Improving Sensorimotor of Children with Intellectual Disability Through Teaching Writing in Shanti Yoga Special School, Klaten Central Java

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Abstract The present study aimed to improve sensorimotor skills of children with intellectual disability through writing. The subjects of the study were fifteen fifth-grade students with intellectual disability in Shanti Yoga Special School, Klaten. The present study employed experimental method with one group pretest-posttest design. The subjects were treated in a ce*rtain amount of times, the effects were measured from the difference gained between pretest and posttest result.* Due to limited number of students, the researcher could not do sampling. Accordingly, the researchers involved all individuals in population (total sampling). The data were collected using essay test in order to measure their initial writing skills. The instrument was considered valid by three experts in terms of content, construct, and language. The present study employed non-parametric statistical analysis method, *Wilcoxon Signed Rank Test*, this was done using SPSS 20. The descriptive analysis result showed the average posttest score was 12.93, which was greater than the pretest score (11.60). Non-parametric analysis found the z-value of -2.83 with asymp. Sig. (2-tailed) = 0.022, accordingly, hypothesis stating that there is a significant effect on the improvement of sensorimotor of children with intellectual disability through teaching writing was accepted. This study concludes that there is an effective improvement of sensorimotor of children with intellectual disability through writing learning process in SLB Shanti Yoga Klaten.

Keywords: sensorimotor skill, intellectual disability, Wilcoxon Signed Rank Test, writing learning process

1. Introduction

Education is a right possessed by every citizen. It is stated in article 31 of the 1945 Constitution. It reads: (1) Each citizen has the right to an education, and (2) The government organizes and implements a national education system, to be regulated by law. Every citizen has the right to an education. Education here means education for all children with their diverse characteristics, both for typically developing children and for children with disabilities. Children with disabilities start to gain the government's attention, this is proven by the increased allocation for special education. A survey conducted by Coordinating Body for Special Education (BAKOR PLB) in Central Java in 2008 found that there were 13.090 children with special needs studied at school (Subagya,

2009). Out of all registered children with special needs, children with intellectual disability (ID) exhibit the greatest number by 60% (5.356 students with mild ID and 2.692 students with moderate ID).

Children with ID, according to DSM IV (2006), are as follow: (1) Their intellectual functions are significantly below the average, the IQ is less than 70, (2) Lack of adaptive social function in at least two of the following sectors : communication, self-care, family life, interpersonal skill, community resource use, decision-making ability, functional academic skill, recreation, occupation, health, and safety, (3) Occurs before 18 years old. Children with ID faces many obstacles in teaching-learning process at school (Setyaningsih, 2017). One of the obstacles they often face is sensorimotor disorder.

Sensorimotor disorder may hinder the cognitive development of children with ID, resulting in late learning goal achievement.

Sensory and motor are two different things, yet they possess close association. Musjafak Assjari and Eva Siti Sopariah (2011) state that sensorimotor is a combination between input of sensation (often called as stimulus) and output of motor activity. Thus, children will receive a stimulus given through their sensory, then they respond it through motor activity. When children' sensory function is sub-optimal, there is a great possibility of minimum motor function.

Teacher, in handling children with ID who experience sensorimotor disorder, has not possessed a clear standard for improving children' sensorimotor ability. In this case, the teacher's role is pivotal, this is in agreement with Tias Martika and Subagya (2014) stating that the educational institution or family is expected to provide an educational service that fits the ability of children with ID. This improvement of sensorimotor ability is an activity to maximize the children with ID who experience sensorimotor disorder through periodic, structured training.

The present study aimed to improve sensorimotor of children with intellectual disability through teaching writing. The result of this study is expected to be beneficial for teachers in improving sensorimotor skill of children with ID.

2. Research Methodology

The present study employed experimental method with one group pretest-posttest design. The subjects were treated in a certain amount of times, the effects were measured from the difference gained between pretest and posttest result.

Pretest	Treatment	post test
T_1	X	T_2
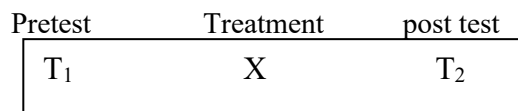
(Moh. Nasir, 1999: 279)
Description:
T_1: pre-test
X: Treatment given by the researcher
T_2: post-test.

The present study was conducted in SLB Shanti Yoga Klaten, Central Java. The subjects of the study were fifteen 5th-grade students with ID. Due to limited number of students, the researcher could not do sampling. Accordingly, the researchers involved all individuals in population (total sampling). The data were collected using essay test in order to measure their initial writing skills. The instrument was considered valid by three experts in terms of content, construct, and language. The present study employed non-parametric statistical analysis method, *Wilcoxon Signed Rank Test*, this was done using SPSS 20.

3. Results and Discussion

The subjects of the study were 5th-grade students with ID in SLB Shanti Yoga, Klaten. The present study aimed to improve sensorimotor skill of children with intellectual disability through teaching writing. The collected data were analyzed using SPSS 20.

Table 1 Students with ID in SLB C/CI Sahnti Yoga, Klaten

No.	Name	Gender
1	Al	F
2	Yul	M
3	Ib	M
4	Im	F
5	Lut	M
6	Bad	M
7	Hp	M
8	Db	F
9	Tk	F
10	Ba	M
11	Bg	M
12	Mt	F
13	Eg	F
14	Ar	F
15	Tg	M

1. Children Skill before Treatment

Table 2 Score of Fine Motor Skill, Gross Motor Skill, sensory, and sensorimotor

No.	Name	Fine motor skill	Gross motor skill	Sensory skill	Sensorimotor skill
1	Al	22	19	18	7
2	Yul	21	12	22	7
3	Ib	18	12	22	7
4	Im	22	30	24	13
5	Lut	28	22	30	12
6	Bad	25	30	23	13
7	Hp	30	30	30	15
8	Db	17	10	30	11
9	Tk	21	20	16	11
10	Ba	26	30	29	15
11	Bg	28	30	30	13
12	Mt	30	30	30	15
13	Eg	27	30	27	13
14	Ar	24	23	24	13
15	Tg	19	15	23	9

2. Student's Skill After Treatment

Table 3 Posttest Score of Fine Motor Skill, Gross Motor Skill, sensory, and sensorimotor

No.	Name	Fine motor skill	Gross motor skill	Sensory skill	Sensorimotor skill
1	Al	23	21	22	10
2	Yul	16	17	24	10
3	Ib	24	19	22	11
4	Im	26	29	30	14
5	Lut	29	29	30	15
6	Bad	29	30	30	15
7	Hp	30	30	30	15
8	Db	19	13	30	11
9	Tk	24	25	25	11
10	Ba	30	30	29	13
11	Bg	29	29	29	15
12	Mt	30	30	30	13
13	Eg	27	30	30	14
14	Ar	27	30	28	14
15	Tg	29	30	24	13

Table 4 Description of Pre- and Post- Treatment Statistics

		Pretest	Posttest
N	Valid	15	15
	Missing	0	0
Mean		11.60	12.93
Median		13.00	13.00
Mode		13	15
Std. Deviation		2.874	1.870
Minimum		7	10
Maximum		15	15
Sum		174	194
Percentiles	25	9.00	11.00
	75	13.00	15.00

Following the description above, there is a difference between pretest and posstest score, the average writing skill in pretest was 11.60, while in posttest was 12.93. In order to see whether or not this difference is statistically meaningful, the data analysis was conducted.

The present study employed Wilcoxon signed rank test. The test result is as follow:

Table 5 Sensorimotor skill Data analysis
Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Pretest	15	23.87	4.257	17	30
Posttest	15	26.13	4.240	16	30

Table 6 The result of *Willcoxon Signed Rank Test*
Ranks

		N	Mean Rank	Sum of Ranks
Posttest - Pretest	Negative Ranks	1[a]	10.00	10.00
	Positive Ranks	11[b]	6.18	68.00
	Ties	3[c]		
	Total	15		

a. Posttest < Pretest
b. Posttest > Pretest
c. Posttest = Pretest

Table 7 Statistical Test Result
Test Statistics[a]

	Posttest − Pretest
Z	-2.283[b]
Asymp. Sig. (2-tailed)	,022

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

Following the table above, there was one negative rank and there were 11 positive

rank and three equal ranks. The calculation on pretest and Posttest score regarding sensorimotor skill results in Z-value of -2.283 with asymp. Sig. (2-tailed 0,043<0,022) with 5% of level of significance. --- --- In other words, there is a significant difference in students' pretest score and posttest score. To conclude, sensorimotor training for children with ID is significantly effective.

The followings are relevant studies on sensorimotor training. A study conducted by Musjafak Assjari and Eva Siti Sopariah (2011) entitled "Penerapan latian sensorimotor untuk meningkatkan kemampuan menulis pada anak autistic spectrum disorder" (The implementation of sensorimotor for improving writing skills of children with Autistic Spectrum Disorder). Some children with ASD experience motor disorder, resulting in the hindrance of writing skill. The study found that the subjects of the study exhibit writing skill improvement. Therefore, this sensorimotor training can be used as a reference to improve the writing skill of children with ID.

A study conducted by Sri Haryani (2009-67), entitled "Upaya Meningkatkan Prestasi Belajar Matematika Melalui Latihan Sensomotorik pada Anak Tunagrahita Kelas Dasar I SLB Bina Taruna Manisrenggo Klaten Tahun 2008-2009" (An attempt to improve Mathematic learning achievement through sensorimotor training on Children with Intellectual Disability in Class I of SLB Bina Taruna Manisrenggo Klaten in 2008-2009) found that sensorimotor training significantly improved the mathematics learning achievement of children with intellectual disability in Class I of SLB Bina Taruna Klaten.

Another study was conducted by Tjutju Soendari (2010-1), this study discussed the organization of writing skills materials covering four major skill namely pre-writing skill, initial writing skill, spelling skill, and advanced writing skill. Some points were observed during the assessment. These points were: holding a pencil correctly, writing direction (left to right), paper/book position, sitting position, eye-paper distance, student's condition while writing (tense, frustrated, emotional), exhibited attitude (negative, bored, disturbing). The study found that training to write correctly significantly improved student's writing skill.

From the result of the studies mentioned above, it could be concluded that that sensorimotor training that was conducted significantly improve the students' learning outcome for those experiencing difficult at counting, reading, and writing. This treatment can also be applied to other children with special needs.

The present study also aimed to improve student's writing skill. This sensorimotor training also has its advantages and limitation. This sensorimotor training is advantageous to activate motor nerves of children with ID, and to optimize the sensory function of children with ID, resulting in student's writing skill improvement. This training can also improve student's interest and motivation. In addition, this training can make students more focus on carrying out learning process at school and doing the assignment given by teachers. The limitation of this training lies on every child's different level of motor and sensory skill. Due to this difference, the training should be carried out individually. Besides, sensorimotor training that is given at the last school hours can exhaust the children. Accordingly, the students can be exhausted instead of encouraged, making them lose their focus on the learning. Regardless of its advantages and limitation, this sensorimotor training holds its benefit and aim.

This sensorimotor training aimed to find out its effectiveness for improving the skill of children with special needs. Based on the result of the study, in line with the data analysis, it is found that there is a significant difference in pretest and posttest score. The pretest score was 11.60 while their posttest score was 12.93. It could be concluded that there is a significant improvement in writing skill after the treatment was given. The hypothesis testing result using Wilcoxon Signed Rank Test with SPSS 20 showed that z value was -2.283 with asymp. sig. (2-tailed) of 0.022 (<0.05.) Since the probability value of Z was smaller than (α) 5%, Ho stating that sensorimotor training through teaching writing does not affect children with ID in class 5 of SLB Shanti Yoga Klaten, is rejected. The alternative hypothesis (Ha)

stating that there is an effect of sensorimotor training through teaching writing on children with ID in class 5 of SLB Shanti Yoga, Klaten, is accepted.

4. Conclusion

The present study concludes that children with ID experienced significant improvement in sensorimotor skill after the treatment in the form of sensorimotor training was given.

Not all children receive therapy, this makes student with sensorimotor disorder do not gain adequate directed training. Classroom teacher is expected to be able to train student's sensorimotor movement using instructions that are directed to sensorimotor training during the classroom learning process.

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