

## Development of basic movement ability tests for students with mental disabilities in special schools

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### ABSTRACT

*Researchers found facts in the field that seen from the results of initial observations and values taken from the basic motor ability test observed there were five basic movement indicators in mentally retarded students, namely; balance, walking, running, jumping and object manipulation, more than 70% of students were at very poor and poor levels. This study aims to develop a basic motor ability test instrument for mentally retarded students phase B and C aged 8-13 years in special schools. This study uses the ADDIE development approach (analysis, design, development, implementation, evaluation). The study was conducted on 30 mild mentally retarded students with IQ 55-70 phase B and C in special schools in Padang City. The results of the study were in the form of a basic motor ability test for mentally retarded students consisting of 4 tests, namely; basketball throwing test, 4-second sprint test, ball throwing test against the wall, and long jump test without run up which have been tested for validity with a value of 0.000 and reliability test with a value of 0.811. So the researcher concluded that the basic motor skills test instrument for mentally retarded students developed by the researcher had met good criteria.*

*Keyword: movement ability tests, mental disabilities*

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## INTRODUCTION

Students with intellectual disabilities are students who have limitations in cognitive function, so that they have a level of intelligence below the average of normal students. The limitations in the development of their intelligence are not optimal, so that they hinder the process of growth and development such as low thinking skills, less able to think abstractly and do not have a good vocabulary. Intellectual disabilities can be classified into three parts, namely Debil (educable), Embik (trainable) and Idiot (need to be cared for) ([Jonker et al., 2021](#); [Schalock & Luckasson, 2021](#)) The types of students with disabilities in general terms both nationally and internationally are grouped into: intellectual disabilities, mental disabilities, physical disabilities, and multiple disabilities ([Kirsty Dunn, Ewelina Rydzewska, Michael Fleming, 2020](#)) Children who are classified as mild intellectual disabilities (educable) are included in the Mental Retardation category, namely students who experience obstacles in

social adaptation and intelligence abilities, but still have the ability to develop in academics, work and socialize in groups, so that learning must be adjusted to their characteristics and abilities.

This is in accordance with the results of observations that have been carried out since September 12, 2022 at one of the Special Schools in Dharmasraya Regency. The author found facts in the field that when viewed from the results of initial observations and the values taken from the basic movement ability tests observed, there are five basic movement indicators in mentally retarded students, namely; balance, walking, running, jumping and object manipulation. At the time of the author's initial observation, data from the five indicators of basic movement development of mentally retarded students in basic movement ability values can be seen that only 8.33% of students have very good balance, 6.25% of students are able to walk very well, 8.33% of students are able to run very well, 10.4% of students are able to jump very well, and 8.33% of students are able to manipulate objects very well, and more than 70% of students are very bad, and not good at the balance, walking, running, jumping and object manipulation indicators.

Similarly, the results of the study ([Baan A. B, Rahayu T, Sugiyanto, 2018](#)) stated that students with mental retardation experience cognitive disorders due to the low IQ level of *Intellectual Disability students*, limitations in mastering discussions and lack of ability to consider something that affects social development, including in carrying out movement activities ([Wardana Ketut, Suarmini Kadek, 2019](#)). Intellectual barriers in children with *Intellectual Disabilities* cause children with mental retardation to have difficulty in carrying out movements that are very important for carrying out their daily lives ([des Portes, 2020](#)). The results showed that the scores of children with *intellectual disabilities* were significantly lower on all items of movement ability, object control ability compared to normal children. Of course, this must be a serious concern, especially for teachers and assistants in special schools in overcoming the low basic movement abilities of students. Based on these problems, researchers are motivated to study the appropriate test instrument model to measure basic motor skills that are in accordance with the characteristics of mentally retarded students. Considering that there have been many studies on mentally retarded students in improving cognitive and fine motor skills with the DDST (Denver Developmental Screening Tests) instrument. ([Baqiyudin et al., 2023](#)) further research ([Haris Satria et al., 2020](#)) developed a model of locomotor and non-locomotor movement play activities, as well as research developing a basic manipulative

movement learning model for mentally retarded students, with this instrument it is hoped that educators will be able to evaluate education in physical education learning on movement material, and be able to know the abilities possessed by mentally retarded students ([Atin et al., 2019](#)).

Based on several previous studies, it appears that there has been no research that has developed a basic motor ability test instrument for mentally retarded students. With this instrument, it is hoped that educators will be able to evaluate education in physical education and health learning on movement material, and be able to determine the abilities possessed by mentally retarded students. The innovation carried out in this study is to develop a basic motor ability test instrument specifically for mentally retarded students adopted from Gusril's motor ability test instrument (Sepriadi, Syafruddin, Khairuddin, Nurul Ihsan, 2022). Based on the description above, a study was conducted with the title "Development of a Basic Motor Ability Test Instrument for Mentally Retarded Students in Special Schools".

## METHOD

Study This is *development Study* or known with provision *research And development*, which serves to validate and develop a product. This research uses model Study ADDIE theory from Robert Maribe Branch ([Kurt, 2017](#)). The term ADDIE stands for *Analysis, Design, Development, Implementation, and Evaluation*. Analyze What Which related with activity analyze situation environment, so that Can found A product Which will developed. Design is activity in the Where product designed in accordance with need. Development, make product And activity testing and evaluation, evaluate the product and proof draft ([Branch, 2010](#))([Kurt, 2017](#)).



**Figure 1.** ADDIE research flow ([Branch, 2010](#)).

This study was conducted in June 2024. Data analysis used in this study by calculating the data results with validity tests and reliability tests. Participants in this study were mild mentally retarded students phase B and phase C (mental age  $\pm$  8 years) totaling 30 children, there is one Special School in Padang City, West Sumatra Province. Sampling Procedure The sampling technique used is the random sampling technique, namely the technique of determining the location and sample randomly by determining the number of samples to be studied so that each member of the population has the same opportunity ([Sugiyono, 2019](#)). Samples were taken from schools that had the largest number of students, taking into account students in the low mental retardation category who were in the age range of 8 to 13 years, then all data was collected into one according to student characteristics.

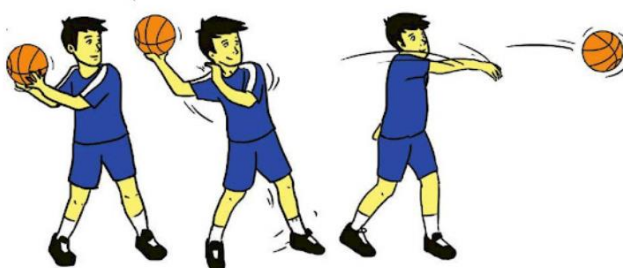
## RESULTS AND DISCUSSION

### *Results*

Instruments are tested to 30 students mentally retarded in school specifically in Padang city. All subjects tested produced data that met the data analysis requirements. The data produced were then tested statistically, namely the validity test and test reliability instrument developed test. Test try test Basic movement skills have been tested on 30 mentally retarded students at a Special School in Padang City. The basic movement skills test was adopted from test ability motion base ([Gusril, 2017](#)) which consists of of the 4 tests are as follows:

#### 1. Basketball Throw Test

The basketball throwing test aims to measure arm strength, shoulder strength, and coordination. The throwing distance is measured in meters. As shown in the picture below.



**Figure 2.** Basketball Throwing Test

The results of the trial test of the ability to throw the ball on 30 students, obtained a maximum throwing distance of 8.31 meters and a minimum of 1.05 meters, with an average value of each category of children of 5.11 meters. The throwing distance category is presented in the following table.

**Table 1.** Throwing distance categories

Category	Value Interval
Good	$JL > 7.08$
At the moment	$3.14 \leq JL \leq 7.08$
Not enough	$JL < 3.14$

## 2. 4 seconds dash

The 4-second sprint is a basic motor ability test for mentally retarded children that aims to measure running speed calculated in seconds. As shown in the image below.

**Figure 3.** 4-second sprint test.

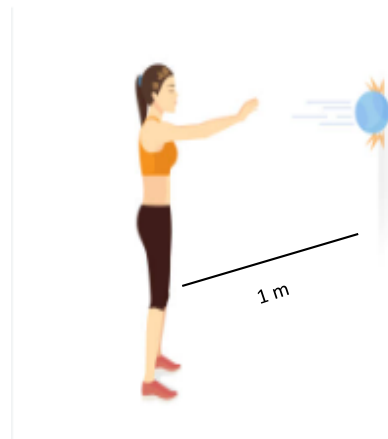
The results of the 4-second sprint ability test on 30 mentally retarded students, obtained a maximum running speed of 21.42 meters and a minimum of 8.61 meters, with an average value of 15.82 meters. is part motion base based on flexibility in unit time certain (Syafuruddin, 2011). Number child in each category of 4 second sprint running is presented in the following table.

**Table 2.** 4 second sprint category

Category	Value Interval
Good	$LC > 19, 22$
At the moment	$3.4 \leq LC - 12.42$
Not enough	$LC < 3.4$

## 3. Passing the ball to the wall (wall pass)

Test Passing the ball against a wall aims to measure hand and eye coordination which is calculated by the number of passes per second at a distance of one meter from a standing position facing the target wall.



**Figure 4.** Passing the ball to the wall

The results of the trial ball passing test to wall with distance stand 1 meter away from wall Reflection . Test done in 30 children mentally disabled with get score maximum ball passing of 20 times and minimum score of 2 times, with an average score for each ball passing category to wall as many as 8 children are presented in the following table.

**Table 3.** Passing the ball against the wall

Category	Value Interval
Good	$PB > 12$
At the moment	$4 \leq PB \leq 12$
Not enough	$PB < 4$

4. Long jump without a run-up

This test aims to measure students' strength which is calculated in meters.



**Figure 5.** Long Jump Test Without Run-Up

The results of the no-run jump test trial on 30 mentally retarded students obtained a maximum jump distance of 2 meters and a minimum value of 0.044 meters, with an average value of each no-run jump category of 1.09 meters, which is presented in the following table.

**Table 4.** Long jump categories without run-up

Category	Value Interval
Good	$JL > 1.58$
At the moment	$0.6 \leq LJ \leq 1.58$
Not enough	$LJ < 0.6$

After obtained data results test try furthermore done analysis and it is known that developed instruments can declared valid with level significance  $0.000 < 0.05$ , results test reliability instrument test ability motion base student disability intellectual.category light age 8-13 years , shows value 0.811, based on mark level reliability according to ([Dina Hajja Ristianti, 2020](#)) can it is said very reliable. By Because that , instrument the can used as tool measuring ability motion base student mentally disabled .

### *Discussion*

The results of this study that the form of the basic motor skills test instrument for mentally retarded students consists of 4 tests, namely; basketball throwing test, 4-second sprint test, wall pass test, and standing long jump test which aim to measure basic skills locomotor, nonlocomotor and manipulation object. Students with intellectual disabilities in physical education learning that involves a lot of physical activity, have below average mental abilities that affect physical abilities in large and small ways, such as: Basic movements that seem awkward, disproportionate, and inflexible (stiff) especially in basic movements such as walking, running, jumping, and crawling ([Satria M. H, 2020](#)). Movement problems that generally occur in children with intellectual disabilities are weaknesses in gross motor skills, fine motor skills, movement coordination, motor skills, lack of self-awareness of the situation and surrounding environment, and poor physical health, ([Dana & Christodoulides, 2020](#); [Delpie, 2012](#)).

Furthermore, in the research that has been conducted ([M.Westendorp, Houwen. S, Hartman. E, 2012](#)) showed that the scores of children with special needs were significantly lower on all items of motor skills, the ability to master objects compared to normal children. This was also found by researchers in the initial observation of the study by conducting basic motor skills tests on students with special needs with moderate difficulty levels with very poor and poor results on locomotor, non-locomotor, and manipulative movement indicators ([Lou, Lin, Hsu, Liao, 2020](#)). Although in general students with special needs have mild intellectual



disabilities, they can still do physical education activities ([Listianti, 2018](#)).

Basic knowledge and understanding of Adaptive Physical Education for physical education teachers in special schools is still lacking, because many of them have a background as classroom teachers ([Komaini, Ganefri, Alnedral, Kiram, 2021](#)). So that professional competence as a physical education teacher is not fulfilled ([Ekawati et al., 2021](#)). Teachers in special schools need clear guidance on methods, models, or approaches and evaluation in physical education learning ([Rubiyatno et al., 2023](#)). Therefore, researchers provide a solution for teachers in special schools by using the basic movement ability instrument of *intellectual disability students* as an evaluation in physical education learning.

## CONCLUSION

The results of this study can be concluded that the form of the basic motor skills test instrument for mentally retarded students consists of 4 tests, namely; basketball throwing test, 4-second sprint test, wall pass test, and standing long jump test which aim to measure basic skills. locomotor, nonlocomotor and manipulation object. The basic motor skills test instrument for mentally retarded students aged 8-13 years develop by researchers meets the validity criteria and reliability criteria so that it meets the good criteria. Development this, test try the ability instrument motion focused base on student mentally disabled mild, limited to one school in Padang City. Therefore, the results cannot be generalized to a larger group of subjects. The researcher's suggestion for measure ability motion base student mentally disabled should use the right instrument.

## REFERENCE

- Atin, S., Kristiyanto, A., & Fadhilah, S. (2019). Analysis of Manipulative Basic Motion Learning Model Second Grade Mentally Retarded Children at Slb Putra Mandiri. *Social Science and Humanities*, 03(02), 848–854. <https://sshjournal.com/index.php/sshj/article/view/299>
- Baan A. B, Rahayu T, Sugiyanto, S. (2018). Survei Tingkat Kebugaran Jasmani Siswa Tunagrahita Pada Sekolah Dasar Luar Biasa Di Kabupaten Donggala. *Jurnal Pendidikan Jasmani Olahraga*, 7(3).
- Baqiyudin, G., Nurhasan, N., & Suroto, S. (2023). Improving The Gross Motor Skills Of Mentally Retarded Children Through Rhythmic Brain Gym Activities. *International Journal of Educational Research & Social Sciences*, 4(5), 845–849. <https://doi.org/10.51601/ijersc.v4i5.726>
- Branch, R. M. (2010). Instructional design: The ADDIE approach. In *Instructional Design: The ADDIE Approach*. <https://doi.org/10.1007/978-0-387-09506-6>
- Dana, A., & Christodoulides, E. (2020). The Effects of a Period of Selected Physical Activity



- on Improving Manipulative and Locomotors Skills of Children with Neuropsychological Learning Disabilities. *Journal of Rehabilitation Sciences and Research*, 7(1), 25–30. <https://doi.org/10.30476/jrsr.2019.81592.1006>
- Delpie, B. (2012). *Pembelajaran Anak Tunagrahita*. PT REFIKA ADITAMA.
- des Portes, V. (2020). *Intellectual disability* (pp. 113–126). <https://doi.org/10.1016/B978-0-444-64148-9.00009-0>
- Dina Hajja Ristianti, I. F. (2020). *Penilaian Konseling Kelompok*. Deepublish.
- Ekawati, F. F., Ismaryati, I., Rahayu, T. W., & Wijanarko, B. (2021). Meningkatkan Profesionalisme Guru Slb Melalui Pendampingan Permainan Adaptif Keterampilan Gerak Dasar Anak Berkebutuhan Khusus. *Jurnal Pengabdian Kepada Masyarakat*, 27(1), 28. <https://doi.org/10.24114/jpkm.v27i1.21452>
- Gusril. (2017). *Perkembangan Motorik Pada Masa Anak- Anak*. UNP Press.
- Haris Satria, M., Taroreh, B. S., Melynda, M., & Asri, N. (2020). Play activity: To increase fundamental movement skill for children with mild mental retardation. *International Journal of Human Movement and Sports Sciences*, 8(6), 1–10. <https://doi.org/10.13189/saj.2020.080701>
- Jonker, F., Didden, R., Goedhard, L., Korzilius, H., & Nijman, H. (2021). The ADaptive Ability Performance Test (ADAPT): A new instrument for measuring adaptive skills in people with intellectual disabilities and borderline intellectual functioning. *Journal of Applied Research in Intellectual Disabilities*, 34(4), 1156–1165. <https://doi.org/10.1111/jar.12876>
- Kirsty Dunn, Ewelina Rydzewska, Michael Fleming, A. C. (2020). Correction: Prevalence of mental health conditions, sensory impairments and physical disability in people with co-occurring intellectual disabilities and autism compared with other people: a cross-sectional total population study in Scotland. *BMJ Open*, 10(7), e035280corr1. <https://doi.org/10.1136/bmjopen-2019-035280corr1>
- Komaini, Ganefri, Alnedral, Kiram, G. (2021). Motor Learning Measuring Tools: A Design and Implementation Using Sensor Technology For Preschool Education. *International Journal Of Interactive Mobile Technologies (IJIM)*, 15, 179. <https://doi.org/10.3991/ijim.v15i17.25321>
- Kurt, S. (2017). *ADDIE Model: Instructional Design*. Frameworks & Theories. <https://doi.org/10.1017/CBO9781107415324.004>
- Listianti, W. (2018). Peran Orang Tua Dalam Pendidikan Anak Penyandang Disabilitas. *Media.Nationalgeographic.Co.Id*, 1(2), 174–200.
- Lou, Lin, Hsu, Liao, K. (2020). *The Effect Of Implementing Team Games Tournaments On Learning Motivation and Motor Skills In Higher Education Physical Education*. 12, 3. <https://doi.org/https://doi.org/10.3390/su12156147>
- M.Westendorp, Houwen. S, Hartman. E, V. C. (2012). Are Gross Motor Skills and Sport Participation Related In Children With Intellectual Disabilities? Research in Developmental Disabilities. *National Library of Medicine*, 32(2).

- Rubiyatno, Perdana, R. P., Supriatna, E., Yanti, N., & Suryadi, D. (2023). Team Game Tournament (TGT)-type cooperative learning model: How does it affect the learning outcomes of football shooting? *Edu Sportivo: Indonesian Journal of Physical Education*, 4(1), 86–96. [https://doi.org/10.25299/es:ijope.2023.vol4\(1\).12130](https://doi.org/10.25299/es:ijope.2023.vol4(1).12130)
- Satria M. H, W. M. A. (2020). Satria M. H, W. M. A. (2020). Permainan Gerak Dasar Lokomotor untuk Anak Tunagrahita Sedang. *PEJAKORA*, 7(1). Permainan Gerak Dasar Lokomotor untuk Anak Tunagrahita Sedang. *PEJAKORA*, 7(1). <https://doi.org/1023887/penjakora.v7i1.24696>.
- Schalock, R. L., & Luckasson, R. (2021). Intellectual disability, developmental disabilities, and the field of intellectual and developmental disabilities. In *APA handbook of intellectual and developmental disabilities: Foundations (Vol. 1)*. (pp. 31–45). American Psychological Association. <https://doi.org/10.1037/0000194-002>
- Sepriadi, Syafruddin, Khairuddin, Nurul Ihsan, L. (2022). Contribution of Motor Ability to Physical Fitness of Elementary School Students. *Jurnal MensSana Jurnal Ilmiah Bidang Pendidikan Olahraga Edition*, 7(2), 126–134. <https://doi.org/10.24036/MensSana.07022022.17>
- Sugiyono. (2019). *Metode Penelitian Kuantitatif, Kualitatif, Dan R&D* (Sutopo (Ed.)). Alfabeta, Bandung.
- Syafruddin. (2011). *Ilmu Kepelatihan Olahraga Teori dan Aplikasinya Dalam Pembinaan Latihan*. UNP Press.
- Wardana Ketut, Suarmini Kadek, S. D. (2019). Terapi Bermain bagi Tuna Grahita di SLB Negeri 2 Singaraja Bali. *Jurnal Peduli Masyarakat*, 2(2), 65–72. <https://doi.org/10.37287/jpm.v2i2.112>