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Realising inclusive physical education: barriers and strategies for including students with disabilities

Abstract

Inclusive physical education still faces challenges in practice in regular schools. This study aimed to identify the main barriers and effective strategies in its implementation. Researchers selected a total of 245 physical education teachers from various school levels in Pekanbaru, Indonesia, using purposive satar ling based on their experience teaching students with disabilities. Validated for the Indonesian setting, the PEATID III (Physical Educators' Attitudes Towards Teaching Individuals with Disabilities III) questionnaire was used for data collecting with great dependability ($\alpha = 0.88$). According to results, 68% of teachers reported exclusive attitudes from non-disabled students, 59% had never attended inclusion training, and 68% encountered limits of disability-unfriendly facilities. Implementation of inclusive strategies—such as curriculum customisation, the use of assistive technology, and parent collaboration—strongly connected teachers' favourable opinions with This study validates the need for synergy among instructors' pedagogical preparedness, easily available infrastructure, and school and family social support to provide fair and significant physical learning. The findings of this study significantly help Indonesia's inclusive physical education policies and practices to be developed.

Keywords: Inclusive physical education; barriers; strategies; disabilities

1. Introduction

included in general education under the Individuals with Disabilities Education Act (IDEA) of 2004 (Fuller et al., 2022). Physical education tailored to fit every child's needs—including those of those with special needs—is known as personalised physical education (Kumar & Sharma, 2024). Schools nowadays have to give every student, including in physical education, equal learning possibilities (Gerdin et al., 2019; Guerrero & Puerta, 2023). IDEA mandates physical education for every kic in disabilities (Mawena & Sorkpor, 2023). Emphasising the requirement of assistance for teachers, the Americans with Disabilities Act of 1997 mandates that qualified students receive special education and relate services depending on their particular need (Fuller et al., 2022; Peranzoni et al., 2024). IDEA also requires that students with disabilities be educated with non-disabled students to the greatest extent possible and that removal to a more restrictive environment be made only when education in a mainstream setting cannot be achieved despite all support services being provided (Fuller et al., 2022).

Inclusion in physical education involves providing services to students with special needs in a regular education setting (Wilhelmsen & Sørensen, 2017), aiming to create an environment where every student feels valued and empowered to develop academically and socially (Sridevi, 2023). Inclusive education programs seek to provide equal learning opportunities for students with disabilities, allowing them to learn alongside their peers without discrimination or exclusion (Han et al., 2024; Hayun et al.,

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2024). These initiatives seek to establish a school environment that honours diversity, acknowledges individual needs, and cultivates a sense of belonging for all children, regardless of their skills or disabilities (Sridevi, 2023). Inclusion enables students with disabilities to participate in the same classroom while pursuing distinct objectives through a structured schedule of activities that guarantees equitable possibilities (Moriña et al., 2020). The inclusion process is intricate and encompasses numerous elements, particularly those impacting educators. Research on inclusion has ignified several obstacles, including inadequate training, insufficiently equipped facilities, and adverse attitudes towards students with impairments (Greguol et al., 2018; Rekaa et al., 2019). Consequently, it is essential to examine these concerns for successful inclusion.

Recent research on the obstacles and facilitators affecting impaired students' engagement in physical education has proliferated significantly. Numerous studies have shown significant problems encountered by students with disabilities, including insufficient disability-accessible facilities, inadequate teacher preparation for addressing special needs, and adverse attitudes from peers and educators (Greguol et al., 2018; Li et al., 2021). Moreover, institutional restrictions, such as inadequate policy support (Kilinc, 2022) and restricted resources, frequently obstruct the establishment of a truly inclusive learning environment (Debasu & Yitayew, 2024). Conversely, elements such as familial engagement, clusive policies, and the implementation of assistive technology have been demonstrated to facilitate the active participation of children with disabilities in physical education activities (Odeh & Lach, 2023). To comprehensively grasp the dynamics of inclusion in physical education practices across diverse school environments, a more integrative and contextualised approach is essential.

Despite these efforts, previous findings tend to be fragmented, highlighting individual, social, or structural aspects in isolation (Jansen et al., 2020; Kvalsund & Bele, 2023). This method has failed to deliver a comprehensive understanding of how these elements interact and together affect the efficacy of inclusive physical education implementation. In this setting, a thorough understanding of the interrelations among teacher preparedness, infrastructural conditions, institutional regulations, and classroom social dynamics is essential to influence the learning experiences of students with disabilities. This research adopts a comprehensive strategy that examines the correlation between teacher attitudes, the training they receive, and the support from both the school and community, as well as the effectiveness of inclusive physical education techniques. With this approach, the research is expected to produce measures that are more relevant, applicable and in line with the realities of the field.

The need to create fair and equitable learning spaces is more pressing than ever, with physical education playing an important role in shaping students' physical health, social skills and emotional fell-being. Without full access to this learning, students with disabilities risk missing out on valuable opportunities to grow and devel palongside their peers. Therefore, this study aims to (i) identify the main barriers teachers face in including students with disabilities in regular physical education; (ii) analyse the influence of teacher attitudes, inclusive training and institutional support on the implementation of inclusive ph2 ical education strategies; and (iii) explore the most effective strategies in increasing the involvement of students with disabilities in the physical learning process. Through this approach, it is hoped that research can make a significant contribution to designing physical education policies and practices that truly embrace all students.

2. Method

Participants



This study involved 245 teachers of physical education from schools in Pekanbaru, Indonesia. The selection of para pipants was based on purposive sampling to ensure that all respondents had relevant experience in teaching students with disabilities in regular physical education classes. Detailed participants' characteristics, including gender, age, school level, and experience teaching students with disabilities, are summarised in **Table 1**.

Table 1. Detailed Characteristics of Participants

	Number of	Gender	Age	Experience Teaching Students
School Level	Teachers	(M / F)	(M ± SD)	with Disabilities (> 5 years / < 5 years)
Primary School	108 (44%)	75 / 33	38.2 ± 7.5	55 (51%) / 53 (49%)
Junior High School	86 (35%)	52 / 34	39.0 ± 8.1	47 (55%) / 39 (45%)
High School	51 (21%)	36 / 15	38.7 ± 8.3	30 (59%) / 21 (41%)
Total	245 (100%)	163 / 82	38.7 ± 8.0	132 (54%) / 113 (46%)

Instrument

This research used the 'Physical Educators' Attitudes Towards Teaching Individuals with Disabilities III' (PEATID III) questionnaire, which was originally changed from Rizzo (1993) and later apdated by Sari et al. (2025) to fit the Indonesian context. The tool comprises 12 statements intended to assess physical education teachers' attitudes about the inclusion of students with disabilities.

Reliability and Validity

The reliability of the modified PEATID III instrument was evaluated using Cronbach's alpha coefficient. The outcome produced an overall dependability score of 0.88, signifying a substantial degree of internal consistency. The validation method included evaluations of content and construct validity to verify the instrument's suitability for the target demographic.

Data Collection

Data were gathered via structured questionnaires administered to participating educators. The distribution process required cooperation with school administrators to enable access and guarantee extensive involvement. Educators were informed about the study's aims and confidentiality guarantees before participating in the survey.

Data Analysis

Responses were examined utilising descriptive and inferential statistical techniques. Employing descriptive statistics such as frequencies, percentages, means, and standard deviations helped reveal the participants' demographics and the prevalence of the identified barriers. Researchers used inferential statistics, like correlation and multiple regression analyses, to explore how instructors' views related to the inclusive physical education strategies they used. We performed analyses using SPSS version 26, which facilitated thorough statistical processing and guaranteed the reliability and validity of the results.

3. Result



What are the main barriers teachers face in including students with disabilities in regular physical education lessons?

Table 2 presents descriptive statistics related to the barriers faced by teachers in including students with disabilities in regular physical education. Based on the data analysis, it was found that there are several main barriers to including students with disabilities in regular physical education learning. These barriers include a lack of accessible infrastructure, a lack of training for teachers, negative attitudes among non-disabled students, and high administrative burdens. A descriptive statistical analysis was conducted to understand how physical education teachers perceive these barriers, summarising the mean, standard deviation, and percentage of teachers who agreed with each barrier.

Table 2. Descriptive statistics of barriers in inclusive physical education

Barriers	Mean (M)	Standard Deviation (SD)	Percentage of Teachers Agreeing (%)
Lack of accessible infrastructure	3.89	0.75	68%
Lack of teacher training	3.75	0.82	59%
Negative attitudes of non-disabled students	3.55	0.78	53%
High administrative burden	3.42	0.80	47%

Based on **Table 2**, the most significant barrier is the lack of accessible infrastructure, with a md 10 value of M = 3.89, SD = 0.75, and 68% of teachers agreed that the sports facilities in their schools do not adequately support the needs of studen with disabilities. This shows that accessibility limitations are still a major challenge in implementing inclusive physical education. Unfriedly infrastructure for students with disabilities, such as fields that do not have special access paths, the absence of adapted sports equipment, and the lack of other supporting facilities, hinders students' active participation in physical education activities.

The second most common barrier perceived by teachers was the lack of inclusive training, with an M 103.75, SD = 0.82, and 59 per cent of teachers agreeing that they have not received sufficient training to teach students with special needs. This lack of training has an impact on teachers' limitations in adjusting teaching methods and adapting physical education activities to include all students. Without adequate understanding, teachers find it difficult to develop effective and inclusive learning strategies.

In addition, negative attitudes from non-disabled students are also an obstacle to inclusive physical education. With M = 3.55 and SD = 0.78, 53 percent of teachers indicated that non-disabled pupils frequently show less supportive attitudes towards their peers who have special needs. Such behaviours may manifest as disengagement from communal activities, reluctance to participate in athletic endeavours, or discriminatory actions that render students with impairments feeling unwelcome in the classroom setting. Negative views can undermine the confidence and motivation of students with disabilities to engage in physical education.

The research also revealed significant administrative burden as an obstacle to the execution of inclusive physical education. Among the instructors surveyed, 47 per percent perceived an excess of administrative tasks, which resulted in constrained time and resources to modify the curriculum or offer inclusive teaching materials; the effect was in 19 ted by M = 3.42, SD = 0.80. This administrative burden includes curriculum planning that must be adapted to the various needs of students, recording the progress of students with disabilities, and preparing reports related to inclusion.

The findings highlight that there are still challenges to overcome in ensuring truly inclusive physical education. Efforts to increase the participation of students with disabilities in regular classes need to



focus on better infrastructure, more comprehensive training for teachers, and raising awareness among non-disabled students about the importance of inclusion in physical education. In addition, more supportive education policies and reduced administrative burdens for teachers can help them focus more on creating inclusive and effective learning environments for all students.

To what extent do teachers' attitudestowards inclusive training and school support influence their implementation of inclusive physical education strategies?

Correlation Analysis

To explore the relationship between teachers' attitudes towards inclusive 11 ysical education and the strategies they implement, a Pearson correlation analysis was conducted. The results of the correlation analysis are shown in **Table 3**.

Table 3. Correlation between Teachers' Attitudes and Strategies Implemented

Variable	1	2	3	4
Teacher attitudes towards inclusion	1			
Curriculum adaptation	0.47*	1		
Use of assistive technology	0.39*	0.45*	1	
Collaboration with parents	0.42*	0.50*	0.41*	1

^{*}p < 0.05, *p < 0.01

The results of the correlation analysis showed that teachers' attitudes towards inclusion had a significant positive reptionship with curriculum adaptation strategies (r = 0.47, p < 0.05), use of assistive technology (r = 0.39, p < 0.05), and collaboration with parents (r = 0.42, p < 0.05). This finding suggests that the more positive teachers' attitudes towards inclusion, the more likely they are to implement various strategies to support disabled students' participation in regular physical education learning.

Multiple Regression Analysis

A multiple regression analysis was conducted to examine how different factors, such as teacher attitudes, inclusive training, and school support, influence the implementation of inclusive physical education strategies.

Table 4. Results of Multiple Regression Analysis

Predictor Variables	В	SE	β	t	p
Teacher attitudes	0.35	0.08	0.42	4.37	0.001
Inclusive training	0.28	0.07	0.39	3.92	0.002
School support	0.23	0.06	0.34	3.67	0.004
$R^2 = 0.48$, F (3, 241) = 12.57, p < 0.001					

The results of the regression analysis indicated that all three predictor variables (teacher attitudes, inclusive training and school 12 upport) significantly influenced the implementation of inclusive physical education strategies ($R^2 = 0.48$), meaning the model was able to explain 48% of the variability in the strategies implemented by teachers.

What strategies are most effective in increasing disabled students' participation in regular physical education learning?



Curriculum Adaptation is the Main Strategy

The results of the analysis show that curriculum adaptation is the strates most widely implemented by teachers and has a significant impact on increasing the participation of students with disabilities in physical education.

Table 5. Effectiveness of Curriculum Adaptation Strategies

Adaptation Strategies	Mean (M)	Standard Deviation (SD)	Percentage of Teachers Using (%)
Modification of game rules	4.12	0.71	72%
Use of adaptive sports aids	3.98	0.75	68%
Simplification of movement instructions	3.85	0.79	64%
Adjustment of exercise intensity	3.77	0.83	61%

Table 5 shows that game rule modifications were the most effective form of adaptation (M = 4.12, SD = 0.71) and were used by 72% of teachers. These modification and include changes in field size and game duration, as well as more flexible competition rules to allow students with disabilities to actively participate. In addition, the use of adaptive sports aids such as sounding balls for blind students or sports wheelchairs for students with mobility limitations was also an effective strategy (M = 3.98, SD = 0.79) with 68% of teachers implementing it. Adjusting movement instructions (M = 3.85, SD = 0.79) and adjusting exercise intensity (M = 3.77, SD = 0.83) also helped to increase student engagement, especially for those with physical limitations or motor coordination disorders.

Use of Assistive Technology in Physical Education

In addition to curriculum adaptation, the use of assistive technology also proved to be an effective strategy in supporting the engagement of students with disabilities.

Table 6. Effectiveness of Assistive Technology in Physical Education

Types of Assistive Technology	Mean (M)	Standard Deviation (SD)	Percentage of Teachers Using (%)
Inclusive sports tutorial videos	3.95	0.78	65%
Interactive exercise apps	3.88	0.80	61%
Motion sensors and wearables	3.73	0.85	57%

Video tutorials featuring inclusive sport techniques were the most used technology by teachers (M = 3.95, SD = 0.78), with 65% of teachers reporting their use. These videos assist students in comprehending sports movements visually and provide guidance that is easier to understand. Meanwhile, interactive training apps (M = 3.88, SD = 0.80) that allow students to learn and practise independently are also widely utilised by teachers (61%). Some schools have started to adopt motion sensors and wearable devices such as smartwatches that can monitor students' physical activity, although the level of use is still lower than other strategies (M = 3.73, SD = 0.85, 57% of teachers).

Collaboration with Parents to Support Student Participation

Another strategy that has proven effective in increasing the participation of students with disabilities is collaboration with parents, which allows for ongoing support at home and school.

Table 7. Effectiveness of Collaboration with Parents



Forms of Collaboration	Mean (M)	Standard Deviation (SD)	Percentage of Teachers Using (%)
Regular communication between teachers and parents	4.02	0.76	70%
Involving parents in school activities	3.90	0.79	66%
Providing physical activity guidance at home	3.84	0.81	63%

Regular communication between teachers and parents was the most effective form of collaboration (M = 4.02, SD = 0.76), with 70% of teachers reporting that they actively discuss with parents the needs and development of students. This communication ensures that students receive consistent support both at school and at home. In addition, involving parents in school activities (M = 3.90, SD = 0.79) and providing guidance on physical activities that can be done at home (M = 3.84, SD = 0.81) also had a positive impact on the engagement of students with disabilities in physical education.

4. Discussion

This study aimed to identify challenges and strategies in the implementation of inclusive physical education in regular schools. The results of this study revealed that the implementation of inclusive physical education in regular schools still faces major challenges, especially in the aspects of infrastructure that is not disability-friendly, lack of teacher training, exclusive attitudes of non-disabled stu@nts, and high administrative burden. Sixty-eight percent of teachers indicated that sports facilities fail to accommodate the needs of students with disabilities, corroborating the findings of Mawena and Sorkpor (2025) and Kombe et al. (2024), who asserted that insufficient facilities, such as sports fields, present substantial obstacles to learning and participation for students with physical disabilities. Furthermore, 59% of educators had not participated in inclusion training, suggesting adverse attitudes and diminished self-efficacy (Haegele et al., 2018; Hutzler et al., 2019). Negative peer views, noted by 53% of educators, constitute an impediment to the social engagement of students with disabilities, corroborating the conclusions of Delgado-Gil et al. (2023). Significant administrative overhead impedes flexibility in adaptive lesson preparation, a situation further aggravated by the reduced time available for teaching physical education (Alves et al., 2017). These findings underscore the necessity for systemic transformation via teacher capacity enhancement, provision of accessible facilities, and the establishment of an inclusive school climate.

The association analysis in this study revealed that instructors' favourable attitudes towards inclusion were strongly associated with the execution of effective inclusive measures, such as curriculum modification, utilisation of assistive technology, and engagement with parents. This substantiates Sari et al. (2022) that educator attitudes are a fundamental basis for building a successful, inclusive physical education curriculum. Prior research by Frumos (2018) and Gkouvousi et al. (2024) has shown that educators with elevated self-efficacy and favourable views towards students with impairments are more inclined to consistently apply inclusive pedagogical methods. Furthermore, a successful technique involved curriculum customisation, particularly by altering game rules. Seventy-two percent of teachers indicated that this method was effective in enhancing the participation of students with disabilities. Adaptation tactics, such as the simplification of rules, reduction of game duration, and reorganisation of team structures, exemplify effective strategies that can be employed with flexibility (Block, 2016). This finding aligns with the research conducted by Holland and Haegele (2021), which highlighted that alterations in physical activity can enhance the confidence, motivation, and social interactions of students with impairments. This method enhances engagement and facilitates significant participation within an equitable and inclusive physical education environment.

Moreover, the incorporation of assistive technology—such as inclusive video tutorials and interactive training applications—has demonstrated an enhancement in the engagement of students with impairments. This study aligns with McNicholl et al. (2021), who demonstrated that accessible and



tailored visual-based learning positively influences student engagement. From an educational standpoint, the application of this technology enables educators to administer inclusive classrooms more effectively and deliver differentiated instruction (Johler & Krumsvik, 2024; Kurniasandi et al., 2023; Montgomery, 2022). Furthermore, continuous communication between educators and parents is essential for facilitating effective inclusion. Effective communication between the two parties facilitates ongoing monitoring of pupil progress and guarantees uniform support across home and school settings. Willis et al. (2019) and Yao et al. (2016) discovered that active parental engagement markedly enhanced students' motivation and persistence in physical exercise participation. Haines et al. (2015) further underscore that robust collaborations among educators, families, and the broader school community constitute a crucial basis for establishing effective inclusive education practices. These findings confirm that successful inclusive physical education depends not just on how teachers feel, but also on additional support systems and relationships that help all students participate meaningfully.

The research demonstrates that the efficacy of inclusive physical education is significantly dependent on the interplay of accessible infrastructure, educators' pedagogical preparedness, social support within the school context, and strong cooperation with parents. This collaborative approach is essential for establishing equitable, safe, and engaging learning environments for all kids, including those with special needs. When these factors are linked, children with disabilities have enhanced opportunity to actively engage, cultivate confidence, and develop social skills through participation in inclusive physical activities. A low sample size and a specific educational context constrained this study, requiring cautious generalisation of the results. Future research ought to encompass a broader and more diversified sample regarding geography, social background, and disability categories to achieve a more thorough understanding of the obstacles and opportunities associated with implementing inclusive physical education. Moreover, it is essential to investigate psychological issues such as motivation, self-confidence, and views of physical exercise among students with disabilities, as these elements can profoundly affect their levels of engagement. We need to conduct long-term studies to assess how well inclusive programs work over time, including teacher training, assistive technology, and school policies. Consequently, inclusive physical education can transition from a theoretical discourse to a sustained, transforming practice that benefits all learners.

5. Conclusion and Recommendation

This study confirms that including all students in physical education classes at regular schools still faces major challenges, such as lack of accessible facilities, inadequate teacher training, negative attitudes from non-disabled students, and issues with school management. The results indicate that educators' favourable dispositions towards inclusion, sufficient training, and institutional backing substantially enhance the execution of inclusive tactics. The most efficacious measures for enhancing the engagement of impaired students included curriculum modification, the implementation of assistive technology, and proactive communication with parents. Therefore, policies are needed that support the strengthening of teachers' capacity through continuous inclusive training, the provision 6 disability-friendly facilities, and the creation of an inclusive school culture so that every student has an equal opportunity to participate in physical education learnin 27 his research contributes to getting a better grasp of the challenges and implementation strategies of inclusive physical education in regular schools and offers applicable recommendations for the development of more inclusive physical education policies. This researd can serve as a basis for policymakers, educators, and practitioners to strengthen the implementation of inclusive physical education in Indonesia, with a focus on improving the quality of teacher training, creating more accessible facilities, and establishing an inclusive culture in schools.

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