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Development of Digital Identification Instruments for Mentally Retarded Children

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Abstract: This study aims to develop a digital identification instrument based Decision Support System (DSS) for mentally retarded children. First year research consisted of three stages, namely (a) instrument need analysis, (b) instrument prototypes development, (c) instrument validation. The study involved 20 special schools taken by purposive sampling from eight districts/cities in Central Java. The method of collecting data at the needs analysis stage uses a questionnaire given to 32 respondents (teachers and principals). At the stage of prototype development, data collection is done by using a web-based DSS development technique. Furthermore, the instrument validation stage is done through professional judgment with Focus Group Discussion (FGD) techniques involving special education experts, information and technology experts, psychometric experts, language experts, psychologists, and users/teachers. Data analysis was performed with quantitative descriptive and qualitative descriptive techniques. The results of the study at the needs analysis stage showed that 75% of respondents had difficulty in compiling identification instruments for mentally retarded children; all respondents (100%) needed the development of identification instruments for mentally retarded children; and 50% of respondents chose identification instruments in digital form. At the instrument development stage, the characteristics of mentally retarded children based on the criteria contained in the previous DSM-V are described in the form of indicators. The identification results of this digital instrument are still limited to indications so that it needs to be continued with more in-depth assessment by authorized professionals. The results of expert validation at the instrument validation stage indicate that this digital identification instrument for mentally retarded children meets the eligibility criteria with improvements in several aspects such as aspects of language, web appearance, and technical operation of the instrument. Furthermore, the instrument prototype is repaired and will be continued with small-scale and wide-scale trials.

Keywords: digital instruments; identification; mentally retarded children.

INTRODUCTION

Mentally retarded children are children with intellectual abilities below the average, which makes it difficult for them to take part in regular education programs so that special education is needed according to ability (Somantri, 2006). The number of mental retardation or mental disability in Indonesia is quite high, reaching 6.6 million people or three percent of the population of around 220 million (http://www. antaranews.com/ berita / 83721 / tunagrahita - di - indonesia - capai - 66 - juta- orang). Therefore, mentally retarded children need special attention, especially in terms of their education. There needs to be an effort to provide appropriate education for mentally retarded children according to their abilities and needs.

Efforts to provide appropriate education to children need to begin with identification and assessment related to the abilities and conditions of the child. Identification of mentally retarded children is carried out with the aim to find out as early as possible whether children experience mental/intellectual disorders/deviations or not so that they can be categorized as mentally retarded children or not. The results of the identification can then be used as preliminary data to carry out the assessment process in more depth. Information or data from identification and assessment results can then be used as a basis for developing appropriate learning programs so that children can get an education that is appropriate to their abilities and needs.

Identification of children with special needs can be done by the closest parties of children, such as teachers or parents. Meanwhile, the assessment process needs to be carried out by professional staff in accordance with their competencies and authorities in order to obtain accurate data according to the child's condition. Thus, the process of identifying whether a child has a mental/ intellectual disorder or can be indicated as a child with mental retardation can be done by the teacher or parent as the closest party to the child. Meanwhile, a more in-depth assessment process related to the condition of the child needs to be carried out by professional staff such as psychologists to establish an accurate diagnosis of the child's mental condition and intellectual abilities.

Table 1. Blueprint of digital identification instruments for mentally retarded children

No	Criteria	Aspect	Indicator	
1	Intellectual function disorder	a. Intellectual ability	1	Difficulty mentioning names
			2	Difficulty in naming body parts
			3	Difficulty in mentioning the number of limbs
			4	Low abstraction (imagination ability)
			5	Minimal speech development
			6	Mimic behavior
		b. Academic ability	7	Difficulty with the concept of numbers
			8	Difficulty with the concept of time
			9	Difficulties with the concept of color
			10	Difficulties with good bad concepts (example: beautiful - ugly)
2	Adaptive function disorder	a. Physical appearance	11	Dirty / not clean appearance
			12	Jolly
			13	Mouth open
			14	Mouth saliva
			15	Flat voice
			16	Thick lips
			17	Slanted eyes
			18	Short fingers and toes
			19	Coarse hair (perpendicular)
			20	Flat back head
			21	Eyebrows grow following the upward outward line
			22	Mongoloid face
			23	Physical growth is disturbed, small, weak
		b. Self-help ability	24	Depend on others
			25	Cannot avoid danger
			26	Do day-to-day activities without awareness
			27	Don’t understand cleanliness
			28	Likes to damage theirselves
		c. Social ability	29	Limited social interaction / social contact
			30	Do not have affection

Identification and assessment of children with special needs is one of the tasks of special education teachers. The accuracy of the results of identification and assessment carried out by the teacher will determine the appropriate learning plan for the child. However, conditions in the field indicate that special education teachers are still having difficulty identifying and assessing children with special needs, one of them is mentally retarded children. The difficulty is caused by the limited competence and knowledge of the teacher about the characteristics of the children with special need, the diversity of characteristics of the children with special need, there is no standardized identification and assessment instrument of children with special need, and the absence of applications or software for digital identification instruments for the children with special need. In addition, the difficulty of identification and management of mentally retarded children is also caused by the characteristics of mentally retarded children, one of which is determined by the level of intelligence (IQ) that can only be done by authorized professionals, namely psychologists.

Based on the DSM-V (American Psychiatric Association, 2013), a child can be said to experience intellectual impairment if he fulfills the two main characteristics of having intellectual functioning disorders and impaired adaptation functions, both of which appear at the age of development. In the process of developing identification instruments for mentally retarded children, the two main criteria or symptoms of mentally retarded children based on the DSM-V were translated into indicators which then served as the basis for developing digital identification instrument prototypes for mentally retarded children.

Table 1 is the blueprint of the characteristics of mentally retarded children as content in the development of digital identification instruments for mentally retarded children. The indicator is then used as a database for the development of digital identification instruments for mentally retarded children. The software application used in the development of digital identification instruments for mentally retarded children is the Decision Support System (DSS) application.

Meanwhile, Decision Support System (DSS) is a computer-based decision support system that supports businesses or organizations to make activity decisions (https://en.wikipedia.org/wiki/Decision_support_system). DSS consists of four components, namely (1) input, in the form of factors, numbers, and characteristics to analyze; (2) user knowledge and expertise, where input requires manual analysis by the user; (3) output, in the form of data that has been transformed from the DSS "decision" produced; (4) decisions, namely the results produced by DSS based on user criteria.

Thus, the purpose of this study was to develop a digital identification instrument for mentally retarded children based on the Decision Support System. This digital identification instrument is intended for teachers, especially special education teachers, with the hope that it can help one of the teacher's tasks to accurately identify and assess children in order to provide appropriate education services according to the needs and abilities of children as early as possible.

METHOD

This study uses an educational research and development (R & D) approach from Borg & Gall (2007), which aims to produce digital instruments DSS-based to identify mentally retarded children. In the first year, the research was conducted in three stages, namely the needs analysis stage, the instrument prototype development stage, and the instrument validation stage based on professional judgment. The study was carried out by involving 20 Special Schools taken by purposive sampling from eight districts/cities in the Central Java region namely Surakarta, Sukoharjo, Karanganyar, Boyolali, Klaten, Wonogiri, Pemalang, and Sragen.

The method of collecting data at the needs analysis stage uses a questionnaire given to 32 respondents (teachers and principals). At the stage of prototype development, data collection is done by using a web-based DSS development technique. Furthermore, the instrument validation stage is done through professional judgment with Focus Group Discussion (FGD) techniques involving three special education experts, two information and technology experts (IT), two measurement experts (psychometrics), two linguists, one psychologist, and 20 users/teachers. Furthermore, data analysis in this study uses quantitative descriptive and qualitative descriptive techniques.

FINDINGS AND DISCUSSION

The results of the study at the needs analysis stage in the form of a preliminary study survey showed that 75% of respondents had difficulty in compiling identification instruments for mentally retarded children, 3% of respondents had difficulty using existing instruments, and 19% of respondents had difficulty in processing identification results. In addition, all respondents (100%) stated that they needed the development of identification instruments for mentally retarded children. Of the 32 respondents (teachers and principals), 50% of respondents preferred identification instruments in the form of digital computers and 41% chose in the form of print files, while 9% did not answer. Thus, it can be concluded that there is a need related to the development of digital instruments to identify mentally retarded children who can help the teacher's task in identifying and assessing students in the current era of globalization and digitalization.

Furthermore, in the process of developing identification instruments for mentally retarded children, the characteristics of mentally retarded children were based on the criteria of children with intellectual impairments found in the DSM-V (American Psychiatric Association, 2013) which had impaired intellectual functioning and impaired adaptation function, both of which appeared on development period. Furthermore, the two main criteria or symptoms are translated into indicators that are more directly observable through observation and brief interviews. Determination of indicators is adjusted to the competence and authority of the teacher considering that this digital identification instrument is intended to assist the teacher's task in the process of identification and assessment in order to develop learning plans for children. These indicators are then used as a basis in developing digital identification instruments for mentally retarded children.

The results of this digital identification instrument are indications or allegations that children are included in the category of mental retardation or not, not in the form of a diagnosis. Therefore, the results of this identification in the form of indications or allegations still have limitations so that they still need to be continued with further assessment processes by authorized professionals such as psychologists. In addition, the results of identification have not been able to provide a definite diagnosis about the level of impairment of children (mild, moderate, or severe mental retardation) and also the level of intellectual ability. That is because the determination of the diagnosis is not the authority of the teacher but is the authority of the psychologist. Thus, the results of this digital identification instrument are in accordance with the authority of the teacher and do not exceed the authority of the psychologist in the process of identification and assessment of mentally retarded children.

Furthermore, the results of instrument validation by experts indicate that digital identification instruments for mentally retarded children fulfill eligibility criteria

with several improvements. These improvements are related to language, web appearance, and technical operation of the instrument. In aspects of language, improvements are related to the use of simple terms that are more concrete and easier to understand. While improvements to the technological aspects related to the appearance of the web can be made more attractive but still simple and the technical operation of the instrument to be made more systematic, more practical, and easier to understand related to the results of the indication. While in the psychometric aspects and mental health content, the indicators are in accordance with the blueprint of the instrument so that it meets the eligibility criteria. Furthermore, the instrument prototype is improved according to the input of experts and will be continued with limited-scale trials and large-scale trials.

CONCLUSION

The results of the study at the needs analysis stage showed that 75% of respondents had difficulty in compiling identification instruments for mentally retarded children and all respondents (100%) needed the development of identification instruments for mentally retarded children. In addition, 50% of respondents prefer identification instruments in digital form. It can be concluded that there is a need for the development of digital instruments to identify mentally retarded children who can help with the task of teachers in identification and assessment in the current era of globalization and digitalization.

At the instrument development stage, the characteristics of mentally retarded children based on the criteria contained in the DSM-V are described in the form of more concrete indicators adjusted to the competence and authority of the teacher in the identification and assessment of mentally retarded children. The results of the identification of digital instruments are still limited to indications or allegations that children are included in the category of mentally retarded children so that they need to be continued with a deeper assessment process by authorized professionals.

The results of expert validation at the instrument validation stage indicate that digital identification instruments for mentally retarded children meet the eligibility criteria with improvements in several aspects such as aspects of language, web appearance, and technical operation of the instrument.

In the end, this digital identification instrument for mentally retarded children is expected to be used to help one of the teacher's tasks in the process of accurately identifying and assessing children so that learning programs can be arranged that are appropriate to the abilities and needs of the child.

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