educator at Zamboanga Peninsula Polytechnic State University, bringing 11 years of experience in the fields of arts and research. She is dedicated to fostering creativity and critical thinking among her students, emphasizing the importance of artistic expression and scholarly inquiry. Her expertise allows her to blend artistic disciplines with rigorous research methods, providing students with a well-rounded educational experience. Known for her innovative approach, she encourages students to explore, experiment, and deepen their understanding of both art and research practices. Her commitment to student growth and academic excellence has made her a valued mentor within the university. She continues to contribute to the development of her students' skills in both the creative and analytical aspects of their education. She can be contacted at email: esmisil@zpps.edu.ph.