The effect of technology supported collaborative learning settings on behaviour of students towards mathematics learning

Fezile Ozdamli, Dervis Karabey, Besime Nizamoglu
Near East University, Institution of Educational Science, Department of Computer and Teaching Technology Education, CYPRUS

Abstract
Technology supported collaborative learning settings facilitate long lasting learning of students in computer and internet supported situations with collaborative workings among them. The aim of this study is to find out whether technology supported collaborative learning settings affect the behaviour of students towards the discipline of Mathematics or not. Being a single-group empirical research, pre-testing and post testing have been used in this study. Seventeen students studying in seventh year in Şehit Hüseyin Ruso Secondary School, a state school connected to Education Ministry in North Cyprus, participated in this study. Students were taught algebraic expression in detail at the beginning of this academic year. Then dividing the students in groups of four or five, they were given projects related to the given topic. In the projects the students were needed to search their projects' topic with their friends in their group, discuss and then prepare a presentation cooperatively. The presentations of the students were shared and discussed in the setting of Wikispaces by themselves. According the pre-testing and post testing results, it is pointed out that technology supported Mathematics education has a positive effect on students.

Keywords: Collaborative Learning, Technology Supported Mathematics Teaching, Computer Supported Collaborative Learning.

Introduction

In today’s world, the classical education system where the teacher-focused of information formats, such as lecturing, has begun to be increasingly criticised and this has paved the way for a widespread growth of technology supported ‘student-centred learning’ system as an alternative approach. In technology supported education system, technological course materials provide interactively learning and teaching settings between teacher and student. Therefore such settings facilitate both teacher and student to be active during a lesson.

Mathematics is not only for science but also a very important tool for people that we use to solve the problems in our daily lives. The answer given to the question; “What is Mathematics?” changes according to; the aims of people why they apply to mathematics, mathematics topics which they use for a specific propose, people’s experience in mathematics, their attitudes towards mathematics and people’s interest in this subject. In this variety of people’s perspectives in mathematics and their point of views about what mathematics is can be categorized in four groups:

1 Corresponding Author: Fezile Özdamlı Tel.: +90 392 650 2000
2 E-mail address: fezileozdamlı@hotmail.com
Mathematics is a counting, calculation, measurement and drawing that is applied to solve the daily lives’ problems.

Mathematics is a language that uses some symbols.

Mathematics is a logical system which helps people to improve their cognitive thinking.

Mathematics is a helper that we apply for comprehending the world and improving our environment (Yenilmez, 2009).

Throughout their lives, people try to figure out the problems they come across, reduce the problems or overcome the problems they have once faced and for these circumstances, the means they own themselves are their greatest supports. What the head of these supports is the education. The main goal of the education is to increase the amount of active cells among the billions of ones in human brain. This can be done through thinking and making reasoning. The science which teaches thinking is the mathematics (Yenilmez, 2009).

Various objectives have been determined by the means of improving the quality of mathematics teaching in every stage of education system. Some of these objectives are to make students have mathematical concept, to gain problem-solving skills, to trust himself/herself in mathematics, and to have a positive attitude towards mathematics. One of the beliefs about mathematics teaching; how mathematics teaching is required to do, the aims which will be determined about mathematics teaching, how the education programme is needed to be organized are all related with the methods and tools that will be used. It is required to clarify the beliefs of teacher candidates and teachers about the concepts of what knowing mathematics, doing mathematics and being teacher means (Yenilmez, 2009).

In mathematics lesson student is needed to change the abstract concept into concrete concept and to understand while doing it. The role of the technology supported education here is to help student not only being able to concretize complicated abstract concepts but also to facilitate once again the configuration in student’s mind through some known theorem graphics and multidimensional studies. Today, most of the scientific researches have pointed out that computers whether being in a programming way or teaching the topics in various effects (such as writing, voice, graphic) have been facilitating not only the comprehension of mathematical concepts but also increasing the motivation of student and the trust of himself/herself (Yenilmez, 2009).

For that reason it takes time for students to understand the subjects in mathematics lesson in classical education system. In order to increase the comprehension of the subjects in the lesson to the top level, Technology Supported Education system is preferred.

Review Of The Literature

In the research of Duru, Peker, Açıkgöz (2010), it is aimed to define the attitudes of students towards mathematics, computer, and using computer in mathematics lesson and to examine these according to some variables. In that research, Behavioural Participation, Trust of Using Computer, Mathematical Trust, Emotional Participation and Attitude towards Computer Supported Mathematics Teaching, which are the five subscales of Mathematics and Computer Attitude Scale have been used in collecting data. During the data analysis procedure, descriptive statistics, t-test for substantive exemplifications and one-way variance analysis were used. As a conclusion, that research has pointed out that participants’ attitudes towards computer supported mathematics teaching are more positive (Duru, Peker, Açıkgöz, 2010).

Another research carried out by Gelici and Bilgin (2011) has aimed to introduce the techniques of collaborative learning and examine the opinions of students about these techniques. Activity research from qualitative research approaches has been chosen for that research and in order to determine the opinions of students, they were given Personal Opinion Forum about Collaborative Learning Techniques. Data collected from that research were analyzed by forming frequency and percentage tables. As an outcome from the research, it was observed that the general opinions of participants for the applied coopeartive learning techniques are positive (Özlem and Bilgin, 2011).

Ozdamlı and Uzunboylu (2008) carried out another similar research aiming to determine the behaviours of students towards technology supported collaborative learning who have been studying in technology supported
collaborative learning settings. Being a single-group testing from preliminary test research patterns, pre-testing and post testing were applied in that research. “Attitude towards Technology” (Alpha=.86) and “Consistency Criteria of Collaborative Learning” (Alpha=.92) scales which are similar to Quintet Likert Scale were used in that research and as a data collection tool, it included “Personal Information Forum”. According to the pre- and post testing results, it was observed that the attitudes of students towards technology are positive. Moreover, it was pointed out that students’ attitudes towards technology have increased after studying in the technology supported collaborative learning settings (Özdamlı and Uzunboylu, 2008, Hussein, 2010; Persisco and Pozzi, 2011; Dewitt and Siraj, 2010, Girgin, Kurt and Odabasi, 2011).

Aim

The aim of this research paper is to determine whether technology supported collaborative learning settings affect the attitudes of students towards mathematics and technology or not.

Method

This present essay focuses on the behaviours of the students towards mathematics through computer supported collaborative learning. For the research, participants were chosen from the seventh class in Şehit Hüseyin Ruso Secondary School which is a secondary, state school under the control of National Education Ministry. The research was applied according to single-group pre- and post testing from preliminary test patterns and was supported by technical literature scanning.

Participants

Seventeen students (64.7 % female (f = 11) and 35.3 % male (f=6) ) from Şehit Hüseyin Ruso Secondary School, from the class 7B participated in the study. Their average age was thirteen.

Table 1: When did you first start using a computer?

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preschool</td>
<td>11</td>
<td>64.7</td>
</tr>
<tr>
<td>Primary Education</td>
<td>5</td>
<td>29.4</td>
</tr>
<tr>
<td>Secondary Education</td>
<td>1</td>
<td>5.9</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>100</td>
</tr>
</tbody>
</table>

The answers given for the question, “When did you first start using a computer?” in Table 1 showed that the number of students in “Preschool” who started using a computer for the first time is 11 (64.7 %), in “Primary Education” it is 5 (29.4%) and in “Secondary Education” it is 1 (5.9%). The findings obtained from this result showed that all the participants have their own personal computers at their homes.

Table 2: “When did you first meet computer using for education purpose?”

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preschool</td>
<td>7</td>
<td>41.2</td>
</tr>
<tr>
<td>Primary Education</td>
<td>10</td>
<td>58.8</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>100</td>
</tr>
</tbody>
</table>

The answers given for the question, “When did you first meet computer using for education purpose?” in Table 2 showed that while the number of students in “Preschool” who started using a computer for the first time is 7 (41.2 %), it is 10 (58.8%) in “Primary Education”.

Table 3: “How often do you use a computer?”

<table>
<thead>
<tr>
<th>How Often</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Everyday</td>
<td>9</td>
<td>52.9</td>
</tr>
<tr>
<td>Few times in a week</td>
<td>7</td>
<td>41.2</td>
</tr>
<tr>
<td>Few times in a month</td>
<td>1</td>
<td>5.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

In the light of datas obtained from this research, it is resulted that the students who started to use a computer for the first time is the Preschool period, whereas the students who started to use a computer for the first time for education purpose is the Primary Education period. Another result taken out from this research is that 52.9% students use a computer everyday.

**Data Collection Procedure**

As a data collection procedure, Mathematics and Technology Attitude Scale, which was improved by Pierce vd., (2007) was adapted into Turkish. In the original form of the scale, the points about the technology consist of; graphics calculator machine, computer algebra system and attitude towards computer supported mathematics education. In this research paper, the attitudes of the students towards technology supported mathematics education were investigated, and for that reason some changes has been done on the points (such as the original form “I like using graphics calculators for Mathematics” was adapted as “Matematik dersinde bilgisayar kullanmayı severim- I like using computer in Mathematics lesson”). The scale was adapted into Turkish by Adem Duru, Murat Peker, and Veysel Akcakın and “Mathematics and Technology Attitude Scale” which is consisted of twenty points Quintet Likert Scale type was used. The points in the scale range from “Kesinlikle Katılıyorum- I strongly agree” to “Kesinlikle Katılmıyorum-I strongly disagree”.

**Application**

Seventeen students from Şehit Hüseyin Ruso Secondary School, a secondary, state school under the control of National Education Ministry, from the class 7B have formed the working group in this research. Related to the subjects taught, the students were grouped in four or five and given project topics. The students were needed to search, discuss and then prepare a presentation about their chosen project topics in their groups, lastly sharing them on Wikispaces atmosphere. The students shared their presentations on Wikispaces atmosphere with their friends. They also shared their points of views about each presentations on that atmosphere. The address of the web-page improved for the students for this purpose is [http://rusouygulama.wikispaces.com/](http://rusouygulama.wikispaces.com/).

**Data Analysis Procedure**

In the analysis of the datas obtained from the research, arithmetic average, standart deviation, single-factor variation analysis, frequency and T-test were applied. Statistical operations were done using the package programme called SPSS (Statistical Package for Social Sciences). In the whole analysis, .005 significancy level was taken as a base.

**FINDINGS AND ANALYSIS**

The results and the comments obtained through the aims of the research have been explained with the following table.

The average of datas collected according to the inferior dimensions of pre- and post testing survey using “Mathematics and Technology Attitude Scale” for the sake of determining the expectations and attitudes of the students before and after studying in the technology supported collaborative learning settings have been given in the Table 4.
Table 4: The differences between Pre-Testing and Post Testing results of the students in the Technology Supported Collaborative Learning Setting.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>N</th>
<th>SD</th>
<th>T</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Testing</td>
<td>3.6941</td>
<td>17</td>
<td>.45924</td>
<td>-3.608</td>
<td>.002</td>
</tr>
<tr>
<td>Post Testing</td>
<td>4.2441</td>
<td>17</td>
<td>.42862</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As it is seen in the table above the attitudes of the students towards mathematics and technology before studying in the technology supported collaborative learning atmosphere were determined at the average level (x- = 3.69 S= .459). Therefore it can be suggested that the attitudes of the students before studying at that setting was not so low. However, the students’ attitudes towards (X=4.24, p= 428) mathematics and technology after studying in technology supported collaborative learning setting have significantly increased (t= -3.608, pc .05). As a result technology supported collaborative learning instruction has been shown in this research paper to facilitate learning of the students in a positive way.

Conclusion

To sum up, it is pointed out according to the results of the research that all students have their own computers at their homes and therefore they have the opportunity to save on their computers and study the power point presentation files prepared at home and in class related to the improved web page.

As a result of this experimental research it can be suggested that the students’ attitudes towards mathematics and technology have been facilitated and improved in an effective way after involving in the activities through technology supported collaborative learning. Therefore technology supported collaborative learning settings can be used to aide in teaching mathematics and technology.

The combination of education and technology has been considered the main key to human progress in today’s world. Education feeds technology, which in turn forms the basis for education. Therefore instead of using classical education, technology supported education system should be urgently used in this century. Using computers as a medium for studying is much more motivating for a student as opposed to writing with a pencil. This is today’s education considered progress. It can be said that technology supported education system has improved the motivation and interest of students in mathematics lesson. In the future researches it can be studied on students’ success with bigger experimental groups.

References


