



Origami and Fine Motoric Ability of Intellectual Disability Students

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This study aims to analyse the effect of playing origami on fine motor skills. The research method used is quasi experiment with time series design. Data analysis techniques including the Wilcoxon test. Data analysis techniques were based on the developmental delays experienced by students with mental retardation caused by various things. One of which is the absence of activities that optimally develop fine motor skills. One of the activities that can be used to optimize fine motor skills in retarded students is playing origami. Origami play activities involve the skills to move the fingers, the skills to move the wrists, and the skills to move the arms. Wilcoxon test will be used to test whether playing origami affects the fine motor skills of retarded students.

Keywords: *Origami, Motoric Ability, Intellectual Disability*



Introduction

Fine motor skills are movements that only involve certain limbs and involve small muscles between the exercise of the wrist and the ability to move the fingers (Bambang, 2007). Fine motor skills play a very important role for every individual, because daily activities almost all involve fine motor skills. Examples of activities involving fine motor skills include holding small objects such as beads, spoons, cutting paper, and folding paper.

Fine motor skills begin when the baby is just born. This can be seen when the baby is clenching his fist, which is the first development of fine motor skills (Chamidah, 2009; Soetjningsih, 2012). Along with the growth and development of children, fine motor skills also develop, especially in children aged 3-7 years. Children in this age range have very rapid motor development. However, each individual has characteristics in the phase of his own fine motor development. This does not rule out the possibility of an individual, especially a child, experiencing delays in the development of fine motor skills, including mentally retarded children.

Fine motor skills are the use of a group of small muscles such as fingers and hands which require precision, accuracy, neatness and eye coordination with the hands to control in achieving the implementation of skills. Fine motor skills in this study is the use of a group of small muscles for control in the successful implementation of skills that involve neat and accurate eye and hand coordination. The development of a child's fine motor skills is not based on observation but rather an assessment of the results. The completeness of their facilities is also an obstacle. Complete facilities make it easier for children to explore. Appropriate simulation is thus needed to practise the development of fine motor skills because, with the differing ages of children in different classes, there is also a difference in their abilities (Ningsih, 2015). As the full use of the hands is not yet possible, the development of fine motor skills will affect the readiness of the child in writing, that is, in the practice of coordinating the eye and hand with the recommended amount of time.

Visibility is also another activity of fine motor skills, applying the ability of children to look to the left, up and down which is important for the preparation of early reading. One development that needs to be optimized is the aspect of motor development, especially fine motor skills. Fine motor is a movement that only involves a particular body and is carried out by small muscles and requires eye and hand coordination, accuracy and precision. The fine motor skills of children need to be stimulated so that children do not experience difficulty in coordinating the movements of their fingers flexibly. Fine motor skills are indispensable for children in their readiness to write. The goals of fine motor skills include: 1) Adjusting the social environment as well as providing opportunities for the learning of social skills because each development cannot be separated from each other; 2) Improving motor skills of the smooth child of Group B, in order to be able to develop fine motor skills, especially eye and



hand coordination, optimally; 3) developing their confidence as the more and more children do an activity the bigger their sense of confidence gets (Ningsih, 2015).

Developmental impairment is an individual with an intellectual function which, besides mental retardation, also has a deficiency in adaptive behaviour and occurs during the development period, namely between the conception period until the age of 18 years (Wijaya, 2013). Someone with mental retardation has these characteristics. One of them is intellectual impairment. The impact of intellectual decline is the difficulty of a mentally disabled person in learning, understanding, and communicating. A child is said to be a Child with Special Needs if the child has the following two conditions: (1) children have significant deviations from children in general (less or more than children in general); (2) these deviations make children experience obstacles in their daily lives; and (3) because of these obstacles a child needs special services. If the three conditions above exist in the child, then the child is categorized as a Child with Special Needs. Thus, when there are children who have physical and intellectual deviations but do not have obstacles in their daily lives, these children do not automatically need special services and are not categorized as children with special needs (Aziz, Sugiman, & Prabowo, 2016; Yatmiko, Banowati, & Suhandini, 2015).

Another impact of mental retardation is mental retardation skills in carrying out daily activities such as, taking care of yourself, as well as relating to others (Wijaya, 2013). The limitations of mental retardation in thinking make it difficult for them to control the behaviour inherent in daily activities. (Efendi, 2006). Therefore, mental retardation requires a method of behaviour modification, one of which is playing therapy. Mild retardation are those who belong to the group whose intelligence and social adaptation are inhibited, but have the ability to develop in academic learning, social adjustment and work ability (Putri, 2012).

Playing is an activity without coercion. Play includes the use of symbols, actions or objects that have meaning for themselves (A. I. Sari & Wahyuno, 2016; Sukma & Sihkabuden, 2018). Play is the right therapy method for mental retardation because play can be done anywhere, indoors or outdoors, and uses all kinds of toys that may be bought or made. Games that can be given in mental retardation are simple games that have a low level of difficulty and are easily accepted and understood (Efendi, 2006). Playing has many benefits for mental retardation, ranging from enhancing physical development, imaginary development, to sensomotor development. One of the games that can be applied to mental retardation is playing origami.

In the past, many people used the term props. Demonstration, derived from the word raga which means the body or form. The term props has been attached to many educators for quite a long period of time. Even today there are still many people using the term props alternately with other terms such as aids, media, learning tools, and others. Props were intended to clarify the lessons presented. This term does not mean that the use of the word "props" is considered



wrong or conventional. Teaching aids in learning is essentially a tool used to show something real that clarifies learning. When conventional learning begins to realize its weaknesses by educators, the thought arises that everything that is taught should be demonstrated in reality so that it can be understood by students. Comenius with his famous book, "Orbis Pictus" (the world in pictures). Comenius hopes that through these drawings students get a more realistic understanding of what is learned. In line with the change in the way of delivery, other figures emerge who say that the image can still lead to wrong perceptions, so it should be shown the original object. The use of drawing has been the subject of considerable discussion in art and design instruction but there is little agreement on the particular nature that it should take. This is due to the fact that there are countless different applications of drawing, which depend on how it is created and the intended use (Eshun, Toupfic, & Appiah, n.d.). From this arises again how to teach things like the ancestors who taught their children directly or by demonstration. To achieve success in fine motor skills then an interesting and varied activity is needed so that the teacher can see the behaviour that arises from a child's potential direction. A child's lack in learning can be seen according to time, sensitivity or the development shown by each child (Astria, Made Sulastri, & Magta, 2015).

Origami is the art of folding paper with the original material and only from paper without additional materials or tools. According to Fajar Ismayati (A. I. Sari & Wahyuno, 2016) all papers can be used, so that everyone can easily access origami. The art of folding paper or origami is a very interesting activity and is believed to be very popular with children for a variety of reasons. Origami is useful for training fine motor skills, and fostering motivation, creativity, skills and perseverance. Origami exercises can help children understand relatively complete measures by using more effective strategies for size comparisons (Hasanah & Priyantoro, 2019). Playing origami makes children more patient, creative, resilient, and independent. Fine motor development is the process a child undertakes to skilfully move the limbs, especially the fingers and wrists. Therefore children learn from the teacher about some patterns of movement that they can do to train dexterity, speed, strength, flexibility, and accuracy of coordination with eyes and hands. Thus, the art of folding paper or origami can be used as a method in improving fine motor skills in mentally retarded children.

Origami models are usually also miniatures of creatures or objects from life. The model is the result of the imagination of the makers. There are very clear or very natural models of life forms or models. But it is also so abstract that more imagination is needed to capture it. A child will learn to imagine through origami if and when when he has tried to be creative with something new without imitating or following the diagram.

Origami is the art of folding paper, so when a child makes origami it means he has learned to work (art). Art here can be interpreted in two ways, namely the first art of folding it (technique and how to fold it, the process at each fold, etc.), the second is the model itself which is a work of art. Origami's works can clearly be included in visual art.



The use and type of paper variety and colour will also make the model different, even from the desired composition. Speaking of works and art certainly cannot be separated from words of appreciation. Practicing origami also means learning to appreciate a branch of art from visual arts. A child will also learn to appreciate art and beauty from an early age, meaning he also learns the subtlety of the soul.

Origami is folding paper to make a model, so when a child is playing origami it means he is learning to make from a piece of paper (or more) a model according to his abilities and preferences. Models in origami are numerous and continue to evolve along with new works produced by folders. But the origami model that is preferred by children is usually a traditional origami model in the form of toys (miniature) animals, airplanes (boys), houses and household items (girls) and so on. This origami model for children usually consists of simple folds with a few steps in the diagram. But do not rule out the possibility that a child who has tried many types of folds will be able to make origami models that have a higher difficulty. More and more try this type of fold and a child can certainly make even more origami models.

Many origami models are used for children's play, for example jumping frogs, flying saucers, large balls, airplanes, boats, gunshots, propellers, home appliances models from cabinets, chairs, tables, beds, and others. These models can generally be made from a single sheet of paper. For certain large models, you can use newspaper, such as making hats, large balls, planes and others. It should be underlined that in origami folding itself is part of playing. After becoming a model, it can also be played alone or together.

Origami not only can be learned through the guidance of a teacher or instructor, but also through animation or through diagrams from an origami book. A child can make origami by following the diagram in the book, although it must be chosen and adjusted to the level of ability. This is expected so that children have no difficulty in completing it. If the ability of the child is still a beginner stage, it is always good to be accompanied by an adult, even recommended, so that when there is difficulty someone can help solve it. The more children who practice through diagrams, the better the ability to read diagrams, including the introduction to the folds used. The process of reading the diagram will stimulate the mind to think of a series of stages to completion.

An origami diagram consists of several stages, where each stage is a series of diverse fold problems. When a child makes origami by following the flow of a diagram, he is actually facing problems at each stage of the diagram. If he managed to follow step by step, it means he can solve the problem of origami. At times like that, certain age children will follow the logic: How to follow, read pictures and solve those problems. Even if he has started making his own work, he will try to find a solution until he succeeds in forming an expected origami model. Of course, this is a very good exercise for children to learn to solve problems. One of the things that really determines the beauty of origami models is what is called the proportion



of shapes (comparison). Why this or that model resembles a particular form is due to the theory of proportions. The level of beauty of an origami model (although the model is clear) is also very much in this proportion. On the other hand, traditional origami folds are generally folds based on mathematical theory, meaning that they are not spontaneous (different from many techniques for contemporary models). Thus, origami activities can guide a child to recognize the concept of the comparison of forms and mathematical concepts as well. Paper folding is an easy activity to make and the fun of folding is not only for children, but also adults through media. Origami learning makes proper use of media (Yuli Wulandari, 2014).

Fine motor movements make the child more creative by, say, cutting paper with straight cut-outs, drawing simple pictures and colouring, using kilp to put together two sheets of paper, sewing, weaving paper and sharpening a pencil with a pencil sharpener. However, not all children have the maturity to master this ability at this stage (Indraswari, 2012). Observations on a Special School in X City show that retarded students have problems moving limbs that involve fine motor skills, especially in carrying out simple activities such as folding fingers, grasping, holding, or writing less than optimal values, which are caused by delays in motor development and a lack of training to improve fine motor skills in retarded students. Besides that there is no paper folding or origami activity in Special School in X City. Motion assessment is the process of gathering information or data about the appearance of the motion that is relevant for decision making and the programs provided (Pradipta & Andajani, 2017).

Based on the background of the research, the problem to be answered is, "Does playing origami influence the fine motor skills of retarded students at Special School in X City". The purpose of this study is to analyse the effect of playing origami on fine motor skills in retarded students.

Research methods

This research is experimental, and the type of research is a quasi-experimental research with time series design. This time series design research group used as a study cannot be chosen randomly. Before being treated, the group was given a pretest four times. Pretest is given four times to find out the stability of the group's condition before being given treatment. After treatment the group was given a post-test up to four times. Post-tests were given four times to determine the stability of the group after being treated (Djarwanto & Subagyo, 2003). Participants come from a non-coercive basis and they also have the right to resign or not participate in a study. Researchers are also required to keep all data used or collected for research purposes is strictly confidential (Mulyadi, 2012; Setyanto, 2013)

The research method used by the writer is quasi-experimental method (Quasi Experiment). The research method is a way to solve research problems that are carried out in a planned and meticulous manner with the intention of obtaining facts and conclusions in order to



understand, explain, predict and control the situation. From the above understanding, the researcher used a quantitative research approach in conducting this research. Quantitative approaches are usually used to test a theory, to present a fact or describe statistics, to show the relationship between variables, and some are developing concepts. Quantitative research is further divided into experimental research, correlational descriptive, evaluation, and so forth. The experimental research method is divided into three large groups, namely pre-experiments, experiments, and quasi-experiments. In this study the authors used a quasi-experimental (quasi experiment) design type non-equivalent control group design. The author uses this research design because it feels appropriate to the title of the study taken. Conclusions drawn from Arikunto's opinion that the authors provide a preliminary test (pretest) to students to find out to the extent to which knowledge is possessed by students. After being given the initial test, the author conducted an experiment by providing treatment (intervention). The final action taken by the author is to describe the final test (posttest) in order to get a comparison of data analysis from the initial test (pretest) to the final test (posttest).

The subject of the study of the influence of origami games on mental retardation motility was 9 students of mental retardation class I in the academic year 2017/2018 at Special School in X City with 2 male students and 7 female students. The research subjects were selected based on observations made by researchers regarding fine motor skills that have not yet developed optimally. Students were not able to hold pencils correctly, write neatly, and unzip bags.

The type of instrument used in this study was the performance test instrument. Performance tests in this study were conducted to measure and determine fine motor skills in retarded students. Validation used in this study is instrument validation and material validation because validation is concerned with the content and format of the instrument. An instrument is said to have content validation if certain objectives are aligned with the material or content of the learning provided (Arikunto, 2013). The validators in this research instrument were fine motorists and learning experts (class teachers). In (Sugiyono, 2010), analysis is performed after all data from all respondents have been collected. Data analysis in this study aims to describe the data that has been collected as it is. The data referred to in this study is data taken from the results of pre-test and post-test students and the hypothesis test used is the Wilcoxon test.

Research result

The pre-test was held on February 26 to March 1, 2019 in the first-grade students of SDLB BC Kepamjen Malang Regency. Pre-test was carried out four times with the aim of knowing students' fine motor skills in the form of taking paper using 5 fingers, 3 fingers and 2 fingers and making an origami shape before being given treatment. Pre-test activities were carried out for 35 minutes at each meeting. In table 1 are the results of pre-test of fine motor skills of



mentally retarded students in Special School in X City Regency before the treatment (treatment) playing origami. Criteria for mental retardation fine motor assessment is in the form of taking paper without assistance, with assistance twice, with assistance more than twice, and taking paper with full assistance.

Based on the results obtained from the pre-test results in table 1 students with mental retardation class I in Special School in X City Regency, it is known that the average overall value is 36.46 so these results indicate that fine motor skills are included in the very low category. These results indicate that there are no activities that can maximize students' fine motor skills. The post test was carried out on 7-10 March 2019 on the first grade students of Special School in X City Regency. The post test was carried out four times (O5 O6 O7 O8) with the aim of knowing the condition of the students after being given treatment (treatment) playing origami. Post-test activities were carried out for 35 minutes at each meeting. In table 2 are the results of pre-test of fine motor skills of mentally retarded students at Special School in X City Regency after the treatment of playing origami. Based on the results obtained from the results of pre-test for mentally disabled students in Special School in X City Regency, it is known that the average overall score is 88.35 so these results indicate that fine motor skills are included in very good criteria and have increased. The mean score of the pre-test was 36.46 and the average post-test score was 88.35. Based on the comparison between the pre-test results and the post-test results it is known that the post-test results are higher than the pre-test results, this shows an increase in the fine motor skills of mentally disabled students before and after playing origami.

Table 1 Pre Test Result Data for Fine Motor Ability

No	Sbjc	Score <i>Pre Test</i>				Ttl	Avrg.
		I	II	III	IV		
1.	SF	37,5	37,5	56,2	37,5	168,7 5	42,18
2.	DD	25	31,2	43,7	31,2	131,5	32,87
3.	LN	31,2	31,2	37,5	31,2	131,2 5	32,81
4.	HN	25	25	43,7	43,7	137,5	34,37
5.	EL	25	25	31,2	25	106,2 5	26,56
6.	PT	43,7	50	56,2	56,2	206,2 5	51,56
7.	AS	31,2	31,2	37,5	31,2	131,2 5	32,81
8.	AZ	43,7	43,7	50	50	187,5	46,87
9.	NV	25	25	37,5	25	112,5	28,12
		Total					328,15 ÷9 =36,46

Table 2 Post Test Result Data for Fine Motor Ability

No	Sbjc	Score <i>Post Test</i>				Ttl	Avrg
		I	II	III	IV		
1.	SF	100	100	100	100	400	100
2.	DD	75	93,7	87,5	87,5	343,7	85,92
3.	LN	93,7	93,7	100	100	387,4	96,85
4.	HN	75	87,5	87,	87,5	337,5	84,37
5.	EL	75	75	75	81,2	306,25	76,56
6.	PT	100	100	100	100	400	100
7.	AS	81,2	87,5	81,2	81,2	331,25	82,81
8.	AZ	100	93,7	100	100	393,7	98,42
9.	NV	68,7	68,7	75	68,7	281,16	70,29
		Total				795,22 ÷9 = 88,35	

In this research, hypothesis testing uses the ranking formula marked Wilcoxon (Wilcoxon's Signed Rank Test). The hypothesis in this study suggest there are differences before and after being given treatment by playing origami. If the results of the rank test marked Wilcoxon (Wilcoxon's Signed Rank Test) state that $T_{count} \geq T_{table}$ then $H_0 =$ is accepted and shows no effect of playing origami on the students' fine motor skills. If the results of the rank test marked Wilcoxon (Wilcoxon's Signed Rank Test) state that $T_{count} \leq T_{table}$ then $H_0 =$ rejected and show the influence of playing origami on the students' fine motor skills. The real or significant level used is $\alpha = 5\%$ or equivalent to 0.05 (Wibisono, 2005).

Discussion

Children's initial fine motor skills was measured through paper folding or origami activities through performance tests. Pre-test is an initial activity before being given treatment in the form of origami play activities, pre-test is carried out four times aiming to determine the stability of the initial fine motor skills of students. The origami play activity begins with the researcher teaching examples of various origami, which certainly attracted the students' attention.

According to (Bambang, 2007), fine motor skills are movements that only involve certain parts of the body and are performed by small muscles, such as moving the wrist and moving the fingers. The activity of taking origami paper using 5 fingers, 3 fingers, and 2 fingers on the pre test shows the fingers of the students' hands are still stiff. The majority of fingers that are still stiff include the middle finger, ring finger and pinky finger, so they still need help. The assistance provided is in the form of holding the students to bend their fingers to keep them from being separated.

(Hildayani, Sugianto, Tarigan, & Handayani, 2014; Rolina, 2010; Sumantri, 2014) said that the fine motor development of children in the age range of 6-7 years, among others, can write letters of the alphabet in full and hold stationery like adults, in addition to that they have also been able to write their first names; are able to use equipment to paint, draw and create other works of art. It can be said that mental development of the mentally retarded delays developmental, because it is not in accordance with the age range it should be.

The next assessment is to make a form from origami paper. The shape made is the shape of a shark, a cat's head, tulips, and rabbits. The difficulty of the form made includes very easy, easy, medium and difficult. The fine motor skills of students in making shapes are still not timely, they still need to fold, and they still need help folding. At the stage of giving origami decoration in the form of eyes and mouth if the shape is made by using an animal pencil, students have not been able to hold a pencil properly and have not been able to shape the eyes and nose perfectly. This is caused by a weak mental state or intelligence that causes fine motor disturbances in mentally disabled people (Amriliyanto, 2013; AYU SEKARWATI, 2013; Sulistyaningsih, 2010).

Children's fine motor skills after playing origami was measured through paper folding or origami activities through performance tests. Pre-test is an initial activity before being given the treatment in the form of origami play activities, pre-test is carried out four times in order to determine the stability of the initial fine motor skills of students.

Fine motor skills through taking origami paper using 5 fingers, 3 fingers and 2 fingers show development after playing origami. It is characterized by a middle finger, ring finger that begins to bend perfectly and without help. In addition, students can make origami shapes including sharks and tulip in a timely manner, and without assistance. The repetition of folds in students is also reduced. However, some students have not been able to finish the form on time. Students with mental retardation will usually experience interruptions in concentration, meaning that longer focus is needed in order to give them information. They also need more time to do their tasks (Wijaya, 2013). Children's fine motor development organises the use of a group of small muscles such as fingers and hands, which often requires intelligence and eye and hand coordination (FITRI, 2017; Rahmawati, 2014; E. K. Sari, 2012).



Pre test results and post test results where the post test results are higher than the pre test results shows that the fine motor ability of mentally retarded students increases. Small muscles can be trained through activities that are carried out routinely. Based on field observations, it appears that there are still many retarded children who are experiencing obstacles in motor development, both gross and fine motor (Garlina, 2013; Sartika, 2013; Ulya, 2016). In this study paper folding or origami activities are carried out routinely for four meetings. Origami is the art of paper folding which is useful for improving fine motor skills by teaching accuracy and neatness. Based on data analysis and a discussion of improving learning results, it was concluded that applying the demonstration method of paper folding activities (origami) can improve the fine motor development of children (Purnamasari, Negara, Ke, & Suara, 2014).

Conclusion

Fine motor is a movement that involves small muscles as the main character and only involves certain parts of the body, for example, the skill of moving the fingers, the ability to move the wrist, and the ability to move the arm. This study shows the influence of origami activities on the fine motor skills of mentally retarded children. The developmental delay experienced by students with mental retardation is caused by various things, one of which is the absence of activities that optimally develop fine motor skills. One of the activities that can be used to optimize fine motor skills in retarded students is playing origami. Origami play activities involve the skills to move the fingers, the skills to move the wrist, and the skills to move the arm. Therefore, there are ten benefits to origami, namely; 1) the formation of more perfect motor skills in both hands; 2) increasing intellectual abilities; 3) increasing the ability of creative power; 4) stimulating balanced performance between the left and right brain parts; 5) increased imagination; 6) increasing the ability to focus attention (arguably increasing concentration); 7) increased memory capacity (memory); 8) patience; 9) providing emotional and aesthetic experience, and of course; 10) enabling a person to better appreciate the pleasure, satisfaction, and pride in his work. In accordance with its benefits, origami can help students with intellectual disabilities to train and improve their fine motor skills.



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