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Bernadeta Suhartini
Yogyakarta State University, Indonesia

Sujarwo
Universitas Negeri Yogyakarta, Indonesia

Galih Priyambada
Universitas Muhammadiyah Kalimantan Timur, Indonesia

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Development of Tool for Evaluation of Motor Perception Activity Learning of Students with Intellectual Disabilities

Bernadeta Suhartini, Sujarwo, Galih Priyambada

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Abstract

The aim of this study was to develop an application-based assessment tool for evaluating motor perception learning in children with intellectual disabilities who attend elementary classes in State Special Schools in Yogyakarta City. The tool was designed to align with the characteristics of these children and determine their mastery of motor perception activities in the educational context. The measurement instruments were designed based on the underlying concept of the research, and the items were structured as follows: (1) Sensory awareness, which assessed the children's ability to identify and select balls of different sizes; (2) Balance awareness, which involved the children climbing blocks over a 5-meter distance; (3) Space awareness, which examined the children's ability to form shapes (circles, triangles, and rectangles) using body movements; (4) Body awareness, which evaluated the children's knowledge of the functions of different body parts (feet, hands, eyes, and ears); (5) Time awareness, which assessed the children's throwing and catching abilities using light and heavy balls; and (6) Directional awareness, which tested the children's ability to throw the ball in different directions (up, down, front, and back). The results indicated that the motor perception activity evaluation tool consisted of six items, each of which assessed the mastery of motor perception in children with intellectual disabilities who attend elementary classes. The validity of the test was found to be 0.720, and the reliability was 0.837. In conclusion, this research successfully developed an application-based learning evaluation tool and established motor perception assessment norms for children with intellectual disabilities attending elementary grades in State Special Schools in Yogyakarta City. These tools can be utilized by physical education teachers to assess the motor perception activities of children with intellectual disabilities in an educational setting.

Introduction

Physical education, sports, and health play a crucial role in education by encompassing various aspects such as physical fitness, movement skills, critical thinking, social skills, reasoning, emotional stability, moral actions, promotion of healthy lifestyles, and fostering a clean environment. These components are integrated into systematically planned physical activities, which align with the broader goals of national education (Yucesoy-Ozkan, Gulboy & Kaya, 2018). The overarching objective of physical education, sports, and health is to enhance physical fitness, enabling individuals, especially children, to navigate life successfully.

Improved physical fitness positively influences work performance, allowing individuals to carry out tasks efficiently without experiencing significant fatigue. Evaluation tools employed in motor perception activities within physical education are specifically designed to enhance students' physical fitness, develop their motor skills, foster knowledge and behaviors related to healthy and active living, instill sportsmanship, and promote emotional intelligence. Moreover, these activities create a conducive learning environment that supports the holistic growth and development of students across the domains of physical, psychomotor, cognitive, and affective abilities (Carbin, & Charles, 2018).

Intellectual Impairment and Special Education

According to the Law of the Republic of Indonesia, specifically the National Education System number 20 of 2003, Article 5 paragraph 1 emphasizes the equal right of every citizen to receive quality education. In paragraph 2, it further states that citizens with physical, emotional, mental, intellectual, and/or social disorders are entitled to special education. Children with special needs, referred to as ABK, exhibit abnormalities encompassing physical, mental, and social aspects. These children may encounter challenges related to sensory, motor, learning, and behavioral functions, consequently affecting their physical development. Due to difficulties in responding to environmental stimuli, imitating movements, and potential physical impairments, ABK requires exceptional education, known as PLB (Extraordinary Education).

PLB, as a form of special education, is specifically designed to cater to the educational needs of ABK. It encompasses specialized classes, programs, and services aimed at meeting the unique requirements of these individuals. Notably, education for children with special needs necessitates a tailored approach, particularly for those with intellectual disabilities whose intellectual capabilities fall below average. In this regard, physical education, sports, and adaptive health serve as key components that are carefully crafted to align with the specific characteristics and needs of each student. By engaging in adaptive physical activities within the context of physical education, sports, and health, individuals with intellectual impairments can enhance their extraordinary motor perception, as highlighted in the research by Cahyono (2015).

Therefore, special education, exemplified by PLB, acknowledges the diverse needs of ABK and offers tailored solutions through specialized classes, programs, and services. Within this framework, physical education, sports, and adaptive health are intricately designed to cater to the unique characteristics and requirements of students with disabilities, including those with intellectual impairments. These subjects provide opportunities for individuals to enhance their extraordinary motor perception through adaptive physical activities, fostering their overall development and well-being (Cahyono, 2015).

Motor Perception and Assessment in Children with Intellectual Disabilities:

In living daily life, mastery of motor perception is needed for each student. To determine the results after doing movement activities through physical education, sports and adaptive health learning, it is necessary to use a tool to assess the results after doing activities (Shahid, Naheed & Javed, 2012). In addition, movement (physical) activities carried out through physical education, sports and health learning to encourage physical growth, Psychic development, motor skills, and can stimulate the brain of children with intellectual disabilities to improve knowledge and concentration and child health.

Research conducted by Dyson, 2011 shows that the level of physical fitness of children with intellectual disabilities who have mental abilities at the age of 2 years to 12 years is in the category of less once, while normal children are in the category of less. Research conducted by Westendrop et al. (2012: 1) shows that children with mild intellectual impairment have significantly lower scores on almost all 5 items of specific motor skills, and also skills towards object control when compared to non-mentally impaired peers. The low level of physical fitness and movement ability of children with intellectual disabilities will have an impact on their health so that they are vulnerable to disease. To find out the level of children's fitness and the success of an education can be known through tests and measurements, and evaluations. As Johnson (2021) said, tests are tools used to measure performance and to collect data, while measurements are quantitative scores derived from tests. How far the goal has been achieved, or to what extent the child's learning progress can be revealed and presented through measurement and evaluation. Asep (2009) says that evaluation is the process of placing values on measurements by involving or comparing scores with scales and values instilled. In the evaluation process, an assessment to measure the level of success or progress of the child is conducted. The objectives of physical education are thorough in nature, covering the cognitive, affective, and psychomotor domains.

There are various terms for the mentally impaired, namely, weak brain, weak memory, weak nerves, weak mental, mentally impaired, and so on. These terms in English are called: mentality handicap, mentality subnormality, mentality *retarded, mentality deficient, oligophrenia, back warnerds,* and *intellectual subnormalit*y (Sri, 1987). The *American Association on Mental Deficiency* (AAMD) in B3PTKSM defines impairment as a disorder: it includes sub-average general intellectual functioning, i.e. IQ 84 and below based on tests, .appearing before age 16, showing barriers in adaptive behavior.

The definition of intellectual impairment according to the Japan League for Mentally Retarded (1992: p.22) in B3PTKSM (p. 20-22) is as follows: intellectual function is slow, namely IQ 70 and below based on standard intelligence tests, deficiencies in adaptive behavior, occurs during development, namely between conception to the age of 18 years. The American Association on Mental Retardation (AAMR) is an individual identified by psychologists as having slowness in thinking and learning and difficulty in speaking, measured by IQ levels below 70. All of those symptoms appear before the age of 18. One of the categories of Tunagrahita is Down Syndrome. The term *Mental Retardation* (mental disability), at this time should not be used anymore because it is considered degrading and mentally degrading the child. For this reason, a new term is used, namely intellectual disability.

Understanding children with intellectual impairments, as defined by Branatata (1977: 5), i.e., those who have the potential to acquire education in the areas of reading, writing, and arithmetic, and able to acquire abilities based on their talents. Causes of Intellectually Challenged Children According to Prihatin Muchrad (1991:18), various factors might produce intellectual disability. Genetic damage or biochemical abnormalities, chromosomal abnormalities, children with intellectual disabilities caused by this factor are typically Down syndrome or Mongol syndrome with an IQ between 20 and 60, and an average IQ between 30 and 40, there is a period before birth (Prenatal), infection Rubella (smallpox), Rhesus infection (Rh), At birth (Perinatal).

Intellectual impairment or mental retardation can be attributed to various factors that occur at different stages of a child's development. Prenatal factors include birth injuries, asphyxia, and premature birth. Postnatal factors comprise infectious diseases like meningitis, an inflammation of the brain's lining, and nutritional deficiencies such as malnutrition, particularly protein deficiency, experienced in infancy or early childhood. Furthermore, the socio-cultural environment also plays a pivotal role in the cognitive development of an individual. Alongside these factors, metabolic or nutritional disorders can also lead to intellectual impairment. Examples include Phenylketonuria, a disorder of amino acid metabolism attributed to enzymatic anomalies, and Gargoylism, a metabolic disorder affecting the liver, spleen, and brain's saccharide metabolism. Lastly, Cretinism, resulting from thyroid hormone imbalances primarily due to iodine deficiency, is another potential cause of intellectual impairment (Johnson, 2012).

Grossman et al. (1973), cited in B3PTKSM (p.24), delineated several causative factors of intellectual impairment, which span a broad range of biological and environmental influences. These factors encompass infections and intoxication, physical trauma or other physical causes, metabolic disorders, nutritional deficiencies, actual brain diseases related to postnatal conditions, unknown prenatal diseases or influences, gestational disorders, post-psychiatric disorders, and other unclassified conditions resulting from various environmental influences.

In order to accommodate the diverse range of abilities within the intellectually impaired population, the American Association on Mental Retardation, as referenced in Special Education in Ontario Schools (p. 100), presents a classification scheme useful for educational contexts. The classifications are as follows:

- Educable: This category includes children who, despite their intellectual disabilities, retain academic capabilities roughly equivalent to those of their peers in fifth grade at a regular elementary school.
- Trainable: This category includes children who possess the ability to engage in self-care, self-defense, and social adaptation, but have very limited potential for academic education. Through intensive, specialized training, these children can develop basic self-help and communication skills, albeit generally requiring consistent supervision and support.

This classification is pivotal in tailoring educational approaches to meet the unique needs of each child, optimizing their potential for growth and development.

The B3PTKSM provides an elaborate framework to categorize varying levels of intellectual disabilities for educational purposes. This schema includes classifications such as 'borderline' or 'slow learners' characterized by an IQ range of 70 to 85, 'educable mentally retarded' individuals with an IQ range of 50 to 75, and 'trainable mentally retarded' individuals with an IQ between 30 and 50 or 35 to 55. At the extreme end, individuals requiring intensive care, often labeled as 'dependent' or 'profoundly mentally retarded,' show an IQ less than 25 or 30. This framework, however, extends beyond intellectual capacity as it also evaluates adaptive behavior that underscores social maturity instead of mere intellectual prowess. Further, this classification incorporates three additional levels: Tunagrahita Ringan (debil), also referred to as moron, characterized by an IQ of 68-52 according to the Binet scale or an IQ of 69-55 per the Weschler scale (WISC). Although language and concentration abilities are noticeable in this group, they struggle academically, progressing at a rate of half to three-quarters that of their typical peers. Despite these challenges, with adequate support and educational interventions, they can attain basic literacy, numeracy skills, and eventual financial independence (Soetjiningsih, 2012). Moderate Intellectual Impairment (imbesil) is characterized by an IQ of 51-36 on the Binet scale and 54-40 on the Weschler scale (WISC). This group, with developmental abilities up to approximately 7 years, has limitations in numeracy skills, literacy, and social adaptability (Somantri, 2007: 106-107). Simple activities such as word repetition and skill programs involving scissors or painting are often beneficial for this group.Lastly, Severe and Very Severe Intellectual Impairment, often termed idiots, can be further bifurcated into heavy and very heavy categories. Individuals in these groups demonstrate an IQ between 32-20 on the Binet scale and between 39-25 on the Weschler scale (WISC) for severe impairment, while those with profound impairment show an IQ below 19 on the Binet scale and an IQ below 24 on the Weschler scale (WISC). These individuals display developmental abilities less than three years of age, late language skills, passivity, and motor skill issues. Intervention strategies often emphasize gross motor development and identification of colors and shapes, alongside a multisensory approach. Individuals in these categories require comprehensive care assistance, and they must be protected from potential dangers throughout their lives (Yohana, 2014: 118).

To clarify the aforementioned categorization or grouping of children with intellectual impairments according to their IQ in order to lead instructors in delivering PLB services for these children, consider the following: There are 5 (five) youngsters who are all the same age, namely 10 years old (Cronological Age = CA 10 th). A has an IQ of 100, B has an IQ of 70-55, C has an IQ of 55-40, D has an IQ of 40-25, and E has an IQ of 25 and below. To provide benchmark material for constructing adaptive learning for children with intellectual impairments, we transform the child's IQ into his or her mental age (Mental Age = MA). According to (Nanda et al., 2014: 1326), a kid whose condition is milder than the embossed youngster whose IQ level is between 25 - 50. Children with intellectual impairments that can be educated have cognitive levels ranging from 55 to 75. Children with intellectual impairments are able to teach, according to Yohana (2014: 27), specifically children whose intelligence is greater than the intelligence held by children with intellectual disabilities who can train.

According to AAMD (American Association On Mental Deficiency) and PP no. 72 of 1991, (Rochyadi, 2013), children with intellectual disabilities who are able to educate are those who are included in the group of children whose level of intelligence and adaptation is inhibited but have the ability to develop in academics, social adjustment, and work ability. So, based on some of these experts' opinions, it can be concluded that children with intellectual disabilities, defined as those with intelligence levels ranging from 50/55 to 70/75, still have the ability to develop in terms of education, social adjustment, and work skills when educated using special approaches and learning methods.The characteristics of children with intellectual disabilities can be split into two categories:

mental and social symptoms (Apriyanto, 2012). The mental symptoms include stunted thinking, lack of analysis skills, and weak fantasy power, while social symptoms involve poor independent functioning abilities. Despite their fluent speech, their vocabulary is often limited, and their intelligence reaches the equivalent of a normal 12-year-old child (Ministry of Health of the Republic of Indonesia, 2014).

The Ministry of Health of the Republic of Indonesia (2014) characterizes children with intellectual disabilities as being competent in speech fluency yet limited in their vocabulary. Despite this limitation, these children are capable of achieving intellectual development comparable to typically developing children up to the age of 12. Rochyadi (2013) expands on this, outlining that these children may have normal physical appearances, yet they display challenges in their cognitive abilities. They struggle with low thinking skills, self-control, attention, and are often unable to learn independently about daily life tasks. Sumaryanti (2017) further delineates the disparities between physical and mental abilities based on chronological age in children with moderate intellectual impairments. For example, a child with a chronological age of 12-17 years may exhibit mental abilities equivalent to a typically developing 6–8-year-old child. At their chronological age, these children are capable of engaging in highly organized games, furthering skills involving sports equipment like rackets and balls, and even participating in team games with a strategic understanding. However, at their mental age, they can only partake in modified versions of all sports activities, mostly individual sports like swimming, bowling, and walking, which require minimal social interaction and accountability from their peers. These children can execute simple tasks such as throwing and catching a ball, but they find it challenging to engage in competitive activities.

Drawing from these perspectives, it is evident that children with intellectual disabilities tend to exhibit certain distinct characteristics. These include lower cognitive abilities which make it challenging for them to carry out tasks involving mental and intellectual functions, fluency in speech despite limited vocabulary, weaker memory leading to difficulty in problem-solving, and variable capacities for self-control. These findings can be instrumental in developing appropriate educational strategies and interventions for this population.

The progression of a child's motor skills is significantly influenced by a multitude of factors, which necessitates that the motor development during the formative years should be commensurate with the child's maturation and chronological age (Santrock, 2007). Therefore, it becomes incumbent upon caregivers involved in a child's motor development to comprehend and appropriately facilitate the mastery of motor skills. Two key elements of a child's early motor development are motor enrichment and motor perception. This research aims to provide insights into the specific motor perceptions of children at certain periods or among children at Special Education Schools (SLB).

According to the relevant literature, İlhan and Esentürk (2014) developed a scale to measure the awareness level of the effects of sports on individuals with intellectual disabilities. The exploratory factor analysis revealed that the scale consists of 32 items and a single dimension. The explained variance is 75.083%. The Cronbach's alpha reliability coefficient for the entire scale is 0.989. Sperling et al. (2002) developed the Metacognitive Awareness Scale to measure metacognitive skills in students from grades 3 to 9. This scale has been adapted to the Turkish culture as a single-factor scale (Karakelle & Saraç, 2007). Howe et al. (2017) developed the Computerized

Perceptual Motor Skills Assessment (CPMSA) for children in early elementary grades. The scale demonstrated moderate significant correlations with relevant reference tests such as Beery VMI, TVPS-3, and the eye-hand coordination subtest of the DTVP-2, indicating good concurrent validity for the CPMSA. Kocakülah and Uslu (2018) developed a valid and reliable scale aiming to measure middle school students' mental states in conceptual learning. After the analyses, it was observed that the scale consisted of 35 items and comprised a total of 4 subscales. The emotional and intentional categories of the scale were found to consist of two factors, while the other internal and external mental state categories demonstrated a single-factor structure. Regarding the reliability analysis, it was determined that the Cronbach's alpha internal consistency coefficients of the subscales ranged from .67 to .79, and the overall Cronbach's alpha coefficient of the scale was .90.

As the principle of development is sequential and continuous, it is critical to assess the extent of motor enrichment and the quality of motor perception in children with special needs (Steyn & Vlachos, 2011). It should be noted that the competency of teachers, playgroup educators, caregivers, and managers of parental daycare centers plays a pivotal role in shaping the motor skills development of children. Given this context and the conspicuous absence of a standardized test to measure motor perception among SLB children in Yogyakarta City, there is an evident necessity to devise an evaluation tool, scale score, and norms for assessing children's motor perception.

Method

Study Design and Sample

The principal aim of this research was to devise an application-based assessment tool to scrutinize motor perception learning among children with intellectual disabilities in State Special Schools within Yogyakarta City. The research adopted a descriptive survey design, offering a quantitative depiction of trends, attitudes, and opinions of the population under study. The sample constituted 64 students with intellectual disabilities, aged 13-15 years, attending grades I-III in a public special school. A purposive random sampling technique was utilized to derive a representative sample from the target population, ensuring that each participant was chosen deliberately based on their relevance to the research question.

Data Collection Tools

An evaluation instrument, firmly rooted in the study's theoretical underpinnings, was developed for data collection. The instrument encompassed six critical domains: (1) Sensory awareness, evaluated through the child's proficiency in identifying and categorizing balls according to size; (2) Balance awareness, assessed via the child's capability to traverse a 5-meter block arrangement; (3) Space awareness, determined by the child's capacity to embody geometric shapes through bodily movements; (4) Body awareness, measured through the child's understanding of the functionalities of various body parts such as feet, hands, eyes, and ears; (5) Time awareness, gauged through the child's ability to handle balls of distinct weights; and (6) Directional awareness, tested through the child's aptitude to propel a ball in assorted directions. This instrument was meticulously designed to ascertain the children's mastery of motor perception activities within their educational environment.

Data Analysis

The collected data were subjected to robust statistical analysis procedures to affirm the validity and reliability of the instrument. The Pearson correlation coefficient, a statistical measure that calculates the strength of the association between two variables, was employed to evaluate the construct validity of the assessment tool. Moreover, Cronbach's alpha, a commonly used statistic for assessing internal consistency reliability of a psychometric instrument, was deployed to measure the reliability of the test.

Results

Validity of the Instrument

Validity of an instrument or scale refers to the extent to which it measures the intended variable. Unlike reliability testing, validity testing does not rely on a single number. Therefore, validity testing is mostly conducted through theoretical analysis (Reuterberg & Gustafsson, 1992).

Scope and Face Validity

Preliminary studies are needed to determine the coverage (scope validity) or the ability of an item to predict the relevant construct (construct validity) of the scale (McGartland et al., 2003). To test the comprehensiveness of the scale, experts' opinions and theoretical and empirical studies related to the subject are often utilized (Tezbaşaran, 2008). Face validity can be defined as "the extent to which a measurement tool appears to measure the intended characteristic based on its name, descriptions, and questions (Büyüköztürk et al., 2012). In order to ensure the face validity of the scale, the opinions of three faculty members working at the university were sought. Based on the feedback received from the experts, revisions were made to ensure face validity.

Construct Validity

Construct validity, defined as the degree to which a measurement tool can measure the intended theoretical construct, reveals the relationship between each item in the scale. Construct validity pertains to the extent to which the obtained scores from the test actually measure the intended concept or construct. The issue of how well the items in this scale measure the intended construct is related to construct validity. One of the most commonly used methods to test the construct validity of a scale is factor analysis (Bacon et al., 1995). In this study, factor analysis was conducted as the initial step for the validity analysis of the scale on the collected data (Table 1, 2, 3).

Table 1. Kaiser-Meyer-Olkin and Bartlett's Test Results related to Scale Scores

Tests	Factor and p value
KMO	.800
Bartlett x^2	108.088
p	.000*

As seen in Table 1, factor analysis was performed for all items of the scale due to each of the 6 items demonstrating consistent results among themselves and with the total scale scores. The suitability of the data for factor analysis was analyzed using Kaiser-Meyer-Olkin and Bartlett's tests. The Kaiser-Meyer-Olkin (KMO) value for Principal Component Analysis was found to be 0.80, which can be considered sufficient according to the literature and expert opinions (Murphy & Davidshofer, 1991). The result of the Bartlett's test was 108.088 ($p<0.05$), indicating that factor analysis is suitable for the variables (Aiken, 1996).

Table 2. Eigen Values related to Scale Scores

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.058	50.966	50.966	3.058	50.966	50.966
2	.887	14.779	65.745			
3	.690	11.505	77.249			
4	.552	9.205	86.454			
5	.475	7.912	94.366			
6	.338	5.634	100.000			

Extraction Method: Principal Component Analysis.

The Eigen value results related to the scale scores are presented in Table 2. The initial Eigen values indicate the amount of variance explained by each component. The first component has an Eigen value of 3.058, accounting for 50.966% of the total variance and cumulatively reaching 50.966%. The second component has an Eigen value of 0.887, explaining 14.779% of the total variance and cumulatively reaching 65.745%. The remaining components have Eigen values of 0.690, 0.552, 0.475, and 0.338, representing 11.505%, 9.205%, 7.912%, and 5.634% of the variance, respectively. The cumulative variance reaches 100.000%. These results summarize the distribution of variance among the components and indicate that Principal Component Analysis was employed as the extraction method.

Table 3. Results of Factor Analysis for the Scale

Scale Items	Factor Load
Item 1. Sensory awareness	.702
Item 2. Balance awareness	.801
Item 3. Space awareness	.743
Item 4. Body awareness	.750
Item 5. Time awareness	.679
Item 6. Direction awareness	.590

Factor analysis techniques were used for construct validity. Due to the positive results of the Kaiser-Meyer-Olkin and Bartlett's tests, Component and Varimax factor analyses were applied to reveal the underlying factors and dimensions of the scale. It is noted in the literature that factor loadings ranging from 0.30 to 0.40 can be considered as the lower cutoff point for creating a factor pattern (Neale & Liebert, 1980). As a result of the factor analysis, it was observed that the loading values for the first factor exceeded 0.59 for the 6 items. It can be concluded that the motor perception measurement instrument used as a motor perception evaluation tool for children with intellectual disabilities is still valid.

Instrument Reliability Test or Reliability

In the study, the item-total and reliability analyses of the scale are presented in Table 4 and 5, respectively.

Table 4. Summary of Item-total of Motor Perception Items of Mentally Impaired Children Able to Educate in SLB Negeri in Yogyakarta City

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Item 1. Sensory awareness	7.2031	3.879	.711	.856
Item 2. Balance awareness	7.1094	3.845	.684	.861
Item 3. Space awareness	7.0469	3.728	.743	.850
Item 4. Body awareness	7.2188	3.920	.697	.859
Item 5. Time awareness	7.0938	3.832	.687	.860
Item 6. Direction awareness	6.9844	3.952	.613	.872

The test in this study was used on the grounds that the instrument had been tested for reliability. Proven in the table above, the test conducted resulted in a reliability. Reliability refers to the notion that an instrument is trustworthy enough to be used as a data collection tool because the instrument is good. To test the reliability of the instrument in this study using the Alpha Cronbach technique, because the score on the instrument is a graded score of 0–3. The alpha coefficient set is 0.837. It means that

I. If alpha > 0.8, then the instrument used is reliable.

II. If alpha < 0.8, then the instrument used is not reliable.

It can be concluded that the motor perception measurement instrument used for evaluation tools is declared reliable or reliable. The Cronbach's alpha value is a coefficient that ranges between 0 and 1, and as this number approaches 1, it is considered that the scale has high reliability (Yılmaz & Sünbül, 2009).

Table 5. Item Summary and Total Validity and Reliability

Items	Validity	Information	Reliability	Information
Item 1. Sensory awareness	0.711	Valid	0.856	Reliable
Item 2. Balance awareness	0.684	Valid	0.861	Reliable
Item 3. Space awareness	0.743	Valid	0.850	Reliable
Item 4. Body awareness	0.697	Valid	0.859	Reliable
Item 5. Time awareness	0.687	Valid	0.860	Reliable
Item 6. Direction awareness	0.613	Valid	0.872	Reliable
Total	0.720		0.837	

From the research conducted, 6 test items have been found that qualify as measuring instruments for motor perception evaluation models of children with intellectual disabilities able to educate: (1) Sensory awareness, (2) Balance awareness, (3) Space awareness, (4) Body awareness, (5) Time awareness, and (6) Direction awareness.

The validity test result of 0.720 means that the tool can be used as a measuring instrument because it can already measure what should be measured. While the reliability test produces a number of 0.837, meaning that the tool is reliable and can be used as a measuring tool for motor perception of elderly children who are able to educate in Yogyakarta. The collected data is compiled on a score scale model of motor perception evaluation tools for children with intellectual disabilities able to educate by converting the rough number of each test item into a z score with cumulative frequency. The score scale then obtained the norms for assessing motor perception models of children with intellectual disabilities able to learn as shown in Table 6.

Table 6. Model Assessment Norms Motor Perception Evaluation Tool for Children with Intellectual Disabilities Able to Educate

No	Assessment Norms	Category
1	64-77	Bad
2	78-91	Not Good
3	92-105	Good enough
4	106-119	Good
5	120-133	Excellent

Table 6 provides the model assessment norms for the Motor Perception Evaluation Tool for Children with Intellectual Disabilities Able to Educate. The assessment norms are categorized as follows: scores ranging from 64 to 77 are considered "Bad," scores between 78 and 91 are classified as "Not Good," scores from 92 to 105 are deemed "Good enough," scores ranging from 106 to 119 are labeled as "Good," and scores between 120 and 133 are categorized as "Excellent." These norms serve as benchmarks to evaluate the performance of children with intellectual disabilities on the Motor Perception Evaluation Tool.

Discussion and Conclusion

The results obtained from this study provide important implications for the assessment of motor perception in children with intellectual disabilities. Considering the adequate KMO value and the suitability of the data for factor analysis, a factor analysis was conducted to determine the factorial structure of the scale (Ay et al., 2015). Factor analysis of the scale, coupled with the Kaiser-Meyer-Olkin and Bartlett's tests, indicates strong validity for the motor perception measurement instrument. This aligns with previous literature, confirming the necessity and effectiveness of these tests in assessing the construct validity of a scale (Bacon et al., 1995; Murphy & Davidshofer, 1991; Aiken, 1996).

The fact that the percentage of variance explained by a single factor exceeded 50% suggests a dominant underlying factor in the scale. This suggests a strong, specific construct being measured, reinforcing the validity of the scale.

The factor loadings also remained well above the literature's suggested cutoff (Neale &Liebert, 1980), offering further support for the validity of the instrument. In terms of reliability, the results align with existing research, suggesting that the instrument used is reliable. All items showed strong item-total correlations, and the Cronbach's alpha if items were deleted remained above the generally accepted cutoff of 0.80 (Yılmaz & Sünbül, 2009). The alpha coefficient for the scale was 0.837, providing strong evidence of reliability and indicating that the instrument can be used consistently to measure motor perception in children with intellectual disabilities. Due to the recommendation of obtaining a single total score in the scale, as in other studies, it appears more appropriate to use the scale by obtaining a single total score in this study as well (Schraw & Dennison, 1994; Sperling et al., 2002). The six areas identified for motor perception evaluation - sensory awareness, balance awareness, space awareness, body awareness, time awareness, and direction awareness - present a comprehensive framework that may provide valuable insight into the development of effective educational strategies for these children. This instrument may enable more accurate assessments and better-targeted interventions.

The findings have implications for both practice and future research. In a practical sense, the confirmed validity and reliability of the motor perception measurement instrument suggest it can be used as a useful tool for assessing the motor perception abilities of children with intellectual disabilities. This could assist educators, therapists, and caregivers in developing effective strategies for interventions, supporting their educational goals, and enhancing their quality of life.

For instance, it should be noted that each scale has a specific purpose and focus, and therefore, a single scale may not cover all requirements. Therefore, careful evaluation should be made when deciding which scale to use in a research or application. In addition to the debates regarding the use of scales, further research, and development of the scales are necessary. For example, it is important to examine the validity of the scales in different age groups and to conduct studies on long-term monitoring and effectiveness assessments of the scales.

In conclusion, the scales developed by İlhan and Esentürk (2014), Sperling et al. (2002), Howe et al. (2017), and Kocakülah and Uslu (2018) can play an important role in meeting assessment needs in specific areas. However, the limitations and controversial aspects of using these scales should be carefully evaluated. With future studies, further development of the scales and evaluation of their effectiveness will be possible.

Future research can build on these findings by exploring the specific ways these six areas of motor perception interact with each other and with different types of intellectual disabilities. Understanding these relationships might lead to even more nuanced and effective interventions. Researchers may also consider investigating the instrument's applicability across different age groups and cultural contexts, as well as its responsiveness to change over time.

Children, being invaluable gifts and responsibilities endowed upon us, deserve to be nurtured and educated to become beneficial members of society. Fundamentally, every child has the inalienable right to grow and reach their fullest potential, particularly in the realm of education. Nonetheless, a significant number of children grapple with intellectual impairments that not only hinder their cognitive functioning but also impact their adaptive behavior. The developed assessment tools are important in identifying children's needs in this regard and enhancing the quality of education provided to them.

The results also suggest a need for continuous validation and reliability testing, given the evolving nature of assessment instruments and the populations they serve. As new methods of analysis and interpretation emerge, and as our understanding of intellectual disabilities continues to develop, it's essential that we continually revisit and reassess our tools to ensure their ongoing efficacy and accuracy.

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Author Information

Bernadeta Suhartini
https://orcid.org/0000-0002-3661-9820
Yogyakarta State University
Colombo Street Number 1 Yogyakarta
Indonesia
Contact e-mail: *bernadeta_suhartini@uny.ac.id*

Sujarwo
https://orcid.org/0000-0001-8865-9499
Universitas Negeri Yogyakarta
Colombo Street Number 1 Yogyakarta
Indonesia

Galih Priyambada
https://orcid.org/0000-0002-4840-6152
Universitas Muhammadiyah Kalimantan Timur
East Kalimantan
Indonesia