

Study of Educational Plays Effect on Learning Concepts of Knowing and Comparing Number Mathematics in First-grade Girl Students of Shahr-e Ray

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Abstract: *Mathematics curriculum in schools is always a key position and is considered as an essential knowledge. So it is taught in the first years of school curriculum. This knowledge has focused on calculating the initial period. So this part of mathematics play an important role in Lives of all people so this knowledge is essential for learning today. In the early years of primary school children, through the making and working with objects and tangible things, learn different concepts. Play is one of the most effective and best ways to teach children. Education using play has several advantages. Since students like play and involve in their play and since play appear as simple complex situations of life and concepts of educational problems and as a result, they easily learn the concepts. This research has studied the educational games effects on learning of math concepts on primary school girls of Shahr-e-Ray. Research goal determine effect educational plays to learn on the concepts of the curriculum of first-grade math students The study population consisted of all female first-grade students in the school year of 2012- 2013 who lives in Shahr-e-Ray.50 first grade student was chosen with Cochran formula, and divided into two 25 group(experimental and Control) randomly. The data collected with 30 question questionnaire made by researcher that divided in two areas of training numbers (knowing number) and comparing the number (less, more or equal). Educational games (6 games) were performed during 10 sessions. This study was semi-experimental pretest and posttest with control group and follow up steps. For data analysis descriptive statistics and inferential statistics were used. The result of this study showed that educational games has influenced on learning of math concepts in knowing and comparing numbers. We found that educational play have effect on learning math curriculum concepts (knowing and comparing numbers).*

Keywords: *Educational games, learning, concepts of mathematics curriculum, concept of knowing number, concept of comparing numbers (less, more or equal).*

Introduction

Mathematical concepts are one of the most effective training materials in these courses. The simplest explanation of the reason for learning mathematics is that mathematics are combined with our lives and generally the world around us. Mathematics is one of the major keys to understanding the world. Galileo believed that "nature speaks with the language of mathematics (Reys et al. 2002). The basic objective of any education system is to provide the necessary skills to students to help them play an effective role as a useful member of society provide possibilities for their growth and development. According to the characteristics and requirements of today's world, mathematics has a major contribution in presentation and transmission of knowledge and skills. Given the importance of mathematics, its education has entered in human civilization for centuries. About four hundred years BC, count has been taught as a subject in Greece and even in Plato's school, the philosophy were taught using mathematics concepts. British in the nineteenth century, included mathematics in general education of schools, since that time, mathematical education considered in different communities, and is one of the major components of public education program (Brumes et al., 2003).

Comprehension is important in teaching math. Learn and understand the basic principles of a subject, will not only summarized in its general principles learning but also it needs to have the ability to discover new and resolve the problems. Curriculum specialists believe that the fundamentals of such subjects should be offered somehow enable students to explore the unknown end. So, in order to student will be able to understand mathematical problems and to explore the unknown environment, training should be related to his /her environment (Safavi, 2010).

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Therefore, mathematics education should be done using the student environment and the different senses and his/her favorite activities to be considered. This makes learning to be done correctly. Also, teachers should teach students to problem solving and consider more transcendent goals in mathematics education (Bromes et al., 2003). In the early years of primary school children, through the making and working with objects and tangible things, learn different concepts. So working with words and other symbols, as well as objects and tangible things, have greater impact on children's learning (Seif 2011). Therefore, the education system and teachers should try to students see, manipulate and learn different things and objects. Such activities enable students to understand different concepts. Instead of giving information directly from a verbal description to the students, teachers provide those collections of diverse activities, including various means of art, handicrafts, cubic wooden toys, and puzzles for students. So they can better understand mathematical concepts and knowledge discovery (Berk 2009).

Play is one of the most effective and best ways to teach children. Education using play has several advantages. Since students like play and involve in their play and since play appear as simple complex situations of life and concepts of educational problems they do not fatigue and as a result, they easily learn the concepts (Ekhvast, 2009). Frubel believed that Play is the highest stage of child development. He considered play more than a leisure and pleasure. Frobel designated his educational plan by using play as an educational model and curriculum. He could train children by special method based in play (.Mofidi, 2010). All children love to play and mathematic plays help children to better understand mathematic and enjoy it and lead them to resolve problems (Bromes et al, 2003). Educational play is a strategic activity with obvious goal. It include of roles and plans which carried out in special situations. Also educational plays provide a competition environment for children to achieve their goals (Hays, 2005). Educational play is a kind of play for learning (Angaji and Asgari, 2007). Play as a teaching method help students to resolve educational issues with high quality. Using educational play increase student's learning level and motivation. Another advantage of educational play as well, they fit with different learning styles of students (Blum and Yocum, 1996). Behaviorists believe that we can consider play as a learning experience for children. In other words we can use play as a tool for learning and education (Hiuse, 2010).

Dewey and the Gestalt theorists, introduced play as a formal education strategy in the first two decades of the twentieth century. Research results show that educational games than traditional training methods are more useful and effective (Burenheide, 2006). Results of Ekhvast's study indicated that Use of educational play increased motivation and understanding of students in educational environments. Mongillo (2006) in his study found that Use of educational play as an educational strategy is valuable. He offered educational plays to teach various subjects. In Lach & Sakshaug(2004) point of view use of educational plays improve social skills and communication of students. Also using of educational plays can learn self-discipline and self-efficacy to students.

Wake Field (1997) believed that use of play in education issue improve social skills, learning of Curriculum Materials and enhance students' creativity and innovation. Burenheide's study (2006) indicated that despite educational plays are very good in education and easy achievement to educational objectives but they don't find appropriate place among scientists and legal communities. So the use of plays in education neglected and very few articles published in this field. Previous researches show that educational plays have positive effect on math learning. Results of Ekhvast (2009), Schuler (2010), Florida county school (2011) indicated that educational plays affects students learning mathematical concepts and sustainable over time.

The importance of this can be said since math is a basic courses in primary school and form difficult curriculum material for students always and since it is difficult for children to understand it and because there are learning problems and lack of motivation for learning of mathematical concepts in the current education classes using educational plays can largely eliminate the barriers to learning and provide learning concepts conditions for students.

Research Goal

Determine effect educational plays to learn on the concepts of knowing and comparing numbers the curriculum of first-grade math students. Specific research objectives are:

1. determine the effect of the knowing numbers plays on the knowing numbers learning in first-grade students
2. determine the effect of comparing numbers (less, more or equal) plays on the comparing numbers (less, more or equal) learning of first-grade students

3. Determine the effect of educational plays sustainability to learn math concepts in school curricula over time

According to research subject, research hypothesis was defined as below:

1. amount of learning in knowing numbers from students whom received knowing numbers plays is more than those whom don't received this plays.
2. Amount of learning in comparing numbers (less, more or equal) from students whom received comparing numbers (less, more or equal) plays is more than those whom don't received this plays.
3. Educational plays on curriculum learning mathematical concepts of students have appropriate Stability over time.

Research Method

Research method was semi-experimental as preliminary and final test with control group. In this study, the researcher is faced with two groups of subjects which were divided into experimental and control groups. Researcher tested experimental group with educational play while control group don't receive this play. However, before running independent variable on the test group's researcher make a preliminary test on each group and finally similar final test carried out on each group. Then curriculum learning mathematical concepts test to measure the stability tests performed on the group.

Track step	Final Test	Independent Variable	Preliminary Test	Group
T ₃	T ₂	X	T ₁	Experimental (E)
-	T ₂	-	T ₁	Control (C)

Under study community: under study community include all of the first grade girl students of Shar-e-Ray in year 2012- 2013. Sample Size: since relative measurement scale in our research hypothesis was in confident level of 99%, our sample size was determined according to the below scientific principles

n= sample size

δ^2 = Community variance based on conducted research equal to 0.09

$Z_{(1-\alpha)}$ = confident level for equal directed hypotheses in 0.99% confident level equal to 2.33

D^2 = acceptable error equal to 1%

$n = \delta^2 \cdot Z_{(1-\alpha)}^2 / D^2$

$n = (0.09)(2.33)^2 / 0.01$

n = 49

Therefore sample size in our research was considered as 50 persons and were studied in two control and experimental groups.

Sampling Method

Multi-step sampling metrology was used in this study as below:

First one area was selected randomly among education and training areas of Shar-e-Ray. Second then among schools of selected areas, one school was selected randomly. Third step: among different class rooms of that schools 50 persons in two primary school and then 25 persons from each class was selected randomly and placed in two experiment and control group according to lottery. After that current study was carried out on them. Data collection methodology and their tools: in this study two tools was used for data collection as below:

1. learning level of students was measured according to researcher test questionnaire contain 30 question related to first-grade mathematic curriculum concepts in two field include:

- 1) Knowing numbers concept
- 2) Comparing numbers (less, more or equal) concepts

Each question had one score and all questions was formulated as 0, 0.5 and 1

2. educational plays were carried out for learning of first - grade mathematic curriculum concepts during 6 two- hours sessions for knowing numbers concept and 4 two- hours sessions for comparing numbers (less, more or equal) concepts. For math concepts learning we designated 6 play fishing play for learning concept knowing numbers and 2 play for learning comparing numbers (less, more or equal) concepts .

Validity and Reliability coefficient calculation: Content Validity: firstly learning math concepts and designated educational plays was presented to first grade teachers and experienced professors in different field include psychology, psychometrics, research method, ... to judge about test questions contains as well as educational plays techniques. Then their views were gathered and those questions and technique which were under their concurrence was executed. To determine reliability coefficient of learning math concepts firstly we selected randomly 500 persons of first-grade students of Shar-e- Ray. Then learning math concepts test was executed on them. Using Kranbakh alpha method between testable scores in values were 0.86 knowing numbers for test and 0.81 for comparing numbers test. As you can see learning math concepts test has acceptable reliability coefficient.

Results

In order to study effect of educational plays on basic concepts learning of mathematic curriculum of first grade student, independent t-test was used. Also to determine significant difference in the mean test scores we used dependent t - test. Scores differences of each person before and after training was determined using educational play in different concepts. Then mean differences calculated and results are shown in the below tables. **First hypothesis:** amount of learning in knowing numbers from students whom received knowing numbers plays is more than those whom don't received this plays. Independent t-test are shown in Table 1.

Table (1): Independent t-test to compare changes in knowing numbers concept between experiment and control group

index group	number	Mean differences	Standard Deviation	Standard Error	Calculated t	Degree of freedom	Confident level
experiment	25	12.03	2.24	0.45	12.422	48	0
control	25	0.54	4.05	0.81			

As can be seen there are significant differences between mean changes of knowing numbers concept in two control and experiment group. Comparison of averages shows that knowing numbers concept change of experiment group is more and higher than of numbers knowing concept changes of control group. In other words learning knowing numbers concept of those students whom received knowing numbers plays was higher than those whom don't receive the plays.

Second hypothesis: amount of learning in comparing numbers from students whom received comparing numbers plays is more than those whom don't received this plays. Independent t-test are shown in Table 2.

Table (2): Independent t-test to compare changes in comparing numbers concepts between experiment and control group

Index group	number	Mean differences	Standard Deviation	Standard Error	Calculated t	Degree of freedom	Confident level
experiment	25	5.98	1.50	0.30	11.664	48	0
control	25	0.26	1.94	0.39			

As can be seen there are significant differences between mean changes of comparing numbers concepts in two control and experiment group. Comparison of averages shows that comparing numbers concepts change of experiment group is more and higher than of comparing numbers concepts changes of control group. In other words comparing numbers learning concepts of those students whom received comparing numbers plays was higher than those whom don't receive the comparing numbers plays.

Third Hypothesis: Educational plays on curriculum learning mathematical concepts of students have appropriate stability over time. Results of dependent t-test are shown in Table 3.

Table (3): Results of dependent t-test to compare reliability of student learning level in experiment group after test step and tracking=25

STEP	POST TEST		TRACK		STATISTICS		
Concepts Index		SD		SD	T value	Degree of freedom	Confident level
number knowing concept	17.36	1.19	17.18	1.11	-1.181	24	0.249
number comparing concept	8.87	1.58	9.16	1.66	-1.475	24	0.121

As can be seen there are significant differences between students learning level in experiment group after test stage, so as a result our hypothesis regarding sustainable reliability over time of learning concept in mathematic curriculum is approved.

Discussion

Results indicated that educational play in out testable groups have effect on learning math curriculum concepts (knowing and comparing numbers). Results of previous study by Ekhvast (2009) showed that educational play increased knowing and comparing numbers learning concepts. According to our research using educational plays in training of math concepts have special effect on learning increscent and motivated subjects. Glymph (2010) in their study found that educational plays in learning and academic achievement of students in numbers knowing learning concepts is effective. Also results indicated that play is enjoyable for students to accelerate their learning. Results of Algiers School Assocaition (2011) showed that educational play have positive effect on training of math numbers knowing. Also this improve mathematics performance of students and accelerate learning mathematical concepts by them.

Mathematical education in fact is creating environments in which children's cognitive structures can emerge and change. Piyage believed that cognitive constructs developed only when the children find their own learning experiences. Thus, learning should be self-motivated and environment should be rich in sensory experiences. Math is not like other courses that students learn by showing and telling. Learning of The mathematical concepts should be commensurate with the growth cognitive, emotional and psychological (Kulaei Nedjad 2006). Craft believed that Mathematics should be taught as a practical and enjoyable subject. One of the make enjoyable learning and teaching is play. Play is an active approach to learning and have more understanding and reliability so are enjoyable and attractive to students. Learning with play causes students to have a good attitude toward math and learning to occur spontaneously (Bromes et al 2003). Mathematics curriculum in schools is always a key position and is considered as an essential knowledge. So it is taught in the first years of school curriculum. This knowledge has focused on calculating the initial period. So this part of mathematics play an important role in Lives of all people so this knowledge is essential for learning today (Teimoori, 2006).

So children need more opportunities to learn through direct experience. So it is better that teachers and schools provide these opportunities for students to help them in better learning of mathematics concepts. In early stage of life learning only done by play. Play provides the necessary conditions for learning different concepts for children (Izadpanah Jahromi, 2004).

The play is one factor that helps to develop children's thinking and creativity.the play provides a field for children to gain knowledge and skills (Qazvini Nedjad, 2010). By play you can open wide horizons of knowledge about the world in the eyes of students and Information provided to him in various fields. By playing a variety of information offered to the students. Because the child is absorbed, discovery, imagination and curiosity is strong, the play quickly becomes more understanding of others thus, learning is active and spontaneous (Aflatooni, 2008).

by play as direct and indirect learning through basic goals of education in different subjects can be reached and active learning and effective teaching are in the play (Berert, 2007). Some teachers have emphasized use of play equipment as the main teaching tool in learning different subjects. Dekorli, Monteserai and Quzner were among those who took advantage of plays for learning. They used play designed different plays to teach math issues to children's and they were focused on using plays for training since the play can motivate a person and provide the self-regulatory efficacy at him/her (Angaji and Asgari, 2007). Reflecting on the words in the play and education of experts we can say that play has the greatest role in early childhood education, knowledge and learning and the play can be considered as a possible training and indirect natural. In the indirect method, the area expands, multiple concepts are considered. Each child so that he can discover and learn. Children have more freedom in activities and look at the education as a play and entertainment (Rahmani, 1999).

The play can not only encompass activities that are aimed but also if the play is associated with a school activity, Complacency arising from play linked to the relevant course and the children to be interested in teaching and course content. In this case, individual motivation and ability to learn, lessons can be accelerated (Tabrizi 2010). Mongolio says, plays have a positive impact on students' cognitive abilities (Mongolio, 2000). Emami (2008) in his study found that two methods of training and experience (with emphasis on the play), is effective for the students to learn the concepts of summation and subtraction. Also education by experience and play is effective on the mathematics academic progress of students. Research results of Davoodi (2009) showed that textbook learning math plays is effective on the learning concepts of numbers knowing and comparing and play increased students' skills in solving mathematical problems. In line with the current study Zuskin (2004) in his study found that educational plays help children to learn the concepts of numbers knowing learning. Also survey results of Florida School Association (2011) indicated that educational play is effective on the learning concepts of numbers knowing of students. This survey also showed that use of educational plays increased motivation and improve student performance in math. Our results also approved these results as previously Keramati (2007), Aali (2003), Stannard (1999), Shafie (2010), Ricks (2006), Schuler (2010), Kebritchi (2008), Glymph (2010), Carpenter (1999), Griffiths (2010), Mihaljevic (2005), Kappers (2009) and Algiers School Association (2011) obtained these results and their study confirms the results of this study.

Conclusion

Results indicated that educational play in our testable groups have effect on learning math curriculum concepts (knowing and comparing numbers). Overall, this study presented a framework for educational plays, method that can be resolved some of the failure of education. Undoubtedly, this training method can solve problems in mathematics learning

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