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A traditional games-based instructional model for fundamental running skills in elementary students with mild intellectual disabilities

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Abstract

Students with intellectual disabilities often face barriers in developing fundamental motor skills, especially running, because of limited adaptability and slower learning processes. Previous physical education practices in special schools remain conventional and rarely offer models tailored to these students. To address this gap, this research developed a basic running movement model based on traditional games, chosen for their simplicity, cultural relevance, and ability to foster motivation and engagement. The study applied a Research and Development (R&D) approach adapted from Borg & Gall, covering preliminary research stages, planning, expert validation, limited trials, and broader implementation. Participants involved 50 students with mild intellectual disabilities from four special schools in Jakarta. Expert validation using the Content Validity Ratio (CVR = 0.7) and reliability analysis with Cronbach's Alpha (α = 0.839) confirmed that the model was valid and reliable. Effectiveness testing through pre- and post-intervention assessments significantly improved students' running abilities ($t = 4.388$, $p < 0.05$). These results indicate that the model is feasible for classroom implementation, as it enhances motor skills, increases student motivation, and provides an inclusive learning medium. Compared to previous studies, the novelty of this research lies in systematically integrating traditional games into structured running instruction for students with intellectual disabilities. The model is also low-cost, adaptable to school facilities, and promotes enjoyment in physical activity.

Keywords: basic running model, traditional games-based learning, motor skill development, intellectual disability students.

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Authors contribution: a – Preparing concepts; b – Formulating methods; c – Conducting research; d – Processing results; e – Interpretation and conclusions; f - Editing the final version.

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INTRODUCTION

Education is a critical foundation for developing human resources, particularly in nurturing knowledge, skills, attitudes, and values that enable individuals to adapt to their environments. In the Indonesian context, inclusive education ensures that children with special needs, including those with intellectual disabilities, receive equal opportunities to learn meaningfully. According to data from the Indonesian Ministry of Education and Culture (Badan Pusat Statistik, 2023), more than 80% of special schools (SLB) still face shortages of adaptive physical education teachers, resulting in generic programs that do not accommodate students' specific motor development needs. These local findings highlight the urgent need for structured interventions that are theoretically sound and culturally and contextually relevant to Indonesia's education system. This aligns with (UNESCO, 2020), emphasising that inclusive education should be implemented through evidence-based strategies responding to local contexts. Similarly, Forlina & Chambers (2011) argue that teacher preparation and professional development are critical in ensuring that inclusive practices are effectively translated into classrooms. In the Indonesian setting, research by Ahmad & May (2018) also underlines that the lack of specialised training for teachers in special schools remains one of the significant barriers to achieving meaningful inclusion.

Children with intellectual disabilities frequently experience delays in fundamental motor development, particularly in locomotor skills such as running, walking, and jumping. Studies have shown that these difficulties hinder their independence and social participation (Astuti et al., 2024; Chen et al., 2024). These individual limitations are further compounded by institutional challenges, such as the absence of adapted teaching materials and the reliance on conventional drills in special schools (Sito, 2020). Without systematic interventions tailored to their characteristics, these students risk being excluded from active participation in educational and social activities. This concern is consistent with (Ma et al., 2024), who found that children with intellectual disabilities show significantly lower

motor competence compared to their peers, limiting opportunities for physical and social engagement. More recent evidence by Hartman et al. (2015) highlights that deficits in motor skills directly affect daily functioning and participation in leisure activities. In the Indonesian context, Wouters et al. (2019) emphasise that without adapted approaches, physical education in special schools often fails to meet the developmental needs of students with intellectual disabilities, reinforcing exclusion rather than fostering inclusion.

Several strategies have been proposed to address these challenges. Prior research has emphasised individualised approaches (Utami, 2025) and the role of enjoyable learning methods in sustaining motivation (Gallud et al., 2023; Kuznetsova et al., 2022). However, previous studies have not yet integrated structured motor training with culturally familiar methods, leaving a gap in adaptive physical education practices. This study addresses the gap by developing a traditional games-based running movement model that trains motor performance and fosters motivation and inclusivity. This is the first study to systematically integrate traditional games into a structured running model for students with intellectual disabilities in Indonesia.

Traditional games such as gobak sodor, ular naga, and kucing tikus are culturally embedded activities that naturally involve elements of running, chasing, stopping, and changing directions. Their simplicity, low cost, and adaptability to various school conditions make them particularly suitable for special schools with limited facilities. Beyond motor skills, these games encourage cooperation, enjoyment, and social interaction, aligning with findings by Irmansyah et al. (2020) and Lestari & Bahri (2024) that traditional games support physical and socio-emotional development. By embedding such culturally familiar practices into adaptive physical education, the model proposed in this study has the potential to bridge the gap between theory and classroom needs.

The practical contribution of this research is equally important. The model offers teachers a structured and validated guide to deliver adaptive

physical education more effectively. It provides a low-cost and feasible framework for schools that can be integrated into daily learning activities. At the policy level, the model may serve as a reference for the Ministry of Education in developing national standards for adaptive physical education, supporting the broader goals of inclusive education in Indonesia. Previous studies have shown the benefits of either motor drills I Gede, Suwiwa et al., 2025) or play-based approaches (Duta Putra Utama et al., 2023), but none have combined both elements systematically. Therefore, this research confirms the importance of adaptive strategies and extends prior findings by offering a comprehensive and culturally rooted solution.

In summary, this study is grounded in the real challenges faced by Indonesian special schools, where children with intellectual disabilities struggle with motor development and teachers often lack adapted resources. This research fills a critical gap by integrating traditional games into a structured running movement model. It provides academic and practical contributions to advancing inclusive and adaptive physical education.

METHOD

This study employed a Research and Development (R&D) design adapted from Borg & Gall (2003), which was modified into five systematic stages to ensure that the model was continuously refined and evaluated. The preliminary study conducted classroom observations and semi-structured interviews with teachers to identify the specific motor skill difficulties faced by students with mild intellectual disabilities. Observations focused on locomotor activities (running, walking, jumping) and teacher strategies, while interviews explored barriers in delivering adaptive physical education. The results of this stage provided the foundation for drafting the initial prototype of the model.

The draft model was designed in the planning stage, including the selection of ten traditional games that incorporated running activities. At this stage, instruments were also designed for expert validation, student

assessment, and observation. The draft model emphasised structured sequences of traditional games, each aligned with basic running components (straight running, directional changes, obstacle running, endurance running).

The expert validation stage involved four experts in physical education, athletics, traditional games, and special needs education. They evaluated the model using a questionnaire of 20 items grouped into three domains: content validity, construct validity, and practicality. Examples of indicators included: (1) The game structure reflects fundamental running skills (content), (2) The sequence of activities is logically organised and easy to follow (construct), and (3) The model can be implemented with simple equipment in a classroom setting (practicality). Each item was rated on a 5-point Likert scale (1 = very poor, 5 = very good). Feedback from experts was used to revise the model before proceeding to field trials.

The small-scale trial was conducted with 26 students from SLB Negeri 4 Jakarta. Ten games were implemented over four sessions (two days, two sessions per day, 30 minutes per session), facilitated by the researcher with assistance from the class teacher. Data collected included student engagement, safety, and instruction clarity, using observation sheets and student feedback forms.

The large-scale trial involved 30 SLB Negeri 7 Jakarta students and SLB C Budi Daya. Implementation took place over six sessions (three weeks, two sessions per week, 30–40 minutes per session). The focus was on assessing usability indicators: ease of implementation, clarity of instructions, student interest, safety, and equipment feasibility.

The effectiveness test was conducted with 20 students from SLB C Dian Grahita. Students completed a motor skill performance test consisting of: (1) running straight for 20 meters, (2) running sideways for 10 meters, (3) running through a 5-obstacle course, and (4) a 3-minute endurance run. Performance was scored based on speed, accuracy, and completion, with higher scores indicating better motor skill performance.

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Pre-tests were conducted before the six intervention sessions, and post-tests were administered after the intervention period.

Table 1. Research and development (R&D) stages

Stage	Activities	Output
Preliminary Study	Observation, teacher interviews, needs analysis	Identification of motor skill problems
Planning	Drafting model, designing instruments	Prototype of basic running model
Expert Validation	Four experts evaluate using CVR & CVI	Validity scores, revised model
Small-scale Trial	Implementation with 26 students at SLB Ne0067eri 4 Jakarta	Data on usability, engagement, and safety
Large-scale Trial	Implementation with 30 students at SLB Negeri 7 & SLB C Budi Daya	Data on feasibility, clarity, and interest
Effectiveness Test	Pre-test & post-test with 20 students at SLB C Dian Grahita	Evidence of model effectiveness

For data analysis, expert validation was analysed using content validity ratio (CVR) and content validity index (CVI). Table 1 shows the CVR results per item, with an average CVR score of 0.70, indicating strong agreement among experts. Reliability was tested using Cronbach's Alpha, yielding 0.839, confirming internal consistency across domains. Descriptive statistics summarized expert ratings, usability scores, and student engagement. Finally, a paired-sample t-test was used to compare pre-test and post-test scores, showing a statistically significant improvement ($t = 4.388$, $p < 0.05$), which confirmed the model's effectiveness.

Table 2. Expert Validation Results by Domain

Domain	Items	CVR Range	Cronbach Alpha	Interpretation
Content Validity	8	0.60 – 0.80	0.82	Valid and consistent
Construct validity	6	0.65 – 0.75	0.84	Valid and consistent
Practicality	6	0.70 – 0.85	0.85	Valid and consistent
Average	20	0.70	0.839	Valid and reliable

RESULTS

The development of the traditional games-based basic running movement model for students with intellectual disabilities underwent several stages of testing, including expert validation, reliability testing, small-scale trials, large-scale trials, and effectiveness testing. The results of each stage are presented systematically to demonstrate the model's feasibility and impact.

Expert Validation

Validation by four experts in physical education, athletics, traditional games, and special education was analysed using the Content Validity Ratio (CVR) and Content Validity Index (CVI). The average CVR score of 0.7 indicated that the items in the model were essential and suitable according to expert judgment. Meanwhile, the CVI score confirmed overall agreement among experts that the model was valid in content, construct, and practicality. This demonstrates the model has a solid foundation for implementation in learning environments.

Reliability Test

Reliability analysis using Cronbach's Alpha showed an average score of 0.839 across affective, cognitive, psychomotor, and recreational aspects. This value indicates high internal consistency, meaning the instrument used to evaluate the model was reliable. Therefore, the developed model can consistently measure the targeted aspects, confirming its feasibility for educational practice.

Small-scale Trial

The small-scale trial was conducted at SLB Negeri 4 Jakarta with 26 students. Ten selected game models were implemented to evaluate ease, clarity, interest, safety, and equipment feasibility. Results showed average usability scores above 80%, with the highest score being 95% on the indicator of student interest. These findings suggest that the model attracted students' attention and maintained safety and practicality during classroom implementation. Teachers noted that additional guidance was required when introducing new games.

Table 3. Small-scale Trial Results

Indicator	Percentage	Description
Ease	90%	Usable
Clarity	85%	Usable
Interest	95%	Highly Usable
Safety	80%	Usable with guidance
Equipment	80%	Usable

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Large-scale Trial

The large-scale trial involved 30 students at SLB Negeri 7 Jakarta and SLB C Budi Daya. Results reinforced the findings of the small-scale trial, with usability indicators showing even higher percentages, including 100% for ease and student interest. This consistency across schools indicates that the model can be generalised and applied in different learning environments. Nonetheless, teacher feedback highlighted the importance of demonstration and scaffolding, especially when introducing games requiring higher coordination.

Effectiveness Test

The effectiveness test was conducted at SLB C Dian Grahita with 20 students, comparing pre-test and post-test scores. The paired t-test analysis yielded $t = 4.388$ with $p < 0.05$, confirming a significant improvement in students' basic running skills after the intervention. The average increase of 4.9 points between pre-test and post-test demonstrated that the model effectively enhanced motor performance. These findings provide strong evidence that integrating traditional games into structured running activities can significantly improve the physical abilities of students with intellectual disabilities.

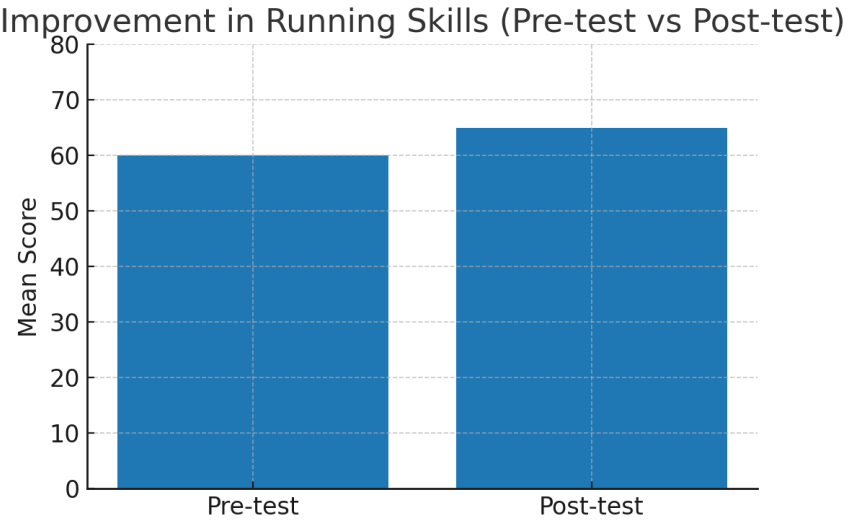

Figure 1. Improvement from Pre-test to Post-test

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The figure illustrates a clear improvement in students' mean scores between the pre-test and post-test. Before the intervention, students' average running skills score was 60 points. After applying the traditional games-based running movement model, the post-test average increased to 64.9 points, reflecting an improvement of 4.9 points. This result supports the statistical analysis ($t = 4.388$, $p < 0.05$), confirming that the model significantly affected students' motor skills. The increase also indicates that students could adapt to the structured learning activities and benefited from the engaging elements of traditional games integrated into the model.

Integration of Results

The findings indicate that the model is valid, reliable, feasible, and effective. The validation process confirmed the quality of the model's content, while reliability analysis ensured consistency. The trials demonstrated that students were highly engaged and motivated, and the effectiveness test provided empirical evidence of improved motor skills. Together, these stages show a coherent process of development and testing that supports implementing the model in inclusive schools. Despite these positive outcomes, limitations such as teacher guidance and small sample sizes should be acknowledged, highlighting the need for further testing on larger and more diverse populations.

DISCUSSION

The findings of this study confirmed that the traditional games-based running movement model for students with intellectual disabilities is valid, reliable, and effective. However, beyond the descriptive results, it is essential to analyse why and how the model worked. Traditional games involve repetitive patterns of movement that resemble drills but are embedded in playful contexts. This repetitive yet enjoyable practice helps strengthen motor pathways and improve coordination, similar to the mechanisms emphasised in motor learning theory. In addition, traditional games inherently integrate social interaction, peer engagement, and intrinsic motivation, which may explain why students demonstrated higher

participation and motor improvement levels than conventional drills. The psychological mechanism of enjoyment reduced anxiety and monotony, fostering sustained engagement, while the physiological mechanism of repeated locomotor activities strengthened endurance, agility, and coordination.

The novelty of this study lies in systematically combining structured motor skill training with culturally embedded traditional games. Previous research either emphasised drills to enhance motor competence e.g., (Kardiyanto et al., 2024) or highlighted games as motivational tools (Kurniawan et al., 2022), but no study has explicitly integrated both elements into a comprehensive model tailored for students with intellectual disabilities. This is the first study to systematically integrate traditional games into a structured running skill model for students with intellectual disabilities in Indonesia. This positioning highlights the study's unique contribution in theory and practice.

The results are also consistent with and extend previous studies. While Valentini et al. (2021) found that structured interventions support autonomy and participation, our findings extend this by demonstrating that culturally embedded games can sustain long-term motivation and engagement. Similarly, Stanley et al. (2016) emphasised the role of enjoyment in increasing participation for students with disabilities, and this study empirically confirms that embedding enjoyment within culturally familiar games fosters sustained involvement. In line with Lavega-Burgués et al. (2023), who revealed the social benefits of traditional games, this research adds evidence that such games are socially enriching and effective in systematically improving motor performance. Furthermore, Wagner & Lieberman (2014) highlighted that culturally adapted physical activities increase accessibility and relevance for children with intellectual disabilities, which supports the argument that interventions must be rooted in familiar contexts. In addition, Shields et al. (2012) also demonstrated that motivational and game-based approaches reduce behavioural barriers, facilitating greater consistency in motor learning. Finally, Yang et

al. (2021) stressed that incorporating traditional and cooperative games in adapted physical education enhances physical competence and students' self-confidence, suggesting that the current model contributes to both skill acquisition and psychosocial development. These comparisons confirm that this study not only aligns with but also extends the literature by offering a validated and contextually relevant model that bridges motor development with cultural and motivational dimensions.

The practical implications of this study go beyond teachers simply adopting the model in classrooms. For example, the model can be adapted into lesson plans by aligning each running component with specific traditional games, ensuring that learning objectives are met while keeping students engaged. Schools can use the model in their extracurricular programs to foster inclusion and cultural preservation. At the same time, teacher training workshops could incorporate this model as a practical module, providing educators with hands-on experience in implementing adaptive game-based learning strategies. These specific applications make the model not just a theoretical framework but also a concrete tool for daily practice.

Despite the promising results, several limitations must be critically reflected upon. The small sample size and the fact that the study was limited to four schools in Jakarta restrict generalizability. The reliance on teacher guidance during trials may also have inflated engagement results, as students were highly dependent on teacher presence to understand and follow instructions. Furthermore, the focus on running skills means that other domains of motor development, such as object control and balance, were not addressed, which limits the comprehensiveness of the model. The relatively short intervention period also raises questions about the sustainability of improvements over time. These limitations suggest caution when interpreting the findings and highlight the need for more extensive studies in the future.

The policy implications of this research are also significant, especially in the Indonesian context. The model can be aligned with the Kurikulum

Merdeka, emphasising flexibility, contextualization, and student-centred approaches. The model resonates with national education goals by embedding traditional games into adaptive physical education while ensuring inclusivity. The Ministry of Education and Culture (Kemendikbudristek) could adopt this model as a standard reference for physical education in special schools, providing guidelines and resources for teachers across Indonesia. Moreover, the findings contribute to developing adaptive sports policies, supporting Indonesia's commitment to inclusive education as outlined in the UN Convention on the Rights of Persons with Disabilities.

CONCLUSSION

The results of this study demonstrate that the traditional games-based running movement model for students with intellectual disabilities is valid, reliable, and effective, while offering insight into why it works. The model improves motor skills through structured repetition and embedding movements in enjoyable and socially engaging contexts, which sustain student motivation and participation. This confirms that integrating traditional games into structured running activities provides a practical and culturally relevant solution for adaptive physical education. This is the first study to systematically integrate traditional games into a structured running skill model for students with intellectual disabilities in Indonesia, which marks its unique contribution.

Beyond its effectiveness, this model offers clear practical value for teachers as a structured guide, for schools as a feasible low-cost intervention, and for policymakers as a framework that can be aligned with inclusive education agendas. However, the study is limited by its small sample size, the short duration of the intervention, and its reliance on teacher facilitation, which may have influenced engagement outcomes. Future research should expand to larger and more diverse samples, address other motor skill domains beyond running, and evaluate long-term impacts to strengthen the model's applicability further.

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