Evaluation of Primary School Physical Education Teaching and Learning Process for Learners with Intellectual Disability in Malaysia

Ding Lei[1,*], Adenan Ayob[1], Mohd Rain Shaari[2] & Hendri Pratama[3]

[1]Faculty of Social Sciences and Liberal Arts, UCSI University, Kuala Lumpur, Malaysia

[2]Faculty of Languages and Communication, Sultan Idris Education University, Tanjong Malim, Perak, Malaysia

[3]Faculty of Technical and Vocational Education, Sultan Idris Education University, Tanjong Malim, Perak, Malaysia

*Correspondence: Faculty of Social Sciences and Liberal Arts, UCSI University, Kuala Lumpur, Malaysia. Tel: 60-12-301-6998. E-mail: 1002l64l80@ucsiuniversity.edu.my

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Abstract

Physical education (PE) plays a crucial role in fostering the physical, cognitive, and social development of students, including those with intellectual disabilities (ID). In Malaysia, the effectiveness of PE programs for learners with ID remains a concern due to systemic challenges such as inadequate resources, insufficient teacher training, and curriculum gaps. This study evaluates the efficiency of PE programs in Malaysian primary schools for students with ID using Kirkpatrick's evaluation model. A quantitative research approach with a descriptive survey design was employed to assess the teaching and learning process. The study involved 395 respondents, including teachers, administrators, and parents from 15 selected special needs public primary schools. A structured questionnaire assessed teacher competencies, resource availability, and program efficiency. Descriptive and inferential statistical analyses, including Pearson correlation, were conducted to evaluate the relationships between teacher-centered and learner-centered approaches and PE efficiency. Findings indicate that while current PE programs moderately benefit students with ID, significant gaps remain in accessibility, resource availability, and teaching effectiveness. Need-supportive teaching approaches—comprising teacher competence, autonomy, relatedness, and motivation—exhibited strong correlations with PE efficiency ($r = .920$, $p < .001$). The study also found that learner-centered approaches, particularly resource availability, had a higher impact on PE efficiency ($r = .949$, $p < .001$) than teacher-centered approaches. The study underscores the need for reforms in PE programs to enhance inclusivity and effectiveness. Strengthening teacher training, improving resource allocation, and adopting a balanced approach between teacher- and learner-centered strategies are crucial for optimizing PE outcomes. These findings provide valuable insights for policymakers and educators aiming to develop a more inclusive and effective PE curriculum for learners with ID.

Keywords: intellectual disability, physical education, need-supportive teaching, resource availability, teaching efficiency

1. Introduction

Physical education (PE) is an essential component of holistic education, contributing to physical, cognitive, emotional, and social development. In Malaysia, the primary school PE curriculum plays a critical role in fostering inclusivity and well-being for students, including those with intellectual disabilities (Sharma et al., 2020; Perdima et al., 2022). The teaching methods educators use significantly influence how students learn, with need-supportive teaching gaining attention for its focus on meeting students' basic emotional needs for competence, autonomy, and relatedness. This approach is particularly valuable for students with disabilities, as it helps address their unique challenges by providing structure, autonomy support, and engagement (Behzadnia et al., 2022). Rooted in self-determination theory (SDT), need-supportive teaching aims to create a motivating and inclusive learning environment. For students with impairments, this method emphasizes clear instructions, self-management opportunities, and meaningful peer interactions, fostering a sense of accomplishment and belonging. Teachers' active involvement and support for student autonomy are key to enhancing motivation and educational success. By making thoughtful modifications to traditional teaching strategies, educators can create a supportive environment that helps

students with disabilities thrive academically and emotionally (Ratcliffe et al., 2019; Vansteenkiste et al., 2020).

However, these students face challenges such as limited access to tailored programs, inadequate facilities, and a lack of specialized teacher training, which hinder their participation and development. Recent studies highlight the importance of sustainable theory, emphasizing long-term viability, equity, and the balance of economic, social, and environmental factors (Quennerstedt, 2019; Cascone et al., 2020; Djabbarova et al., 2020; Shaffeei et al., 2025). Nevertheless, there is a noticeable gap between sustainable theory and its application in the context of physical education for learners with intellectual impairments in Malaysia. This gap raises concerns about how physical education programs in Malaysia contribute not only to immediate educational outcomes but also to the future health and participation of these learners (Zaharrudin et al., 2018). While previous research has focused on educational achievements (Garrels & Palmers, 2020; Bruefach & Reynolds, 2022; Casali et al., 2024), this study explores how these programs align with sustainable principles, considering holistic development, social integration, and future opportunities for learners with disabilities). Kirkpatrick's evaluation model, a widely recognized framework, assesses the effectiveness of training and educational programs across four levels: reaction, learning, behaviour, and results. These levels assess engagement, knowledge acquisition, behavioural changes, and the long-term impact of the programs (Kamalikhah et al., 2017; Louw et al., 2020). The study applies Kirkpatrick's model to evaluate the impact of physical education programs on learners with intellectual disabilities in Malaysia, examining both the effectiveness of the programs and the resources available for their successful implementation.

Despite Malaysia's commitment to inclusive education, the implementation of effective PE programs for learners with intellectual disabilities remains a significant challenge. Intellectual disabilities, affecting 1.7% of Malaysia's population, often involve limitations in cognitive functioning, adaptive behavior, and motor skills (Özkan & Kale, 2023). These challenges demand tailored approaches to ensure equitable access to education. While PE offers benefits beyond physical health, including improved self-esteem, social integration, and mental well-being, systemic issues such as resource limitations, insufficient teacher preparation, and curriculum gaps undermine its effectiveness (Ahmad et al., 2017; Mohamed et al., 2024). The growing prevalence of disabilities among Malaysian schoolchildren further highlights the urgent need for targeted interventions. Physical education (PE) in Malaysia faces critical challenges, particularly in accommodating learners with intellectual disabilities (ID). Despite its recognized importance in fostering physical, cognitive, and social development, PE programs often fail to meet the diverse needs of students due to systemic inefficiencies. Key issues include a lack of tailored pedagogical strategies, insufficient teacher training, inadequate facilities, and limited resources. These gaps hinder the delivery of inclusive, high-quality PE and undermine the objectives of Malaysia's inclusive education policies. Research indicates that many PE teachers lack specialized qualifications, with only 28.1% holding relevant degrees. Additionally, teachers report challenges in classroom management, access to assessment tools, and inadequate equipment, further exacerbating the problem (Abi Nader et al., 2018). PE is frequently marginalized within school curricula, leading to insufficient time allocation and poor integration into broader educational goals. These limitations negatively impact students' physical, social, and intellectual development, with learners with ID facing the greatest barriers.

Efforts to align PE practices with national policies are hampered by the absence of a robust policy framework and clear implementation strategies. Misalignment between policy goals and practical execution results in suboptimal learning outcomes for students with disabilities. Teachers often struggle with heavy workloads, insufficient training to address diverse needs, and a lack of support for inclusive practices, further diminishing the effectiveness of PE programs (Hamzah et al., 2022). Urgent reforms are needed to address these disparities and promote equitable access to quality education. Enhancing teacher training, improving facilities, and developing tailored curricula can ensure that PE programs align with the needs of students with ID. A comprehensive evaluation and restructuring of current PE practices are critical to achieving Malaysia's vision of inclusive education and fostering the holistic development of all learners. In line with these efforts, this research was conducted to answer the research questions, namely:

1) RQ1: What is the extent of current physical education efficiency in primary school physical education teaching and learning process for learners with intellectual disability in Malaysia?
2) RQ2: What is the relationship between need-supportive teaching approach such as teacher competence, autonomy, relatedness, motivation and efficiency of physical education?
3) RQ3: What is the impact of teacher-centered on availability of needed resources such as physical education program objectives, physical education materials and relevant content, facilitator knowledge on efficiency of physical education?

4) RQ4: What is the impact of learner-centered on availability of needed resources such as physical education program objectives, physical education materials and relevant content, facilitator knowledge on efficiency of physical education?

Furthermore, based on the research question, this study aims to 1) determine the efficiency of current physical education in primary school physical education teaching and learning process for learners with intellectual disability in Malaysia; 2) To examine the relationship between the need-supportive teaching approach such as teacher competence, autonomy, relatedness, motivation and efficiency of physical education; 3) investigate the impact of teacher-centered on availability of needed resources such as physical education program objectives, physical education materials and relevant content, facilitator knowledge on efficiency of physical education; and 4) investigate the impact of learner-centered on availability of needed resources such as physical education program objectives, physical education materials and relevant content, facilitator knowledge on efficiency of physical education.

2. Method

This study adopts a quantitative research approach rooted in the positivism philosophy, which emphasizes the collection and analysis of factual knowledge through observation and measurement (Creswell & Creswell, 2017). It aims to evaluate and improve the teaching and learning processes of primary school physical education (PE) for learners with intellectual disabilities in Malaysia. By focusing on measurable data, the research ensures objectivity in data collection and interpretation, ultimately contributing to developing an inclusive and effective PE framework. It utilizes a descriptive survey design to gather detailed data from a diverse sample of participants, including students, teachers, principals, and administrators in selected Malaysian primary schools. Surveys were chosen for their ability to efficiently collect large volumes of data across multiple locations, offering insights into the efficiency, challenges, and effectiveness of current PE programs. The questionnaire, as the primary data collection tool, is structured in three parts: demographic information, evaluation of teacher competencies (autonomy, relatedness, and motivation based on a need-supportive teaching approach), and program assessments (objectives, materials, content relevance, and outcomes based on Kirkpatrick's evaluation model).

This study employs a carefully designed sampling approach to evaluate the efficiency and challenges of physical education (PE) programs for learners with intellectual disabilities in Malaysia. A diverse and representative sample, including students, PE teachers, parents, school administrators, policymakers, and advocates, ensures a comprehensive understanding of the educational ecosystem. Participants from various regions and schools reflect the geographical, cultural, and infrastructural diversity of Malaysia, capturing a holistic perspective on the PE framework that focuses on learners with intellectual disabilities enrolled in special needs schools and regular schools with special units. Teachers and administrators are central to the sample, as their insights into curriculum execution, resource allocation, and program outcomes are critical. Parents and guardians provide valuable perspectives on the broader impact of PE on students' development, while policymakers and advocates contribute expertise on aligning PE practices with national and international standards.

A stratified random sampling method, complemented by purposive sampling, ensures inclusion across urban, suburban, and rural contexts. This approach captures variations in infrastructure and access to resources, while purposive sampling identifies individuals with specific expertise or experiences, enriching the data with nuanced insights. For statistical reliability, the study follows Krejcie and Morgan's (1970) guidelines, targeting a sample size of 450 respondents, including teachers and administrators from 15 selected special needs public primary schools. This ensures the robustness of the findings while accommodating resource feasibility. Quantitative data is collected through structured questionnaires, assessing program objectives, content relevance, teaching materials, and outcomes. Teachers' competencies, autonomy, relatedness, and motivation are evaluated alongside administrators' assessments of program execution.

A pilot study was conducted in this study as a crucial initial step to ensure the effectiveness and accuracy of the study before full-scale implementation. Its primary purpose was to identify and address potential issues in data collection, refine the research instrument, and improve the overall study design. By evaluating the survey form, interview scripts, and other data collection tools, researchers could ensure clarity, relevance, and efficiency in obtaining the needed information. The structure and flow of these instruments were also assessed to facilitate smooth data collection. In addition to testing the research tools, the pilot study allowed for refining the study methodology. Researchers were able to reassess and adjust their approach to align with the research objectives, ensuring that the methods were tailored to the specific requirements of the study. This process strengthened the study framework, providing clear

direction for data collection and analysis.

Demographic variables, such as age, gender, and educational background, are analyzed using nominal scales, which categorize data into non-ordered groups. Meanwhile, variables related to program objectives, resources, content relevance, and facilitator expertise are evaluated using ordinal scales based on a 5-point Likert format. This scale ranges from 1 ("strongly disagree") to 5 ("strongly agree"), capturing the degree of agreement or satisfaction expressed by participants. To address the study questions and hypotheses, descriptive and inferential statistical analyses will be conducted using SPSS. Pearson correlation will examine relationships between variables, while descriptive metrics will summarize participant demographics. Qualitative data from interviews and open-ended survey responses will undergo thematic analysis to identify recurring patterns and insights.

3. Results

3.1 Respondents' Demographic Profile

Based on the results analysis, Table 1 shows the age distribution of the 395 respondents, providing valuable context for understanding the demographic composition of those involved in the education of learners with intellectual disabilities. The largest age group is 30-39 years, comprising 237 respondents (60%), followed by the 40-49 age group with 103 respondents (26.08%). A smaller proportion, 48 respondents (12.15%), fall within the 20-29 age range, while only 7 respondents (1.77%) are above 50. This distribution indicates that most participants are in their prime working years, suggesting substantial professional experience among educators, administrators, and parents. Their experience will likely influence teaching effectiveness, problem-solving approaches, and the ability to support learners with intellectual disabilities. The presence of younger participants reflects a modest influx of new professionals and parents into the education system, contributing to a mix of traditional and modern perspectives in physical education practices. The age composition aligns with the study's inclusion of parents, most of whom naturally fall within the 30-49 age group.

Table 1. Age Group Distribution Overview

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20 - 29	48	12.15	12.15	12.15
	30 -39	237	60.00	60.00	72.15
	40 - 49	103	26.08	26.08	98.23
	Above 50	7	1.77	1.77	100.0
	Total	395	100.0	100.0	

The demographic distribution of respondents is nearly balanced as shows in Table 2, with 192 male participants (48.6%) and 203 female participants (51.4%), totalling 395 respondents. This representation ensures diverse perspectives, reflecting the collaborative nature of education among teachers, administrators, and parents. The inclusion of various stakeholders, particularly parents, broadens the scope of the study by incorporating both institutional and home-based perspectives on physical education for learners with intellectual disabilities. The balanced gender distribution enhances the analysis by accounting for differences in attitudes and experiences that may influence educational practices and outcomes. By integrating viewpoints from male and female respondents, the study provides a comprehensive understanding of the effectiveness of physical education programs. These insights contribute to developing more inclusive and supportive learning environments, reinforcing the importance of gender-sensitive approaches in education.

Table 2. Gender Distribution Overview

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	192	48.6	48.6	48.6
	Female	203	51.4	51.4	100.0
	Total	395	100.0	100.0	

Based on Table 3 shows that a small portion of respondents (6%) have 0 to 1 year of experience, representing 23 individuals who bring fresh perspectives despite limited exposure to the field. A larger group (36%), comprising 143 respondents, has 2 to 3 years of experience, suggesting a developing understanding of effective teaching strategies. Those with 4 to 5 years of experience comprise 34% of the sample (134 respondents), indicating a significant number of seasoned educators and stakeholders with established perspectives on physical education. The most experienced cohort, with over 5 years in the field, accounts for 24% of respondents (95 participants), reflecting deep practical knowledge essential for assessing long-term program effectiveness. The data visually illustrates the progression of experience levels, highlighting a well-distributed sample that captures both emerging and well-established viewpoints. This representation strengthens the study's findings by incorporating various perspectives to ensure a thorough assessment of physical education programs for learners with intellectual disabilities.

Table 3. Working Experience Distribution Overview

Working Experience					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 – 1 year	23	21.8	21.8	21.8
	2 – 3 years	143	28.1	28.1	49.9
	4 – 5 years	134	26.1	26.1	75.9
	Above 5 years	95	24.1	24.1	100.0
	Total	395	100.0	100.0	

Table 4. Reliability Statistics - Item-Total Statistics

Construct	Number of Items	Cronbach's Alpha
Competence (C)	5	.787
Autonomy (A)	4	.736
Relatedness (R)	5	.845
Motivation (M)	5	.815
Teacher Centered – Program Objective (TC_PO)	3	.767
Teacher Centered – Physic Education Materials (TC_PM)	5	.806
Teacher Centered – Facilitator Knowledge (TC_FK)	5	.723
Learner Centered – Program Objective (LC_PO)	5	.806
Learner Centered – Physic Education Materials (LC_PM)	4	.825
Learner Centered – Facilitator Knowledge (LC_FK)	2	.742
Efficiency of Physic Education (PEE)	3	.828

The reliability of the scales used to measure various constructs in physical education teaching and learning has been statistically confirmed through Cronbach's Alpha analysis. Competence, measured with five items, shows good internal consistency ($\alpha = .787$), indicating effective capture of the construct. Autonomy, assessed with four items, has an acceptable Alpha of .736, reflecting a reliable measurement of learners' independence. Relatedness, with five items, demonstrates strong internal consistency ($\alpha = .845$), confirming its validity in measuring students' sense of belonging. Motivation, another five-item scale, exhibits high reliability ($\alpha = .815$), indicating a consistent measure of learners' enthusiasm. In the teacher-centred approach, the Program Objective scale (three items) has an Alpha of .767, the Physical Education Materials scale (five items) records .806, and the Facilitator Knowledge scale (five items) shows an acceptable reliability of .723. These values confirm that the scales effectively capture program objectives, educational material effectiveness, and instructor knowledge. For the learner-centered approach, reliability remains strong. Both the Program Objective and Physical Education Materials scales exceed .8. In contrast, the Facilitator Knowledge scale (two items) maintains an acceptable Alpha of .742, reinforcing its reliability in measuring facilitator engagement and content impact. The Efficiency of Physical Education scale, with three items, has a high Alpha of .828, confirming its consistency in evaluating program effectiveness. Overall, these findings

validate the robustness of the scales in assessing physical education for learners with intellectual disabilities. While most constructs demonstrate high internal consistency, minor refinements could enhance measurement precision, particularly in scales with lower but acceptable reliability levels. Table 4 shows the reliability statistics test results.

To assess the construct validity, we utilized the Average Variance Extracted (AVE), which measures the proportion of variance captured by a construct relative to the variance due to measurement error (Tomoliyus et al., 2016; Samsudin et al., 2020). An AVE value greater than 0.5 indicates satisfactory construct validity, as it signifies that more than half of the variance in the items is explained by the construct they are intended to measure. As shown in Table 5, Competence demonstrates strong construct validity with an AVE of 0.683, suggesting that the construct effectively captures the variance. Autonomy also meets the threshold, with an AVE of 0.627, confirming that it is well-defined by its items. Similarly, Relatedness and Teacher-Centered Program Objectives exhibit solid construct validity, with AVEs of 0.642 and 0.693, respectively. Although Motivation has a lower AVE of 0.587, it still exceeds the 0.5 threshold, indicating adequate construct validity and effectively capturing the motivational aspects. Teacher-Centered Facilitator Knowledge, with an AVE of 0.582, falls slightly below the ideal threshold, suggesting potential for improvement in construct precision.

On the other hand, Learner-Centered Program Objectives and Physical Education Materials demonstrate excellent construct validity, with AVEs of 0.794 and 0.831, respectively. Learner-Centred Facilitator Knowledge also shows robust validity, with an AVE of 0.726, confirming that the construct captures a significant portion of the variance. Finally, the Efficiency of Physical Education construct, with an AVE of 0.598, indicates that a substantial portion of the variance is attributable to this construct as well. In summary, the AVE results provide strong evidence for the construct validity of the majority of the constructs in the study. Most constructs show that a significant proportion of the variance in the items can be attributed to the constructs they are designed to measure, reinforcing the reliability of the measurement model.

Table 5. Validity Rest Results

Construct	Average Variance Value (AVE)
Competence (C)	.683
Autonomy (A)	.627
Relatedness (R)	.642
Motivation (M)	.587
Teacher Centered – Program Objective (TC_PO)	.693
Teacher Centered – Physic Education Materials (TC_PM)	.727
Teacher Centered – Facilitator Knowledge (TC_FK)	.582
Learner Centered – Program Objective (LC_PO)	.794
Learner Centered – Physic Education Materials (LC_PM)	.831
Learner Centered – Facilitator Knowledge (LC_FK)	.726
Efficiency of Physic Education (PEE)	.598

3.1 RQ1: What is the Extent of Current Physical Education Efficiency in Primary School Physical Education Teaching and Learning Process for Learners with Intellectual Disability in Malaysia?

Figure 1 illustrates the perceived efficiency of physical education for learners with intellectual disabilities across three dimensions: PEE1 (positive changes in pupils), PEE2 (academic performance), and PEE3 (emotional well-being). The mean score for PEE1 is approximately 3.85, indicating that respondents agree physical education fosters noticeable positive changes in pupils, though there is room for improvement as the score does not approach the upper limit. PEE2, which evaluates the impact of physical education on academic performance, shows a slightly higher mean score of 3.86. This reflects a stronger agreement that physical education positively influences the academic success of these learners, suggesting a potential link between physical activity and cognitive performance. PEE3, representing the expression of positive feelings after physical education sessions, has a mean score of about 3.83. While this is the lowest among the three dimensions, it still indicates agreement that physical education enhances emotional well-being, contributing positively to the overall learning experience of pupils with intellectual disabilities. The scores' proximity across all dimensions highlights a consistent perception of the program's efficiency, but none reach the level of strong agreement (closer to 5). This consistency suggests that while the current

physical education programs are effective to a degree, there remains significant potential for improvement. These findings underscore the importance of enhancing the curriculum, resources, and delivery methods to maximize the benefits of physical education for learners with intellectual disabilities. They also provide a constructive basis for stakeholders to refine and amplify the positive impacts of these programs on academic, emotional, and developmental outcomes.

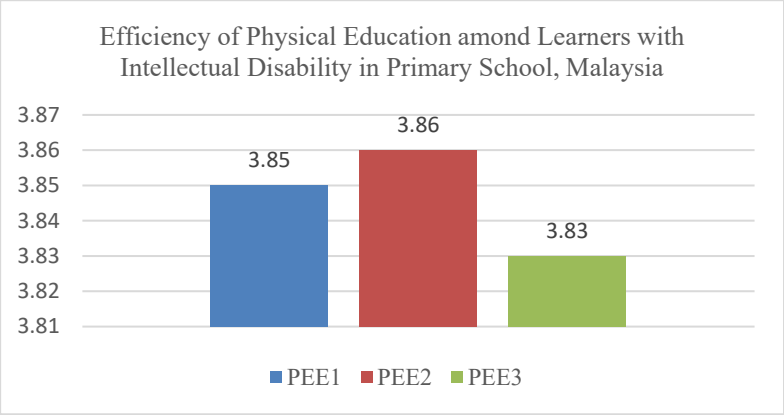

Figure 1. Histogram of Current Physical Education's Efficiency in Primary School, Malaysia (Mean Score)

3.2 RQ2: What is the Relationship Between Need-Supportive Teaching Approach Such as Teacher Competence, Autonomy, Relatedness, Motivation and Efficiency of Physical Education?

Table 6 demonstrates a strong statistical relationship between the components of a need-supportive teaching approach and the efficiency of physical education, as analyzed through Pearson Correlation coefficients. The findings reveal significant positive correlations for teacher competence, autonomy, relatedness, and motivation, highlighting their critical roles in enhancing physical education outcomes. Teacher competence shows a substantial positive correlation with efficiency ($r = .817$, $p < .001$), indicating that higher perceived competence among educators significantly improves the effectiveness of physical education. Similarly, autonomy exhibits a strong positive relationship ($r = .805$, $p < .001$), suggesting that when students experience a sense of control over their learning, the efficiency of physical education increases. Relatedness also correlates positively with efficiency ($r = .823$, $p < .001$), emphasizing the importance of fostering a sense of connection and belonging among students, teachers, and peers to enhance educational outcomes.

Table 6. Correlational Analysis of Need-Supportive Teaching Approach and Efficiency of Physical Education

Need-Supportive Teaching Approach		Efficiency of Physical Education
Competence	Pearson Correlation	.817*
	Sig. (2-tailed)	.000*
	N	395
Autonomy	Pearson Correlation	.805*
	Sig. (2-tailed)	.000*
	N	395
Relatedness	Pearson Correlation	.823*
	Sig. (2-tailed)	.000*
	N	395
Motivation	Pearson Correlation	.920*
	Sig. (2-tailed)	.000*
	N	395

Motivation displays the highest correlation with physical education efficiency ($r = .920$, $p < .001$), underscoring its critical influence. This finding highlights that both intrinsic and extrinsic motivation significantly impact students' engagement and overall perception of the program's effectiveness. These results provide compelling evidence that meeting learners' psychological needs is integral to optimizing physical education outcomes. Addressing these needs through strategies that enhance teacher competence, promote autonomy, foster relatedness, and bolster motivation can substantially improve the quality and efficiency of physical education for learners with intellectual disabilities in Malaysia. The findings underscore the importance of a need-supportive teaching approach as a foundation for developing effective and inclusive educational programs.

3.2 RQ3: What is the Impact of Teacher-Centered on Availability of Needed Resources Such as Physical Education Program Objectives, Physical Education Materials and Relevant Content, Facilitator Knowledge on Efficiency of Physical Education?

The results presented in Table 7 address Research Question 3, examining the impact of a teacher-centered approach on resource availability and its relationship with the efficiency of physical education. A moderately strong correlation is observed between teacher-centered program objectives and physical education efficiency ($r = .642$, $p < .001$), highlighting the importance of clear and well-defined goals in enhancing educational outcomes. These objectives provide structure and focus, enabling teachers to deliver more targeted and effective instruction. The correlation between educational materials and efficiency is notably strong ($r = .818$, $p < .001$), emphasizing that the quality and relevance of resources play a critical role in program effectiveness. When teachers have access to high-quality materials, their ability to engage students and achieve educational objectives improves significantly. Facilitator knowledge also demonstrates a strong positive correlation with efficiency ($r = .726$, $p < .001$), underscoring the crucial role of teacher expertise in delivering effective instruction. Competent educators who are well-versed in both subject matter and pedagogical strategies can adapt their teaching to meet diverse learner needs, thereby enhancing the overall impact of physical education programs. These findings collectively indicate that in a teacher-centered approach, the alignment of objectives, availability of quality materials, and educator expertise are key factors influencing the efficiency of physical education. Enhancing these elements can significantly improve program outcomes, particularly for learners with intellectual disabilities (Basaruddin & Mustafa, 2024). Investing in teacher training, resource development, and curriculum clarity is essential for fostering more effective and inclusive physical education environments.

Table 7. Correlational Analysis of Teacher-Centered on Availability of Needed Resources and Efficiency of Physical Education

		Efficiency of Physical Education
Teacher Centered – Program Objective	Pearson Correlation	.642*
	Sig. (2-tailed)	.000*
	N	395
Teacher Centered – Physic Education Materials	Pearson Correlation	.818*
	Sig. (2-tailed)	.000*
	N	395
Teacher Centered – Facilitator Knowledge	Pearson Correlation	.726*
	Sig. (2-tailed)	.000*
	N	395

3.3 RQ4: What is the Impact of Learner-Centered on Availability of Needed Resources Such as Physical Education Program Objectives, Physical Education Materials and Relevant Content, Facilitator Knowledge on Efficiency of Physical Education?

The data in Table 8 explore the relationship between learner-centered resources and the efficiency of physical education, addressing Research Question 4. The findings reveal strong positive correlations across all components—program objectives, physical education materials, and facilitator knowledge—underscoring their significant impact on the effectiveness of physical education. Learner-centered program objectives show a strong correlation with efficiency ($r = .794$, $p < .001$), indicating that aligning educational goals with the needs and interests of students enhances the effectiveness of physical education. Clearly defined and relevant objectives create a focused

and purposeful learning environment, leading to better engagement and outcomes. The materials used in physical education demonstrate an exceptionally strong correlation with efficiency ($r = .949$, $p < .001$), highlighting their critical role in supporting learning. When materials are tailored to the learners' developmental levels and interests, they become more engaging and effective, significantly enhancing the learning process and outcomes. Facilitator knowledge also exhibits a robust positive correlation with efficiency ($r = .920$, $p < .001$), emphasizing the importance of educators' expertise in adapting their teaching to the specific needs of students. Educators who are knowledgeable and skilled in connecting with their learners contribute substantially to the success of learner-centered educational approaches. These findings collectively reinforce the value of learner-centered approaches in physical education. Aligning objectives, materials, and facilitator knowledge with the needs of students creates a more engaging, effective, and inclusive educational experience, significantly improving the efficiency of physical education programs for learners with intellectual disabilities.

Table 8. Correlational Analysis of Learner-Centered on Availability Of Needed Resources and Efficiency of Physical Education

		Efficiency of Physical Education
Learner Centered – Program Objective	N	395
	Pearson Correlation	.794*
	Sig. (2-tailed)	.000*
Learner Centered – Physic Education Materials	N	395
	Pearson Correlation	.949*
	Sig. (2-tailed)	.000*
Learner Centered – Facilitator Knowledge	N	395
	Pearson Correlation	.920*
	Sig. (2-tailed)	.000*
	N	395

4. Discussion

4.1 The Efficiency of Current Physical Education among Learners with Intellectual Disability in Primary School in Malaysia

The study highlights a moderate positive impact of current physical education (PE) programs on learners with intellectual disabilities in Malaysian primary schools, focusing on three dimensions: observable changes in pupils, academic performance, and emotional well-being. The mean scores (3.83–3.86) indicate a satisfactory level of effectiveness but also underscore significant room for improvement to maximize the benefits of PE for these students. Existing research consistently emphasizes the value of PE in enhancing motor skills, social interactions, and cognitive functions among learners with disabilities. For instance, studies by AlNahdi et al. (2024) and Shen et al. (2024) demonstrate substantial improvements when programs are specifically tailored to the needs of students with intellectual disabilities. The current findings, though aligned with these observations, suggest that variations in program implementation, instructor expertise, and resource availability may account for differences in outcomes, pointing to opportunities for targeted interventions to elevate results.

Academic performance, as measured in this study, reinforces findings by Goenarjo et al. (2020), which link physical activities with improved cognitive functions, highlighting the role of PE in supporting better oxygenation and brain activity. With a mean score of 3.86, the potential to optimize PE curricula for greater academic impact is evident. Emotional well-being, another critical dimension, aligns with research by Rosly (2022) and Koch et al. (2020), demonstrating the positive influence of physical activity on mood and stability. However, the slightly lower mean score of 3.83 suggests a need to enhance emotionally engaging and supportive elements within PE programs. The consistency of mean scores across dimensions reflects balanced perceptions of PE's efficiency but signals a universal need for improvement. Addressing gaps through specialized teacher training, tailored curricula, and enhanced resource allocation could drive better outcomes. Incorporating continuous feedback mechanisms for refining PE

practices would further ensure alignment with the unique needs of students, potentially bringing results closer to those seen in more successful international implementations. While current PE practices are moderately effective, the findings underscore the potential for further development to enhance the physical, academic, and emotional outcomes for learners with intellectual disabilities in Malaysian primary schools.

4.2 The Relationship between Need-Supportive Teaching Approach and Efficiency of Physical Education

This study demonstrates a strong relationship between a need-supportive teaching approach and the efficiency of physical education (PE) for learners with intellectual disabilities in Malaysian primary schools. Significant correlations between teacher competence, autonomy, relatedness, and motivation highlight the essential role these factors play in improving PE outcomes. Motivation emerged as a key driver, with a remarkably high correlation ($r = .920$, $p < .001$), underscoring its central role in fostering engagement and effectiveness in PE programs. This finding aligns with Self-Determination Theory, which emphasizes intrinsic motivation as crucial for sustained participation and deeper learning. Strategies to enhance motivation, such as incorporating enjoyable activities, personal goal setting, and inclusive rewards, can significantly elevate the quality of PE experiences for these learners (Ryan & Deci, 2020).

Teacher competence ($r = .817$, $p < .001$) also plays a pivotal role, emphasizing the need for skilled educators who can adapt teaching methods to meet diverse learning needs. Competent teachers not only provide structured and supportive environments but also inspire confidence and autonomy in students. Incorporating specialized training that combines pedagogical skills with emotional intelligence is vital for fostering productive and nurturing interactions in the classroom. Autonomy-supportive teaching practices ($r = .805$, $p < .001$) encourage students to take initiative, fostering a sense of ownership in their learning journey. Providing choices within the curriculum and allowing students to set personal goals can increase engagement and commitment to physical activities. Similarly, fostering relatedness ($r = .823$, $p < .001$) by creating a sense of belonging through group activities and collaboration significantly enhances learning, particularly for students who may feel marginalized. The findings highlight the importance of integrating a need-supportive teaching approach into curriculum development and teacher training. Prioritizing teacher competence, autonomy, relatedness, and motivation can significantly improve the efficiency of PE programs, contributing to the holistic development of learners with intellectual disabilities and preparing them for lifelong learning and social integration.

4.3 The Relationship between Teacher-Centered on Availability of Needed Resources and Efficiency of Physical Education

The correlation between a teacher-centered approach and the availability of necessary resources underscores the critical factors influencing the efficiency of physical education (PE), particularly for learners with intellectual disabilities. Clear program objectives, high-quality materials, and facilitator knowledge emerge as pivotal elements in enhancing learning outcomes for this demographic. The moderately strong correlation between well-defined objectives and PE efficiency ($r = .642$, $p < .001$) highlights the importance of clarity in educational goals. Clear objectives provide a structured framework for instruction, guiding educators in delivering targeted lessons and enabling students to understand expectations, which improves performance and learning outcomes. Objectives also serve as benchmarks for assessing student progress and refining teaching methods, ensuring alignment with educational goals.

The strong correlation between the quality of teaching materials and PE efficiency ($r = .818$, $p < .001$) emphasizes the impact of engaging, well-designed resources in the learning process. High-quality materials facilitate active participation, better comprehension, and information retention, particularly in hands-on and visual learning contexts like PE. Ensuring access to such resources is vital for creating an inclusive and effective learning environment, especially for students with intellectual disabilities. Facilitator knowledge, with a significant correlation to PE efficiency ($r = .726$, $p < .001$), underscores the essential role of teacher expertise. Competent educators who are knowledgeable and skilled in adaptive pedagogy can effectively tailor lessons to diverse needs, fostering a supportive and productive learning environment. Teacher expertise directly influences the delivery and assimilation of content, making it a cornerstone of educational quality (Wong & Rashid, 2022). These findings emphasize the need for targeted investments in teacher training, resource development, and program evaluation. Professional development initiatives that focus on creating clear objectives, enhancing material quality, and building pedagogical expertise can significantly improve teaching practices. Regular evaluations of resources and methodologies ensure their continued relevance and effectiveness. By prioritizing structured teaching practices, quality resources, and teacher competence, educational institutions can substantially enhance PE outcomes, particularly for learners with intellectual disabilities. This approach supports broader goals of inclusivity and effectiveness, fostering an

educational environment where all students can thrive.

4.4 The Relationship between Learner-Centered on Availability of Needed Resources and Efficiency of Physical Education

The findings demonstrate the substantial impact of learner-centered resources on the efficiency of physical education (PE) for learners with intellectual disabilities, emphasizing the importance of tailoring educational practices to meet individual needs. The strong positive correlation between learner-centered program objectives ($r = .794$, $p < .001$) and PE efficiency highlights the necessity of aligning goals with students' interests and abilities. This alignment enhances engagement and motivation, making learning activities more meaningful and effective. The very strong correlation between learner-centered materials ($r = .949$, $p < .001$) and educational efficiency underscores the importance of providing resources that are engaging, accessible, and relevant to students' developmental levels. Thoughtfully designed materials play a crucial role in promoting active participation and improving learning outcomes, particularly in practical subjects like PE. Similarly, the strong correlation between facilitator knowledge ($r = .920$, $p < .001$) and efficiency emphasizes the critical role of educators' expertise in adapting teaching strategies to individual needs, enabling a more effective learning experience.

To enhance PE programs, schools should focus on developing objectives that are both standards-compliant and student-centered, ensuring relevance and engagement. Prioritizing the creation and acquisition of tailored materials that foster active participation is equally crucial. Professional development for educators should emphasize adaptive teaching methods, enabling teachers to assess and address diverse student needs effectively. These learner-centered approaches extend beyond academic improvement, fostering inclusion, self-esteem, and social interaction among students with intellectual disabilities. The integration of technology, such as interactive tools and virtual reality, can further personalize learning experiences, while continuous assessment ensures educational goals remain aligned with students' evolving needs (Mokmin et al., 2022). Collaboration among educators, parents, and stakeholders is vital for creating a supportive and inclusive learning environment (Swargiary, 2024). It can be concluded that, aligning educational objectives, materials, and teaching strategies with the needs of students significantly enhances the efficiency of PE programs. By embracing learner-centered approaches, schools can provide an inclusive, engaging, and effective educational experience, contributing to the overall development and well-being of learners with intellectual disabilities.

5. Conclusion

In conclusion, teacher-centred strategies provided structure, clear objectives, high-quality materials, and facilitator expertise, enhancing program efficiency. Conversely, learner-centred approaches improved engagement and motivation by tailoring resources to individual needs, creating a supportive and responsive learning environment. The research reaffirms the relevance of Self-Determination Theory, emphasizing autonomy, competence, and relatedness as critical elements in education. It offers practical insights for balancing both approaches to develop inclusive and effective PE programs that meet diverse student needs. These findings provide valuable guidance for educators, curriculum developers, and policymakers in enhancing PE quality and accessibility. Future studies are encouraged to validate these findings across different contexts and investigate their long-term impacts on learners' development. This research underscores the importance of integrating teaching strategies to foster inclusive, engaging, and effective PE environments, contributing to the holistic development and well-being of students with intellectual disabilities.

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DL were responsible for conceptualization, drafted the manuscript and Prof. AA were responsible for study design,

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