



Original Article

Exploring the Psychometric Properties of a Tool to Assess the Talents of Children with Special Needs in Indonesia

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ABSTRACT

Background: This study aims to explore the psychometric properties of a tool designed to assess and improve the identification of talents in children with special needs in Indonesia.

Methods: This study used a cross-sectional and descriptive quantitative design. The qualitative part involved teachers from special schools in Indonesia who were purposefully selected. The quantitative part's sample size consisted of 354 participants chosen through random sampling. The qualitative data were analyzed by transcribing interviews and coding the main themes through several steps. Content validity, item analysis, internal consistency, and test-retest reliability were examined for the quantitative analysis.

Results: The qualitative analysis revealed that the talents of children with special needs in Indonesia can be categorized into six areas: cognitive, language, movement, social and emotional skills, learning and education, and daily life skills. The items' Content Validity Ratio (CVR) ranged from 0.8 to 1. The correlation between each item and the scale's total score indicated that all items were significantly correlated with the total score. Exploratory factor analysis supported the existence of six factors, all of which demonstrated acceptable factor loadings.

Conclusion: This study's findings suggest that the children's behavioral questionnaire possesses acceptable psychometric properties and is suitable for research and rehabilitation activities.

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Introduction

The global prevalence of individuals with special needs, such as those with mental retardation and autism, continues to rise. Currently, people with mental retardation comprise approximately 3% of the world's population [1]. Addressing mental retardation effectively begins with the early identification of symptoms. Early identification enables detecting children with cognitive or intellectual disabilities as soon as possible,

providing valuable insights for education and behavioral management [2].

Such identification is a foundation for conducting more comprehensive assessments to determine the most suitable interventions for children [3]. Furthermore, the information obtained through identification and assessment can guide the development of tailored educational programs, ensuring that children receive learning experiences that align with their unique abilities and needs [4-6].

The assessment process must be carried out by qualified professionals with the competence and authority to ensure accurate data collection that reflects the child's condition [7]. Individuals closely connected to the child, such as

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parents and teachers, play a vital role in the identification process [8]. The accuracy of teachers' identification and assessment significantly influences the development of appropriate learning plans and the effectiveness of teaching strategies for children with special needs [9, 10].

Alibakhshi et al. [11] and Avcı-Doğan [12] investigated children's behavior by focusing on processing speed as an indicator of general intelligence and learning potential. Their studies aimed to explore the effectiveness of game therapy in improving information processing speed and social/emotional processing in students with specific reading learning disorders. Using an experimental research method with a pretest-posttest control group design, their findings demonstrated that game therapy significantly enhances information processing speed and social/emotional processing in these students.

This research is significant because early identification of children with special needs can offer hope and lead to the development of tailored programs that address their unique requirements. The primary objective of this study is to examine the processes involved in identifying and assessing the talents and interests of children with special needs in inclusive schools across Indonesia.

This research's main contribution lies in identifying key factors that can help uncover the talents of children with special needs, thereby supporting their educational journey. The findings provide valuable insights for education and counseling services, crucial in treating and developing children with special needs.

Furthermore, the outcomes of this study can potentially inform policy decisions at both the national and provincial levels in Indonesia. These policies could focus on systematic data collection, identification, assessment, and nurturing interests and talents among children with special needs in inclusive school settings nationwide.

Materials and Methods

Participants

This study employed a descriptive research design, utilizing a survey method to gather data through questionnaires administered to participants. A total of

354 teachers and principals from inclusive schools across Indonesia participated in the study, which used structured questionnaires to collect data.

The demographic profile of the respondents includes variables such as school status, education unit level, and the types of special needs of students. Table 1 presents detailed demographic information.

Table 1 presents the demographic data of the research respondents. The status of the schools included in the study shows that 61.6% are public, while 38.4% are private. Regarding education unit levels, 25.7% of schools are at the TKLB, 86.7% at the SDLB, 79.7% at the SMPLB, and 72.3% at the SMALB. These figures indicate that children with special needs have opportunities to pursue the same levels of education as their peers without special needs.

Inclusive schools provide children with special needs access to various subjects and opportunities to participate in school events, extracurricular activities, and developmental programs. These include scientific and educational workshops, combined educational and recreational courses, specialized training based on interests, and scientific camping activities tailored to their needs and interests [13].

In terms of the types of special needs represented in the schools:

42.4% of schools include visually impaired students, 70.3% include students with hearing impairments, 80.2% accommodate intellectually disabled students, 53.1% support students with motor or mobility challenges, 34.5% cater to students with emotional and social-behavioral barriers, 55.1% include autistic students, 21.5% have students with ADHD, and 17.5% accommodate students with multiple disabilities.

Instrument

The questionnaire used in this study consists of 50 questions and evaluates eight aspects of children with special needs. The test is designed to measure the abilities and talents of children, focusing on eight distinct areas of intelligence, as shown in Table 2.

Table 1: Respondent Demographics

No	Demographics	Total	%
1	School Status		
	Government	218	61.6
	Private	136	38.4
2	Education Unit Level		
	Preschool for special needs children	91	25.7
	Primary school for special needs children	307	86.7
	SMPLB (Secondary school for special needs children)	282	79.7
	Senior high school for special needs children	256	72.3
3	Types of Special Needs of Students		
	Vision Impairment	150	42.4
	Hearing Impairment	249	70.3
	Intellectual Barriers	284	80.2
	Movement/Motoric Barriers	188	53.1
	Emotional, Social, and Behavioral Barriers	122	34.5
	Autism	195	55.1
	Attention deficit hyperactivity disorder	76	21.5
	Compound	62	17.5

Table 2: Questionnaires for Talent Identification

Subject	Question	Subject	Question
Linguistic intelligence	1. Interests in reading books and listening to stories.	Musical intelligence	24. Enjoys singing.
	2. Enjoys conversations and discussions		25. Remembers the rhythm of songs.
	3. Interested in memory games.		26. Enjoys playing with musical instruments.
	4. Enjoys rhyming sentences, riddles, and putting others to work.		27. Listens to music.
	5. Asking questions.		28. Interested in composing songs by himself (with sound-producing devices).
Logical-mathematical intelligence	6. Enjoys examining things and shaping them.	Interpersonal intelligence	29. Reacts when he hears music.
	7. Examines and explores patterns.		30. Whispers and whistles.
	8. Enjoys solving problems.		31. Talks about domestic animals.
	9. Enjoys playing on board and cardboard.		32. Interested in planting and bringing domestic animals to class.
	10. Interested in counting and saying numbers.		33. It has a collection of insects, stones, and other natural things.
Visual-spatial intelligence	11. Enjoy putting things together or separating parts from each other		34. Observes birds, butterflies, and clouds.
	12. Enjoys painting and drawing.		35. Takes things in nature to the classroom.
	13. Enjoys connecting the pieces of the puzzle.		36. Enjoys experiences outside the home and school and travel.
	14. Creates new things.		37. Enjoys playing with his friends.
	15. Dreaming.		38. Talks with others.
Physical-kinetic intelligence	16. Enjoys watching pictures and videos.		39. Having many friends.
	17. Enjoys physical activity.		40. Showing the characteristics of leadership.
	18. Interested in rhythmic movements.		41. Organizes activities.
	19. It moves around the room.		42. Enjoys group activities.
	20. Uses body language (hand and hand movements...)		43. Interested in helping others.
	21. Touches and examines objects.		44. Enjoys working alone.
	22. Enjoys role playing.		45. Seeks to satisfy his past.
	23. Interested in tactile experiences (such as playing with sand or painting).		46. Follows the interests.
			47. Enjoys thinking and pondering.
			48. Interested in personal space.
		49. Interested in solo work more than group work.	
		50. Interested in doing his work.	

These areas are visual-spatial, verbal-linguistic, logical-mathematical, kinesthetic, musical, interpersonal, intrapersonal, and naturalistic intelligence (Table 2) [13]. Both descriptive statistics (mean and standard deviation) and inferential statistics (Multivariate Analysis of Variance, MANOVA) methods were employed for data analysis. The statistical analyses were performed using SPSS 24 software.

Procedure

A feasibility or relevance test was conducted using a validity technique to validate the instrument and collect data. This process involved a rational analysis performed by a panel of competent experts through expert judgment. Data analysis employed quantitative descriptive techniques, analyzing trends and percentages for each component. Trends were calculated by dividing the score/frequency of each component by the maximum score and multiplying it by one hundred.

Two medical doctors specializing in psychometric assessments of special children and two experts educating children with special needs were consulted to evaluate the questionnaire items. The scale validation process used correlational and confirmatory factor analysis (CFA). The instrument's validity and reliability were confirmed by examining its factorial structure, Pearson's correlation, item-total correlations, internal consistency, and variance regression.

The questionnaire employed a Likert scale for scoring,

where responses ranged from 0 (Very Unimportant) to 3 (Very Important) [14]. The reliability of the questionnaire, calculated using Cronbach's alpha, demonstrated strong internal consistency. The reliability rate for the entire questionnaire was 1.79, with validity rates of 1.50 for the overall questionnaire and specific scores for its subcategories: interpersonal relationships (1.85), physical condition (1.88), and job interests (1.80) [15].

Results

Statistical Analysis

The inferential statistics section examined the research hypotheses using Pearson's correlation and linear regression statistical tests. All statistical analyses were conducted using SPSS software.

Central hypothesis: There is a relationship between meeting the standards of the teaching profession and the academic progress of students with special needs in Indonesia.

Pearson's correlation test was employed to determine the correlation between compliance with teaching profession standards and the academic progress of students with special needs in Indonesia. Table 3 presents the results.

Based on the findings, Pearson's correlation test indicates a moderate direct correlation between the components of compliance with teaching profession standards [16] and the academic achievement of students with special needs. These components include content

Table 3: Correlation Between Academic Progress and Teaching Profession Standards

Independent variables	Correlation	Significance level
Content knowledge	0.505	0.001
Teaching profession	0.507	0.001

Table 4: Pearson Correlation of Content Knowledge and Academic Achievement

Independent variables	Correlation	Significance level
Content knowledge	0.505	0.001

Table 5: Regression Variance to Determine the Effect of Content Knowledge on Students' Academic Progress

Variable	R	R ²	Modified R ²	Error	t	Sig
Content Knowledge	0.563	0.299	0.301	1.32	43.003	0.001

Table 6: Pearson Correlation of Content Knowledge, Teaching Methods, and Academic Progress

Variable	Correlation	Significance
Content knowledge of teaching methods	0.507	0.001

Table 7: Regression Variance to Determine the Effect of Content Knowledge of Teaching Methods on Students' Academic Progress

Variable	R	R ²	Modified R ²	Error	t	Sig
Content knowledge of teaching methods	0.498	0.234	0.229	1.32	43.003	0.001

knowledge, teaching methods, knowledge and skills of teaching, professional techniques and attitudes, and the ability to perform professional activities.

Sub-hypothesis 1: A relationship exists between content knowledge and academic progress of students with special needs in Indonesia.

As shown in Table 4, the findings of the Pearson correlation test indicate a moderate direct correlation between teachers' content knowledge and the academic achievement of students with special needs in Indonesia. The correlation coefficient was 0.505, with a significance level of 0.001, indicating statistical significance. This suggests that the higher the teachers' content knowledge, the more significant the academic progress observed in students with special needs.

The regression variance test was performed to determine the effect of content knowledge on the academic progress of students with special needs in Indonesia. The results are presented in Table 5.

The regression variance test, conducted with the t-test statistic and a significance level of 0.001, confirms the goodness of fit of the regression model relating to the content knowledge and academic progress of students with special needs. The test indicates that their teachers' content knowledge level influences 25% of the variance in students' academic progress.

Sub-hypothesis 2: There is a relationship between the content knowledge of teaching methods and the academic achievement of students with special needs in Indonesia.

As presented in Table 6, the Pearson correlation test results show a moderate direct correlation (with a coefficient of 0.507 and a significance level of 0.001) between the content knowledge of teaching methods and the academic achievement of students with special needs in Indonesia. Specifically, this suggests that the greater the teachers' content knowledge in teaching methods, the higher the students' academic progress.

According to the regression variance test performed with the t-test statistic and a significance level of 0.001, the

goodness of fit for the regression model linking content knowledge of teaching methods and the academic progress of students with special needs in Indonesia is confirmed. The regression test indicates that 25% of the variance in students' academic progress is explained by the amount of content knowledge of teaching methods (Table 7).

According to Table 5 and Table 7, the adjusted R-square value indicates that 97% of the variance in teacher performance, mainly related to content knowledge, is explained by job stress and the components of interpersonal relationships, physical condition, and job interests of teachers working with children with special needs in the entire research group. The standard coefficients of the predictor variables show that job stress and the physical condition of teachers have a significant positive contribution to predicting the physical environment. However, the career interests of the teachers have a significant negative contribution to predicting the physical environment, while interpersonal relationships do not significantly contribute to predicting the physical environment.

Factor Analysis

The continuous development of students, following their potential and talents, has been formally regulated in the Regulation of the Minister of National Education regarding the Development of Achievement of Students. This regulation emphasizes the importance of nurturing students' remarkable intelligence and talents through specialized training, educational assistance, and the provision of facilities to ease access to education, education insurance, and merit scholarships. Table 8 below presents the results from the factor analysis of the research instrument.

Table 8 shows the number and percentage of responses to each question on the instrument. The data reveals that 84.7% of schools identify the talents and interests of students with special needs, while 15.3% of schools do not engage in such identification.

Table 8: Results of Factor Analysis of the Research Instrument

No	Questions	Answers	
		Total	%
1	Identification/data collection of talents of students with special needs		
A	Implementation of identification		
	Yes (No)	300 (54)	84.7 (15.3)
B	Importance of identification		
	Very important	262	74
	Important	90	25.4
	Not important	2	0.6
	Very unimportant	0	0
2	Talent, special interest, students with special needs		
A	Interest in talent data		
	Yes (No)	105 (249)	29.7 (70.3)
B	The importance of interest talent data		
	Very important	252	71.2
	Important	102	28.8
	Not important	0	0
	Very unimportant	0	0
3	An identification instrument to capture the talents of Students with Special Needs		
A	Identification instrument		
	Yes (No)	221 (133)	62.4 (37.6)
B	Importance of identification instruments		
	Very important	253	71.5
	Important	100	28.2
	Not important	1	0.3
	Very unimportant	0	0
4	Special talent development for students with special needs		
A	Talent development		
	Yes (No)	333 (21)	94.1 (5.9)
B	Importance of interest talent development		
	Very important	257	72.6
	Important	97	27.4
	Not important	0	0
	Very unimportant	0	0
5	Special facilities for the development of special talents of students with special needs		
A	Availability of special facilities		
	Yes (No)	307 (47)	86.7 (13.3)
B	Importance of special facilities		
	Very important	265	74.9
	Important	89	25.1
	Not important	0	0
	Very unimportant	0	0
6	Special teachers/trainers/instructors for the development of special talents of students with special needs		
A	Availability of specialized teachers/coaches/instructors		
	Yes (No)	283 (71)	79.9 (20.1)
B	Importance of specialized teachers/coaches/instructors		
	Very important	272	76.8
	Important	82	23.2
	Not important	0	0
	Very unimportant	0	0
7	Special budget allocations to support the development of special talents of students with special needs		
A	Special budget allocation		
	Yes (No)	313 (41)	88.4 (11.6)
B	Importance of special budget allocation		
	Very important	250	70.6
	Important	103	29.1
	Not important	1	0.3
	Very unimportant	0	0
8	Inclusive time outside of class hours to provide special talent coaching for students with special needs		
A	Inclusive time		
	Yes (No)	260 (94)	73.4 (26.6)

B	Importance of inclusive time		
	Very important	182	51.4
	Important	167	47.2
	Not important	3	0.8
	Very unimportant	2	0.6
9	Participation of students with special needs in various competitions		
A	Participation of students with special needs		
	Yes (No)	331 (23)	93.5 (6.5)
B	Importance of participation of students with special needs		
	Very important	235	66.4
	Important	118	33.3
	Not important	1	0.3
	Very unimportant	0	0
10	Achievements in various championships from students with special needs and special talents		
A	Achievement of students with special needs		
	Yes (No)	331 (23)	84.7 (15.3)
B	Importance of achievement for students with special needs		
	Very important	186	52.5
	Important	161	45.5
	Not important	7	2
	Very unimportant	0	0
11	Awards for students with special needs and special talents who won the championship		
A	Championship award		
	Yes (No)	229 (55)	84.5 (15.5)
B	Importance of championship awards		
	Very important	223	63
	Important	131	37
	Not important	0	0
	Very unimportant	0	0

Additionally, regarding the interests of identification/ data collection, 74% of schools reported that it is very important to identify the special interests of students with special needs in inclusive schools.

Discussion

It is important to emphasize that most children with special needs possess intellectual abilities comparable to their peers. Adapting their education to fit their learning styles is the key to unlocking their potential. A deeper understanding of learning disabilities and specific learning challenges can significantly contribute to their success both academically and in broader life contexts.

Potential talents and abilities should be identified as early as possible [17]. As Moore et al. [18] suggest, early identification is pivotal in enabling children to acquire the necessary skills from a young age [19]. Identifying talents early also aids in tailoring educational strategies to best support their development. Since children often fail to recognize their strengths, teachers play a critical role in identifying these talents, offering guidance, and providing interventions that promote their growth [20].

In developing the talents and interests of children, teachers must offer stimulation that aligns with the child's identified strengths. This approach fosters growth and development positively and naturally, free from external pressures [21]. Positive reinforcement and support from teachers and parents further enable children to discover and nurture their talents [22]. To ensure the success of the teaching and learning process for students with special needs in inclusive schools, it is essential to assess various

factors—both from the perspective of the teachers and the students [23].

Schools play a crucial role in fostering the talents and interests of children with special needs. However, the data reveals significant gaps in practice: only 29.7% of schools maintain written data on student interests and talents, while a striking 70.3% do not. Despite this, 71.2% of schools acknowledge the importance of such data, compared to 28.8% that consider it unimportant.

Regarding the availability of identification instruments, 62.4% of schools reported having tools to capture the specific interests of students with special needs. Notably, 71.5% of schools agree on the critical value of these instruments. This highlights a clear need to standardize and emphasize the implementation of identification processes across all-inclusive schools.

Developing children's talents requires aligning educational programs with the differentiating frameworks of giftedness and talent. Schools must use instruments that are not only tailored to identify these attributes but also validated by experts and grounded in established principles and practices. Following identification, schools should ensure targeted coaching that nurtures specific talents and interests to maximize each child's potential.

In the special interest talent development activity for students with special needs, 94.1% of schools have implemented coaching programs, with 72.6% of these schools being governmental. Fostering the talents of students with special needs in inclusive schools is highly important, as 27.4% of schools also acknowledged its importance. Dialogue development and demonstrations of interest and talent are conducted to optimize the potential of

students with special needs [26 (Ref 24, 25)]. For instance, in Indonesia, children with Down syndrome have played a significant role in talent development activities, serving as a reference for other schools in nurturing the potential talents of students. Technological advancements can enable children with special needs to experience change, build social relationships, and acquire essential skills [27]. Based on the perceived importance of these facilities, 74.9% of schools stated that special facilities were very important, while 25.1% considered them important. A supportive learning environment can significantly enhance the development of students' skills [28].

79.9% of schools provide teachers with expertise in special interest talents, while 20.1% do not. Therefore, it is crucial to ensure the availability of exceptional teaching staff with adequate knowledge of social participation and student academic achievement [29]. Regarding the importance of providing specialized teachers, trainers, or instructors, 76.8% of schools stated it was very important, while 23.2% considered it important. This reflects positive progress, as it involves experts in student activities. Providing adequate infrastructure facilities for inclusive schools positively impacts student achievement [30]. For example, coaching students with cerebral palsy has positively affected their determination and performance in Paralympic competitions. Thus, the positive attitude of teachers, trainers, and instructors toward inclusion is a prerequisite for the success of inclusive education [31, 32].

Budget allocation is essential to support the talent development of students with special needs in inclusive schools. 88.4% of schools have allocated a special budget based on the instrument results. Additionally, schools provide special time outside of class hours to focus on talent development for students with special needs who have special interests. According to the instrument results, 73.4% of schools have allocated special time for talent development, while 26.6% have not. Further supporting these findings, only 51.4% of schools stated that allocating special time for fostering the talents of students with special needs was very important, while 29.1% considered it important. The remaining schools regarded it as unimportant. Multidimensional support can potentially improve students' health and well-being [33].

Regarding students with special needs participating in various competitions, 93.5% of schools have included them in such events. Of these, 66.4% of schools stated that the participation of students with special needs in competitions was very important, while 33.3% considered it important. Students' involvement has resulted in significant achievements, with 84.7% of schools reporting success in various championships. Additionally, as a form of appreciation, 84.5% of schools provide awards to students with special needs who win championships. This highlights that early identification and appropriate interventions can yield remarkable outcomes in the form of achievements by students with special needs. Such successes can help shift the negative stigma associated with special needs into a positive narrative, showcasing the potential for these students to develop their strengths. Furthermore, student performance and achievement

motivation are key indicators of inclusive education success [34].

Conclusion

The findings indicate a significant and positive relationship between the content knowledge of teaching methods and the academic achievement of students with special needs in Indonesia. Teachers with adequate knowledge of teaching strategies, content planning, and both formal and informal evaluation methods are better equipped to facilitate the academic progress of students with special needs. Expert teachers can adopt suitable solutions within the teaching-learning process to support students in achieving academic success.

Identifying and assessing the talents and interests of students with special needs are crucial for schools and teachers to provide appropriate education, instruction, and mentoring. Effective talent identification requires data from thorough assessments, reliable assessment instruments, the development of talent and interests, adequate facilities, professional support from teachers/trainers/instructors, budget allocations, dedicated time, student participation in activities, achievement recognition, and awards for accomplishments.

This study underscores the importance of systematic policies by the central government and provincial governments in Indonesia to promote talent and interest assessments and foster the development of talents and interests for children with special needs in inclusive schools nationwide.

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