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Learning by Doing Methods in the Field of Horticultural Skills to Improve the Calculating Ability of Students with Intellectual Disability

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Abstract: This study aims to describe the effect of *Learning by Doing* methods in the field of horticultural skills to improve the ability of calculating summation for students with intellectual disability. The experimental research method is used with the design of the one group pretest-posttest. The data were analyzed with the Wilcoxon of the Signed Rank Test. The results showed that the *Learning by Doing* method in the field of horticultural skills had an effect on the increase in the ability of calculating summation for students with intellectual disability.
Key Words: Learning by Doing Methods, Horticultural Skills, The Ability of Calculating Summation, Students with Intellectual Disability

INTRODUCTION

Children with intellectual disability have intelligence that is below the average and have difficulty in social, communication and academic. Pawlyn and Carnaby (2009) state that the boundaries of a person are categorized as having intellectual or intellectual disabilities, if he has such a low level of intelligence/below average, so that, in pursuing the task of development requires specific assistance or services, including in education program.

The obstacle experienced by intellectual disability children is the difficulty/problems in basic abilities in academics such as mathematics in terms of arithmetic. Intelligence factors and low memory cause children with intellectual disability have lack concentration on the material taught by the teacher, so that, it inhibits their learning process.

The results of a preliminary study at SMALB YP-2 Kedungkandang Malang, it was found the problem that there are still many class X intellectual disability children whose calculation skills are still very low. This can be seen when the learning process takes place, students were asked to work on the addition problem with a range of final results 1-30 written by the teacher on the board, but some students have not been able to do the summing problem correctly.

In the learning process, inculcation of mathematical concepts or principles for students with intellectual disability should be taught in a concrete form, so that, the students can understand the subject matter provided by the teacher more easily.

Therefore, the effort that can be done in improving the numeracy ability for students with intellectual disability is by applying appropriate learning methods and using a variety of concrete objects or calculating tools which in their application can be linked to daily activities that are usually carried out by students with intellectual disability. One of them is by applying *learning by doing* methods through horticultural skills activities at school. In line with the opinion of Suparman (2015) that "Counting learning for intellectual disabilityd children should use something concrete, easy to understand, use simple examples, use language that is easily understood and equipped with props, is carried out in interesting and fun situations with changing methods, so that,y the children are motivated to learn and not quickly bored ".

Based on the description above, it is conducted the study a entitled "The Effect of *Learning by Doing* Methods in the Field of Horticultural Skills to Improve the Ability of Addition in Arithmetic Operation for Students With Intellectual Disability Grade X at SMALB YP-2 Kedungkandang Malang "

METHOD

The experimental quantitative methods is implemented in this research by using pre-experimental approach with the one group pretest-posttest design in which comparing the conditions before being treated, so that, the results can be known more accurately. In this design, the selected population cannot be chosen randomly. This research design uses only one group, it does not require a control group. The research subjects were seven students with intellectual disability in class X at SMALB YP-2 Kedungkandang Malang.

The instruments are the documentation and tests of student learning outcomes in the form of oral and written tests. The preparation of the test items was made on the basis of the development of the previously made grid.

Table 1. Results of Oral Pre-test Before Being Given Treatment

No.	Student Name	Pre-test Value
1.	Aa	70
2.	Ca	70
3.	Di	60
4.	Ly	60
5.	Ma	70
6.	No	70
7.	Uk	60
Total		**460**
Average		**65,71**

Table 2. Results of Pre-test Written Test Before Giving Treatment

No.	Student Name	Value Pre-test
1.	Aa	52
2.	Ca	34
3.	Di	36
4.	Ly	38
5.	Ma	74
6.	No	36
7.	Uk	74
Total		**344**
Average		**49,14**

Table 3. Results of Oral Post-test After Treatment

No.	Students' Name	Post-test Value
1.	Aa	100
2.	Ca	100
3.	Di	90
4.	Ly	80
5.	Ma	100
6.	No	100
7.	Uk	90
Total		**660**
Average		**94,28**

This test is used to measure the ability of students in the arithmetic operations. Data collection was carried out in three stages, namely: a) pre-test conducted 1 time, b) treatment provided with the application of the method of learning by doing through horticultural skills activities 3 times meeting, c) post-test conducted 1 time.

In this study, the non paretic data analysis was used that hypothesis testing on data analysis uses the Wilcoxon the Signed Rank Test. Hypothesis testing is done to find out whether or not a research hypothesis is accepted. Provisions for making hypothesis test decisions with a significant or significant level of 5% with a value of $\alpha = 0.05$, namely: $\mathbf{H_o}$ is accepted if $\mathbf{T_{count} > T_{table}}$ and vice versa if $\mathbf{T_{count} < T_{table}}$ then $\mathbf{H_o}$ is rejected.

FINDINGS AND DISCUSSION

Findings

Ability to calculate addition of students with intellectual disability class X SMALB YP-2 Kedungkandang malang before implementing learning by doing methods through horticultural skills activity

The results showed that the total operative counting ability of students with intellectual disability in the grade X at SMALB YP-2 Kedungkandang was still relatively low. This can be seen from the pre-test of both oral and written test obtained by students.

Based on table 1, Pre-test results oral test, it can be seen that the ability to calculate the total number of students with intellectual disability in class X SMALB YP-2 Kedungkandang Malang before being given treatment through horticultural skills activities in the highest value obtained by students is 70, the lowest value obtained by students is 60 and the average value of pre-test oral test is 65.71.

Based on table 2, Pre-test results written test, it can be seen that the ability to calculate the total operation of intellectual disability students in class X YAL-YP-2 Kedungkandang Malang before being given treatment through horticultural skills activities ie the highest value obtained by students is 74, the lowest value obtained by students is 34 and the average value of pre- The written test is 49,14.

Ability to Calculate Addition of Students with Intellectual Disability Class X SMALB YP-2 Kedungkandang Malang After Application of Learning By Doing Methods through Horticultural Skills Activity

The results of the study showed that the ability to calculate the total number of intellectual disability students of YP-2 Kedungkandang increased after treatment with the application *of learning by doing* through horticultural activities. This can be seen from the scores of both oral and written post-test obtained by students.

Table 4. Results of Written Post-test After Giving Treatment

No.	Students' Name	Post-test Value
1.	Aa	80
2.	Ca	76
3.	Di	78
4.	Ly	68
5.	Ma	100
6.	No	78
7.	Uk	98
Total		**578**
Average		**82,57**

Table 5. Data Analysis of Wilcoxon Oral Test

No.	**Value**		**Y-X**	**Rank**	**Sign**	
	Pre-test (X)	Post-test (Y)			+	-
1.	70	100	30	4,5	+4,5	0
2.	70	100	30	4,5	+4,5	0
3.	60	90	30	4,5	+4,5	0
4.	60	80	20	1	+1	0
5.	70	100	30	4,5	+4,5	0
6.	70	100	30	4,5	+4,5	0
7.	60	90	30	4,5	+4,5	0
Total					**T = 28**	**T_{count} = 0**

Table 6. Data Analysis of Wilcoxon Written Test

No.	Value		Y-X	Rank	Sign	
	Pre-test (X)	Post-test (Y)			+	-
1.	52	80	28	3	+3	0
2.	34	76	42	6	+6	0
3.	36	78	42	6	+6	0
4.	38	68	30	4	+4	0
5.	74	100	26	2	+2	0
6.	36	78	42	6	+6	0
7.	74	98	24	1	+1	0
Total					T= 28	T_{count} = 0

Based on table 3, it can be seen that the ability to calculate the total number of students with intellectual disability in class X YP-2 Kedungkandang Malang after being given treatment through horticultural skills activities ie the highest value obtained by students is 100, the lowest value obtained by students is 80 and the average value of Post-test oral test was 94.28.

Based on table 4, it can be seen that the ability to calculate the total number of students with intellectual disability of class X YP-2 Kedungkandang Malang after being given treatment through horticultural skills activities ie the highest value obtained by students is 100, the lowest value obtained by students is 68 and the average value was 82.57.

The Effect of Learning By Doing Methods in the Field of Horticulture Skills towards Ability of Addition in Arithmetic Operation of Students with Intellectual Disability in the Class X SMALB YP-2 Malang Kedungkandang

Based on the results of research and hypothesis testing that has been done it can be seen that the method of learning by doing in the field of horticultural skills affects the Improvement of the ability to calculate the number of operations in students with intellectual disability in the grade X SMALB YP-2 Kedungkandang.

Data comparison of the results of oral pre-test and post-test, it can be concluded that there is significant progress after the treatment given for each student who took the oral pre-test and post-test. This is evident from the average pre-test score oral test of 65.71 and the average post-test oral test score of 94.28. So, every student who takes an oral test results increase, from an overall average score of 65.71 to 94.28. it can be concluded that there is significant progress after the treatment given through horticultural skills activities in each student who took the written pre-test and post-test. This can be seen from the average of the written pre-test score is 49.14 and the post-test score is 82.57. So, every student who takes a written test results increase, from 49.14 to 82.57.

Based on calculations through the test Wilcoxon with n=7 at a significant level of 0.05 obtained $\mathbf{T_{table}}$ = 2, then $\mathbf{H_o}$ was rejected because $\mathbf{T_{count}}$ (0) < $\mathbf{T_{table}}$ (2) means, the null hypothesis ($\mathbf{H_o}$) in this study was rejected. This shows that the application of *learning by doing* methods in the field of horticultural skills has an effect on increasing the ability to add count operations in students with intellectual disability in the class X at SMALB YP-2 Kedungkandang Malang.

Discussion

Ability to Calculate Addition of Students with Intellectual Disability Before the Application of Learning By Doing Methods through Horticultural Skills Activity

Based on the research that has been carried out, the results of the study show that the total operational ability of students with intellectual disability is still relatively low before being given treatment by applying the method of learning by doing through horticultural skills activities. This can be seen from both oral and written pre-test. During the pre-test, students with intellectual disability seemed to have difficulty in working on the questions given. Students who experience difficulties

or errors in doing addition problems due to them do not understand how to do the summed array correctly. This condition makes them have difficulty in mentioning and answering the problem of counting operations of the sum of 1-30 in both oral and written tests. Given these difficulties, the scores pre-test obtained by students show low results. This is in line with the opinion of Apriyanto (2012) regarding one of the characteristics of intellectual disability children namely the learning capacity of intellectual disability children is very limited. Moreover, the capacity is regarding in abstract matters. In learning activities, they tend to repeat the same mistakes and mental development reaches a peak at a young age. In addition, it is also supported by the opinions expressed by Mangunsong (1998) that the memory of children with intellectual disability have difficulty in remembering information, especially information that is more theoretical and complex, and require 'levels of processing' which deep.

One of the causes of the low total arithmetic ability in students with intellectual disability is a low intelligence factor. This is supported by the opinion expressed by Efendi (2017) that individuals who are classified as having intelligence ability below the normal average will show a low tendency towards the general functioning of their intelligence. In addition according to Efendi (2017) barriers experienced by intellectual disablity children from systems cognitive, namely: 1) tend to have the ability to think concretely and difficult to think abstractly, 2) have difficulty in concentration, 3) limited socialization ability, 4) unable to store difficult instructions, 5) less able to analyze and assess the events encountered.

And based on the description above, it can be understood that the low intelligence factor causing cognitive abilities possessed by intellectual disability students is relatively low making students with intellectual disability have difficulty in counting. Although students with intellectual disability has a low level of intelligence, but that does not mean students with intellectual disability cannot increase the ability he has. Potential and numeracy skills possessed by intellectual disability students can be improved by paying attention to the learning methods and media used in the learning process and by paying attention to the stages of development of each individual in each learning process.

Ability to Calculate Addition of Students with Intellectual Disability after Application of Learning By Doing Methods through Horticultural Skills Activity

Based on the research that has been carried out, the results of the study show that the ability to calculate the total number of students with intellectual disability has increased after being treated with the application of learning by doing through horticultural skills activities. After being given treatment three times, improvement in the ability of students with intellectual disability in the arithmetic operations can be seen in the ability of students to mention and count numbers from 1 to 30, which is shown in the results of both oral and written post-test students have done. The results show that increase compared to the results of students' abilities when oral and written pre-test. In the learning process, students are seen actively following the entire series of activities that have been carried out, namely during horticultural skills activities in the school garden and also when learning in the classroom. This is in line with the principles that must be considered in learning by doing proposed by Rahayu (2014), namely: 1) involving students directly in teaching and learning activities because learning by doing emphasizes direct student experience relating to competencies that students must master, 2) provides a multi-approach Sensory for students when learning takes place, such as hear, feel, smell, and create objects studied, 3) provide competence for students to develop skills in using materials and conduct experiments, 4) foster a social atmosphere that is transactional between students dan teacher.

In the learning process, the application of the method of learning by doing through horticultural skills activities affects the increase in numeracy skills in intellectual disability students after the treatment is given. This is in line with the opinions according Wardani & Iriyanto (2014) that learning math is done active and efficiently is needed to explore and practice which is owned by the students. And in the learning process for children with intellectual disability need a learning approach that can optimize the numeracy ability of children with intellectual disability (Putri, 2014). In addition, another opinion that supports this research is the opinion expressed by Suparman (2015) that learning to count on intellectual disability children should use something concrete, easy to understand, use simple examples, use language that is easily understood and equipped with tools visual aid, carried out in interesting and fun situations with alternating methods so that children children with intellectual disability are not bored so motivated to learn.

Based on the description above, it can be understood that the effort that can be done in improving the numeracy ability of students with intellectual disability is by applying learning methods and using appropriate media in the learning process. The method of learning by doing is a learning method that can be applied to increase the numeracy ability for students with intellectual disability because this method is a method that prioritizes direct practice in its implementation, this method is applied through horticultural skills activities by utilizing concrete

media for students in the form of tools and materials agriculture as a means to practice the ability of students with intellectual disability in terms of numeracy.

The Effect of Learning By Doing Methods in the Field of Horticulture Skills towards Ability of Addition in Arithmetic Operation of Students with Intellectual Disability

Based on the results of research and hypothesis testing that have been done, it can be seen that the learning by doing methods in the field of horticultural skills has an effect on increasing the ability to add count operations on students with intellectual disability. The application of learning methods and the use of appropriate media in the learning process will have an impact on the abilities possessed by students with intellectual disability. Because it has a low level of intelligence, it causes students with intellectual disabilities to concentrate less on the material taught by the teacher, so that, it inhibits students in the absorption of information in order to gain knowledge. Low intelligence factor also makes students with intellectual disability difficulty in thinking abstract things. Therefore, teachers need to apply appropriate learning methods and use appropriate media in the learning process for students with intellectual disability. This is supported by the opinion expressed by Supaman (2015) that learning to count in children with intellectual disability challenges teachers should use something concrete, easy to understand, use a simple example, using a language that is easily understood and is equipped with props, in a situation which interesting and fun with alternating methods, so that, children with intellectual disabilities not easily bored so motivated to learn.

The application of method learning by doing in the field of horticultural skills can improve the summing ability of students with intellectual disability. This method is a method that prioritizes direct practice that is applied in horticultural activities, where in practice it can train the intellectual disability skills in terms of counting totals. In addition to providing a pleasant experience for students, learning activities by doing or direct practice will make students easier to understand the material being studied because students can absorb information and gain knowledge through direct experience. The application of the method of learning by doing in this study, supported by Edgar Dale's thoughts about the cone of experience that provides an illustration that the learning experience gained by students can go through the process of doing or experience themselves what is learned, the process of observing and listening through certain media and the process of listening through language. The more concrete students learn the teaching material, for example through direct experience, the more experience students get. Conversely, the more abstract students gain experience, for example only relying on verbal language, the less experience students get. Sensing activities in the learning process can enable various forms of behavior change (Sanjaya, 2008 in Rahayu, 2017).

In the process of its application, the advantages of learning by doing methods compared to other learning methods, namely in the learning process for students with intellectual disability, students are invited to do, see, hear, and feel directly the object being studied by emphasizing the students' experience directly, so that it will make students more easily absorb information and can understand the material being studied more clearly. This is supported by the opinion expressed by Safitri (2017) that the method of learning by doing has many advantages including making it easier to focus attention students' in the learning process and make students more enthusiastic about learning because it can communicate with real situations to develop an ability in one subject or several subjects at once.

So, based on the description above it can be seen that, through the application of learning by doing methods in the field of horticultural skills can increase the ability to calculate the number of operations for students with intellectual disability because by linking the material of arithmetic operations into activities that are often done by students in schools will facilitate students in understanding the material taught by the teacher, besides the use of concrete learning media in horticultural activities will also make it easier for students with intellectual disability to understand the concepts and practice their abilities in learning addition arithmetic operations.

CONCLUSIONS

Based on the results of research and discussion, obtained differences in the results of assessing students' numeracy skills at the pre-test and post-test. The ability to calculate operations for students with intellectual disability class X at SMALB YP-2 Kedungkandang Malang is still relatively low before the treatment is given, and the ability to count students with intellectual disability has increased after being given treatment by applying the method of learning by doing through horticultural skills activities. So, it can be concluded that the method of learning by doing in the field of horticultural skills affects the increase in the ability to calculate the number of students with intellectual disability class X SMALB YP-2 Kedungkandang Malang.

It is expected some suggestions for further researchers and for class teachers. Suggestions for further researchers, that is suggested the results of

this study can be a reference for further research and also expected for future researchers to further develop research to improve the ability to calculate operations with the application of learning methods through varied vocational activities and can be used on other research subjects. And for classroom teachers, it is recommended that they continue to apply creative and innovative learning because through interesting activities and utilizing the concrete media available can make learning more effective and enjoyable for students.

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