

The Acquisition of Students' Life Skills through Computerized Mathematics Curriculum at Discovery Schools in Jordan

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ABSTRACT

The purpose of this study was to investigate the effect of using computerized curriculum in teaching mathematics on students' learning life skills. The sample consisted of (98) students from 9th graders at discovery and regular schools in Jordan. The sample was distributed into two groups. The experimental group consisted of 24 female and 24 male 9th graders and the control group consisted of 24 female and 26 male ninth grades. The participants studied math one period daily of length (45 minutes) during the first semester of 2009/2010. Content validity was established by distributing the instrument to experts from the faculty of Educational Sciences. The reliability of the instrument was assessed by using Cronbach's Alpha. The reliability coefficient was (0.87) over all the measure. The results of data analysis indicated that students in the experimental group statistically improved their life skills abilities in comparison with the control group. The results also indicated that the females in the experimental group scored significantly higher in the dimensions of communication skills, social skills, and psychological skills than the males, while the males in the experimental group scored significantly higher in the thinking skills dimension.

Keywords: Technology, Discovery Schools, Mathematics, Life Skills.

INTRODUCTION

Over the last few decades, it is apparent that technology has been increasingly used in educational process at all levels and has changed the way of teaching and learning. In recent years, educators in all subjects used computer instruction to achieve better students' involvement in learning activities and to place students at the center of the learning process, teachers can help students to enjoy learning and feel more comfortable during the class to motivate them to participate effectively, they select the most appropriate teaching method that meet students' needs and preferences. As computers become more powerful and less expensive, instructional processes using computer become increasingly popular in learning processes. In the field of education, Facione (2001) mentioned that mathematics educators used Computer-Assisted Instruction (CAI) to promote greater student involvement in learning mathematical activities, and to increase access of learning material. Beyer (2003) mentioned that the major benefit

of using technology in education is to enhance students learning and increase teacher effectiveness.

Life skills are those skills that enable students to succeed in different environments in which they live such as schools, homes, and neighborhoods (Goudas, M., Dermitzaki, I., Leondari, A. and Danish, S., 2006).

According to Philip (2009), the importance of life skills comes from the challenges of the new technology life. It helps students grow beyond schools and make appropriate life decisions and have successful and happy life by reflecting positive morals, values, behavioral, cognitive/ mental, emotional areas and positive attitudes. Therefore, teaching appropriate life skills becomes an important part of new school curricula.

Teaching and learning are two different educational processes, but they interact definitely. Teaching consists of goals and methodology, learning acquires goals and skills. Between teaching and learning there is an interaction that can be viewed from the positions of teachers and learners (Veugelers, 2000). Furthermore, Lwin and Omel (2008) mentioned that teachers can help students to enjoy and feel more comfortable during the class and thus students participate effectively, teachers select the most appropriate teaching style in which meets students' needs of life skills. In other words, students

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prefer teachers who imply different styles of teaching to learn different skills.

During the past century, the major mission of schools focused only at teaching reading, writing, and mathematics, while in the nineties of the 20th century, changing in society life has induced a growing need for the acquisition of mental problem solving, cooperative and communication life skills, and thinking skills (National Council of Teachers of Mathematics (NCTM,2000). There is an indication that the fundamental missing element in our schools today is the thinking students. The development of personality through the processes and outcomes of learning vary among students due to individual differences, conceptions of learning, learning styles and strategies, teaching methods, interests, motivation, beliefs, and emotions Thachin and Norman (2008).

The Jordan Education Initiative (JEI) was conceived at the Annual Meeting of the World Economy Forum in Davos, Swaziland, in January 2003. The leaders of instructional technology, information technology, and telecommunications approved the sponsorship of an initiative for educational reform in Jordan.

The JEI was formally launched at the Meeting of the Meeting of the World Economic Forum in Jordan in June, 2003. It has several objectives. One of those objectives is to supporting in-classroom technology that aimed to innovate, test, and deploy Instructional Computer Technology (ICT) through a blended learning style which combines using technology. Another objective is to let the teachers have the tools to integrate the use of ICT into everyday classroom setting. This let the students exposed to technology and e-content. Specialist mathematics labs are established and used in the Discovery Schools to give the students hands-on access to computers. The students learn and interact with technology

Now days, mathematics teacher preparation is considered as an essential part of the educative process in the century of knowledge economy. Many mathematics education scholars believe that the preparation of teachers play important roles to develop the ability of teachers to structure the learning activities and experiences and to create an optimum learning environment. (Ministry of Education, 2011).

The curriculum of mathematics education is one of the richest fields of developing thinking and social skills. Educators use mathematical activates to enhance the quality of students' life by developing their physical,

social, health, life skills and thinking domains. So, in order to reach the students' needs, attitudes, and the objectives of mathematics teaching, mathematics educators need to be prepared well in a suitable way, in order to help them know how to achieve the objectives of the lesson, what methodology to use to achieve the desired objective, how to motivate student; how to provide appropriate feedback; and how to evaluate the student's performance (NCTM, 2000 and Schnifter and Brandy (2011).

When teachers plan for subject matter, they are recommended to choose skills to be self – evaluated, and tasks focused on end results, in which students can identify their own limits, successes, and failures; on other words, they have the chance to be responsible for their own evaluation (Harrison and Blackmore, 2002).

This study is going to investigate the effect of teaching mathematics using a computerized curriculum on students' life skills achievement.

Related Literatures

Schnifter and Brandy (2011) conducted a study to investigate the effect of integrating mathematical, technologic, and pedagogical knowledge in learning. The sample consisted of 24 6th graders in public schools at Florida State. The finding indicated that students learning skills improved in comparison with the pre-test scores on the observation sheet, but there was no significant difference with respect to gender.

Fisherman (2010) conducted a study aimed at examining the effect of using technology in teaching mathematics for 7th graders on their thinking skills. The sample consisted of (94) female and male students. The findings showed that the students' thinking skills improved. In addition to that it showed that males' students' thinking skills improved more than females' students' thinking skills.

Malotcha and Snyder (2010) conducted a study examining the effect of teaching geometry using technology on students' communication skills. The sample consisted of (62) 6th graders. It was distributed as 30 students - 17 females and 13 males- representing the experimental group where they studied mathematics for two months using computerized software. While the other (32) students - 15 females and 15 males representing the control group where they studies mathematics without using the computerized software. The results indicated that the students in the experimental group improved their

communication skills more than the students in the control group. Also, there were no significant differences in communication skills improvement with respect to gender.

Philip (2009) investigated the effect of applying technology in teaching mathematics to promote communication. The sample consisted of (45) 4th graders. It was distributed into experimental and control groups. The results indicated that the students in the experimental group improved their communication skills more than the students in the control group. While, there were significant differences in communication skills improvement with respect to gender.

Thanchin and Norman (2008) conducted a study to identify the effect of teaching thinking skills for 8th graders in China. The sample consisted of (154) female and male students. The results showed that there were no significant differences between males students' thinking skills and females' students' thinking skills.

Almosairi (2007) conducted a study to investigate the effects of computerized instructional program based on problem solving on achievement and development in creative thinking in mathematics for intermediate students in Kuwait. The sample consisted of 55 students distributed into two groups consisted of 28 students taught by computerized instructional program and a control group consisted of 27 students taught the traditional method without using the program. The study used Torrance Test for creative thinking and achievement Test. The findings indicated that there were statistically significant differences between the means of Torrance Test in behalf of the experimental group.

Alhersh (2006) conducted a study to examine the effect of using computer on developing writing skills at the eleventh graders. The sample consisted of 59 students distributed into experimental group which had 28 students and a control group consisted of 31 students studied using paper and pencil. The results indicated that there were significant differences on behalf of the experimental group and there were no significant differences with respect to the gender.

In study for Abdullah (2006) aimed at identifying the effects of applying technology on instructional competencies of teachers and learning competencies of students in the Jordanian Discovery Schools. The sample consisted of 170 students and 58 teachers. The findings indicated that there was a positive effect of using technology on teachers' instructional competencies (classroom management, assessment, and lesson plan)

and on students' learning competences (communication, critical thinking, and preparation).

Furthermore, Alsarayra (2001) conducted a study aimed at identifying the effectiveness of teaching mathematics using computerized software for 7th graders on their achievement and written communication skills. The sample consisted of 170 students distributed into 6 groups identified as follows: three males groups (2 experimental groups and one control group), and three females groups (2 experimental and one control group). One experimental group studied mathematics using computerized software only. Another experimental group (females and males) groups studied mathematics using computerized software and a written paperwork. The control group (males and females) groups studied mathematics using the traditional method. The findings indicated that there were significant differences with respect to the two experimental groups and no significant differences to the interaction between the teaching method and the gender.

It is clear from the previous studies that none of them studied the effect of using computerized curriculum in teaching mathematics on students' learning of social and thinking life skills at the Discovery Schools. According to the researcher knowledge, this study is going to be one of the first studies to examine this topic.

Statement of the Problem

In general, based on the researcher knowledge, there is a lack of research studying the effect of teaching mathematics using a computerized curriculum on students at middle schools with respect to their learning of life skills, especially in Arab countries. In addition to that, there is a huge amount of research conducting in the discovery schools in Jordan, but they focus on investigating variables such as achievement, attitudes, or computer skills.

After the process of reviewing relates studies, the researcher found few Arabic studies conducted on the effectiveness of computerized curriculum on learning life skills. While the researcher couldn't find any study in the effectiveness of using computerized curriculum in teaching mathematics on students' learning of social and thinking life skills. In other words, mathematical teaching strategies influence students' social, communication, psychological, and thinking skills. Furthermore, the researcher discussed those educational issues with different math teachers. Many of them mentioned that

they really don't spend time on life skills and few of them mentioned that they don't even know what it means.

The Purpose of the Study

The purpose of this study was to investigate the effect of using computerized curriculum in teaching mathematics on students' learning of social and thinking life skills.

Research Questions

As a result of the related reviewed literature, this study answers the following questions regarding the main purpose of this study:

- 1) Are there any significant differences in students' life skills learning between the experimental group who learned math via computerized curriculum and the control groups who learned math without the computerized curriculum?
- 2) Are there any significant differences in students' life skills learning between females and males in the experimental group who learned math via computerized curriculum?

The Subjects

The participants in this study were (98) male and

female 9th graders. Four classes were chosen: two classes from discovery middle schools in Amman. Those two classes were considered as the experimental group where the students learned mathematics using computerized curriculum. One of those two classes had only female students and the other one had only male students. While the other two classes were chosen from regular middle schools and were considered as the control group in which the students learned mathematics using the traditional method (without using computerized curriculum). One of those two classes had only female students and the other one had only male students. In other words, two classes were female classes distributed as one experimental group from a discovery school and the other one as a control group from a regular school, and two classes were males students distributed as one experimental group from a discovery school and the other one as a control group from a regular school. All the four classes studied the same units of mathematics for the entire first semester of 2009/2010. The participants learned mathematics for one period every day. The length of the period was 45 minutes.

Table 1 shows the distribution of the participants with respect to their gender (male or female) and group (experimental or control).

Table (1)
Distribution of the participants with respect to Gender and group

Gender \	Female	Male	Total
Experimental	24	24	48
Control	24	26	50
Total	48	50	98

Definitions of Terms

Computerized mathematical curriculum: the mathematical content, examples, activities, assessments, questions, and lessons for 9th graders, transferred into electronic version so that teachers teach and students learn it using technological tools.

Life skills: skills that are needed in-classroom and out-classroom. In this study it has four dimensions: social, communication, thinking, and psychological skills. It is measured by the total score of students' responds to the instrument which is developed by the researcher.

Discovery schools: Jordanian schools participated in the Jordan Education Initiative (JEI), where the students

learn using different tools of technology.

Procedures

- In the present study, two different methods of teaching were used: teaching mathematics for 9th graders using the computerized curriculum at the discovery schools and the other method is teaching the same mathematics for 9th graders using the traditional method at the regular schools which means without using the computerized curriculum.
- The researcher met the teachers (two females and two males) prior to the implementation of the study and explained to them the process of the study. All the four teachers have a bachelor degree in mathematics

and they have teaching experiences between 8-10 years in teaching middle mathematics and they have teaching experiences between 5-7 years in teaching mathematics for 9th grade. The researcher visited all the four classes in the experimental and the control groups to ensure the process of teaching.

- The questionnaire was distributed among the participants before conducting the study. Table 2 shows the results of the pre-test of the questionnaire which indicates the two groups were equivalent with respect to the acquisition of the life skills.

Table (2)
Pre-test Scores Analysis of the four Life Skills Dimensions for the participants

Skills Dimensions	Control group		Experimental group		T Value	Sig. level
	M	SD	M	SD		
Social communication	33.27	1.82	31.62	2.58	.812	.371
Psychological Thinking	37.78	2.41	35.32	1.88	1.02	.192
Overall	31.05	2.13	34.96	2.75	.195	.632
	35.42	1.95	38.81	2.91	.531	.341
	137.52	4.02	140.71	3.78	.986	.342

As can be seen in table (2), there were no significant differences between the experimental group and the control group in their life skills according to the social skills, communication skills, psychological skills, and thinking skills dimensions. This means the two groups are equivalent.

The Instrument of Life Skills

The Instrument of life skills was created and developed based on multiple life skills researches and studies such as Abdullah (2006), Mustafa (2006), and Alsarayra (2001). The final version of the measure consists of 60 positive items, using a 5-point Likert-type scale, items ranging from 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree). These items are distributed into the following four dimensions: communication skills; social skills; psychological skills; and thinking skills.

Content validity was established before conducting this study by distributing the instrument to some experts from the faculty of Educational Sciences at the University of Jordan, Alhashmiyah University, and Alyarmouk University. The primary version of the instrument consisted of 67 positive items. The instrument judges examined the measure and agreed that it did assess what it was supposed to assess, they modified and rephrased few words to be understood by the participants and they deleted seven items. Additionally, Content validity was established before conducting this study by distributing the instrument to some experts from the faculty of Educational Sciences the researcher assessed the

reliability of the instrument by using Cronbach's Alpha, as a measure of consistency coefficient. The instrument was distributed to (42) females and males 9th graders from a discovery school. This school was not one of the participant discovery schools in the study. It was calculated to find the internal-consistency of reliability for the instrument. The result showed that the reliability coefficient was (0.87) over all the measure, which means that the instrument was reliable.

Variables of the Study

The independent variable was the teaching strategy, teaching mathematics: (using computerized curriculum, without using computerized curriculum)

The dependent variable was the students' life skills and the classified variable was the gender.

Data Analysis

Means, standard deviation, and t-test were used as the appropriate statistical tools to test the research questions. Based on the research questions, data was analyzed using the Statistical Packages for Social Sciences (SPSS) version 13.0. The (0.05) level of significance was selected to determine if any differences between the groups were statistically significant.

Results Description

The purpose of this study was to investigate the effect of using computerized curriculum in teaching mathematics on the achievement of students' life skills. The results of data analysis for life skills measure indicated that students

improved their life skills from pre-test to post-test. Table 3

displays the findings of first question.

Table (3)
Scores Analysis of the four Life Skills Dimensions for the participants

Skills Dimensions	Control group		Experimental group		T Value	Sig. level
	M	SD	M	SD		
Social	37.97	2.12	48.74	2.35	16.31	.001
communication	41.08	1.78	49.32	2.11	17.01	.000
Psychological	37.01	2.45	47.08	2.04	15.85	.003
Thinking	39.35	1.89	52.11	2.08	23.71	.002
Overall	155.37	4.21	197.25	3.14	40.02	.002

Alpha = 0.05 was the level of significance

As can be seen in table (3), there was significant differences between the control group and the experimental group on behalf of the experimental group with respect to the social skills, communication skills, psychological skills, and thinking skills dimensions and the overall of the life skills dimensions. Students in the

experimental group scored significantly higher than the students in the control group.

The information in table (4) displays differences in students' life skills learning between females and males in the experimental group who learned math via computerized curriculum by showing the post-test scores analysis of the four life skills dimensions for females and males.

Table (4)
Post-test Scores Analysis of the four life skills Dimensions for the females and the males experimental Groups

Skills Dimensions	Females Group		Males Group		T Value	Sig Level
	M	SD	M	SD		
Social	53.11	2.72	47.88	1.83	5.26	.001
Communication	53.79	3.62	47.01	2.04	4.97	.003
Psychological	48.03	2.38	45.05	1.97	3.78	.000
Thinking	48.65	2.50	55.74	3.08	7.74	.001
Overall	203.58	6.36	196.13	4.33	4.27	.001

Alpha = 0.05 was the level of significance

As can be seen in table (4), there were significant differences between the females group and the males group in their life skills according to the social skills, communication skills, psychological skills, and thinking skills dimensions. The females group scored significantly higher than the males group in the life skills dimensions of social skills with mean (53.11), communication skills with mean (53.79), and psychological skills with mean (48.03). While the males group scored significantly higher than the females group in the thinking skills dimension with mean (55.74). However, there was significant difference between the two groups in the overall skills dimensions, the females group scored significantly higher than the males group.

DISCUSSION

The results of the questionnaire of the experimental and control groups showed that teaching mathematics using the computerized curriculum improved 9th grade students' life skills abilities in all the four dimensions (social skills, communication skills, psychological skills, and thinking skills). From the researcher's experiences, the explanation for this result could be referred to the fact that the way the lessons, activities, examples, and problems were introduced in the computerized curriculum may help students gaining many life skills in the field, because they interact with the technology, teachers, and their classmates, compete, communicate, and learn with and from each other, which give them more opportunities to improve their abilities and characteristics and this is one of the benefits of learning

by doing. These results were consistent with the study of Abdullah (2006) who find out that computerized programs help students gaining knowledge and skills that are necessary for successful coping with a complex reality of life, and becoming better students and concerned and productive community members. In this regard, Mustafa (2006) mentioned that teaching via computer helped to improve different skills abilities such as problem solving skills. In the following the researcher discussed the results with respect to each dimension.

Dimension of Social Skills

The results of the questionnaire of the experimental and control groups showed that teaching mathematics using the computerized curriculum improved 9th grade students' social skills abilities. This could be due the fact that some of the questions in the computerized curriculum were designed in a way that requires the students to work in groups and share, compare, and discuss the solutions with other students. Also it could be because sometimes students need to ask each other for help and assistance.

Dimension of Communication Skills

The results of the questionnaire of the experimental and control groups showed that teaching mathematics using the computerized curriculum improved 9th grade students' communication skills abilities. This finding is consistent with the findings of the studies of Philip (2009) and Malotcha and Snyder (2011). This can be explained by the fact that many activities in the computerized curriculum are designed in a way that enhances students' communication skills such as using more than one communication tools for expression, for example they can write words, and they can draw using diagrams or shapes.

Dimension of Psychological Skills

The results of the questionnaire of the experimental and control groups showed that teaching mathematics using the computerized curriculum improved 9th grade students' communication skills abilities. This finding is consistent with the findings of the studies of Lwin and Omen (2008) and Henk (2009). The researcher's explanation for this result is that it could be because the computerized curriculum is designed in a systematic approach that may influences students confidence in solving the questions. Also, the computerized curriculum

displays the examples and the questions using an attractive manner including colors, pictures, shapes, drawings, and animations. All those facilities can improve self-challenge and bring enjoyment to learning mathematics. The computerized curriculum also provides instant feedback and reinforcement which may lead to high level of satisfaction and self-esteem.

Dimension of Thinking Skills

The results of the questionnaire of the experimental and control groups showed that teaching mathematics using the computerized curriculum improved 9th grade students' thinking skills abilities. This finding is consistent with the findings of the studies Fisherman (2010) and Thachin and Noman (2008). This finding can be explained due the reason that the computerized curriculum helps students to analyze different solution and it gives them more than one opportunity- normally three attempts- for answering a particular question. Furthermore, it is designed using multi-direction teaching approach. If a student doesn't understand a specific activity or question, the computerized curriculum provides him/her with a different one which is simpler than the original one. This means that it helps students discover and judge his/her mistakes. In addition to that, students control the speed of their learning. All the above characteristics of the computerized curriculum may improve students thinking skills.

The findings, also, indicated that males' students in the experimental group scored significantly higher than the females in the thinking skills dimension, the explanation for this result could be because the computerized curriculum asks students to explain their solutions in logical standards. Furthermore, this could be because the males' students in this group used more and high level of thinking skills to discover and reach the correct answer. They responded cognitively to the questions, and improved their thinking skills through discovering the most appropriate strategy or procedure by using higher level of thinking skills. This result is consistent with result of Fisherman (2010) and in contrast with the finding of Thanchin and Norman (2008).

The results, also, showed that females students in the experimental group scored significantly higher than the males in the same group in the dimensions of social skills, communication skills, and psychological skills, the explanation for these results could be referred to the fact that he computerized curriculum depends on colors,

shapes, animations, and pictures. Normally girls enjoy and interact with colors and animations more than males do. In addition to that, mostly females work, communicate, interact, and talked with each other; therefore, they have better chance than males to develop levels of psychological, personal and social skills. This finding is consistent with the finding of the finding of Malotcha and Snyder (2010). While this finding is in contrast with the finding of Philip (2009).

In conclusions, based on the results of this study, it is clear that using technology while teaching mathematics helped students achieved different kind of life skills; therefore, the researcher agrees that it is quite important that mathematics teachers consider teaching styles and tools that enhance their students' learning skills and meet their needs of life skills. In this regards, the National Council of Teachers of Mathematics (NCTM) (2000) stated that to achieve the effective teaching and learning of mathematics, teachers are encouraged to use

technology in teaching to make the learning environment more enjoyable and more productive for students.

RECOMMENDATIONS

- The findings suggest that using computerized curriculum can be used as an effective style of teaching.
- Students' life skills should be considered when teachers selecting teaching style.
- Teachers should use more than one style of teaching to meet students' needs and interests.
- Further researches are needed to investigate the relationship between different styles of teaching and other students' age levels on life skills.
- Additional researches are needed to investigate the relationship between technological styles of teaching and other subjects than mathematics on other abilities.

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