



Effect of math multimedia teaching on mathematics self-regulation and learning in the first grade Students of secondary school

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ABSTRACT

This study investigated the effect of math multimedia teaching on mathematics self-regulation and learning at the junior high school girls students in Iran in the 2012-2013 academic year; and has been performed with quasi-experimental methods (quasi experimental). For this purpose, we selected two classes of first grade school in velayat educational complex in Harsin city (Iran) that have random arrangement and their Mathematics was taught by a teacher; and randomly assigned were considered one class as experimental group and another class as control group. The total respondents were 60 (29 cases in the experimental group, and 31 cases in control group). To collect the data used from regulated learning strategies questionnaire (MLSQ), and were used lesson math final scores for assessing students' learning. After the pretest in two groups, experimental group were taught by multimedia applications, and control groups by common mode. Dependent and independent t-test was used for data analysis. The results showed that, although the self-regulation and academic performance of students with math learning software were taught in the control group was outperformed, But this advantage was not significant at %95 confidence level. Among the reasons for lack of significant assumptions in this study, it can be noted to non-observance of the principles of multimedia in software used, teachers' lack of familiarity with how to use new technologies and how to combine it with traditional, Students' unfamiliarity with new methods of teaching and Students' lack of proficiency in the use of computers.

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Introduction

In recent decades, the world witnessed a new trend in education to more efficient. These trends such as individualized and wider distribution of education, use of technology especially computers enhances the ability of teachers to communicate with students effectively and reduce from traditional approaches to learning. Use of computers has received such an important role that perhaps can be achieved to the greatest technological advances in education by relying on computer (gharakhani, afrooz & masoumian, 2010). Computer and e-learning programs have consolidated their place not only in schools and formal classroom, but also outside formal educational environments. And its applications are increasing day by day in the field of education - especially in form of multimedia and web pages- (Amir Teymouri, 2012). The order of media in this study is using a computer to transfer content through a variety of texts, sounds, fixed and movable images and animations, which despite the interfaces and tools, allow the navigation, interaction and communication to user or learner (Hafstr 2001, quoted Amir Teymouri, 2011). From main features of multimedia are attention to individual differences, different rates of learning and putting them in real situations. The use of multimedia educational causes the average learning time is reduced to a large extent; and increased levels of student's achievement more than one standard deviation (Colic 2001 quoted Amir Teymouri, 2011). Clark (2008) in research that has done concerning white new media and information and communication technology,

Concludes that use of new educational technologies due to the flexibility of data:

- 1-Increase the selection in learners.
- 2-No significant effect on the amount of mental effort learners.
- 3-Teachers are more motivated to teach; and this causes their empowerment in education.

Among other factors that affect to student's achievement, particularly in multimedia application is self-regulated. Various senses are engaged in learning in use of multimedia; and this stimulated and motivated the learner's active participation in the process of learning, and makes them self-regulated and self-guiding. Self-organized is active process, which in it during, the learners can choose their own learning goals, and then try to regulate, control and monitor their cognition, motivation and behavior (Stefanou, 2001). Bandura's social cognitive theory (1986) provides a useful theoretical framework for the development of self-regulated learning model; which according to it, in each case, histological and behavioral factors provide the opportunity to Control of student learning (Quoted from Nikos & George, 2005). Including concepts emphasized in Bandura's Social Cognitive Theory, is learning of self-organization and self-regulation. Bandura (1997) believes that learning of self-regulation is related with motivation and academic achievement. Santraak (2004) argues that the purpose of self-organization is "produced and directed thoughts, emotions, and behaviors by him-self in order to achieve the goal" (quoted from Seif, 2007). Self-regulation is a process whereby students direct their understanding, behavior and

emotions actively and continuously to achieve goals systematically (Schunk & Zimmerman, 1994; quoted from Boekaerts, 1997). Although the various theories of self-regulation have grown over the past twenty years, but they all are share in some similar characteristics and specifications (Zeidner, Boekaerts & Pintrich, 2000; quoted from klerly and zimmerman, 2004). In general, self-regulated are engage the learners actively in conduct of behavior or strategies to achieve the goals collection. Also in the beginning when learners are not able achieve to their goals, Can be rely on emotion, cognition, motivation, and behavioral feedback engaged to correct or evaluate the strategies and behaviors (Zimmerman, 1986; *ibid*). According to several studies has been done about the use of computers and multimedia software for teaching, can say that educational software improve the learning outcomes, when used in addition to traditional methods of teaching and in classroom. Moreover, due to the numerous examples, regulation of learning rate and repetition, the efficiency will be very good at solving problems and learning and individual differences. With this method, we can created Optimal learning environment for different people with different characteristics. From the foregoing, it can be concluded that the educational use of multimedia, Activates learners in the learning process and the acceptance of learning responsibility; and thus leads to a deeper understanding and sustainable of content. Despite this conclusion, in this regard, not research has been done specifically with the experimental procedure; and for this reason, was chosen in this study as the issue that is effect of math multimedia teaching on mathematics self-regulation and learning at the junior high school girl's students.

Method

This study is applied; and the experimental procedure was performed according to the objectives, and to it conduct the pre-test - post-test control group was used. Our samples are consisted of two classes of high school students at educational complex of velayat in Harsin (Iran). This complex was introduced as a medium sample by education department in harsin. Among the first grade classes of this institution, two classes were chosen randomly, one as the experimental group and the other as the control group. 29 persons participated in the experimental group and 31 patients in the control group. The research tools included: self-regulated learning questionnaire "MSLQ", learning math teacher made tests, and Mathematics Software Produce by Ministry of Education. For measure the extent of use subjects from self-regulation learning strategies were used from scale of self-regulated learning "MSLQ" that has been produced by Pntrych and De Groot (1990). This scale has 47 items that has been set in two parts of motivational beliefs and self-regulated learning strategies. Considering that the scale designers have permission to use part of the scale, in this study, the questionnaire limited to self-regulated learning strategies. The questionnaire contains 22 items that have two cognitive strategies (including the four categories of repetition and review strategies, organization and comprehension strategies) and meta-cognitive strategies and self-regulation system (including the three categories of planning, Control and Monitoring and regulation strategies). Pintrich and De Groot (1990) are use of Cronbach's alpha to check the reliability of the questionnaire "MSLQ", and for the subscales of self-efficacy, intrinsic value, test anxiety, use of cognitive strategy and self-regulation(using cognitive strategies and effort management) alpha coefficients, respectively, 89/0, 87/0, 75/0, 83/0 and 74/0

received. Mousavi Nejad (1997) in Iran has used of factor analysis method for validity and content validity. Which in this analysis was extracted three factors of low-level Cognitive strategies, high-level cognitive strategies and metacognitive self-regulation strategies. Also Alborz and Samani (1999) was used the retest to determine of questionnaire reliability; and obtain 76/0. To measure of students learning in math of test and control groups was performed using the "math test" teacher made. This test is of type criterion; and approved based on content of the subjects taught by lecturers and experts.

Multimedia Mathematics instruction: Educational software of "Mathematics 1" for the first grade of Secondary school that has designed and approved by the Department Information and Communication Technology "of the Ministry of Education.

The implementation method of Research

After the pretest the two groups; the test group educated during the three-month trial involving 24 sessions,with using from software of "mathematics education1", produce by Department of Education, and The control group educateed with the customary practice without using multimedia. Dependent and independent t-test was used for statistical analysis.

The results

According to the data in Table (1-1) T calculated is - 1/102and degrees of freedom is 58 at a significance level of $P=0/05$; The average difference of two groups was not significant; This represents the homogeneity of the two groups.

According to the data in Table (1-2), the average difference between test and control groups was not significant in relation to self regulation variable ($DF=58$, $p=0/05$, $t=0/011$); As a result the hypothesis was not confirmed.

According to the data in Table (1-3), in both experimental and control groups in academic achievement, t obtained 1/684, and degree of freedom is 58, at significance level are $P=0/05$; we conclude that there is no significant difference between math scores in two groups between. Thus, the use of multimedia is not effective in math learning of students. As a result the second hypothesis was not confirmed.

Discussion and Conclusion

The aim of this study was to investigate the use of mathematics instruction multi-media on self-regulation and mathematics achievement in the first grade of secondary school girls that enrolled at 2012-2013 academic year in Harsin (Iran). The results showed that, the average scores of the two groups in self-regulatory strategies, was Expressed the lack of significant differences between the self-regulation of students who were educated in the use of multimedia teaching method in compared with traditional educating. Accordingly the First research hypothesis was not confirmed. This result is consistent of with the part of findings of Clark (2008); and is inconsistent with research of Dwyer (1998) who received using educational technology in the classroom, enhances learning and constitutes a the impetus for students that are prone to asking questions and participating in class; as well as with research Hallet and Faria (2006) that Compare the two groups of students (a group by multimedia. other group through the PowerPoint was text only) That received both qualitatively and quantitatively, multimedia has had a positive effect on students' under test. In this field, it can be pointed to the role of teachers. Indeed it could be said, teacher as main executor of schools education programs can have played an important role in encourage and develop the educational innovations or confinement and slowing pace of educational innovations.

Table 1. Results of independent t-test, pre test of self regulation

Sig.	df	t	Standard deviation	Average	Number	
0/275	58	-1/102	4/416	72/310	29	Test group
			3/828	73/483	31	Control group

Table 2. independent t-test, self regulation post-test

Sig.	df	t	Standard deviation	Average	Number	
0/991	58	0/011	5/785	71/758	29	Test group
			4/709	71/774	31	Control group

Table 3. independent t-test of two groups in relation to math scores

Sig.	df	t	Standard deviation	Average	Number	
0/097	58	1/684	1/983	17/672	29	Test group
			2/472	16/693	31	Control group

In this regard, It can be institutionalization this belief that teacher can't possibly be replaced by the new educational technologies; But will facilitate their professional teaching duties with use of new educational technologies; In this field, Dwyer's research (1998) shows that teachers' professional skills are developed through the use of information and communication technology. This is only time possible that teachers are educated to use of information and communication technology. In relation to the second hypothesis test results showed no significant difference between the mean scores of the two groups; and showed that have no affect the use of mathematics instruction multimedia on the academic achievement in students. Among the reasons that can be state for this conclusion is use of traditional methods of assessing students. The reason for this is clear partially. Traditional evaluation methods measure only memories or low levels of learning. May be lack familiarity of Teachers and students in the appropriate use of software is another factor affecting on student achievement. Maybe if were more careful in multimedia production and multimedia production principles were considered, multimedia would more attractive for students and their learning was remarkable from educational multimedia. This statement is consistent with the results Saffarian, fallah and Mir Hosseini (2010). They found that the performances of students who educated with educational software are significantly better in compared to students who are educated with traditional method. According to these findings suggest that before using of any new educational technology, teachers already trained and prepared to use of new technologies in practical; as well as will provide the required suggestions for use with computers to the students. In addition, we will train the working with educational software to students.

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