The Effect of Land Transportation Educational Game (GETAR) Based on Computer Assisted Instructional (CAI) on Cognitive Ability of Children with Intellectual Disabilities

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Abstract. Mild mentally retarded children are children with intellectual disabilities who can still be developed academically. As one aspect that can be developed, namely, the ability to recognize land transportation. The use of learning media in the form of Land Transportation Educational Games in Indonesian abbreviated (GETAR) Based on CAI is one of many ways in the context of learning the ability to recognize land transportation for mild mentally retarded people. CAI Based Land Transportation Educational Game GETAR is an interactive medium, because it stimulates users to be directly involved in the game. This study uses a quantitative approach with a pre-experimental one group pretest-posttest method. The subjects in this study were five participants who were students with mild mental retardation in grade 7 SLB Negeri Batu. This research activity is divided into three stages: pretest, giving treatment, and posttest. The results of the study describe the average pretest and posttest. Respectively worth 51 and 81. With the values of Asymp.Sig. (2-tailed) of 0.041, then H1 is accepted and H0 is rejected. So, the CAI-based GETAR Land Transportation Educational Game has an effect on increasing the ability to recognize transportation for mentally retarded children at SLB Negeri Batu.

Keywords: Mild Mental Retardation · Land Transportation · Getar

1 Introduction

Children with mental retardation are individuals with intelligence below average and experience developmental delays in adapting to the environment, Amin (1995). These limitations cause mentally retarded children to be less good at thinking about abstract things, such as mathematics learning materials. According to [1, 2] mental retardation is a child who has intelligence that is significantly below average and is accompanied by an inability to adapt behaviour that appears during development.

Mild mentally retarded children according to [3, 4] are mentally retarded children who have an IQ of 50–80. Mild mental retardation are children who are still able to educate (disabled). They can be independent and taught like other children with normal

IQ. It's just that the learning that is done is quite time-consuming and special attention. They can achieve intelligence up to the average intelligence of a normal child aged 12 years. If trained consistently and in comfortable situations, mild mental retardation can develop like other normal children.

Meanwhile, according to [5, 6] children with mild mental retardation or children who are able to educate, namely children who have the ability to work while for the IQ range of mentally retarded children have an IQ of 69–50. Another opinion according to the Guidelines for the Diagnosis of Mental Disorder [4, 6] Mild retarded children are usually a bit late in learning language but most of them can achieve the ability to speak for their daily needs. In addition, they are also able to hold conversations, and can also be interviewed. Most of them can also be fully independent in taking care of themselves such as eating, bathing, dressing, defecating and urinating. Even able to achieve practical skills and household skills, although the level of development is a bit slower than normal children. The main difficulty usually appears in school work of an academic nature.

The intelligence ability of mentally retarded children is mostly measured by the Stanford Binet test and the Wechsler Scale (WISC) in [7–9] Mild mental retardation is also called moron or debil. This group has an IQ between 68–52 according to Binet, while according to the Weschler Scale has an IQ of 69–55. They can still learn to read, write, and do simple arithmetic. With good guidance and education, children with mild mental retardation in time will be able to earn income for themselves.

There are several classifications of mentally retarded children, according to Hallahan in [10, 11], namely mild mental retardation (light mental retardation (IQ 70–55), moderate mental retardation (moderate mental retardation IQ 55–40), saver mental retardation/severe (tuna mental retardation IQ 40–25), and profound mental retardation / very severe (tuna mental retardation IQ 25 and below). Meanwhile [1] states the classification of intelligence abilities based on IQ scores from Stanford-Binet and David Wechsler are mild mentally retarded children (IQ 50–70), moderate mentally retarded children (IQ 25–49), and mentally retarded children. Weight (IQ 25 and below). Children with mild mental retardation can still learn to read, write, and do simple arithmetic. His intelligence develops at a rate between half and three-fourths the speed of a normal child and stops at a young age. After adulthood, mentally retarded children are able to stand on their own and their intelligence reaches the normal age level of 9 and 12 years. Transportation is used to make it easier for humans to carry out daily activities. The introduction of transportation to mentally retarded children is very influential to help stimulate imagination and creativity. According to [12], transportation is defined as a system consisting of certain facilities along with a flow and control system that allows people or goods to move from one place to another efficiently at any time to support human activities. Types of land transportation consist of all forms of transportation that operate on land. This type of land transportation is often considered synonymous with road transportation [13]. Types of land transportation consist of various types of transportation with special characteristics. According to [14], land transportation can be classified into 2, namely Physical Geographical Transportation, consisting of types of rail transportation, types of inland water transportation, special types of transportation from pipes and cables and types of road transportation. Second, Administrative Geographical Transportation, divided into urban transportation, rural transportation, inter-city transportation within

the province, inter-provincial inter-city transportation and cross-border transportation between countries (international).

Educational games are all kinds of games aimed at creating a learning environment that is beneficial for students. Educational games that are interesting, interactive, and easy to understand will generate interest in learning for children with special needs with mental retardation [15, 16]. Educational games are one type of media used to provide teaching, increase knowledge through a unique and interesting media. According to [17] a game or game is something that can be played with certain rules so that someone wins and someone loses, usually in a non-serious context with the aim of refreshing. The benefits of educational games in general include making children more motivated because educational games are an interesting and interactive learning method. The learning process can be done anywhere and anytime. Game as a playing activity carried out in order to seek pleasure and satisfaction, but is characterized by a search for winning or losing. In addition to fun, there are certain benefits that children can get through playing [18]. The design of strategies for using educational games is usually done in two ways, namely playing games in a learning setting or learning directly through games [19]. Educational games are a form of game designed to help students achieve certain learning goals and at the same time provide motivation [20]. The use of games can help design parables or game designs in learning [12]. Games can be categorized as one of the formats of learning multimedia presentations. Judging from the game model specifically, [21] provides a detailed category into 20 types. Examples include (1) platform games (2) sports games, (3) serious games, (4) casual games, (5) edutainment (educational games), (6) RPG (role playing games), and so on. This type of educational game actually emphasizes more on functional design, not on technical design. CAI (Computer Assisted Instruction) is one of the most interesting learning media and can increase children's learning motivation. CAI helps children understand a material and can repeat the material repeatedly until he masters the material. CAI utilizes all computer capabilities, consisting of a combination of almost all media, namely: text, images, photos, audio, video and animation. All of these media are convergent, will support each other and merge into one extraordinary medium, Effendi (2017). Another opinion according to Ronald H. Anderson in Wahyu, et al. (2017:4) broadly CAI is the use of computers directly on students to convey lesson content, provide exercises and test students' learning abilities.

2 Methods

This study uses a quantitative approach. The quantitative approach uses data analysis in the form of numbers and statistics. According to [22] the quantitative approach is a method based on the philosophy of positivism, used to observe certain populations or samples, in collecting data using research instruments, statistical data analysis which aims to test established hypotheses.

This study used a pre-experimental design in the form of a one-group pre-test post-tests design because in this study there were no control variables and there was a pre-test before treatment and post-tests after treatment using an experimental group that aims for more accurate results from treatment after being given treatment. The design of this
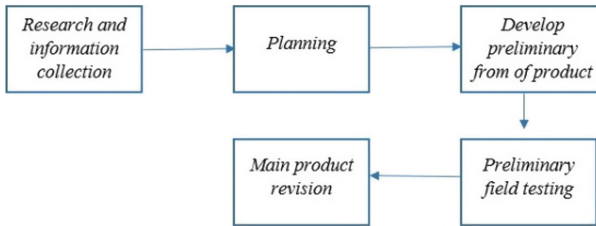
Fig. 1. Design of the Research

Fig. 2. Results of Product Development

research can be described as follows [22] can be seen in Fig. 1 and the results of product development can be seen in Fig. 2.

According to Sandu, et al. (2015) there are data collection techniques in the form of interviews, questionnaires, tests, observations, and documentation. In this study, researchers collected data through a method that was carried out by tests, observations, and documentation. As for the test instrument, it can be seen in Table 1, while the results of the validator can be seen in Table 2 and Table 3. The treatment procedure, namely at the implementation stage, was carried out on 5 children, the implementation was carried out by giving a pre-test 1 time, treatment 4 times and post-tests 1 time. At this stage, researchers used to determine the ability to recognize land transportation for students of SMPLB class 7 mentally retarded before and after giving treatment.

3   Results and Discussion

The pre-test data were obtained before being given treatment using the CAI (Computer Assisted Instructional)-based Land Transportation Educational Game (GETAR) media to 7th grade mentally retarded students at the Batu City State Junior High School. The pre-test was carried out 1 time with a total of 20 questions by making 2 answer options for each question. The following is the pre-test data to determine the initial ability to

Table 1. Test Instrument

Competency standards	Basic competencies	Indicator	All Item	No. Item
Getting to know land transportation	Know the types of technology used in the local area (among others: production, communication and transportation technology)	Choose land transportation	5	1,2,3,4,5 (A)
		Sort land transportation by number of wheels	5	1,2,3,4,5 (B)
	Show and tell the types of technology that exist in the local area (among others: production technology, communication and transportation) and their benefits for life around the house, school, or playground	Match ground transportation according to the picture	5	1,2,3,4,5 (C)
		Installing numbers according to the number of transportation wheels	5	1,2,3,4,5 (D)

Table 2. Validator 1 Test Results

No.	Alternative Answer	Score	Total Answer	Total Score
1.	Very relevant	4	22	88
2.	Relevant	3	2	6
3.	Less relevant	2	-	-
4.	Irrelevant	1	-	-
Total				94

Table 3. Validator 2 Test Results

No.	Alternative Answer	Score	Total Answer	Total Score
1.	Very relevant	4	22	88
2.	Relevant	3	2	6
3.	Less relevant	2	-	-
4.	Irrelevant	1	-	-
Total				94

Table 4. Pre-Test Results

No.	Name	Score *Pre-test*
1	MN	40
2	MZF	60
3	WCP	65
4	CAB	45
5	MAG	45
Total mean value of pre-test		$\frac{255}{5} = 51$

Table 5. Post-Test Results

No	Nama	Nilai Posttest
1	MN	75
2	MZF	80
3	WCP	85
4	CAB	85
5	MAG	80
Total Post-test Average Score		$\frac{405}{5} = 81$

recognize land transportation for students with mental retardation in grade 7 SMPLB Negeri Batu city before being given treatment. It can be seen in Table 4, that the value of the pre-test results on the ability to recognize land transportation for mentally retarded students in grade 7 junior high school before being given treatment got an overall score of 255 so that an average score of 51 out of 5 students can be obtained, with WCP students getting the highest score of 65 and MN students got a score of 40.

Post-test data were obtained after being given treatment using the Computer Assisted Instructional (CAI) based Land Transport Educational Game (GETAR) media to students with mental retardation in grade 7 Junior High School. The post-tests was carried out 1 time with the same questions as the pre-test with 20 questions by making 2 answer options for each question. The post-tests results data can be seen in Table 5, the post-tests results are to determine the final ability to recognize land transportation for 7th grade mentally retarded students after being given treatment.

It can be seen from Table 5, that the post-tests score on the ability to recognize land transportation of students with mental retardation in grade 7 Junior High School after being given treatment received an overall score of 405 so that an average score of 81 out of 5 students could be obtained, with WCP and CAB students getting the highest scores. 85 and MN students got the lowest score of 75. Based on the results obtained from the pre-test and post-tests, which aims to determine the effect of using computer-assisted instructional (CAI)-based land transportation education game (GETAR) media on the

Table 6. Comparison of Pretest and Posttest Results

No.	Name	Pre-test	Post-test	Difference
1	MN	40	75	35
2	MZF	60	80	20
3	WCP	65	85	20
4	CAB	45	85	40
5	MAG	45	80	35
Total		255	405	150
Average		51	81	30
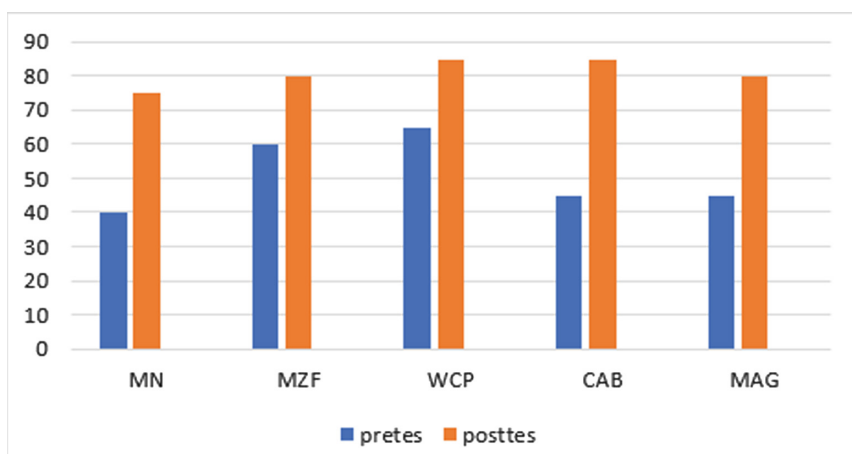
Fig. 3. Pre-test and Pos-test Results

ability to recognize grade 7 SLB Negeri Batu, before and after being given treatment, the following is a comparison of the results of the pre-test and post-test.

From the results of the recapitulation in Table 6, there is an increase in student scores. Based on the student's average score. The pretest value showed lower results compared to the posttest average value. The difference in the average pretest and posttest scores can indicate the effect of using the CAI Computer Assisted Instructional (CAI)-based land transportation educational game media on the ability to recognize land transportation for 7th grade junior high school students at the Batu City State Special School.

This study is intended to explore information on the ability to recognize early land transportation before getting treatment. The pre-test activity was carried out 1 time with a total of 20 questions by making 2 answer options for each question. The results of the pre-test showed that the 7th grade students in Batu City State SLB got less marks. It can be seen from the average score obtained by 51 out of 5 students. Almost all students showed difficulty in working on pre-test questions regarding the material of choosing, sorting, matching, and pairing. MN students almost experienced difficulties from the

4 aspects tested, but the most visible aspect was the sorting aspect. MN students also have difficulty matching pictures with words, MN still has difficulty reading words that have a consonant in the middle. MZF and WCP students got quite high pre-test scores. MZF and WCP almost mastered the aspects tested, CAB and MAG students got the same score on the pre-test. CAB and MAG almost have the same difficulty to work on the 4 aspects tested. CAB experienced the most obvious difficulty in working on sorting material, while MAG experienced the most obvious difficulty working on the sorting aspect, and matching the number of wheels with words. From these difficulties, it can be concluded that mentally retarded students do not understand the material given during the learning process. Mentally retarded students are children with intellectual disabilities. Which causes the mentally retarded child to have difficulty understanding and managing information. According to [12] Intellectual limitations in mentally retarded children tend to be less in learning information, adapting, thinking abstractly, creatively and critically.

The post-test activity carried out by the researcher was the same as the initial pre-test activity, only in this activity before giving the post-test the researcher did first treatment to 5 subjects. The post-test was administered after giving treatment using the Computer Assisted Instructional (CAI)-based Land Transportation educational game, which aims to determine the ability to recognize land transportation for mentally retarded students in grade 7 of the Batu City State Special School after the treatment.

The ability to recognize land transportation for mentally retarded students in grade 7 of the Batu City State Special School after being given treatment using a land transportation education game (GETAR) based on Computer Assisted Instructional (CAI) has increased. It can be seen from the post-test results which show an average score of 81 out of 5 students. In addition, students are better able to understand the material of choosing, sorting, matching, and pairing. MN students experienced an increase in results from the 4 aspects tested, MN was better able to work on aspects of sorting and matching words after getting treatment. WCP and CAB students got the same high post-test scores. WCP begins to memorize numbers above 5 after giving treatment. CAB students made very significant progress marked by a high difference in pre-test and post-test results, CAB was better able to work on the 4 aspects that were tested after treatment. MZF and MAG students got the same score on the post-test. MZF and MAG mastered the 4 aspects tested. MZF began to memorize the names of land transportation above 5 after the treatment. Meanwhile, MAG made significant progress, marked by a high difference in pre-test and post test results after treatment.

The increase in post test scores was due to the provision of effective treatment and the use of tools such as media that attracted students' interest during the learning process. Interesting media helps add students' motivation to learn mathematics. According to [23] learning motivation is a very important factor for students to have. Motivation can be seen from the enthusiasm and involvement of students in the treatment process with land transportation educational game media (GETAR). Media Educational games that are interesting, interactive and can facilitate understanding of the material will increase interest in learning for mentally retarded children in learning.

Media selection is an important factor to help encourage motivation to come from within students. Monotonous media will make students bored quickly. So it is necessary to consider choosing media in accordance with the opinion of [24] which states that

the use of appropriate and varied media can overcome student boredom in learning. The CAI-based land transportation educational game media (GETAR) is suitable for use because game-based media can stimulate all sensory children so that children are directly involved during the learning process.

Giving treatment helps improve the ability of mentally retarded children, especially in understanding the material. Based on the description, it can be seen that the results of the post test conducted after the application of treatment using land transportation education game media (GETAR) based on CAI there was an increase in the value of the 5 subjects. The effect of using computer-assisted instructional (CAI) based land transportation educational games (GETAR) on the ability to recognize children with mental retardation in grade 1 at the Batu State Special School can be seen from the results of data hypothesis testing. Where there is a change seen from the results of the pre-test and post test scores. The selection of CAI-based land transportation educational game media (GETAR) is one of the factors that has an impact on increasing student scores. The CAI-based land transportation education game (GETAR) has the advantage that students can play while learning in accordance with the opinion of [25] which states that the play while learning approach has advantages, which involve student activity in learning because learning through games invites every student. to try new things. This learning can also explore students' creativity in learning.

The ability to recognize mentally retarded students in grade 7 at the Batu State Special School has increased after using the CAI-based land transportation education game (GETAR). The delivery of material using the CAI-based land transportation educational game media (GETAR) showed success. Where students can operate the game well and students can absorb the material contained in the game. Which means that there is an effect of using CAI-based land transportation education games (GETAR) on the ability to do simple arithmetic in 7th grade mentally retarded children at the Batu Negri Special School marked from the post test results which showed an increase value compared to the pre-test value before being given treatment.

4   Conclusion

Based on the results of the research, data analysis and discussion that has been explained, it can be concluded as follows. (1) The ability to recognize students with mental retardation in Grade 7 at the Batu State Special School before being given treatment was still lacking in the aspect of recognizing and understanding land transportation, referring to the results of the pre-test with an average score of 51, (2) The ability to recognize land transportation for students with mental retardation in Grade 7 Batu State Special School after being given treatment experienced an increase in aspects of knowing, understanding land transportation, referring to the post test results with an average score of 81, and (3) The use of Land Transportation Educational Game (GETAR) media based on CAI Computer Assisted Instructional (CAI) had an effect on the ability to recognize land transportation with a percentage increase of 30% in 7th grade mentally retarded students at SLB Negeri Batu.

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