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EDUCATIONAL GAME TOOLS TO IMPROVE 3-4 YEARS OLD CHILDREN DEVELOPMENT

(Pre Screening Study at Al-Muhajirin Play Group Semarang)

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Educational game is the form of educational activity performed using educational methods or tools. The optimum and maximum aspect of child development can be posed through playing activity. Allowing children to play in the pre-school age has been proven to increase the child's development. This study is aimed to assess the 4 indicators of children development including rough motoric, soft motoric, personal social and language. This study employed a quasi-experimental design and applied non-randomized with control group and pre-test post-test design. Forty (40) children aged 3-4 years involved in this study were divided to control and experimental group. Twenty children in experimental group obtained educational game tools for 14 days, 2 hours per day, whilst the twenty children in control group have no experience to educational game tool stimulation. Children aged 3-4 years either in experimental or in group control involved in this study were highlighted with high score for rough and soft motoric development, and personal social. The result suggested that the children were not using their language ability (score: 0 – 0.05) to be involved socially to their friends (1.65 – 2.00). We also recognized among forty children aged 3-4 years old the soft motoric (score: 1.80 – 2.00) was higher than the rough motoric (score: 1.50 – 1.60). We acknowledge that the educational game tools supported positively to the four indicators which used to score the children development. Compared to the control group, without experienced to educational game tools, educational game tools contributed significantly to the rough motoric, personal social, and language (p value < 0.001). Educational game tools which allowed a child to communicate with their friends directly and be exposed to physical activity with their friends will greatly improve in their early development.

Keywords: Educational Game Tools, Children Development, Rough Motoric, Soft Motoric, Personal Social, Language

1. INTRODUCTION

Development is a process of change that took place regularly and continuously. Children developments are related to children growth regarding to body functions and structures. The 3-4 years stage is a necessary part of children development in order to quickly detect any interference cornerstones of development for further developments, and this age also named as golden age since in this period brain develops very fast to 80 percent (Soetjningsih, 1995). Therefore, it is very

important to find out the solutions to maximize children intelligence which initiated in the first three years.

From National Family Planning Coordinating Board (NFPCB) (2012) around 16% of 13,898,951 children under 5 (toddlers) in Indonesia experienced neurodevelopmental disorders and brain from mild to severe (Ariani, 2010). In America, 1 of 100 children experiences developmental disorders. In 2006, from 1,125 the number of visits pediatric patients, 10.13 % of children experiencing developmental disorders. Data from Dr. Soetomo Hospital shown in 2010 26% of 38,377 patients visited child poly diagnosed with impaired development while in 2011 2.22 % of 37,960 patients visited child poly experienced developmental disorders (Depkes RI, 2006).

Child development will be more optimal if stimulation obtained in accordance with the needs of children at different stages of development. One of the efforts to improve child development is provide the educational game tools which provide educational activities to maximize child development through social activities. Persuading children to play at the pre-school age improves the development of rough and soft motoric, and social and language skills (Sain *et. al.*, 2013). Therefore, this study is aimed to determine the effect of educational game tools to development and performance among children aged 3-4 years in the PG / TK Al-Muhajirin Semarang.

2. RESEARCH METHODOLOGY

2.1. Design and Samples

This study employed a quasi-experimental design and applied non-randomized with control group and pre-test post-test design. Forty (40) children aged 3-4 years involved in this study were divided to control and experimental group. Twenty children in experimental group obtained educational game tools for 14 days, 2 hours per day, whilst the twenty children in control group have no experience to educational game tools stimulation. Respondents who experienced to pain during the stimulation should be excluded. In experimental groups, the educational game tools stimulation was provided by that school.

2.2. Measurement

A questionnaire consisted of 9-10 questions about the children progress was provided to assess children development. In providing this treatment, researchers recruited teachers to score children performance. Educational game tools were provided to the children to assess: (1) rough motoric, such as running, jumping, standing on one leg, climbing, playing ball, riding a tricycle, catching a ball, walk in a straight line, throwing small objects up and imitating the animals walk; (2) soft motoric by arranging puzzles and blocks, drawing, matching images, classifying objects, cutting the paper, sewing paper, writing, counting, and colors mixing; (3) speech and language including listening to a story, singing, storytelling, introducing themselves, asking questions, and recognizing letters; (4) social skills and self-reliance including persuading the children by embrace them, making the child to express his feelings, eating together, asking them to invite other children to park and library, and involving children in light housework. These instruments evaluate child development, and classified the development, then, either as normal or irregularities. The educational game tools were provided 2 hour a day for 10 days. The teachers have been trained by the researches before assessed children performance.

2.3. Data Analysis

The characteristic data of children (i.e., age, gender, weight, and height) was performed in the results. To find out the difference level, parametric data was employed to analyze the normal distributed data whilst the non-parametric test was performed for non-normal distributed data.

3. RESULTS AND DISCUSSIONS

Performed by Mann Whitney test, we recognize there was no different distribution of participants between the control and experimental group regarding to their age, gender, weight and height. It indicates the difference produced from the treatment may not be resulted from the unbalance distribution of participants in control and experimental group. The age of children involved in this study was on the average of 50 months with proportional body growth with weight of 13 to 22 kg and height of 85 to 115 cm, as shown in Table 1.

Table 1. Characteristic distribution of children by age, gender, weight and height

Parameters	Group		p value
	Eksperiment (N= 20)	Control (N= 20)	
Age (Month)			
Mean ± SD	50 ± 2,3	50 ± 2,0	0,807
Range	48 – 54	48 – 52	
Gender			
Men	12 (60%)	9 (45%)	0,527
Female	8 (40%)	11 (55%)	
Weight (Kg)			
Mean ± SD	18,3 ± 2,1	17,2 ± 2,3	0,689
Range	14 – 22	13 – 20	
Height (cm)			
Mean ± SD	102,7 ± 4,9	100,4 ± 4,9	0,347
Range	95 – 115	85 – 105	

Per by the result, we revealed that the educational game tools supported significantly to the children development aged 3 – 4 years at 0.001 difference level. Before treatment the score among the children ranged 3 – 6, and no difference of children development was identified between the control and treatment group (*p* value = 0.947). From Table 2, the mean score (± SD) of children development increased from 5.25 ± 1.02 to 8.50 ± 0.51 after intervention. It indicated that the educational game tools contributed positive effects to children development.

Table 2. Children development scoring before and after educational game tool intervention

Children Development Scoring	Group		p value
	Eksperimental (N=20)	Control (N= 20)	
Pre-test			
Mean ± SD	5.25 ± 1.02	5.40 ± 0.681	0,947
Range	3 – 6	4 – 6	
Post-test			
Mean ± SD	8.50 ± 0.51	5.85 ± 0.745	< 0,001
Range	8 – 9	4 – 7	
<i>p</i> value	< 0,001	0.157	

During the development, children may develop their rough and soft motoric, personal social and language. Children aged 3-4 years either in experimental or in group control involved in this study were highlighted with high score for rough and soft motoric development, and personal social. The result suggested that the children were not using their language ability (score: 0 – 0.05) to be involved socially to their friends (1.65 – 2.00). We also recognized among forty children aged 3-4 years old the soft motoric (score: 1.80 – 2.00) was higher than the rough motoric (score: 1.50 – 1.60).

We acknowledge that the educational game tools supported positively to the four indicators which used to score the children development. Compared to the control group, without experienced to educational game tools, educational game tools contributed significantly to the rough motoric, personal social, and language (p value < 0.001).

As shown in Table 3, rough motoric of the children increased from 1.60 ± 0.82 to 2.55 ± 0.68 whilst the soft motoric rose from 2.00 ± 0.56 to 2.10 ± 0.30 . Educational game tools simulated child gross motor development aspects since the games provide cooperative play between the children with their friend and encourage and teach children how to kick a ball, ride a tricycle, hop on one foot, jump with two legs, throwing a ball. In improving soft skills the children learned how to sewing, buttoning clothes, drawing with crayons, creating a form with candle toys, disassembling using a puzzle.

Personal social of the children increased from 1.65 ± 0.67 to 2.95 ± 0.22 whilst the soft motoric rose from 0 ± 0.00 to 0.90 ± 0.64 . Educational game tools which allowed a child to communicate with their friends directly and be exposed to physical activity with their friends will greatly improve in language. Social skills children are invited to play together (associative play) is to invite and teach children how to wash their hands and feet, eat with a spoon and fork, put on shoes, playing hide and seek. The ability for language / speech is taught by means of read books, watch television, play CDs and memorizing names.

Table 3. Children development affected by educational game tool intervention

Group	Children Development Scoring							
	Pre-test				Post-test			
	RM	SM	PS	L	RM	SM	PS	L
Experiment								
Mean	1.60	2.00	1.65	0.00	2.55	2.10	2.95	0.90
SD	0.82	0.56	0.67	0.00	0.68	0.30	0.22	0.64
Control								
Mean	1.50	1.80	2.00	0.05	1.55	1.90	2.20	0.15
SD	0.68	0.41	0.72	0.22	0.60	0.30	0.83	0.36
<i>p</i> value	0.495	0.369	0.102	0.799	<0.001	0.314	<0.001	<0.001

Description: RM, Rough Motoric; SM, Soft Motoric; PS, Personal Social; L, Language

Gender affected variations in children's creativity. Boys are more creative than girls. This is due to differences in the approach taken by the environment for boys and girls. Boys were observed more independent and exhibited better encouragement from parents and teachers, so they are showing initiative and spontaneous attitude

4. CONCLUSIONS AND SUGGESTIONS

We recognized that children aged 3-4 years either in experimental or in group control involved in this study were highlighted with high score for rough and soft motoric development, and personal social. The result suggested that the children were not using their language ability to be involved socially to their friends. We acknowledge that the educational game tools supported positively to the four indicators which used to score the children development. Educational game tools which allowed a child to communicate with their friends directly and be exposed to physical activity with their friends will greatly improve in their early development. It shows an important of educational game tools to develop children performance in early age.

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