

The Effect of Motor Activity on The Development of 4th-5th Grade Elementary School Students with Mild and Moderate Intellectual Disabilities at Sidotopo 1/48 Elementary School

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ABSTRACT

This study aims to examine the effect of motor activity on the development of 4th–5th grade elementary school students with mild and moderate intellectual disabilities at SDN Sidotopo 1/48 Surabaya. Students with intellectual disabilities often experience limitations in coordination, balance, and basic motor skills, which can affect their learning readiness and social interaction. Therefore, the role of adaptive physical education and structured motor activities becomes essential in supporting their holistic development. This study employed a qualitative descriptive method with a case study approach involving six students (four with mild and two with moderate intellectual disabilities). Data were collected through participant observation, in-depth interviews with teachers and parents, questionnaires, and documentation of students' learning and development records. Data analysis followed the interactive model of data reduction, data display, and conclusion drawing. The findings indicate that structured motor activities contribute positively to students' gross and fine motor development, coordination, and balance. In addition, improvements were observed in students' concentration, learning readiness, self-confidence, and social interaction. Although motor activities did not directly influence cognitive ability (IQ), they significantly enhanced students' engagement and responsiveness during academic tasks. Students with moderate intellectual disabilities showed slower motor development but demonstrated notable progress in motivation and participation when supported with appropriate instructional modifications. In conclusion, motor activity serves as an effective medium for stimulating physical, cognitive, and social development in students with intellectual disabilities. The study highlights the importance of adaptive teaching strategies, consistent practice, and supportive learning environments in optimizing the benefits of motor activity programs in inclusive elementary education.

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KEYWORDS

Motor activity; mild intellectual disability; moderate intellectual disability; elementary school students.

Introduction

Physical Education, Sports, and Health plays a crucial role in the holistic development of elementary school-aged children, including those with intellectual disabilities. Physical is a crucial element of education aimed at promoting physical health, fitness, and motor skills in students (Nurulita & Muhammad Ivan Miftahul Aziz, 2024). Understanding basic concepts of early childhood development and the integrative application of rhythmic and sensory movement activities, with an emphasis on the role of movement as a foundation for children's cognitive, motor, and social-

emotional development (Fitri et al., 2022). One of the main focuses in learning PJOK in elementary schools is the development of basic movement skills, which include coordination, balance, and body awareness (Gustian, 2018). Movement arts activities can facilitate positive social and emotional interactions, which also contribute to cognitive development (Lubis et al., 2025). In elementary school, particularly for students in grades 4-5, the curriculum demands the development of more complex motor skills to support learning processes such as faster writing, participation in sports, or conducting lab work. However, students with intellectual disabilities, particularly those with mild to moderate intellectual disabilities, often exhibit significant limitations in coordination, balance, and body awareness compared to their peers. Inclusive-based Physical Education and Sports learning management has been implemented, but requires strengthening teacher competencies, supporting facilities, and adaptive learning policies for more optimal implementation (Wulandari et al., 2026). Motor development theory according to (Anditiasari & Dewi, 2021) emphasizes the importance of active interaction with the physical environment in developing children's motor skills. For students with intellectual disabilities, an adaptive learning environment and appropriate support from physical education teachers are crucial to optimizing this interaction (Mustofa et al., 2021) with the Zone of Proximal Development (ZPD) theory also highlights the importance of scaffolding or structured assistance from teachers so that students can achieve higher abilities than what they can do alone.

In the context of physical education learning, teachers can provide scaffolding through clear demonstrations, simple instructions, specific feedback, and task modifications appropriate to the student's ability level. For students with intellectual disabilities, the movement learning process may require more time and more frequent repetition. The author's experience during initial observations at several inclusive elementary schools in Surabaya revealed significant variation in the approaches of Physical Education Teachers (PET) to students with intellectual disabilities. While some teachers appeared to have modified their teaching methods and provided special attention, many still struggled to adapt materials and methods to suit the specific needs of students with intellectual disabilities. The role of PET is significant in improving the coordination, balance, and body awareness of students in grades 4-5 with mild to moderate intellectual disabilities. Therefore, this study aims to examine in-depth the role of physical education teachers in improving these motor skills in students with intellectual disabilities and to identify supporting and inhibiting factors in their implementation. Based on the aforementioned background, the author is very interested in conducting research on "The Effect of Motor Activities on Grades 4-5 Elementary School Students with Mild and Moderate Intellectual Disabilities at SDN SIDOTOPO I/48 Surabaya."

Method

This method allows researchers to explore detailed information, understand the context, and capture the complexity of human experience. Through qualitative descriptive methods, students' motor skills and activities can be objectively explored (Anggrayni et al., 2023). Qualitative descriptive research aims to describe, explain and interpret a social phenomenon or condition in depth and as it is (Gustian, 2018). Qualitative descriptive research aims to describe, illustrate, and interpret a phenomenon in depth, as it is, and in its natural context. This approach is implemented through motor activities and social interactions. Motor development strategies through motor activity and social interaction approaches can stimulate the motor skills of early childhood (Aliriad et al., 2023).

Qualitative descriptive research is appropriate for describing practices, challenges, and perceptions in implementing inclusive education.

Results and Discussion

This chapter presents a study conducted at Sidotopo 1/48 Public Elementary School, Jalan Sidotopo Lor No. 68, Sidotopo, Surabaya City, Semampir District, East Java. The study examined the Effect of Motor Activities on Grade 4-5 Elementary School Students with Mild and Moderate Intellectual Disabilities at Sidotopo 1/48 Elementary School, Surabaya. This study aimed to determine the extent of the influence of gross motor activities on grade 4-5 students at Sidotopo 1/48 Elementary School. This study used six students with intellectual disabilities in grades 4-5: two female students and one male student in Grade 4 and one female student and two male students in Grade 5. This study employed Sugiyono's descriptive qualitative data analysis model. The following are the results of the data analysis of students with Intellectual Disabilities in grades 4-5 at SDN Sidotopo 1/48 based on 6 main parameters, namely reading, writing, and arithmetic material, understanding, motor skills, self-development, behavior, and social interaction according to the data on disabilities/types of Intellectual Disabilities:

1.1 Table Of Pre-Test And Post-Test Learning Evaluation For Students With Intellectual Disabilities In July 2025

STUDENT NAME : ALISIA INOCHI WIJAYA		SCHOOL NAME : SDN Sidotopo 1/48	
REGISTRATION NUMBER / ID NUMBER : 6073/3130754788		ADDRESS : Jl. Sidotopo Lor No. 68	
CLASS/SEMESTER : IV/ I		SCHOOL YEAR : 2025/2026	
TYPE OF DEFENSE : Slow Learner-Mild Intellectual Disability		FIN : 3578104807130006	

Student Name	Specialty Program	Material	Naration
ALISIA INOCHI WIJAYA	Academic	The Three Rs	➤ Students' reading ability is only able to read words ➤ Students' writing ability is only able to copy writing ➤ Students' ability to solve simple calculation problems is quite good, students are able to solve multiplication and division problems
		Comprehension	➤ Students' ability to understand the material is quite good, responses are faster, students are able to digest information and instructions from the teacher.
	Non- Academic	Motoric	➤ Students' fine motor skills are good, students are able to hold a pencil correctly, color and cut well ➤ Students' gross motor skills are good, balance is good, crawling and jumping well.
		Build Yourself	➤ Students' self-development skills are good, students are able to button their own clothes, are able to eat by themselves and are able to keep their clothes neat
		Behavior	➤ Student behavior in and outside the classroom is quite orderly, students are able to follow lessons well, are calmer, and understand the teacher's lessons well enough. ➤ Student behavior outside the classroom, students can play well without causing problems with friends.
		Social Interaction	➤ Students' reading ability is limited to recognizing vowels and spelling. ➤ Students' writing ability is limited to copying text. ➤ Students' ability to solve simple arithmetic problems is quite good, and students are able to solve multiplication problems.

STUDENT NAME : MOCH. MAULANA MALIQ IBRAHIM		SCHOOL NAME : SDN Sidotopo 1/48	
REGISTRATION NUMBER / ID NUMBER : 6082 / 061120009		ADDRESS : Jl. Sidotopo Lor No. 68	
CLASS/SEMESTER : IV / I		SCHOOL YEAR : 2025/2026	
TYPE OF DEFENSE : Slow Learner- Moderate Intellectual Disability		FIN : 3578162401160001	

Student Name	Specialty Program	Material	Naration
MOCH. MAULANA MALIQ IBRAHIM	Academic	The Three Rs	➤ Students' reading ability is limited to recognizing vowels and spelling. ➤ Students' writing ability is limited to copying text. ➤ Students' ability to solve simple arithmetic problems is quite good, and students are able to solve multiplication problems.
		Comprehension	➤ Students' ability to understand the material is quite good, students need repeated instructions regarding information and commands from the teacher.
	Non- Academic	Motoric	➤ Students' fine motor skills are good, students are able to hold a pencil correctly, color and cut well. ➤ Students' gross motor skills are good, students are able to kick a ball, crawl and jump well.
		Build Yourself	➤ Students' self-development abilities are quite good, students are still helped to eat by themselves and are able to keep their clothes neat.
		Behavior	➤ Student behavior in and outside the classroom is quite orderly, students are able to follow lessons well, understand the teacher's lessons well enough, and tantrums are reduced. ➤ Student behavior outside the classroom, students can play well without causing problems with friends.
		Social Interaction	➤ Students' social skills with friends are quite good, students are able to coordinate their eyes well but are still passive. ➤ Social skills with teachers are quite good, students are able to understand and provide feedback to teachers when spoken to.

STUDENT NAME : MAULIDIA ANDITA

SCHOOL NAME : SDN Sidotopo I/48

REGISTRATION NUMBER / ID NUMBER : 6085 / 0144063396

ADDRESS : Jl. Sidotopo Lor No. 68

CLASS/SEMESTER : IV / I

SCHOOL YEAR : 2025/ 2026

TYPE OF DEFENSE : Slow Learner- Mild Intellectual Disability

FIN : 3578165705140005

Student Name	Specialty Program	Material	Naration
MAULIDIA ANDITA	Academic	The Three Rs	➤ Students' reading ability is only able to read words ➤ Students' writing ability is only able to copy writing ➤ Students' ability to solve simple calculation problems is quite good, students are able to solve multiplication and division problems
		Comprehension	➤ Students' ability to understand the material is quite good, students are able to digest 2-stage information and instructions from the teacher.
	Non- Academic	Motoric	➤ Students' fine motor skills are good, students are able to hold a pencil correctly, color and cut well. ➤ Students' gross motor skills are good, students are able to jump on 2 feet and crawl well.
		Build Yourself	➤ Students' self-management skills are good, students are able to go to the toilet themselves, are able to eat by themselves and are able to keep their clothes neat.
		Behavior	➤ Student behavior in and outside the classroom is quite orderly, students are able to follow lessons well, understand the teacher's lessons well enough, and focus is increasing. ➤ Student behavior outside the classroom, students can play well without causing problems with friends and share toys.
		Social Interaction	➤ Students' social skills with friends are quite good, students are able to coordinate their eyes well. ➤ Social skills with teachers are quite good, students are able to understand and provide feedback to teachers when spoken to.

STUDENT NAME : ISHAQ AL RIDWAN

SCHOOL NAME : SDN Sidotopo I/48

REGISTRATION NUMBER / ID NUMBER : 5897 / 0149577661

ADDRESS : Jl. Sidotopo Lor No. 68

CLASS/SEMESTER : V/ I

SCHOOL YEAR : 2025/2026

TYPE OF DEFENSE : Slow Learner- Moderate Intellectual Disability		FIN	: 3578112501140002
Student Name	Specialty Program	Material	Naration
ISHAQ AL RIDWAN	Academic	The Three Rs	➤ Students' reading ability is lacking because they are only able to read syllables. ➤ Students' writing ability is limited to thickening the writing given by the teacher and only writing meaningful scribbles. ➤ Students' counting ability is still at the stage of recognizing letters 1-20.
		Comprehension	➤ Students' ability to understand the material is less capable, students are less able to digest information and instructions from the teacher because they tend not to focus, but eye contact is improving.
	Non- Academic	Motoric	➤ Students' fine motor skills are quite good, students hold pencils correctly, color and cut correctly. ➤ Students' gross motor skills are not good, students are less able to kick a ball, crawl and jump well because of their very thin body weight, so they tend to be weak.
		Build Yourself	➤ Students' self-management skills are good, students are able to go to the toilet themselves, are able to eat and wash their hands themselves, but are still less able to keep their clothes neat
		Behavior	➤ Student behavior in and outside the classroom is quite orderly, students are able to follow lessons well and understand the teacher's lessons well enough. ➤ Student behavior outside the classroom, students can play well without causing problems with friends, and are more cheerful.
		Social Interaction	➤ The student's social skills are quite good, the student is able to work together with only a few friends. ➤ The student's social skills with the teacher are quite good, he smiles easily at the teacher and listens to the teacher's instructions well.
STUDENT NAME : LUTHFIE ZAIDAN AKMAL		SCHOOL NAME : SDN Sidotopo I/48	
REGISTRATION NUMBER / ID NUMBER : 6084 / 3141002053		ADDRESS : Jl. Sidotopo Lor No. 68	
CLASS/SEMESTER : V/I		SCHOOL YEAR : 2025/2026	
TYPE OF DEFENSE : Slow Learner- Mild Intellectual Disability		FIN	: 3578170201140003
Student Name	Specialty Program	Material	Naration
LUTHFIE ZAIDAN AKMAL	Academic	The Three Rs	➤ Students' reading ability is quite capable because students are only able to read one word at a time ➤ Students' writing ability is only able to copy the writing given by the teacher. ➤ Students' arithmetic ability is quite good at the addition stage of 1-20.
		Comprehension	➤ Students' ability to understand the material is quite good, students are able to digest information and instructions from the teacher well, understand the flow of the game
	Non- Academic	Motoric	➤ Students' fine motor skills are quite good, students are able to hold a pencil correctly, color and cut correctly. ➤ Students' gross motor skills are quite good, students are less able to run zigzag and jump well.
		Build Yourself	➤ Students' self-management skills are good, students are able to go to the toilet by themselves, are able to eat by themselves, tidy up their own eating utensils, but are still less able to keep their clothes tidy.
		Behavior	➤ Student behavior in class and in the school environment is quite good, students are able to follow lessons in an orderly manner and are able to control their emotions with their friends and are very cooperative.
		Social Interaction	➤ Students' social skills are quite good, students are able to work well together and become team leaders

STUDENT NAME : AULIA CALISHA AZ ZAHRA		SCHOOL NAME : SDN Sidotopo I/48	
REGISTRATION NUMBER / ID NUMBER : 5703 / 3145861028		ADDRESS : Jl. Sidotopo Lor No. 68	
CLASS/SEMESTER : V/ I		SCHOOL YEAR : 2025/2026	
TYPE OF DEFENSE : Slow Learner- Mild Intellectual Disability		FIN : 3578114409140002	

Student Name	Specialty Program	Material	Naration
AULIA CALISHA AZ ZAHRA	Academic	The Three Rs	➤ The student's reading ability is quite good because he is able to read 3-word sentences. ➤ The student's writing ability is quite good. ➤ The student's arithmetic ability is quite good in multiplication and division.
		Comprehension	➤ Students' ability to understand the material is quite good, vocabulary increases, students are able to digest information and instructions from the teacher.
	Non- Academic	Motoric	➤ Students' fine motor skills are quite good, students are able to hold a pencil correctly, color and cut correctly. ➤ Students' gross motor skills are good, students' balance is quite good and directed, crawling and jumping well.
		Build Yourself	➤ Students' self-management skills are good, students are able to go to the toilet alone, are able to eat alone, are able to keep their clothes neat.
		Behavior	➤ Student behavior in and outside the classroom is quite orderly, students are able to follow lessons well and understand the teacher's lessons well enough, and are disciplined with time. ➤ Student behavior outside the classroom, students can play well without causing problems with friends.
		Social Interaction	➤ Students' social skills are quite good, students are able to work together. ➤ Social skills with teachers are quite good because they actively ask questions.

This research was conducted at SDN Sidotopo I/48, involving 6 students with mild and moderate intellectual disabilities from grades 4-5 of elementary school. Data collection was conducted through participant observation, in-depth interviews with accompanying teachers and parents, and documentation. The data analysis technique used the interactive model of Miles and Huberman, which includes data reduction, data presentation, and drawing conclusions (Sugiyono, 2010). Based on the reduction of the results of in-depth observation (pre-test) and evaluation after providing intervention (post-test) in the form of structured motor activities, a pattern was found in the Academic Ability Area (Calistung); Motoric Area and Self-Development. Guidance for elementary school-aged children regarding their motor activities will have implications for learning at school (Yuliarsih et al., 2024). This study aims to examine how reflective activities in play-based learning can stimulate the metacognitive abilities of early childhood (Junanto et al., 2025). The results of the study showed that motor activity did not directly change IQ scores, but significantly increased learning readiness. This study aimed to examine how reflective activities in play-based learning can stimulate metacognitive abilities in early childhood (Aminah & Mauliyah, 2025). The implications of these findings highlight the importance of integrating physical activity programs into the school curriculum as well as parental involvement in supporting healthy lifestyle habits in children (Ramadan, 2025). The post-test revealed that one 4th-grade student had a moderate intellectual disability and two students had mild intellectual disability. Meanwhile, in 5th-grade students, two students had mild intellectual disability and one student had moderate intellectual disability. Motor activity stimulates the cerebellum, which not only regulates

movement but also influences the brain's executive functions. In these 4th-5th grade elementary school students, gross motor movements such as zigzag running or jumping help increase blood flow to the brain, thereby improving concentration while learning to read, write, and count. Motor activities such as coloring, kicking a ball, rhythmic gymnastics, etc. In motor activities, moderate intellectual disability students who were initially stiff in walking began to show better balance. Meanwhile, in self-development activities, there was a positive correlation between fine motor activity and self-development skills.

1.2 Table of In-depth Interviews with Physical Education Teachers, Student Guardian Grades 4 and 5

Observation of the Participation of Students with Intellectual Disabilities in Grades 4-5 of Elementary School

No.	Subject	Answer
1.	Physical Education teacher	Students tend to be very enthusiastic about recreational activities. They are more active outside the classroom (in the field) than during theory lessons in the classroom.
2.	4th Grade Homeroom Teacher	My son really enjoys gym time. At home, he often practices the running and jumping movements taught at school.
3.	5th Grade Homeroom Teacher	Her participation has increased compared to last year. She's now more willing to try ball games, even though her hand coordination isn't perfect yet.

Specific Changes in Cognitive Abilities

No.	Subject	Answer
1.	Physical Education teacher	There's a significant improvement in focus. Students who regularly practice balance tend to be calmer when listening to instructions.
2.	4th Grade Homeroom Teacher	I've noticed he's more responsive to simple commands at home. It seems the physical training at school has helped "revive" his concentration; he's not as easily distracted as he used to be.
3.	5th Grade Homeroom Teacher	After her morning exercise routine, she seems more prepared to study and less likely to get sleepy or lose focus on schoolwork.

Influence on Social Interaction and Behavior

No.	Subject	Answer
1.	Physical Education teacher	Team motor activities are incredibly helpful. I see them beginning to learn the concepts of "queueing" and "taking turns."
2.	4th Grade Homeroom Teacher	My child has become more confident in greeting his friends. Previously, he tended to be a loner, but after playing tag frequently at school, he's developed a "circle" of friends.

3.	5th Grade Homeroom Teacher	There's been an improvement in cooperation. He's starting to understand that in a game, he can't win alone.
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Challenges and Strategies Used		
No.	Subject	Answer
1.	Physical Education teacher	Challenges: Difficulty understanding complex instructions and gross motor coordination. Strategy: I use visual modeling (direct examples) and equipment modifications.
2.	4th Grade Homeroom Teacher	Challenge: He gets tired quickly Strategy: we give him small rewards and make sure he gets enough rest before his workout day arrives.
3.	5th Grade Homeroom Teacher	Challenge: Students with moderate disabilities sometimes struggle to understand complex game rules. Strategy: We communicate with the teacher to simplify the rules.

Expectations Regarding Future Programs		
No.	Subject	Answer
1.	Physical Education teacher	I hope more accessible infrastructure support to specifically train fine and gross motor skills.
2.	4th Grade Homeroom Teacher	My hope is that these motor activities won't just be held during gym time, but that there will also be a short physiotherapy or movement therapy session
3.	5th Grade Homeroom Teacher	I want there to be inclusive sports competitions or festivals that involve these children, so they feel valued and have pride in their physical abilities.

Based on questionnaire data and in-depth interviews with physical education teachers in grades 4 and 5, it appears that physical activity is the most anticipated moment for students. There is a positive correlation between the outdoor learning environment (field) and student happiness levels. However, this participation is highly dependent on instructional modifications; students are more likely to engage actively if instructions are given gradually and using clear visual examples. We need to understand that to be a teacher and adaptive physical education sports activist, we must emphasize student participation in the learning process so that they can carry out their movement activities, so that the implementation of the learning process can achieve the desired goals.(Kurniawati et al., 2022). In students' social and emotional development, there is a shift in behavior from being withdrawn to being more willing to interact. Team activities teach important values such as queuing and patiently waiting one's turn, emotional regulation, and communication initiatives through movement. Physical Education teachers need to evaluate the fulfillment of the needs and rights of students with disabilities in inclusive physical education and identify barriers to the implementation of inclusive physical education for children with intellectual disabilities.(Rubiana et al., 2025). The limitations of people with intellectual disabilities make it very necessary for all family members, teachers/trainers to be involved in supporting healthy behavior implementation and self-development activities (Sumaryanti et al., 2026). Future hopes include the provision of more

disability-friendly facilities and special programs, such as inclusive sports festivals, to boost student confidence. Responsive teachers and the use of appropriate stimuli are crucial to creating effective, inclusive, and enjoyable learning (Nasution et al., 2025).

Conslusions

Based on the research results and discussion outlined above, it can be concluded that gross motor activities have varying positive effects on students with mild and moderate intellectual disabilities in grades 4-5 at SDN Sidotopo 1/48. Qualitative analysis using the interactive model of Miles, Huberman, and Sugiyono (Gustian, 2018) showed that six students with intellectual disabilities (4 with mild intellectual disabilities and 2 with moderate intellectual disabilities). Experienced improvements in basic movement coordination and, more importantly, increased focus and cooperative behavior in academic learning after engaging in physical activities. Students with Moderate intellectual disabilities showed significant improvements in motivation, self-confidence, and social interaction, although their gross motor skill development was slower and required more specific program adaptations. In general, gross motor activities serve as an important medium for holistic stimulation (physical, cognitive, and social) for students with intellectual disabilities.

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