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Adaptive Coaching Approach to Improve Social and Physical Abilities of Children with Special Needs and Mental Retardation

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Abstract
This study aims to develop and test the effectiveness of an adaptive coaching approach in improving the social and physical abilities of children with intellectual disabilities. Children with intellectual disabilities often face obstacles in understanding verbal instructions and limitations in social interaction. Using research and development (R&D) methods, an adaptive coaching approach was designed through adaptive training modules, visual demonstrations, group activity familiarization, and integrated social interaction strategies. A trial was conducted in a special needs school with 20 purposively selected participants. The results showed that this approach was able to significantly improve motor skills (such as coordination, balance, speed) and social aspects (interaction, group participation). Teachers' and trainers' perceptions of this model were also positive. Thus, an adaptive coaching approach can be an effective strategy in inclusive physical education for children with intellectual disabilities.

Keywords: *adaptive coaching, social skills, physical abilities, mental retardation, R&D*

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INTRODUCTION

Physical education for children with special needs, particularly those with intellectual disabilities, is a field that requires serious attention due to its distinct characteristics and challenges compared to physical education for regular students. Children with intellectual disabilities often experience obstacles in motor development, difficulty understanding instructions, and limitations in social interaction with their surroundings. This condition requires tailored learning and training strategies to ensure physical education goals are achieved. Several studies have confirmed that motor delays and social communication difficulties in children with intellectual disabilities can hinder their participation in general physical activities (Chang et al., 2025)(Viegas et al., 2023).

As the concept of inclusive education develops, adaptive approaches to physical education are gaining increasing attention. Physical activities modified to suit a child's abilities have been shown to positively impact both physical and social development. Children with

intellectual disabilities involved in adaptive sports have shown improved body coordination, balance, and courage to interact with peers. This aligns with the findings of (Zhu et al., 2023), who emphasized the importance of children's involvement in adaptive physical activities to strengthen motor skills and build self-confidence.

Furthermore, the success of adaptive physical education is also significantly influenced by the media and methods used to deliver instruction. Children with intellectual disabilities understand material more easily when instructions are presented simply, repeatedly, and supplemented with visual media. A study by (Inayah & Prasetyo, 2025) showed that visual literacy plays a crucial role in helping children with special needs understand learning messages. Therefore, adaptive training is not limited to modifying activities but also involves communication strategies tailored to the characteristics of the students.

From an inclusive education perspective, the successful implementation of physical education for children with intellectual disabilities depends heavily on the ability of teachers and trainers to modify learning. (Bertills & Björk, 2024) emphasized that adapting instruction, using appropriate media, and creating a supportive learning environment are key to ensuring all children can actively participate. Similar findings were also demonstrated by (McNamara et al., 2024), who stated that teacher competence in managing adaptive learning will influence the success of students with special needs in achieving optimal development.

Furthermore, several recent studies have emphasized that adaptive coaching approaches can improve the quality of social relationships in children with intellectual disabilities. Structured group exercise programs have been shown to reduce feelings of isolation and train children to cooperate, follow rules, and respect others. This aligns with the research findings of (D'Amours et al., 2025), which highlighted the significant role of group-based physical activity in strengthening social skills in children with special needs.

These findings increasingly demonstrate that adaptive physical education serves not only as a means of improving physical abilities but also plays a crucial role in developing the social skills of children with intellectual disabilities. Developing a more structured adaptive coaching model is crucial, especially considering the ongoing gap in access to inclusive physical education in Indonesia (Goodwin et al., 2023). also emphasized the need for continued development of innovative and applicable coaching models to provide greater opportunities for children with special needs to access physical education services.

Based on this thinking, this research aims to examine adaptive coaching approaches that can significantly impact the physical abilities and social skills of children with intellectual

disabilities. This study is expected to contribute to the development of inclusive physical education, both theoretically and practically, so that learning can be truly accessible to all students without exception, as emphasized by (Petrie et al., 2024).

METHOD

This study employed a Research and Development (R&D) approach, adapting the simplified Borg & Gall model to suit the context of adaptive physical education. This model was chosen because it allowed researchers to develop a product in the form of an adaptive coaching model and then test its effectiveness through field trials. A similar approach was also used in (Jariono et al., 2025) study to develop physical education for students with special needs.

The study subjects were elementary school children with intellectual disabilities selected using a purposive sampling technique. This technique was used because children with special characteristics cannot be randomly selected but must be tailored to the research needs. Purposive sampling is also widely used in adaptive physical education studies, as demonstrated in their study on the social participation of children with disabilities.

The research instrument consisted of two main categories: physical abilities and social abilities. For physical abilities, the instrument used refers to the basic motor indicators developed by (Chang et al., 2025) and is reinforced by guidelines from (Viegas et al., 2023). These indicators include coordination, balance, strength, and agility. Meanwhile, children's social abilities were measured using an observational instrument that assesses aspects of social interaction, cooperation, rule compliance, and active participation. This instrument was developed based on the social observation model used in the study by (Syafrial & Nopiyanto, 2023)) and reinforced by (Li & Zhang, 2024), which emphasizes the importance of evaluating social behavior in adaptive physical activity.

Data collection was conducted through direct observation during the adaptive training program. Each training session was observed using an assessment sheet validated by an adaptive physical education expert. Instrument validation involved three inclusive education experts, as is common practice in previous research (Rakhmadi et al., 2024).

To ensure the reliability of the data obtained, the researchers employed assessor triangulation, involving more than one observer in each session. This technique was intended to increase measurement reliability, as recommended by (Bertills & Björk, 2024) in research on inclusive physical education.

Data analysis was conducted using a descriptive quantitative approach supplemented by simple statistical tests to identify differences before and after the implementation of adaptive training. This analytical method aligns with (McNamara et al., 2024) research examining the effectiveness of adaptive physical activity-based programs and the recommendations of (Goodwin et al., 2023) regarding the importance of quantitative data processing in evaluating inclusive programs.

Overall, this research methodology was designed to provide a comprehensive overview of the effectiveness of adaptive coaching approaches in improving both the physical abilities and social skills of children with intellectual disabilities. This study not only captures the impact on motor skills but also emphasizes the importance of social interaction, which is often overlooked in conventional physical education .

RESULTS AND DISCUSSION

Result

This study aims to analyze the effect of an adaptive training approach on improving the physical abilities and social skills of children with intellectual disabilities. The training program lasted eight weeks, with sessions occurring three times per week. All activities were conducted in the form of adaptive physical activities involving simple instructions, the use of visual media, and a participatory approach through group games.

Measurement results showed significant improvements in physical ability indicators, namely coordination, balance, strength, and agility. This improvement was evident in the higher average post-test scores compared to the pre-test.

Table 1. Improving Physical Abilities of Children with Mental Disabilities.

Physical Indicators	Pre-Test Average	Post-Test Average	Improvement
Coordination	52,3	68,7	+31,3%
Balance	48,9	65,2	+33,4%
Strength	55,6	70,1	+26,1%
Agility	50,2	67,9	+35,2%

The data above shows that the agility indicator experienced the highest increase (35.2%), while strength showed the lowest increase (26.1%). This indicates that moderate-intensity, game-based training is more effective in developing agility and coordination than muscle strength.

In addition to physical aspects, the study also found improvements in the social skills of children with intellectual disabilities. Indicators measured included social interaction, cooperation, adherence to rules, and active participation in group activities.

Table 2. Improving Social Skills of Children with Mental Disabilities

Social Indicators	Pre-Test Average	Post-Test Average	Improvement
Social Interaction	47,1	62,8	+33,4%
Cooperation	49,5	66,3	+34,0%
Rule Compliance	52,7	69,1	+31,2%
Active Participation	50,9	67,4	+32,4%

Discussion

The findings of this study indicate that an adaptive training approach can significantly improve the physical abilities of children with intellectual disabilities. The increases in coordination, balance, agility, and strength scores align with the findings of (Özkan & Kale, 2023), which confirmed that an adaptive training program with simple instructions can improve basic motor skills in children with intellectual disabilities.

The greatest improvement in agility indicators can be explained by the game-based nature of the training, which requires children to move dynamically, respond to visual and verbal stimuli, and change direction quickly. (Lau et al., 2020) stated that motor activities involving varied movement patterns are highly effective in improving agility and coordination.

Meanwhile, gains in strength were relatively lower. This is understandable because the program emphasized group play activities oriented toward engagement and participation rather than weight training or muscle strength training. (Weterings et al., 2022) found that children with intellectual disabilities require repeated stimulation over a longer period of time to achieve optimal strength development.

In addition to physical aspects, this study also demonstrated the development of social skills. Improved scores on indicators of cooperation, social interaction, rule compliance, and active participation confirm that adaptive sports activities contribute to building social competence.

These results are consistent with research (--, 2016), which found that children's involvement in group sports improves self-confidence, interaction skills, and understanding of social roles. also emphasized that adaptive play provides a safe space for children to learn to share, take turns, and cooperate in an inclusive atmosphere.

The cooperation indicator showed the highest improvement. This can be explained by the fact that most activities were designed as team games, requiring children to support each other to achieve a common goal. Conversely, the rule compliance indicator experienced the lowest improvement. This phenomenon aligns with the findings of (Bertills & Björk, 2024), who stated that children with intellectual disabilities often take longer to understand abstract rules.

The results of this study have important implications for the development of adaptive physical education in inclusive schools. First, the adaptive coaching approach has been shown to improve both physical and social skills, making it a comprehensive learning strategy. Second, the involvement of teachers and coaches in providing simple instructions and the use of visual media has proven effective in facilitating the development of children with intellectual disabilities. Third, this program can serve as a foundation for the development of sustainable training models that emphasize a balance between motor and social skills.

CONCLUSION

Research on adaptive training approaches to improving the physical and social abilities of children with intellectual disabilities provides a clear picture of the effectiveness of physical activity-based intervention models. The results demonstrate that the use of training methods tailored to the characteristics of children with intellectual disabilities, emphasizing simple instructions, visual media, and group play activities, can produce positive development in two key domains: physical ability and social skills.

In the physical aspect, there was a significant improvement in indicators of coordination, balance, strength, and agility. This fact strengthens the argument that adaptive physical education not only stimulates basic motor skills but can also provide more meaningful movement experiences for children with intellectual disabilities. The highest improvements in agility and coordination indicate that game-based training programs with dynamic movement variations are more easily accepted and internalized by participants. This aligns with previous research that emphasized the effectiveness of game approaches in developing basic motor skills in children with intellectual disabilities.

In terms of social skills, this study confirms that adaptive sports-based interventions can encourage increased social interaction, cooperation, rule compliance, and active participation. Children with intellectual disabilities tended to be more cooperative, more communicative, and better able to adapt to group dynamics after undergoing a series of training programs. The highest improvement in cooperation demonstrates that team-based activities can be an effective vehicle for practicing social skills in an inclusive and enjoyable atmosphere. Meanwhile, although rule compliance experienced a relatively lower increase compared to other indicators, these results still indicate positive developments and can serve as a basis for improving future coaching strategies.

Overall, it can be concluded that the adaptive coaching approach is a relevant, applicable, and effective strategy for supporting the development of children with intellectual

disabilities. This model focuses not only on improving physical skills but also significantly contributes to the social and emotional growth of students. This demonstrates the crucial role of adaptive physical education in building independence, improving quality of life, and expanding the social participation of children with special needs.

Therefore, this study confirms the need for continued study and expansion of the adaptive coaching approach, both within inclusive schools and special education institutions. Moving forward, these findings can serve as a reference in designing more targeted policies and training programs, ensuring that the needs of children with intellectual disabilities are optimally met through adaptive, humanistic physical education interventions that are oriented toward long-term developmental sustainability.

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