

INFLUENCE OF CREATIVE AND DIDACTIC GAME ON FINE MOTOR SKILLS IN CHILDHOOD

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Abstract

In this report, a comparison is made between coordination of the hands and dexterity of children in the preparatory group of 6 and 7 years. There are investigated individual components of fine motor skills related to the mental and intellectual development of the child's personality. In connection with the experiment, two groups of children are formed: one, got a creative and didactic game, and the other- a game that has no connection in terms of control and evaluation of the group.

All subjects were pre and post tested within an interval of two months. The creative and didactic game was presented to the experimental group in this interval. Each was administered three times to provide a reliable average. Analyses showed a statistically significant difference between the two groups with regard to right/left handskills speed ($P \leq 0/002$).

The game used to evaluate data for the study is the art that have lately become popular among children which is "Rainbow-Loom" (knitting silicone rubber bands).

An analysis of this study showed a significant difference between the two groups in terms of speed in dexterity of the left and right hand. Further studies reveal that there is no connection between height, weight and age, in the skills for speed of the hands on one hand and the coordination eye-hand and hand-hand, on the other. Besides, sex in the experimental group is also not relevant to the ability of coordination. There is an important relationship between the rapidity of the left and right hand, and age.

Keywords: Creative and Didactic Game; Coordination "eye-hand", "hand-hand"; Fine motor skills, Speed of Hand Skills.

1. Introduction

In the modern stage of development, a society is characterized by organizing a new type of education, meaning – factor, which supports the idea of encouraging human culture, “human – creator”, through positive and constructive solution of urgent challenges in life. This leads to re-orientation of goals and the content of education, with regards the position for humanizing and humanizing within context, to which the human appears as an epicenter of culture and the main value in educational process.

The orientation of society and of the whole system of education for developing child personality will invariably demand the creation of special optimal conditions for shaping their personality and uncovering creativity, growing moral, aesthetic and emotional feelings, values of positive attitude towards oneself and the world around them (Gazman, 1995). Modern education assigns a special role of the standard issue of interdisciplinary connections that facilitate integration of school disciplines in the sphere of education and the inclusion of specific knowledge of the person in semantic, personality aspect in a particular area.

“Through games, the child gets to know different social positions, discovers for themselves closed societies in other people (their feelings and attitudes). Penetrating through the inner circle of other people is actually a very important moment” (Koleva, 2014).

Within this context, there is research of the psychological and pedagogical nature of school and pre-school age from the period of shaping child personality. During this period, in the base of the child’s personality, abilities develop, tendencies for specific activities originate, an overall view of the world around them is created (Venger (1984),Vigotsky (1991), Leontiev(1991), Elkonin(1978). Arguments typical of that age and of pupils from forms 1-4 are that this period is the most sensitive, open to aesthetic and ethical influences, since the emotional and sensitive area is the most rapidly developing.

The game is among the main activities accompanying human life. It is in the basis of its overall development and creation as personality, because it is a way of getting to know the world. Through it the child takes in and re-creates the world and at the same time they get educated and brought up. “The role of society in developing individualism increases in accordance with the amount of social differentiation and development of social relationships. The types of social relationships that exist in society are so various that they increase the necessity of one’s own creation” (Koleva, 2014).

2. Problems in Integrating Game with Art

In the power of family upbringing, there are only two activities that influence a child’s development. First, there are different types of labor in the family, and secondly, this is the game in all its types. In the game anything that is not difficult, in a totally non-differentiated form, becomes a main form of life for the child, and parenthood generates the only universal form of child activities. The closed circle of family and social contacts for the child reflects on the games, of course, and predominantly on these relationships and these functions that differentiate family members in relation with the child and towards one another. Maybe the existence of a personal world for a child in the games as activities is their main content form of compensation, which is a tendency for the child to get out of that vicious circle, in a world of wide social relationships.

The child copies interests and activities of the adults around them. Still, there is a tendency for universalizing the value of the game, and in psychological development it is attributed to different functions as purely educational or influencing upbringing. All activities that exist in an organized system of public education are separated from one another by walls and there is close relation among them. Some of them overlap in their effect on intellectual development. Despite this, it is necessary to determine, more precisely, those aspects of psychological development and shaping a child’s personality that are developed in the game mainly and cannot be developed or only have limited influence in other activities. Researching the psychological characteristics of the game, N. Koleva explains that orientation in social relations can only happen by taking into account the inner side of phenomena, positions, intentions, experience of the adult – without this, social relations cannot be understood. It is not the form through which these relationships are expressed (words and actions of an adult) is important, but the hidden meaning of relationships, their personal and emotional component” (Koleva, 2014).

The game is the key in therapeutic and pedagogical activity because it is the only activity to which a human strives actively and unconditionally and the reputation of which is not determined by external factors (authorities).

The combination between game and work in applied art appears a guarantee for success, for instance “Rainbow Loom” – *knitting elastic rubber bands*. In this case, the principle “Do it yourself” applies, and the children take the role they choose themselves – designers, workers or even managers. They are in an active position, which is a factor for positive development in psychophysical, emotional and social aspects.

In practice, there are differences between the medical–psychological and pedagogical–psychological approaches when using the types of art as a game, but they are in a very close relationship. This is so because in the two approaches, the efforts are directed towards and the influence is on the psychological welfare of the individual, for stimulating their creative activity and vitality. In this sense, art classes in the educational and social activity are used as psycho-hygienic and prophylactic factors (Popov, 2014).

Fine motor skills are those little movements of the hands which require accuracy and precision. For this purpose, skills with independent movements of each finger of the hand have to be created separately, different types of grips have to be learned and children have to get used to the opposition of the thumb to the other fingers. Between the ages of 2 and 6, the children learn to use their hands, move their fingers separately and do these better and better. By perfecting their motor skills, the children can perform routine and everyday activities.

This research has resulted from the effect of integrating game with art, for instance knitting elastic rubber bands.

The global purpose of experiments is to develop fine movements of the hands, dexterity and connection with the higher nervous system of the child and the brain cortex functions. Dr. Maria Montessori states that the hands are the instrument of the brain, i.e. “by developing the motor skills of the hands the brain of the child develops as well” (Kolev, 1997).

The results of this research have the potential to assist ergotherapists in their practice.

Since 1930 to 1960, specialists have been trying to explain the different aspects of the game with regards to its main frame. These efforts form the basis for using the game as a means of diagnosis. The evaluation through game has been customary for the last two decades. Parten (1932) (Henderson, 1995) was the first to describe the development of game behaviour. His observation has given the opportunity to examine specific temporal criteria for the appearance of individual game from birth until two years of age.

Bruner (1972) and (Henderson, 1995) are of the opinion that game is beneficial to the creation of motor skills, more especially of the hands, which are necessary when using any type of tool or instrument. In this way, children’s game provides a calm activity, during which the components of complex skills which are necessary in the adult age are mastered, in a way that does not create any anxiety or tension in children.

Schaaf (1990) indicates the proximity of sensory integration with work therapy (ergotherapy) for children in pre-school age and shows the effect of treatment through evaluation of game behaviour.

Dr. Felicity McFarlane, psychologist and psychotherapist, Director of the clinic Melbourne Child Psychology (McFarlane & Story, 2003) and the psychologists and therapists practicing there have reached the conclusion that activities with small objects, such as knitting elastic

rubber bands, can be compared to the activity “stringing beads” and has an exceptionally positive therapeutic results. The children participate willingly in these activities and this is also a factor for success, because the idea is to provide prevention and treatment exactly through game and fun. Little patients feel happy while creating and training their dexterity, will and emotions.

Specialists think that this art is a powerful means for prevention, rehabilitation and treatment of a number of deviations with regards to general and fine motor skills, negative emotions and psychological conditions and behaviour in children.

The main purpose of this research is to determine the effect of waving elastic rubber bands on fine motor skills of children between the ages 4 – 6.

3. Research Methodology

By experimenting, we shall determine the following co-relations:

- Comparison of the degree of influence of knitting on fine movements in girls and boys.
- Determining the size and effect of knitting on “eye – hand” coordination in a control group and an experimental group.
- Determining the degree of influence of loom on “hand – hand’ coordination in a control group and an experimental group.
- Determining the degree of influence of knitting elastic silicone bands on the speed of dexterity in a control group and an experimental group.

Research methodology includes 24 children at the age of 5-6, divided into two groups: *Experimental Group – 1 (EG1)* consisting of 12 children and *Experimental Group - 2 (EG2)* consisting of 12 children. Scientific research was performed in “Slantse” kindergarten – Burgas, in the period 02.2015 г. – 04.2015.

The **object** of the research was integrating children skills, namely “knitting elastic silicone bands”.

The **subject** of the research was knitting a bracelet from elastic silicone bands in accordance with the “fishbone” model, as an activity beneficial to the development of fine motor skills.

Tools: the research methods used are: modified test (short version) of M. Terzieva for controlling the degree of mastering fine motor skills. Experimental observation in the creation of a bracelet in accordance with the “fishbone’ model, during which the technical movements when making the model are observed and the time for making it is registered. Pedagogical experiment – represents and shows the application of art - “knitting elastic silicone bands” in the game, assisting the development of fine motor skills.

If the experiment has a positive influence on fine motor skills, the use of integrating art with game will be proven. We have to take into account the fact that the participants in knitting the model of the elastic band bracelet are not familiar with the technique for making it and this is their first attempt. The main criteria and indicators by which the results are read are:

1. Time for making the model;
2. Using assistance when making the model;
3. Observing the technological sequence of the stages when making the model;
4. Degree of completion of the model.

The data of this research are on the basis of direct and indirect observation. The “eye – hand” and “hand – hand” coordination, and the speed of dexterity of the hands is researched directly, through the “knitting elastic bands” activity and the results are recorded in a protocol.

The analysis data indicate the measure for differences and the main tendency. The control test for fine motor skills made at the start of the experiment and after it clarifies the degree to which knitting contributed to the development of fine motor skills and the “eye – hand”, “hand – hand” coordination. The average assessment in accordance with the protocol indicators clarifies the scale of development of fine motor skills through knitting.

Procedure of conducting: The “knitting elastic bands” activity is demonstrated in **E1** and group training was made. Through an individual approach, the children are acquainted with the characteristics of the activity and with work safety. The research is conducted during two classes, as a game. Between the first and the second class, there is a pause of two classes as a game. There was a pause of two weeks between the first class and the second class, the purpose of which was to avoid monotony and loss of motivation in the children. The task assigned to group **E12** is not relevant to control – assessment.

We think that the use of experimental work is significant because the children showed satisfactory results. Their interest has been provoked and they really have fun in the process of performing the activity “waving a bracelet of colored elastic bands”, for which an appropriate emotional environment has been created. They demonstrate that in this age, they have the potential to make a sufficiently big effort for such a type of activity, which, on its part, indicated that it has a good effect on perfecting fine motor skills, coordination and concentration.

4. Research results

A. Indicator One – “time for performance”

Table 1. Test one

<i>person</i>	P1	P 2	P3	P4	P5	P6
<i>time /min/s</i>	18'18"	26'43"	31'44"	37'32"	28'49"	41'18"
<i>min</i>	18,30	26,72	31,73	37,53	28,82	41,30
<i>person</i>	P7	P8	P9	P10	P11	P12
<i>time /min/s</i>	44'08"	45'01"	44'17"	38'48"	48'42"	43'53"
<i>min</i>	44,13	45,02	44,28	38,80	48,70	43,88

Table 2. Test two

<i>person</i>	P1	P 2	P3	P4	P5	P6
<i>time /min/s</i>	15'24"	25'12"	41'12"	45'21"	30'15"	48'05"
<i>min</i>	15,40	25,20	41,20	45,35	30,25	48,08
<i>person</i>	P7	P8	P9	P10	P11	P12
<i>time /min/s</i>	49'28"	49'45"	49'19"	45'18"	51'02"	48'52"
<i>min</i>	49,47	49,75	49,32	45,30	51,03	48,87

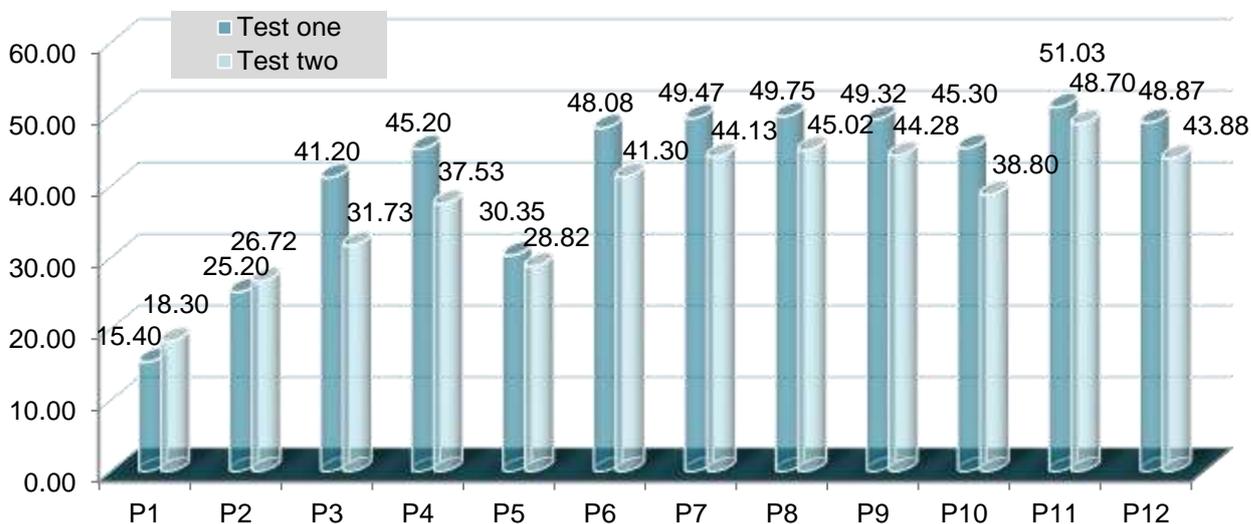


Figure1.

The results under indicator one show a difference between test one and test two with regards to the speed of making the model. Dexterity and coordination of the hands is improved to a great degree. During the second attempt the model is made faster, which shows an increase in the degree of coordinated skills in the movements of hands and fingers. In the girls' group this is more manifested.

B. Indicator Two – “Assistance when making the model”

Table 3. Test one

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	%
No													0%
Nearly no			■		■								16,67%
Average				■		■	■	■	■	■		■	50,00%
Nearly yes													0%
Yes	■	■									■		25,00%

Table 4. Test two

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	%
No			■		■				■	■			41,66%
Nearly no				■		■	■					■	25,00%
Average		■						■					16,67%
Nearly yes	■										■		16,67%
Yes													0%

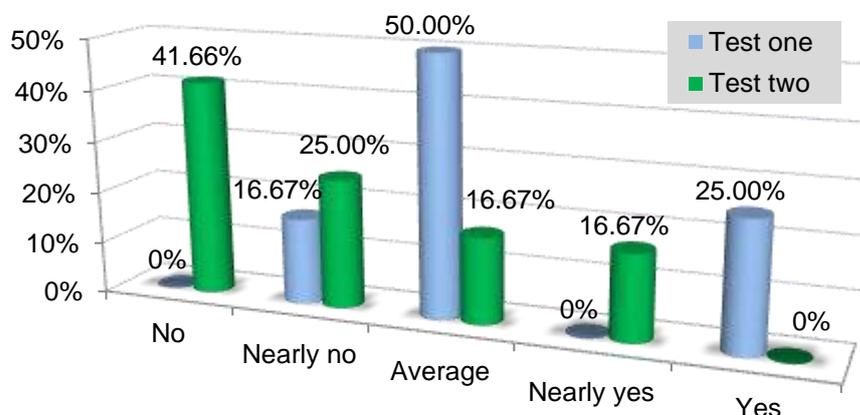


Figure 2.

The analysis of the results shows that a large part of the persons in the two experimental groups initially had difficulties when making the model, mainly in the grip of the hand when using the “knitting needles” tool, as well as with the activity itself. The second test shows significant improvements as regards the researched indicator.

C. Indicator three – “Observing technological sequence of the stages when making the model”

Table 5. Test one

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	%
No	■										■		16,67%
Nearly no		■											8,33%
Average						■	■	■					25,00%
Nearly yes				■					■	■		■	33,33%
Yes			■		■								16,67%

Table 6. Test two

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	%
No													0%
Nearly no	■										■		16,67%
Average		■											8,33%
Nearly yes						■	■	■				■	33,34%
Yes			■	■	■				■	■			41,66%

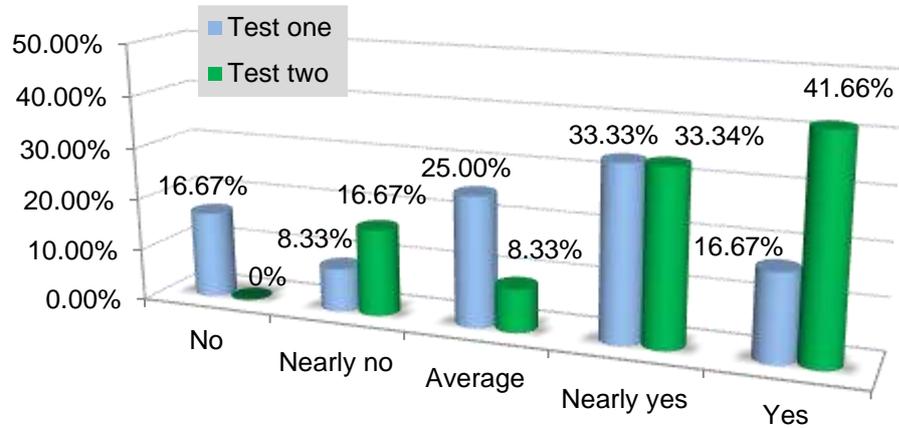


Figure 3.

The data show that the percentage of participants who successfully observe the technological sequence of connecting the elements and shaping the model has increased, which means that their coordination regarding the “eye – eye” and “eye – hand’ model has improved.

D. Indicatorfour – “Completeness of the model”

Table 7. Test one

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	%
No	■												8,33%
Nearly no		■											8,33%
Average							■						8,33%
Nearly yes				■		■		■				■	33,34%
Yes			■		■				■	■	■		41,67%

Table 8. Test two

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	%
No													0%
Nearly no													0%
Average	■	■											16,67%
Nearly yes											■		8,33%
Yes			■	■	■	■	■	■	■	■		■	75,00%

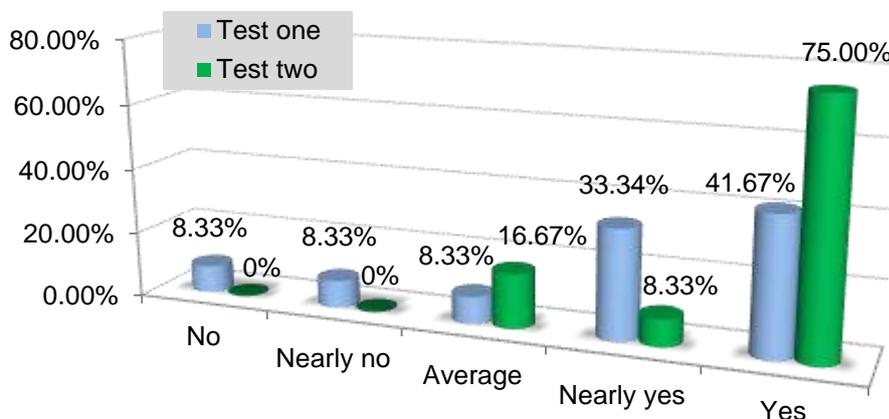


Figure 4.

When comparing the results between test one and test two, it has been noted that in the second attempt, the percentage of the children who have completed the model has increased. Greater precision and accuracy of performance have been detected, as well as perfecting of hand dexterity and concentration of attention.

The control test for fine motor skills for comparing with the first one which showed too low results in fine motor skills of the hands and fingers, as a whole with the children, demonstrates that the participants in EF1, as compared to those in EF2, after the game – art, are more concentrated and faster and give better results with the test.

5. Analysis of Research Results

There is no major link between the children’s physical data and the duration of attention concentration, and also with the fine motor skills in the experimental group. The increase in the fine motor skills in the two groups depending on their sex is similar. The difference between speed and movement of the right hand in the two groups is significant, as well as the difference in speed of dexterity with the two sexes in the experimental stage of the research. Research results show and prove that the activity “knitting elastic silicone bands” helps develop the “eye – hand”, “hand – hand” coordination and the speed of dexterity of the left and right hands. Concentration also improves, because precision when making the model is observed, as well as the sequence of arranging the elements. Perceptive skills are perfected, and most of all positive emotional attitude and pleasure is created, which has a specific effect on the limbic system, which has a main role in performing motor objectives.

The hippocampus plays a vital role for storing information in the processes of the two types of memory – long-term and short-term, as well as with regard to what and how has to be memorized and learned. It turns out that the selected manual activity “knitting” is beneficial to improving concentration and memory, and also to increasing children’s attention span when performing a task. Color perceptions and fantasy are developed, because the children’s brain at this age is quite flexible and thus favorable conditions for appearance and development of imagination are created.

During the work motivation, awareness and concentration appear – these processes are controlled by the limbic system, and the emotions caused by art are, on their part, influenced by it. This must not be ignored as a fact, because the importance of emotional training through game – art is emphasized.

Conclusion

All that has been said so far can be interpreted in the following way: motor reactions are an effect of the limbic system on the motor system and not from the motor system alone. The limbic system is included in the emotional nature of sensory perceptions and feelings, whether pleasant or not.

It has to be emphasized that the “eye – hand” and “hand – hand” coordination and fine motor skills are the means for manual expression. Each of these skills is about non-verbal coordination. Coordination and integration of “eye – hand” and “hand – hand” activities when performing effective movement includes the “movement – perception” link. The development of coordination can provide the child the opportunity to develop general motor skills. The child can more easily determine the position of their body in space, the right posture of the parts of their body (head, arms and legs) and the left – right directions.

For children who have difficulties in fine motor skills, the Loom art is a wonderful way to perfect and strengthen the finest and specific movements of hands and fingers. It encourages a correct grip when handling pen or pencil, which later assists the easier writing of letters and drawing. It should be noted that correct and timely-developed fine motor skills lead to correct development of speaking skills.

The link between the well-developed fine motor skills expressed through knitting elastic bands and the higher nervous system of the child shows that, by individually arranging each bracelet element or another object in a correct manner, the child subconsciously masters the way for consistent and correct arrangement of words and sentences. We know from research that there is this connection: if the development of motor skills of the fingers correspond to the age of the child, the speech development shall be within the limits of what is normal, and vice versa – if motor skills of the fingers and hands is lagging behind, the general speech development shall slow down as well, irrespective of the general motor skill (running, jumping, and climbing) can be normal. Thus, forming the speech areas is performed under the influence of the impulses from the fingers. Normally, a child with well-developed fine motor skills also have a high level of intellect: they can think logically, have a well-developed memory, thinking, attention, connected speech (Vygotsky, 1978).

Dr. Jenifer Todd-Bernard (McFarlane&Story, 2003), member of Occupational Therapist Association thinks that the art of knitting elastic silicone bands addresses complex problems of visual perception, masters the strength of the hand, improves coordination and most of all has a positive effect on the emotional state of children.

The “Rainbow loom” art successfully combined with the playing of the children is a powerful means for achieving high results regarding the overall individual development of the child. Uncovering their intellectual potential in the first seven years contributes to their complete realization throughout their lives. This must be a major responsibility for the adults because we forget that our future depends on the “good start” of our children.

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