

Animation Effectiveness on Fourth Basic Class Students in Mathematical Concepts Acquisition

Dr. Ahmed M. Alduwairi
Faculty of Educational science
Al al-Bayt University/ Mafraq- Jordan

Abstract

The study aimed to identify effectiveness of animation on fourth basic grade students in mathematical concepts acquisition in numbers unit and processes of addition and subtraction of mathematics book. Study sample consisted of (60) students of fourth grade students in Al-Ssaadeen primary school in Mafraq city, students were distributed in a simple random way in two groups, the first one experimental group consisted of 10 boys and 15 girls, the other, control group consisted of 10 boys and 14 girls, experimental method was used. In order to achieve study objective, after ascertaining of its validity and stability, Researcher used a test consisted of (20) paragraphs in final form. The study results showed that there were statistically significant differences in mathematical concepts acquisition of fourth basic grade students in experimental group according to the teaching method, for the experimental group which was studied using animation, results also showed that there were not statistically significant differences on fourth basic grade students in mathematical concepts acquisition according to sex variable, gender interaction, and teaching method. In light of study results, Researcher recommended adopting teaching by using animation in mathematics teaching for students of basic grades because of its effect in mathematical concepts acquisition, designers of the mathematics curriculum at the Ministry of Education urged to include animation in mathematics curriculum. As well as conducting similar studies and research on animation effectiveness use in mathematics teaching to be applied on other stages of study.

Keywords: animation, mathematical concepts, mathematics teaching.

Introduction

Due to knowledge and information explosion, and modern technological development, many new strategies have emerged that will facilitate the process of teaching and learning, where visual means play an important role in teaching and learning concepts, visual means are able to attract students attention and excitement and help them to understand and recall the contained concepts in lessons. Educational means and teaching techniques are an essential component of educational process and integral to the comprehensive educational system, which push educational institutions in worldwide to adopt education and communication technologies to achieve their goals and then to face the challenges that facing the world today as a result of rapid change in information and communication revolution, so the use of educational means become a necessity of teaching necessities that can be used to teach students to be prepared to a high degree of competence and qualify them to meet modern times challenges. The use of visual materials in educational situations also influences greatly in understanding of abstract concepts, clarifies facts to mental perception more clearly than words do, recent studies have shown that the amount of human vision that can be absorbed by sight is 40% of displayed amount (Abu Hawar, 2017).

Multimedia is suitable educational tool for individual or self-learning, it provides information in an organized easy way, it gives the learner an opportunity to interact with presented scientific material, it achieves a good educational return, if it is well prepared to keep up with educational goals that educational curriculum seeks to achieve. There are many expression ways that can be communicated through, and may be the plastique expression paints things and evoke event through it, it is one of the easiest and best way to communicate, we often heard " a picture is worth a thousand words", linguistic expression still has ability to create communication, meanings and touch mind and conscience, if plastique expression skill accompanied by linguistic expression skill in one work, picture and message will be more clear, may be animation is a kind of writing and communication art, which combine two systems of expression into one work that we see in language and image, so it is easier to perception and understanding meaning (qrrsh, 2018).

Television is an effective means of communication; it is considered a second instructor in family because of children long time spends in front of it, many studies talked that spent time in front of television is more than spent time in school, it provides children with many experiences before going to school, it is a threat to school work and family role in education and development of children, children in different ages of their lives like to play and fun, where technological development has a large role in refinement their personality by relying on television and internet, especially programs and animation that they prefer, it works to develop a sense of child to go and imagine, because it combines voice, image and movement and has ability to attract attention, viewer enters into fantasy and full of fun. (Momani, Dolat, and Shloul, 2011).

Animation is one of educational visual material that makes learner participate effectively in educational process, as well as it makes learning outcomes meaningful, in addition, it is a new way of teaching, learning, and evaluation, as animation is a strategy to get ideas of learners and challenge their thinking, and support learners in developing their understanding, response of primary and secondary school students, teachers and learned students to animation was very positive and encouraging (Al-Ashqar, 2013).

Animation contributes to composition and building of children character, because it provides child with information in a form of attractive stories, or exciting stories that occur in places where child was looking for, the attraction of animation comes from its lively movement, which derives its elements from reality of human, animal and plant, which is distinguished in freedom of expression. (Alduwairi, Mashaqpa, 2014)

Animation programs have great effects on all aspects of children's cognitive and behavioral aspects, by addressing the imagination primarily, which children love therefore, the educational institutions sought to invest the balance of animation and make it an educational tool, in order to achieve a number of educational goals, it is characterized as an easy way to understand and absorb easily and quickly, all of this makes them attractive and interesting for learners children, therefore it is possible to employ in educational process. (Sultan, 2005).

Animation programs are important in helping color, motion, sound and image elements in providing children with multiple knowledge and skills, it also works to raise children's awareness, educate them and expand their intellectual horizons through social, religious, economic, health and other programs. (Shadifat, 2006).

Most teachers have noted that one of the important objectives that educational institutions should emphasize in teaching various subjects, especially mathematics and other educational levels, is the teaching of concepts, so teachers, curriculum planners and authors of different school textbooks are working on defining concepts at successive educational levels and developing appropriate materials and methods to teach them because concepts are the basis for learning and problem solving. (Qurban, 2016).

The primary objective of teaching mathematics is to prepare the individual for the public life regardless of his or her future aspirations, on the one hand, and to contribute to the preparation of the individual to continue his or her mission in mathematics or other subjects while in school and after graduation on the other hand. Modern mathematics helps in the proper preparation of individual in public life, and mathematics has a great role today: those who are interested in or applied mathematics in all aspects of life, the various uses have extended to include many applied fields in social, human sciences, business administration and other sciences, development of science is based on mathematics and accompanied by its evolution because of the increasing of science depending in mathematical methods, mathematics has evolved in a large and rapid manner in the past two centuries, which made traditional view of it as composed of separate branches: arithmetic, geometry, and algebra unacceptable, mathematical construction unit and the hierarchical structure of mathematical knowledge should be shown in any classification, the emergence of modern educational theories in teaching and learning has had an impact on the re-organization of mathematics structure and its teaching methods. (Abu Zeina, Abdullah, 2010).

Mathematics curriculum is one of the most related curriculums to everyday students' lives closely; it enables them to play their active role in daily activities effectively where mathematics plays a key role. (Alkateeb, 2016), students are members of community, in order to raise and develop them requires that they be educated and cultured mathematically to face and solve problems in order to make them a good citizen in society rather than a burden. (Mohammed, 2004).

Despite of mathematics importance, mathematics teaching suffers from obvious deficiencies, a feeling of dissatisfaction mixed with pain for mathematics: Mathematics education suffers from disadvantages in content, teaching methods, learning activities and learning outcomes at all levels of education, even in their study trends (Obaid, 2004).

The mathematics current situation of teaching indicate that teachers' concentration on cognitive performance without paying attention to the use of appropriate strategies to develop student's mathematical strength in various aspects, which led to poor performance in mathematics for many students (Fareed, 2014).

Therefore, searching for appropriate strategies, modern methods and teaching tools to be used by teachers in classroom to develop mathematical concepts of students become a necessity for students achieving of mathematical growth, visual tools played an important role in teaching and learning students' mathematical concepts, they attract their attention, stimulate their enthusiasm, help them understand and recall contained information in mathematics (FarajAllah, Karaz, 2017).

Animation is one of educational visual material types that makes learner participate in educational activities actively, makes learning outcomes meaningful, and it is a new way of teaching, learning, and evaluating in private science field. (Birisci et al, 2010).

The use of animation term may be a little misleading; because many people think that there is a relationship between animation and humor, while animation is not so, it is not used to humor or ridicule but it follows the form of multiple choice question, but it differs in integrating the purpose of written text in dialogue form with visual stimuli. Mathematical concepts are important and fundamental concepts in children's learning. Building concepts, including mathematical, is a cornerstone to learn many sciences for children, there is no doubt that learning at these stages depends on senses mainly, perception of sensory forms an input to learn at that stage, and mathematics in its abstract nature is difficult for children at that age, child finds himself in front of chains of numbers and definitions that he cannot understand or translate in a meaningful way (Ahmad, 2014). Animation is important as one of the best means particularly that can help teachers teach some mathematical subjects such as engineering concepts, measurement, algebra and graph.

Study Problem

The great development in teaching mathematics and its uses in many different sciences, in addition to changes in mathematics itself and development that included mathematics and its relations with other knowledge systems, in addition to development in quality and quantity because of its importance in individuals education, the success of students in schools is a result of interaction between students and teachers , different teaching methods , interaction in classroom and the means available and the importance of using new modern teaching methods to affect the level of students understanding. Many studies and researches emphasized the work on bringing, diversifying and renewing modern methods and tools for basic stage students especially; modern technology field in educational process has become a necessity in Arab countries especially, in order to focus on latest developments of times, this desire to find a distinctive and exciting method to work on providing students with concepts and distinctive methods in studying and provide study class with movement, vitality and thrill atmosphere, animation has a great importance in students acquisition of mathematical concepts and its teaching, here was the selection of fourth basic grade and the selection of first unit of mathematics in curriculum of Jordan.: they are numbers and processes of addition and subtraction.

Study Questions:

First question: Are there statistically significant differences ($\alpha = 0.05$) in students of fourth basic grade acquisition of mathematical concepts due to teaching method (using animation, usual way)?

Second question: Are there statistically significant differences ($\alpha = 0.05$) in students of fourth basic grade acquisition of mathematical concepts due to gender variable (male, female)?

Third question: Are there statistically significant differences ($\alpha = 0.05$) in students of fourth basic grade acquisition of mathematical concepts due to interaction between teaching method (animation method, normal method) and gender?

Importance of study:

1. Keeping up with educational development, find new teaching methods to introduce mathematics topics in an interesting and distinctive way and to bring spirit of change and fun for students.
2. Provides a learning environment based on animation in mathematics for fourth basic grade.
3. Administrators may develop mathematical methods in using animation as a method of mathematics teaching.
4. Lack of Arabic researches in using animation as a way to teach mathematics.

Terminology of study

Effectiveness: is the ability to achieve desired educational outputs of unit to be taught by using animation in development of mathematical concepts and measured in terms of differences between arithmetic averages of control and experimental groups on the post-test.

Animation: is movies based on movement creation through a number of consecutive successive shots, it displays shot after another at a regular speed, of this principle, moving sizes and fixed objects become available to display on display screen (Ghalib, 2012).). It is also defined: a series of drawings prepared and animated using 3D technology and the preparation of scientific material of script and dialogue (Al-Haddle, 2014). It is known as all games based on interactive and attractive computer technologies applied to a sample of study members.

Mathematical concept: is a mental perception of a characteristic or a set of common characteristics to a group of objects or situations, and divestiture this characteristic or group of characteristics by giving a name expressed in a word or a symbol or both. (Al-Mutawaq, 2016).Mathematical concept is a mental perception or mental abstraction that indicates to a set of elements or objects that may vary among each other with certain characteristics but all share a common denominator called characteristic feature of concept. (Obaid, 2004).

Acquisition of mathematical concepts procedurally: Students possession of included mathematical concepts in numbers unit and addition and subtraction process of fourth grade mathematics book; it was measured by students' marks in prepared study test for this purpose.

Limits of study:

- **Human limits:** study was limited to fourth grade students.
- **Spatial limits:** Al - Saedeen Elementary School in Mafraq City.
- **Objective limits:** study was limited to first unit of mathematics book for fourth basic grade; they are numbers and processes of addition and subtraction.
- **Time Limits:** study was conducted in the first semester of school year 2018/2019.

Previous studies:

• Kabapinar study (2005):

Entitled: (Effective teaching of concepts by cartoon from structural method point of view), method was introduced in this study as a learning and teaching method, which took into account cartoon approach concept the view of structural way in learning science, also many cartoon concepts have been found, which have been used in various primary classes to find potential benefits by teaching cartoon concepts, they were conducted on fourth and fifth grades students to identify their ideas through individual writing of students, and observe them during classroom interaction, results showed the effectiveness of animation in teaching concepts, and finding ideas for students without being influenced by the ideas of others, and second, he conducted studies to determine the effectiveness of teaching concepts through animation. Results showed the effectiveness of animation in teaching concepts by clarifying and removing student's misconceptions through animation, with the help of teacher especially through raised questions by teacher (stimulating ideas questions),results indicate that this method is effective also in motivating students to study and investigate, if the program contains content that raises research or needs research especially, study emphasized that the effectiveness of this method in teaching science concepts is not based on the use of animation only, but on the appropriate classroom environment , classroom interaction and the use of research and investigation during the use of this method in teaching and after.

• Shadifat Study (2006):

Entitled :(animation programs role in achieving educational goals on third basic grade students from teacher's point of view)it aimed to identify the most important educational goals contained in animation programs presented by Jordan Television, and these programs role in inclusion the educational objectives of third grade students from teachers point of view who are studying third grade in Directorate of Education in Al-Mafraq for the school year 2005/2006,results of study revealed that the animation programs presented by Jordanian TV on first channel contained a high percentage of educational goals reached to 86% of educational goals that is expected to achieve by basic education stage student, and majority came in cognitive and emotional fields, teachers' estimates of animation programs role showed that these programs contribute on average of 55% in educational goals inclusion, majority of educational goals that animation programs contribute to include are related to cognitive fields.

• **Momani, Dolat, Shlool Study (2011):**

Entitled (Effect of using scientific animation programs in teaching science, in scientific concepts acquisition by students, experimental study on sixth basic grade students), study aimed to show the effect of using scientific animation programs in concepts acquisition for basic stage students in Directorate of Education of first Irbid, results of study showed that there were statistically significant differences at level ($\alpha = 0.05$) in acquisition of sixth grade students of experimental group of scientific concepts according to teaching method, in favor of experimental group versus control group. And there were statistically significant differences at level ($\alpha = 0.05$) in acquisition of scientific concepts of experimental group students according to gender variable and in favor of females, results of study showed that students of experimental group had an average of (3.86) in acquisition of scientific concepts, while students of control group obtained a lower average of (3.73) in mathematical concepts acquisition, also there were no statistically significant differences at level ($\alpha = 0.05$) in acquisition degree of scientific concepts of experimental group according to sex variable.

• **Mashaqpa, Alduwairi, study (2014):**

The aim of this study was to investigate the difference between the effect of using traditional teaching instruction and using traditional teaching supported with Educational Math Game Software (EMGS) on first grade students achievement, This study was conducted in one elementary school in Jordan. It used a quasi-experimental control group design. Educational math game software was developed to investigate the difference between the two groups that were given a pre-test and a post-test to measure their achievements in math. The results of the study shows that the learning environment in math supported with EMGS have a positive effect on first grade students math achievements. The study showed a progress on the part of the experimental group which used traditional teaching instruction supported with educational Math Game software (EMGS). It was reflected positively in the first grade students achievement in math.

• **Faraj Allah and Karazstudy (2017):**

Entitled: (Effectiveness of a proposed program based on using animation in development concepts of numbers on first basic grade students of hearing disabilities) study aimed to show effectiveness of a proposed program based on using animation in developing concepts of numbers among first basic grade students of hearing disabilities, impact was significant, with an ETA squared (0.828), study recommended that attention should be paid to introduce and product animation design into teacher pre-service education programs in education colleges.

• **Abo Hwar study (2017):**

Entitled: (The impact of using cartoon strategy on concepts and written expression skills development for fourth basic grade students), study aimed to show the impact of using cartoon drawing strategy on concepts and written expression skills development for fourth basic grade students in Gaza, many lists and tests were used, a list of written expression skills, a list of concepts to be developed by fourth grade students, cartoon drawings for every lesson of experiment lessons, a test to measure concepts development, a test to measure development of written expression skills. The most important results of study were statistically significant differences at level ($\alpha = 0.05$) between control group and experimental group in concepts test and written expression skills test in favor of experimental group, which used cartoons.

Method and procedures

Study Methodology:

In light of main objective of study; the effect of using animation programs in mathematics teaching and mathematical concepts acquisition by fourth grade students in the first unit of mathematics book, numbers and the processes of addition and subtraction units, semi-experimental approach was followed, because it is considered the appropriate approach to study nature and its objectives. Therefore, Researcher designed two groups test, one of them is experimental group, and the other is control group.

Study variables:

The variables of study are in independent variable; the teaching method in using animation programs in mathematics teaching, traditional method. The dependent variable: is mathematical concepts acquisition by fourth grade students.

Study Society:

The study Society consists of all fourth basic grade students in Al- Saedeem elementary school in Al Mafrag city.

Study sample individuals:

The sample of study consisted of Al- Saedeem elementary school in Al Mafrag city, it is a school of basic education schools, and the sample was divided into two groups, experimental group: they studied mathematics by animation programs using, and a control group studied in traditional way, the two groups were used in the same school in close proximity of all cultural, social, economic and political environments levels. The number of students in control group was 24 students (male, female), and the number of students in experimental group was 25 students (male, female) of fourth grade students.

Study tool:

To achieve study objectives, a test was prepared to measure students' acquisition of mathematical concepts on fourth grade students, especially the first unit: numbers, addition and subtraction processes, the unit topics were selected: numbers within 999999, comparison and order numbers, rounding numbers, addition and subtraction, test consisted of (20) paragraphs of multiple choice, each paragraph has four alternatives, only one is correct.

Study accuracy:

The Researcher submitted the test to four specialized arbitrators in mathematics teaching of fourth basic grade in curriculums and teaching methods, to give their opinions on test to measure students' acquisition extent of mathematical concepts by using animation, and appropriateness extent of study objectives. The arbitrators have made the necessary adjustments and modified some vocabulary.

Test stability:

The Researcher used the method of stability computation by Cronbach-alpha, in order to find the coefficient of stability, it got alpha coefficient value for each field of first unit at the rate of (0.91 Cronbach- alpha, which indicate that the value of stability coefficient is high. The validity of test was also verified by applying test to a random sample outside the study sample of 21 students (male, female) in fourth basic grade in Al-Saedeem elementary school, they used test method and return it, Pearson correlation coefficient was calculated, and it reached (88.6).

Study Procedures:

The following procedures were carried out o achieve study objectives:

- 1) Access to theoretical literature and previous studies related to animation and acquisition of mathematical concepts and scientific concepts.
- 2) Identifying the animation that contains mathematical concepts in number unit and the processes of addition and subtraction, that will be taught by Ministry of Education in Jordan for the school year 2018/2019.
- 3) Formulation of test paragraphs to measure fifth grade students' acquisition of mathematical concepts by following the steps to formulate a good test.
- 4) Planning daily preparation notes for the subjects of numbers unit and processes of addition and subtraction to fit animation.
- 5) Present the daily preparation notes on a number of arbitrators and specialists in mathematics curriculum and methods of teaching to make appropriate modifications of amendment, delete or add in light of their notes.
- 6) Determining Al-Saedeem elementary school in intended because of their teachers and mathematics teacher cooperation, as well as the availability of suitable means and equipment for study application.
- 7) Distributing of fourth basic grade students to three divisions at a simple random rate.
- 8) Apply the test on a sample of outside study members to verify the stability of test.
- 9) To ensure equivalence of groups, pre-test was applied to control and experimental groups.
- 10) Provide the teacher with CDs containing animated cartoons that contain mathematical concepts.
- 11) Training the concerned teacher in implementation on mechanism of lessons implementation.
- 12) Implementing study on control group in the usual way, and on experimental group by displaying animation on available computers in school.
- 13) Apply the post-test to the control and experimental groups after completing the teaching with interval time of (21) days for the pre-test.

14) Correct students' responses to post test, insert data into computer and use SPSS software to perform the appropriate statistical analysis.

Study design:

The study consisted of two groups: experimental group and control group, experimental group was taught through the use of animation programs in mathematics for fourth basic grade, focus was on first unit :numbers and addition and subtraction processes, control group used traditional method Through study and discussion without the use of technology and animation programs that used in first group,a pre- and post-test was applied with a 21-days interval between tests.

Study variables:

Independent variable: it is the use of animation in numbers, addition and subtraction teaching.

Dependent variable: it is students' acquisition of mathematical concepts.

Statistical processing:

Researcher worked to empty data of study sample and they used statistical tests, including percentages and frequencies to describe sample of study, Cronbach Alpha method to find stability coefficient, Pearson correlation coefficient to find accuracy of study tool and deviations.

Study results and its discussion

The main results of study will be presented based on statistical treatments conducted on collected and analyzed data through study tool, this study aims to identify animation effectiveness in acquisition of mathematical concepts in numbers and the processes of addition and subtraction unit in mathematics book for fourth basic grade in Al-Saedeen elementary school in Mafraq city, in order of its questions:

Results related to first question and its discussion

First question: Are there statistically significant differences ($\alpha=0.05$) in acquisition of fourth basic grade students of mathematical concepts due to teaching method (animation use, normal method)?

To answer this question, arithmetical averages and standard deviations of fourth basic grade students' marks in experimental group and in control group were calculated on achievement test as in Table 1

Table (1): arithmetical means and standard deviations of fourth grade student's performance on achievement test according to method and gender variables.

Teaching Method	Gender	Pre-test		Post-test		N
		M	SD	M	SD	
Experimental Group	Male	73,1	18,81	80,7	9,76	10
	Female	69,9	15,2	79,6	13,56	15
	Total	71,2	16,43	80,04	11,97	25
Control Group	Male	74,4	17,2	66,9	9,69	10
	Female	73,07	13,52	65,64	13,46	14
	Total	66,17	14,25	73,63	11,82	24
Total	Male	73,75	17,56	73,8	11,82	20
	Female	74,45	14,25	72,86	15,05	29
	Total	72,39	15,55	73,25	13,69	49

Table (1) shows that arithmetic average of study individual's performance of experimental group on achievement test reached (71.2) on pre scale and (80.04) on post scale, arithmetic average of study individual's performance of control group on achievement test reached (66.17) on pre scale and (73.63) on post scale, table (1) shows also differences in pre and post scales between experimental group and control according to gender, which indicates that there are apparent differences in achievement test between experimental and control groups, to find out to favor of which group differences are, method of two ways (ANOVA) was performed, as students' scores in pre achievement test were a common variable, table 2 shows this analysis.

Table (2): Results of analysis of two-way (ANOVA) of fourth basic grade students' performance in achievement test according to method of teaching, gender and interaction between them.

Source of Contrast	Sum of squares	df	Mean square	F	Sig	Partial Eta squared μ^2
Pre-test	1.005	1	1.005	0.007	0.935	0.00
Method	2260.5	1	2260.5	14.99	0.00	0.254
Gender	16.937	1	16.937	0.112	0.739	0.003
Method * Gender	0.058	1	0.058	0.00	0.984	0.00
Erro	6632.8	44	150.75			
Corrected total	9007.06	48				

* Statistically significant at statistical significance level ($\alpha = 0.05$)

Table (2) shows statistically significant differences ($\alpha = 0.05$) between the performance of experimental and control groups in value of achievement test due to the effect of teaching method, where the calculated value of (P) reached (14.99) and a statistical value of (0.00) in order to detect the effectiveness of teaching on student achievement by using animation, impact magnitude was found through finding an ETA squared with an impact size of achievement test (0.254), this means that 25.4% of achievement variation of fourth grade students between experimental group and control is due to method of teaching using animation while the rest is due to other uncontrolled factors.

Previous conclusion can be explained by the fact that content building of numbers unit and addition and subtraction processes according to the use of animation has further contributed to entrenchment and understanding of instructional content and mathematical concepts consolidation among fourth basic grade students in experimental group, experimental group used more senses, which helped them acquire meaningful learning, as well as getting out of classroom routine atmosphere may have been one of the reasons that led to raising their performance, also nature of animation provides an enjoyable environment for students and provides a learning environment based on fun, which has led to improve fourth grade students' achievement, Researcher also point out that animation has an effect on children in drawing their attention and work on suspense, through various elements they possess from sound, image, motion, attractive colors and creative ways of transmitting information.

The results of this study agreed with the study's results of animation effectiveness in development and acquisition concepts (Kabapinar, 2005; Momani, Dolat and Shlool, 2011, Mashaqpa, Alduwairi, 2014; Faraj Allah and Karaz, 2017; Abu hwar, 2017) study, that there is an impact of educational games and illustrations using in acquisition of students to some mathematical concepts, its results indicated that there were statistically significant differences in improvement of students' achievement, in favor of experimental group that studied by using animation.

Related results to second question and its discussion

Second question: Are there statistically significant differences ($\alpha = 0.05$) in fourth grade students acquisition of mathematical concepts due to gender variable (male, female)?

Table (1) shows that arithmetic average of experimental group (male) on post-achievement test is (80.7), while arithmetic average of female students' performance in experimental group in post-achievement test is (79.6), a difference of (1.1) to favor of male experimental group, table (2) shows that there is no statistically significant difference at ($\alpha = 0.05$) due to gender variable, the calculated "P" value (0.112) and statistical significance (0.739) is not statistically significant. The above conclusion can be explained by the fact that all students have the same degree of desire to learn by using animation and thus they have the same degree of involvement, attention, and interaction with this new method, presentation of unit number and addition and subtraction processes in systematic planned method of training activities based on basic science processes (observation, application, prediction, and measurement) which teacher guides students work and follows them through it, providing various activities and feedback to realization of mind in mastering the science, which led to innovation, depth of thinking, students well understanding at the same level, education through animation, and its lessons, activities, pictures, examples, and voices were directed towards learner regardless of gender, gender of learner was not considered in design, in addition, there were no differences in available opportunities for learning between males and females, the application of learning method by using animation was equally between males and females, which took into account developmental characteristics of both sexes.

Results of this study were agreed with study results of (Momani, Dolat and Shlool, 2011), which its results indicated that there were no statistically significant differences due to gender variable in improvement of students' achievement by using animation.

Related results to third question and its discussion

Third question: Are there statistically significant differences at level ($0.05 = \alpha$) in fourth grade students acquisition of mathematical concepts due to interaction between teaching methods (animation method, normal method) and gender (male, female)?

The results of (ANOVA) analysis in Table (2) show that there are no statistically significant differences at ($0.05 = \alpha$) in fourth grade students achievement due to interaction between method and gender, the calculated value of "P" is (0.0) and statistical significance of (0.984), it is not statistically significant. Previous result can be explained by the fact that experimental study group by using animation has been subjected to the same educational conditions in terms of availability of animation programs and a trained teacher in using this teaching method in learning basic concepts of numbers unit and addition and subtraction processes, This result is normal due to absence of statistically significant differences in students' performance in post-test due to gender of student, this means that teaching according to animation use has the same effect on two sexes similarly, also usual method of teaching affects both sexes equally, absence of gender differences in using animation method and usual method led to lack of interaction between teaching method and gender, this gender-related concern may have resulted in educational programming in general, and in animation design in particular.

Recommendations and proposals

Based on results of study, Researcher recommends the following:

Adopting teaching by using animation in mathematics eaching for basic stage students because of its effect in improving students' achievement and mathematical concepts acquisition. Urging mathematics curriculum designers in Ministry of Education to include animation in mathematics curriculums. Conducting similar studies and research on the effectiveness of animation using in mathematics teaching to be applied on other stages of study.

References

- Abu Hawar, L. (2017). Effect of using cartoon graphics strategy on developing conceptual and written expression skills for fourth grade students, unpublished Master Thesis, Islamic University, Palestine.
- Ahmed, N.(2014). Effectiveness manual activities using in kindergarten children acquisition of reasoning concepts and some mathematical concepts in light of multiple intelligences theory. Unpublished doctoral dissertation, Tanta University. Egypt.
- Al-Ashqar, M. (2013).Effectiveness of using cartoon graphics strategy in correcting alternative scenarios of some engineering concepts on sixth grade students. Unpublished Master Thesis, Islamic University, Palestine.
- Al-Momani, M. ;Dolat, A. ; Shlool, S. (2011). The impact of using scientific animation programs in science teaching in scientific concepts acquisition. experimental study on sixth basic grade students, Damascus University Journal, 27(3 and 4), Damascus.
- Al-Mutawaq, S. (2016).The impact of using educational scaffolds in acquisition of concepts and skills of solving mathematical issue and the trend towards mathematics among tenth grade students in Gaza. Unpublished Master Thesis, Islamic University, Gaza.
- Al-Zayyan, K. (2012). Effectiveness of an animation program in concepts acquisition of traffic safety on basic stages students in Gaza, unpublished Master thesis, Islamic University, Gaza.
- Birisci, P. et al. (2010) Pre-service elementary teachers' views on cartoons concept: a sample from Turkey. Middle East Journal of Scientific Research, Vol. (5), No. (2), P. 91-97.
- Alduwairi,A., Mashaqpa, A.(2014).Efficient Properties of Computerized Educational Games in Math Designed for Students in the Basic Stage from the Perspective of Specialists, accepted for publication in 25/9/2015 ,Arab Union Universities Journal for education and psychology, faculty of education, Damascus University.

- FarajAllah, A. ;Karaz, B. (2017). Effectiveness of a proposed program based on using animation in development of numbers concepts on first grade students of hearing disabilities, *Al-Aqsa University Journal, humanities series, Volume 21, No 2*.
- Farid, N. (2014). Strategy effectiveness of marriage thought participated in developing some aspects of mathematics strength on elementary school students, *Journal of Mathematics Education, Egypt*.
- Ghaleb, M. (2012). *Animation Design - Techniques - Production*, Arab community library, Amman.
- Al-Haddle, E. (2014): Effectiveness of animation and direct interaction in development of geometric shapes concepts according to Vygotsky's social cultural theory on pre-school child. *Journal of Arab Childhood, No. 63, Saudi Arabia*.
- Kabapinar, F. (2005). Effectiveness of Teaching via Cartoons Concept from the Point of Constructivist Approach. *Educational Sciences: Theory & Practice, 5(1) p-p 135-146*.
- Korban, B. (2016). Effectiveness of animation using in development of some social values on kindergartens children in Meccacity, *Reading and Knowledge Magazine, Egypt*.
- Mansour, M. (2003). Reflected values by children's programs in local television, survey study of channel 4, Ain Shams University, Institute of childhood studies, department of media and child culture.
- Mashaqpa, A., Alduwairi, A. (2014). Educational Math Game Software: A Supporting Tool for First Grade Students' Achievement. *Journal of Education and Practice\International Institute for Science, Technology & Education. 5(5), pp:134 -141*.
- Mohammed, M. (2004). *Development of visual thinking in mathematics for deaf and normal primary students, first edition, World of Books, Cairo, Egypt*.
- Obaid, W. (2004). *Teaching mathematics to all children in light of standards requirements and thinking culture, Dar Al-Masirah, Amman*.
- Qrrsh, S. (2018). Scientific cartoons between learning, communication and scientific communication, *educational visions, 46-47: 126-135*, retrieved on 11/11/2018
from: http://qattanfoundation.org/sites/default/files/u2/rua_46-47_11.pdf
- Rashed, L. (2002). Effect of imported animation on Qatari child. *Journal of Childhood and Development, No. 7, Volume 8*.
- Shadifat, M. (2006). *The role of animation programs in achieving educational goalson third grade students from point of teachers view, unpublished master thesis, Yarmouk University, Irbid, Jordan*.
- Sultan, A. (2005). *Education and Training Technology, first edition, Dar Haneen publishing and distribution, Amman*.
- Abu Zeina, Farid, Ababneh, Abdullah (2010). *Mathematics Curriculum for first grades. Edition 2, Dar Al Masirah, Amman Jordan*.
- Khatib, Mohamed (2016). *Modern mathematics curriculum design and teaching. Dar Al Masirah, Amman Jordan*.