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The Effect of Multimedia Teaching on Math Anxiety Reduction and Continuity of LSD Students Learning

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Abstract

This study aimed to determine the effectiveness of multimedia teaching on math anxiety reduction and continuity of LSD student learning. The method of this study was quasi-experimental and pre-test and post-test design with a control group. In this study 30 students with learning difficulties in mathematics were selected among total number of 2690 male students in fifth grade in Qaemshahr through cluster multi-stage random sampling. 30 participants were randomly assigned in two groups including one control group and one treatment group with 15 students in each group. In order to analyze this research Betz math test was perfomed, in three phases consisting pre-test, post-test and follow-up test and data analysis was done through SPSS software. Then, using a mixed analysis of variance, analysis of variance of repeated measurements to compare the level of significance was discussed. The results show that post hoc LSD test results for comparison of math anxiety scores in the experimental group showed that there is significant difference between the pre-test and follow-up scores. But there is no significant difference between the pre-test and post-test scores, and there is no significant difference between the post-test and follow-up scores.

It can be concluded that although educational software program did not reduce math anxiety among students with math difficulties after using it, follow-up tests performed 3 months after treatment showed the significant difference with the pre-test.

Keywords**:** math anxiety, traditional method, multimedia, educational software, LSD students

Introduction

In education, math plays a major role. A good mathematical knowledge and the education of mathematics is the foundation of effectiveness of human resources (Olson and Hergenhahn, 2010). Mathematic looks like a language that we need it continuously, so that we can

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describe whatever we see, know and understand. Mathematics has internal discipline and consistency and it is considered in order to foster the intellectual discipline and enhance the power of creative thinking and logical reasoning, and attention. Thus mathematics need is a fundamental need. Mathematics is the study of patterns and relationships. Children should understand how some ideas are repeated and know the different relationship between the concepts of mathematics. Mathematics is a way of thinking and it equips us with approach to organize and analyze the combined data exclusively in the calculations (Hassan zadeh and Motamedi, 2009). Most of people and most of teachers define learning as "getting information, knowledge or special skills". Some coaches think of it as “the transfer of scientific concepts from person to person”. In this process teacher has an essential role and students do not express activity. However, psychologists determine learning as "permanent changes in person’s potential behavior due to experience ".

Computer assisted instruction as one of the major issues curricula in many countries is known and a lot of investment has done in different aspects of design, implementation and evaluation. New era is called revolution and communication age and the clearest sign of this century is explosion of information (Kit, 1964. translated by Froud, 2004). Computer and science have been changed human life, so mathematics and education have a lot of developments. Because computer offers us new features such as color, sound, movement that the new aspects of the issues are found and learning is facilitated. (Ghanbari, 2005). The term of “multimedia” has been a part of our literature from the fifties. This term is used to describe many aspects of technology, so its detailed description is hard. Any combination of text, graphics, sound, animation and video from a computer or other electronic equipment will be available to the user is called multimedia (Keynejad, 2001). One of the efforts in education organization should be done in relation to information technology. Education organization is expected to provide active and collaborative learning among students. For such an approach we need to change our old practices, the current teaching methods don’t meet the changing educational needs of new era (Niaz, 2004).

Human progress is full of things that frankly shows the role of mathematics in basic science, the role of basic science in the development of science, the role of science in development of

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IT, and the role of IT in the development of the communities. One of our problem in teaching math is math anxiety. The feeling of students. Student's feelings arise as a result of various factors, such as teaching methods and evaluation, personality, fear of failure. There are different kinds of math anxiety such as:

Mathematic learning anxiety: It refers to Mathematical problem solving in a position other than the test. Situations such as reading and interpreting graphs and charts, or listen to other students' mathematical problem solving

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Mathematic problem solving anxiety: In this context, the activities and processes associated with learning math, such as providing new math books, participating in math class or starting the new chapters of math book are considered.

Mathematics teacher anxiety: The characteristics of math teacher are considered.

Mathematics evaluation anxiety: Refers to situations related to mathematical evaluation. For example, to prepare for the exam in mathematics, mathematical thinking test a day earlier. It is clear that math anxiety is characterized as satisfactory and there is no stability in this area, however it should be noted that a one-dimensional perspective, cannot provide a comprehensive understanding of the structure of math anxiety (Kazlskys, 1991).

Because each student is unique, characteristics of children with math problems is different. However, there are common features, such as confusion in the spatial relationships, a sense of weakness in the body image, problem in the ability of perception - visual and motor - vision, weakness in terms of the language and orientation, memory difficulties and math anxiety the most difficult in children with this disorder, anxiety mathematics (Ahadi 2003). All agree that math anxiety has a negative impact on the performance of the question that math, advances in mathematics and mathematical efficiency (Betz, 1978). Today, the need for mathematics in business, social sciences and humanities seems inevitable and necessary. However, many students avoid math test, or show their true capabilities below, in other words they have "math anxiety". Buxtoln considers high anxiety in math class as a

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dangerous phenomenon with very important long-term effects. Adopt appropriate teaching method as the external factor can effectively act in the form of mathematics students. In this regard, some researchers have found that math anxiety is partly linked to cognitive learning styles.

Multimedia

One of the important applications of computers at the learning takes place in a customary multimedia educational software which now we study the scope and application of it: multimedia computer software are those in which the combination of text and sound in speech, music, audio and fixed or mobile video effects, two-dimensional or three-dimensional design of the fixed or mobile designs, visual effects were used.

At the same time, by the use of links we can make interaction with the computer in multimedia and in the case of Internet connections we can associate with other users and resources. In multimedia we can give feedback to user by voice or text. User can read text, hear the voice, or watch fixed or mobile pictures. One multimedia can be interactional when the programmer enables users to control on observable information (Teymoori, 2006). Interactive multimedia is a combination of several forms of media, including text, music, spoken words, videos and images that are associated with messages that are interactive (Jons, 2003. Doyran, 2007). Word “multimedia” was used in the past by experts implicitly for visual – audio industry. In fact the use of multimedia was known with the same combination of systems such as slideshows with a slide projector, a multimedia. But today, experts have been replaced the previous multimedia by new digital technology. The word multimedia faced with changes in every stage including the combined use of visual media - Listening to new media and interactive digital media. So today's digital interactive media seems to be constant words in this field that that are frequently used.

Objectives of the study

Due to the fact that some primary school students are with math anxiety, the researcher in this field, aims to investigate the effectiveness of multimedia teaching and learning of mathematics learning on LSD students.

General objectives

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Determining the effectiveness of multimedia teaching on math anxiety reduction and continuity of LSD student learning.

Research Questions

Does multimedia teaching, educational software programs, reduce math anxiety of LSD students?

Does multimedia teaching, educational software programs, cause continuity of learned methods in LSD students?

Method

The research method, due to the nature and objectives of the research, is a quasi-experimental or quasi-experimental and was made based on "pretest - posttest control group" design.

Sampling and Sample Size

According to the research method, for sample selection, cluster multi-stage random sampling was used. 30 students participated in this study. The students were divided into one control group and one treatment group each consisting of 15 participants.

Data collection methods

In this study library and field studies (test of KI MATT, math anxiety test) were used to collect information as follows:

A: Library method: In total, all the present information was gathered through library methods. The applied resources are mentioned in the last part of the research.

B: Field method: To achieve the required information in this method, Iran Keymatt test, Math anxiety test, and designed software and multimedia were applied.

Procedure

The present study was carried out through pretest and posttest in quasia experimental design for two groups. The test was administered individually. Iran keymatt test was publish by Kernoli, Nachi Man and Prichet in 1976 that consists 14 sub tests including of functional, operational, and content levels. Keymatt was done individually. It is suitable for preschool

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children to 11 years old. It includes counting, symptoms, geometry, and division in the content level and consists of addition and subtraction, multiplication and division, the subjective calculating, arithmetic reasoning in the operational level, and finally comprises problem solving, error, measurement, money and time in functional level. Betz's math anxiety scale (1978) was used to measure students' math anxiety. This scale includes two answer packages consisting Likert scales from strongly agree to strongly disagree and estimates two factors of low and high amount of students' math anxiety in normal students which was carried through pretest and posttest. Training sessions were held in the selected schools before the present of the teacher. Training part was done in the prayer rooms. It lasted in 10 sessions of one-hour. Iran keymatt and math anxiety test were administered as posttests. And a posttest was administered 3 months after the procedure in order to ensure of the continuity learning.

The use of Medias in different steps of the study:

A teaching situation generally includes four steps:

Introduction and motivation

Present and development of the content/materials

Summary of the content/materials

Evaluating

1. At first, as an introduction, before the presence of the desired material, some learning and teaching media can be applied. It is useful to benefit from Medias such as pictures, slides and etc. in order to enter the main materials. And students can be interested in learning engagement through being motivated.

2. Different kinds of Medias such as books, films and pictures can be applied to provide learning materials, accelerate, pay attention and fix them. The use of Medias in this step and different variety of communication materials prevent both student's tiring and boring and also the learning materials can be investigated through different views.

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3. At the end, to review, summarize and conclude the present materials, the Medias such as charts can be used to help the permanent of the learning.

4. Evaluation is one of the important step at the end of each teaching process that through it, to get the amount of students' achievement of required goals as well as possible problems through teaching process. Learning and teaching Medias such as pictures can be used to ask some questions. (Amir Teymouri, 1368).

Data analysis and conclusion

Each question of Betz's math anxiety questionnaire is given a score between the ranges of 1 to 5 in this study. The total score is obtained from all questions of the questionnaire that is a score between10 to 50.

control		**experimental**		
SD	**mean**	**SD**	**mean**	**varia bles**
4/047	32/67	2/341	34/27	Math anxiety

Table 1- descriptive analysis of math anxiety in control and experimental groups (pretest)

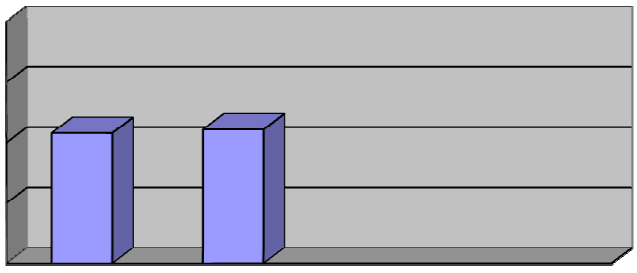

Figure 1: the comparison of math anxiety scores of control and experimental groups in pretest.

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Considering data of table and figure 1- the comparison of math anxiety scores in two groups of control and experimental shows that the mean scores of two groups before engaging in two different groups were not significantly different.

control		**experimental**		
SD	**mean**	**SD**	**mean**	**variables**
3/195	32/93	3/291	32/40	Math anxiety

Table 2- descriptive analysis of math anxiety in control and experimental groups (posttest)

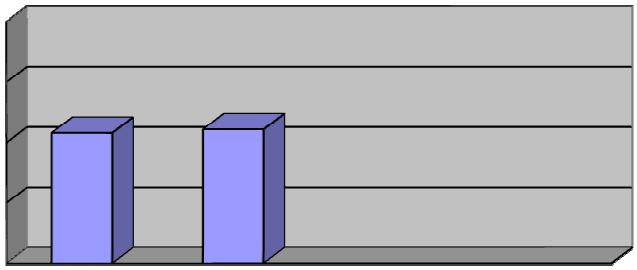

Figure 2: the comparison of math anxiety scores of control and experimental groups in posttest.

Considering data of table and figure 2- the comparison of math anxiety scores in two groups of control and experimental shows that the mean scores of two groups after engaging in two different groups were not significantly different.

control		**experimental**		
SD	**mean**	**SD**	**mean**	**variables**
3/610	32/20	3/089	31/60	Math anxiety

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Table 3- descriptive analysis of math anxiety in control and experimental groups (follow-up)

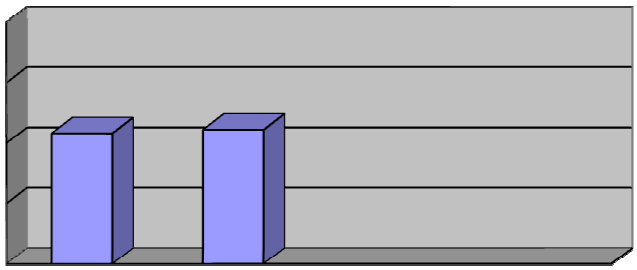

Figure 3: the comparison of math anxiety scores of control and experimental groups in follow-up.

Considering data of table and figure 3- the comparison of math anxiety scores in two groups of control and experimental shows that the different between mean scores of two groups was insignificant.

Question 1 of the study: Does multimedia teaching, educational software programs, reduce math anxiety of LSD students? In order to analyze the data, repeated measures of ANOVA and follow-up test LSD were used. A pretest, a posttest and a follow-up one were administered three month later.

Level of significance	F value	Mean square	df	∑square	variables
					Between groups
0.872	0.26	0.544	1	0.544	groups
		20.754	28	581.111	error
					Inside groups
0.053	3.090	18.411	2	36.822	test
0.149	1.971	11.744	2	23.489	Group and test

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				interactions
	5.959	56	333.689	Error

Table 4- the result of the ANOVA group and test in control and experimental groups

The result of analysis of ANOVA in the above table shows that the achieved significance value is more that the critical value. Therefore, the first hypothesis accepted and the null hypothesis rejected. So it can be said that there is no significant difference. The result of variance analysis shows that the teaching software had an insignificant impact on math anxiety of LSD students.

Result of table 4: it shows that the impact of test and group is not meaningful. Therefore, the result of statistical analysis of the first hypothesis shows that the educational software had insignificant impact on math anxiety of LSD students.

The analytical result of first hypothesis shows that the difference between the scores of math anxiety is not significant in control and experimental groups because of the sig of 0.052 > 0.05. So the first hypothesis (there is difference) is rejected and null one (there is no difference) results in; therefore there is no significant difference in terms of math anxiety in control and experimental groups. So it can be stated that educational software does not have any impact on math anxiety of students. The present study contacts with the result of Khandan Lavasani's study (2011) that shows the cooperative learning in an experimental study resulted in the significant reduction of math anxiety in a short period of the study procedure. And also it is in contrast with Newstid's study (1998). He in a study with the title of "effective factors on math anxiety" shows that the math anxiety is rooted in teaching methods and the quality of math teaching in schools. He shows in his study that substitution teaching method can be used in order to prevent and reduce students' math anxiety as well as it is in the opposite of Green Wood's study (1984) that showed that the most important factors on students' anxiety are teaching methods which are used to teach basic skills in math. Some researchers stated that the math anxiety can be referred to traditional teaching methods.

The second research question: Does multimedia teaching, educational software programs, cause continuity of learned methods in LSD students? The result of follow-up test of LSD for

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the comparison of means of math anxiety in experimental showed that the difference between pretest and follow-up score is significant but the difference is not significant between pretest and posttest scores as well as between posttest and follow-up scores. Therefore, it can be concluded that although, the use of educational software did not reduce the amount of LSD students' math anxiety, but the follow-up test three month later after the treatment showed the low anxiety compared with posttest.

It can be summarized that although, the use of educational software did not reduce the amount of LSD students' math anxiety, but the follow-up test three month later after the treatment showed the low anxiety compared with posttest. It seems that math anxiety doesn't reduce in a short period of treatment as well as it requires long term treatment. And the impact of delayed educational software caused the reduction of math anxiety. Considering the result of present study, it seems that to increase math anxiety, it should be paid attention to different kinds of anxiety (learning anxiety, problem solving anxiety, teachers' anxiety, math evaluation anxiety, individual factors such as personality, interest, individuals' attitude and intelligence, confidence, last experiences and institutional factors including present educational system on schools, teachers' personality, schools' expectations from students and family factors such as individuals training methods at home and emotional atmosphere of home).

The result of present study contrasts with the results of Khandan Lavasani's research (2011) that shows the cooperative learning methods results in the math reduction significantly in the short period of running the procedure.

Today, math anxiety devotes a special place for itself in the case off teaching and learning of school's math and even the academic ones. The low amount of anxiety is required to be developed and high amount of it prevents the progression and causes the inability of students to do something. The effective corporation among three elements of teacher, students and family in the form of systematic attitude can provide required factors to prevent anxiety situations to do mathematical practices. (Alamalhoda, Hasan) mentioned that if the math teaching is in a way that does not include different learning methods, it may cause result in math anxiety among learners.

Suggestions

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1. Pay attention to other factors such as individual factors such as personality, interest, individual attitude and intelligence, confidence and last experience besides study methods.
2. It is suggested that this software is applied in longer period to encounter more anxiety reduction.
3. As students become familiar with mathematical problems from childhood, it can be planned to use educational software of math anxiety in a way that if the children face these problems in this case, the protection will be applied to prevent them later.
4. To give this chance to the teachers to stay at school more to rely more on educational content such as Multimedia Builder 4.9.7. , Auto play Media Studio 7.0 and use them in their teaching.
5. To prepare an appropriate condition for all schools from information technology and computer specially schools of suburban areas to help students to learn better.
6. As it is carried out in Qaemshahr, it is suggested to repeat it another cities.

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