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An assessment on the quality of electronic educational courses versus traditional ones: A case study of math courses

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A B S T R A C T

The new era introduced as a technology era, is important as promising of a new world with modern methods in better and more useful teaching, which result in progress in qualitative teaching of students in education. The aim of the present study is to learn more about the effect of electronic courses in mathematics on students' social growth, cognitive growth and the quality of learning. Statistical population includes 55 teachers of junior high school in city of Khash located in south part of Iran, selected randomly based on Morgan Tables. To gather data, social growth, cognitive growth and learning quality questionnaires were used. To analyze data one-way analysis of covariance (ANOCOVA) test was used. The results reveal that electronic educational courses were effective on social growth and cognitive growth but not on learning quality.

1. Introduction

During the past two decades, there have been tremendous changes on educational learning systems (Harrison et al., 2002; Anderson, 2008). Economy- and technology-driven theories dominate current explanations of social change (Häyrinen-Alestalo & Peltola, 2006). There are literally various software packages as well as electronic learning facilities such as learning management system (LMS) and Wikipedia pages to help people learn easier and faster. Electronic education documentation systems play essential role in educational systems they are important in pedagogy and education of learners. Electronic learning is considered as a way to represent more flexible learning system and to make more opportunities for learners, to facilitate the progress of learners and their activities and to provide an opportunity to establish effective new learning settings.

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Today, educational systems are expected to provide active and collaborative facilities for students. To realize such a procedure, it is necessary to make important changes on traditional procedures. Definitely, old education methods do not respond today's changing education needs; therefore, one of educational departments' efforts should be in association with information and communications technology and its application in curriculum (NiazAzari, 2005). Generally, the role of students' knowledge in learning setting based on information and communications technology is being subjected to change and in this process students are active and focus on producing knowledge (Armitage & Liari, 2003).

One of the primary concerns in many learning systems is the lack of interest in actively learning necessary courses such as mathematics. Many junior high school students fail to learn necessary materials and they are unable to continue their educations in well-known universities. Therefore, there is a need to make necessary changes on teaching systems to increase students' motivation on learning educational courses. One of the new educational methods is to use electronic educational courses. However, there are two main questions associated with the application of information and communications technology in teaching mathematics. First, we have to know why we are searching for utilizing information and communications technology and its achievements in teaching mathematics. Second, we have to know about the obstacles using the features of a proper and successful educational software packages. There is no doubt that information and communications technology help student receive immediate feedback from computers and it helps them react faster and this addresses the first concern of our survey. To answer the second concern, we should say that information and communications technology in the country's educational population and in teaching is not among cultured items. Inclusion of information and communications technology in curriculum especially mathematics, has been always educational practitioners' concerns. In fact, people who produce educational contents and assistant software packages in utilizing information and communications technology in mathematics do not have enough thematic literacy about educational psychology in teaching mathematics and metacognition topics. Therefore, the produced software packages follow the very methodologies to transfer knowledge. In addition, teachers of mathematics and experts of educational topics also were deprived of necessary software literacy in order to optimally design the software packages based on common standards.

Despite the fact that there have been tremendous changes on information and communication technology, many teachers are still are unaware of the advantages on such teaching courses in their daily teaching activities. On one hand, producing math based educational software packages needs necessary skills and educational software manufacturers should have required literacy and skill in combining these two in addition to mathematics thematic literacy.

This study aims to investigate the quality of electronic education courses in mathematics of junior high school students of Khash city located south part of Iran and to find out whether there is any difference between learning mathematics of junior high school students using educational software packages against traditional method or not.

2. Research methodology

In this study, semi experimental method and pretest- posttest type with experimental group and control group are used. The population under study includes all of junior high school teachers of Khash City in school year 2012-2013. According to the volume of the population and by using Morgan Table , 55 people were randomly selected as statistical sample where 40 were experimental group (electronic education) and 15 people were of control group (traditional education). After determining the sample volume, the samples were selected, randomly.

In this research, one questionnaire with 73 items with Likert Scales was used, which were collected after distribution of questionnaires among teachers and completing them. Supervisor and some professors of educational science confirmed questionnaire validity. This questionnaire was distributed

among teachers and was collected after completion and its Cronbach's Alpha was exclaimed 74% by using SPSS software, which indicates that this questionnaire had high reliability for execution. To analyze data, ANCOVA is used.

3. Findings

3.1. The first question of the survey

The first question of the research is as follows,

Is there significant difference between electronic educational method and traditional educational method in the quality of learning mathematics of junior high school students of Khash City?

To answer above question, one-way statistical test of ANCOVA is used and the results are shown in Table 1 as follows,

Table 1
Descriptive results of posttest in the variable of mathematic learning quality in two groups of Control and Experimental

Group	Numbers	Standard deviation	Average
Control (traditional education)	15	5.27	51.53
Experimental (electronic education)	40	8.44	67.1
Total	55	10.37	62.85

The results of Table 1 show that experimental group maintain higher level of learning (Mean = 67.1 Standard deviation = 8.44) than traditional education (Mean = 51.53 Standard deviation = 5.27). Table 2 presents the results of one-way analysis of covariance (ANCOVA) between pre and post-test groups.

Table 2
The results of one-way ANCOVA in dependent variable of learning quality in the scores of posttest of control group and experimental group

Source	Type III Total Squares	Df	Average of Squares	F	Sig.	Partial Square
Modified Model	3498.405[a]	3	1166.135	25.65	.000	.601
Intercept	70.579	1	70.579	1.55	.218	.030
Group	36.084	1	36.084	.79	.377	.015
Pretest of learning quality	844.214	1	844.214	18.56	.000	.267
Group * pretest of learning quality	.009	1	.009	0.0005	.989	.000
Error	2318.609	51	45.463			
Total	223126.218	55				
Modified Total	5817.014	54				

[a]R Squared = .601 (Adjusted R Squared = .578) [b]. Computed using alpha = .05

The results of Table 2 reveal there is no significant difference in scores of post-test of learning quality of mathematics in control group and experimental group [F(1, 51) = .79, P = .377, ω2=0.015]. Thus, we can conclude that electronic education has no impact on learning quality of mathematics and this is not consistent with the studies of Zameni (2010), ShariatMadari (2011), Najafi (2006).

Many countries pay attention to apply information and communications technology in educational system in order to promote the quality of teaching-learning methods. Information and communications technology makes a framework or a structure, which promotes the quality of education, students and teachers can achieve wide learning sources by using this technology, increase their learning motivation and use different forms of learning.

3.2. The second question of the survey

The second question of the research investigates whether or not there is any significant difference between electronic educational method and traditional educational method in social growth of junior

high school students of Khash City. To answer this question we have used statistical test of one-way ANCOVA and the results are shown in Table 3 as follows,

Table 3
Descriptive results of posttest in social growth variable in control group and experimental group

Group	Numbers	Standard deviation	Average
Control (traditional education)	15	6.62	60.66
Experimental (electronic education)	40	10.24	88.67
Total	55	15.67	81.03

The results of Table 3 demonstrate that experimental group maintain higher level of learning (Mean = 88.67 Standard deviation = 10.24) than traditional education (Mean = 60.66 Standard deviation = 6.62). Table 3 presents the results of one-way analysis of covariance (ANCOVA) between pre and post-test groups in terms of social growth.

Table 4
The results of one-way ANCOVA in dependent social growth variable in scores of posttest of control and experimental groups

Source	Type III Total Squares	Df	Average squares	F	Sig.	Partial squares
Modified Model	9259.991[a]	3	3086.664	39.33	.0005	.698
Intercept	632.219	1	632.219	8.05	.006	.136
Group	669.971	1	669.971	8.53	.005	.143
Pretest of social growth	678.140	1	678.140	8.64	.005	.145
Group * pretest of social growth	258.346	1	258.346	3.29	.075	.061
Error	4001.861	51	78.468			
Total	374415.612	55				
Modified Total	13261.852	54				

a.R Squared = .698 (Adjusted R Squared = .680) b. Computed using alpha = .05

The results of Table 4 indicate that there was a significant difference in scores of posttest of social growth in control group and experimental group [F(1,51)=8.53, P=.005, ω2=.1435]. Average of social growth scores of experimental group (M=60.66) is more than control group (M=88.67). So we can conclude that electronic education has effect on social growth of students.

Using technology in learning-teaching process increases students' knowledge ability in writing, common learning, more combination of curriculum, optimal usage of learning strategies, establishment of mutual relationship with teachers, more targeted social relationships and expanding the numbers of global learners (Shahbaz, 2008).

3.3. The third question of the survey

The third question of the research investigates whether or not there is any significant difference between electronic educational method and traditional educational method in cognitive growth of junior high school students of Khash City. To answer this question we have used statistical test of one-way ANCOVA and Table 5 demonstrates the results of our survey.

Table 5
Descriptive results of posttest in cognitive growth variable in control group and experimental group

Group	Numbers	Standard deviation	Average
Control (traditional education)	15	9.1094	75.763
Experimental (electronic	40	6.9148	80.3296
Total	55	7.76269	79.0842

The results of Table 5 demonstrate that experimental group maintain higher level of learning (Mean = 88.67 Standard deviation = 10.24) than traditional education (Mean = 60.66 Standard deviation = 6.62). Table 6 presents the results of one-way analysis of covariance (ANCOVA) between pre and post-test groups in terms of cognitive growth.

Table 6
Results of one-way ANCOVA in dependent cognitive growth variable in scores of posttest of control and experimental groups

Source	Type III Total Squares	Df	Average Squares	F	Sig.	Partial Square
Modified Model	1389.505[a]	3	463.168	12.66	.0005	.427
Intercept	455.500	1	455.500	12.45	.001	.196
Group	435.390	1	435.390	11.90	.001	.189
Pretest of cognitive growth	344.097	1	344.097	9.41	.003	.156
Group * pretest of cognitive growth	384.721	1	384.721	10.52	.002	.171
Error	1864.498	51	36.559			
Total	347240.874	55				
Modified Total	3254.003	54				

a. R Squared = .427 (Adjusted R Squared = .393) b. Computed using alpha = .05

The results of Table 6 reveal that there is a significant difference in scores of posttest of cognitive growth in control group and experimental group [F(1,51)=11.90, P=.001, ω2=.189]. Average of cognitive growth scores of experimental group (M=75.76) is more than control group (M=80.32). So we can conclude that electronic education has effect on cognitive growth of students. The results are consistent with the studies of Sheikhzadeh (2006), Häyrinen-Alestalo and Peltola (2006) and Harrison et al. (2002).

4. Conclusion

In this paper, we have presented an empirical investigation to study the impact of electronic education system on increasing the capability of some selected students who have attended in our survey. The study has concluded that electronic educational courses were effective on social growth and cognitive growth but not on learning quality. The results of this survey indicate that quality of electronic learning system plays essential role for improvement of math based courses in high schools.

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References

Anderson, T. (2008). *The Theory and Practice of Online Learning*. Athabasca University Press.

Armitage, S., & Leary, R. (2003). E-Learning series: A guide for learning technologist. *Heslington Generic Center*.

Häyrinen-Alestalo, M., & Peltola, U. (2006). The problem of a market-oriented university. *Higher Education*, *52*(2), 251-281.

Harrison, C., Comber, C., Fisher, T., Haw, K., Lewin, C., Lunzer, E., ... & Watling, R. (2002). *ImpaCT2: The impact of information and communication technologies on pupil learning and attainment*. British Educational Communications and Technology Agency (BECTA).

Shariatmadari, H. (2011). Comparing teachers' view on some lessons such as science, math, Arabic and literature in middle school and prioritize and deployment of the information technology and communications skills. Master's thesis.

Shahbaz, M. (2009). Check the availability of teachers and their utilization of information and communication technology (ICT) in schools of Isfahan.

Sheikhzadeh, M. (2007). Design of elementary math instructional software based on constructivist approach and assessment of its effectiveness. Master's thesis.

Sheikhzadeh, M., & Mehrmohmmady, M. (2005). Elementary math training software based on constructivist approach and assessing its effectiveness. *Journal of Educational Innovations*, 3, 48-32.

Najafi, M. (2007). The impact of computer use on high school students trying to learn. Master's thesis, Education, Payam Noor University, Branch Khalkhal.

Niazazari, K. (2005). Human behavior in educational institutions of the third millennium. Tehran: Farashenakhti Andisheh.

Zameni, K. (2010). The impact of information and communication technology in mathematics. Master's thesis.