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The effectiveness of literacy stimulation model based on multisensory development of the results of DDST

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Abstract. This research aims to study the effectiveness of literacy stimulation model based on multisensory development of the results of DDST in PAUD Aster 36, Jember. This type of research is Quasi-experimental design which is a form of experimental research that uses a control group but the control group unfunctionally to control external variables that can influence it. DDST assessment was carried out before and after treatment both in children who were given literacy stimulation or not. The research instrument used was the REEDA sign observation sheet with SOP tools. Respondent distribution data included gender, toddler age, toddler parent education, toddler parent age, toddler mother's work, toddler body weight, toddler head circumference and toddler upper arm circumference size. The result is the development of toddler overall assessment using DDST before treatment belongs to the normal category with different percentages. Development of toddler overall assessment using DDST After treatment was included in the normal category, but there was no statistical difference (p-value = 0.083) between the control and treatment groups.

1. Introduction

The development of human potential commonly is through education in which embodied as a whole establishment of socio-cultural values. Early childhood education program is crucial education which influences further education, so all children should get that education. Literacy skills are not learned exclusively during the school years. The time from birth until children enter school is critical in preparing them to read and write[1]. A multisensory approach in teaching literacy is a learning process that utilizes visual, auditory and tactile (movement, touch) sensory learning to improve memory and learning. All three sensorial are optimized simultaneously and support each other so that children can store forms, codes and letter names more easily.

In practice, children are taught to correlate the sound of letters with symbols / written form and touch, write the shape of the letters. Three processes occur, namely looking at the form of letters, mentioning the sound, and writing it [2]. Before school entry, children had difficulties in distinguishing frequent non-alphabetic symbols from letters. Furthermore, letter judgment in kindergarten predicted reading abilities in first grade [3]. There are several reasons why using a multisensory approach in developing the literacy abilities of preschool children.

This approach increases the involvement of children because the stimuli that enter simultaneously to visual, auditory and kinaesthetic sensory are stored deeper and last longer. Listening to information presented with visual input is very effective for making the brain process it at the same time. This

approach enhances positive attitudes and produces skills [4]. Children's literacy is an ability related to, reading, writing, listening and speaking [5]. Simply put, literacy means the ability to read and write, or literacy. In the current context, literacy has a very broad meaning. Literacy can mean technological, political, critical thinking, and sensitive to the environment.

Contemporary literacy as a person's ability to use written or printed information to develop knowledge, thus bringing benefits to society. The period of literacy of children ranging from birth to age six years [6]. The introduction of literacy for children began to be developed especially in the United Kingdom since the 1980s because teachers and researchers saw if the importance of introducing or learning literacy in reading and writing for early childhood [7]. Mothers' discussions during shared book readings with their preschool children focused primarily on the meaning of the story, with little attention to the code of the text. The range of talk techniques that mothers used was largely independent of background factors such as child gender and ethnicity or family home language [8]. Parents teach children through the zone of proximal development [9]. Parenting young children is labor-intensive and requires 49 a great deal of hands-on physical care, attention to safety, 50 and interpretation of cues [10]. Literature has not yet examined the exact role of differentiated instruction in financial education [11]. There are seven principles of literacy education [12]. Longitudinal research where the best means to predict early childhood reading skills is measurement through the child's ability to read and write knowledge in school [7]. Writing is mark letters or numbers on a surface with a pen or pencil, put information, greetings, etc in a letter and then sends it to [13]. divide the writing stages into four stages. Literacy learning in infants McGee and Purcell-Gates. States that literacy development consists of two periods of time, in detail ranging from birth to five years of age and from five years of age to becoming independent readers (conventional). Denver II is a major revision of the re-standardization of the Denver Development Screening Test (DDST) and the Revised Denver Developmental Screening Test (DDST-R) is one of the screening methods for abnormalities in child development. This test is not a diagnostic test or IQ test.

2. Method

Research design is a strategy to achieve research goals that have been set and act as guidelines or guide researchers in the entire research process. The research design is Quasi-experimental design which is a form of experimental research that uses a control group but the control group cannot function fully to control external variables that can influence it. In this study, one group did literacy stimulation while the other group did not do literacy stimulation. Then the two groups assess their DDST results. DDST assessment was carried out before and after treatment both in children who were given literacy stimulation or not. The design can be described as table 1.

Table 1. Quasi-experimental design

Subject	Treatment	Observations	Result
K–A	I	O	O–A
K–B	–	O	O–B

Conclusions :

K-A   : Subject's treatment
K- B   : Subject's Control
I   : did literacy stimulation sensory
O   : literacy stimulation observations process
O–A   : Result DDST.
O–B   : Result DDST

In this study the sampling is done by simple random sampling, namely the sampling of members of the population is done randomly without regard to strata in the population and each member or unit of the population has the same opportunity to be selected as a sample. In this study, Early Childhood Education Programs in Jember district had a population of 60 children. The research instrument is a measuring instrument that would be used to measure the research variables. The research instrument

used was the REEDA sign observation sheet with SOP tools. This research is an experimental laboratory study using a post test design with experimental and control groups (post test only on control group design).

3. Result and Discussion

3.1. Respondent distribution
Respondent distribution data in the study of the effectiveness of multisensory development based literacy stimulation models on DDST results in Early Childhood Education Programs, Aster 36, Jember Regency include child's gender, age, parent education, parent age, mother work, body weight, head circumference and upper arm circumference sizes. The distribution of respondents for each criterion is presented in the following explanation.

3.1.1. Distribution of respondents based on the sex of children
Distribution of respondents based on the sex of children under five is divided into two criteria, namely male and female. The respondent distribution table based on the sex of children under five is presented in Table 2.

Table 2. Frequency Distribution of Respondents by Gender of Toddler in the Effectiveness of Multisensory Development Based Literacy Stimulation Models on DDST Results in PAUD Aster 36, Jember Regency

(Childs' sex)	amount	Presentage
Male	31	51,67
Female	29	48,33
Total	60	100,00

Source: Primary data, processed (2019)

Based on Table 3.1, it shows that the number of respondents based on the sex of children under five has a little difference, namely men (51.67%) and women (48.33%).

3.1.2. Distribution of respondents based on toddlers' age
Distribution of respondents based on toddlers' age is divided into five criteria, namely 0-15 months, 16-30 months, 31-45 months, 46-60 months and 60-72 months. The respondent distribution table based on toddler age is presented in Table 3.

Table 3. Distribution of Respondent Frequencies by Age of the Children in the Effectiveness of Multisensory Development Based Literacy Stimulation Models on DDST Results in Early Childhood Programs Aster 36, Jember Regency

Childs' age	Amount	Presentage
0-15 months	2	3,33
16-30 months	15	25,00
31-45 months	16	26,67
46-60 months	17	28,33
61-72 months	10	16,67
Total	60	100,00

Source: Primary data, processed (2019)

Based on Table 3, it shows that the majority of children under five are aged between 46 to 60 months, namely as many as 17 toddlers (28.33%).

3.1.3. Distribution of respondents based on child's body weight

Distribution of respondents based on child's body weight is divided into four criteria, namely 5-10 kg, 11-15 kg, 16-20 kg and 21-25 kg. The respondent distribution table based on Childs' weight is presented in Table 4.

Table 4. Distribution of Frequency of Respondents by Childs' Weight in Effectiveness of Multisensory Development Based Literacy Stimulation Models on DDST Results in Early Childhood Programs Aster 36, Jember Regency

Childs' Weight	Amount	Presentage
5-10 kg	8	13,33
11-15 kg	33	55,00
16-20 kg	14	23,33
21-25 kg	5	8,33
Total	60	100,00

Source: Primary data, processed (2019)

The distribution of respondents based on child's body weight (Table 4) shows that most children are between 11-15 kg, which is 33 people (55.00%).

3.2. Childs' multisensory development before treatment of literacy stimulation

Childs' multisensory development before treatment of literacy stimulation includes social personal development, fine motor-adaptive development, language development and gross motor development. Observations were carried out in two groups, namely the control group and the treatment group. The results of observations on each aspect are presented in the following explanation.

3.2.1. Social personal development

Cross tabulation of children's social personal development before treatment in the control and treatment groups is presented in Table 5.

Table 5. Cross Tabulation of Children Social Personal Development Before Treatment in the Effectiveness of Multisensory Development Based Literacy Stimulation Models on DDST Results in Early Childhood Programs Aster 36, Jember Regency

Childs' social personal development	Control		Treatment		Total	
	Amount	%	Amount	%	Amount	%
Advance	13	43,3	10	33,3	23	38,3
OK	12	40,0	13	43,3	25	41,7
Caution	3	10,0	4	13,3	7	11,7
Delay	2	6,7	3	10,0	5	8,3
Total	30	100	30	100	60	100
t-value = 0,844			p-value = 0,402			

Source: Primary data, processed (2019)

Table 5 shows that before being given treatment, most of the children under five in the control group experienced social personal development in the advanced category (43.3%) which means passing the subject completely to the right of the chronological age line, whereas in the treatment group it was in the OK category (43.3%) which means passing through, failing, or rejecting the principal cut based on the age line between the 25th and 75th percentiles. The test results statistically obtained the t-value of 0.844 with significance (p-value) of 0.402. The p-value is greater than (0.050), which means that there is no difference in the personal social development of children under five before treatment in the control and treatment groups. This same with the research before a total of 684 participants of 1465 with adequate contact data (46.7%) answered the follow-up questionnaire and 546 of them (37.3%) completed all items [14].

3.2.2. Adaptive-motor fine development of children
Cross tabulation of the adaptive-motor fine development of children before treatment in the control and treatment groups is presented in Table 6.

Table 6. Cross Tabulation of Adaptive-Motorist Development of Children Fine Before Treatment in the Effectiveness of Multisensory Development Based Literacy Stimulation Models on DDST Results in Early Childhood Programs Aster 36 Jember Regency

Adaptive-Motorist fine development of childs	Control		Treatment		Total	
	Amount	%	Amount	%	Amount	%
Advance	13	43,3	13	43,3	26	43,3
OK	13	43,3	12	40,0	25	41,7
Caution	2	6,7	3	10,0	5	8,3
Delay	2	6,7	2	6,7	4	6,7
Total	30	100	30	100	60	100
t-value = 0,148			p-value = 0,883			

Source: Primary data, processed (2019)

Table 6 shows that before being given treatment, most of the children under five in the control group and the treatment group experienced subtle adaptive-motor development in the advanced category (43.3%) which means that they crossed the subject completely to the right of the chronological age line. The test results statistically obtained t-test value of 0.148 with a significance (p-value) of 0.883. The p-value is greater than (0.050), which means that there is no difference in the adaptive-motor fine development of toddlers before treatment in the control and treatment groups.

3.2.3. children rough motor development
Cross tabulation of children rough motor development before treatment in the control and treatment groups is presented in Table 7.

Table 7. Cross Tabulation of Children Motorized Rough Motor Development Before Treatment in the Effectiveness of Multisensory Development Based Literacy Stimulation Models on DDST Results in Aster 36 Early Childhood Programs Jember Regency

Children Motorized Rough Motor Development	Control		Treatment		Total	
	Amount	%	Amount	%	Amount	%
Advance	14	46,7	15	50,0	29	48,3
OK	13	43,3	10	33,3	23	38,3
Caution	1	3,3	2	6,7	3	5,0
Delay	2	6,7	3	10,0	5	8,3
Total	30	100	30	100	60	100
t-value = 0,285			p-value = 0,777			

Source: Primary data, processed (2019)

Table 7 shows that before being given treatment, most of the children under five in the control and treatment groups' experienced gross motor development in the advanced category (46.7%) which means that they passed the point completely to the right of the chronological age line. This also happened in the treatment group but with a different percentage (50.0%). The test results obtained statistically the t-value of 0.285 with significance (p-value) of 0.777. The p-value of 0.777 is greater than (0.050), which means that there is no difference in the rough motor development of toddlers before treatment in the control and treatment groups.

4. Conclusions

Based on the results of research and discussion of the effectiveness of multisensory development based literacy stimulation models on DDST results in Early Childhood Programs Aster 36, Jember Regency, it can be concluded that before treatment, the personal social development of control children under five included in the advanced category, the treatment group included the OK category. Fine adaptive-motor development of children's in the control and treatment group is in the advanced category. Children's language development control and treatment groups are included in the advanced category. The rough motor development of children in the control and treatment group is an advanced category.

After treatment, the personal social development of the control group children included in the advance and OK categories, in the treatment group included the advanced category, but statistically there were no differences (p-value = 0.220). Adaptive motor-development of children in the control and treatment groups included in the advanced category, there was no statistical difference (p-value = 0.113). Development of children's language control and treatment groups included in the advanced category and there were statistical differences (p-value = 0.047). The rough motor development of toddlers in the control and treatment groups is in the advanced category, there is no statistical difference (p-value = 0.119).

The development of children's overall assessment using DDST before treatment belongs to the normal category with different percentages. Development of children's overall assessment using DDST After treatment was included in the normal category, but there was no statistical difference (p-value = 0.083) between the control and treatment groups.

Acknowledgments

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