The Effect of Cooperative Learning on Math Anxiety, Help Seeking Behavior

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ABSTRACT

The present study aims to investigate the effect of cooperative learning on math anxiety, help seeking behavior and academic achievement of the students. Quasi-experimental design has been proceeded in accordance with pre-test post-test control group design. The population of this study was all the female students at Roodsar; the studied sample included 40 female students at first grade of secondary school located in Roodsar. The materials used for measuring the variables were Shokrani’s math anxiety questionnaire (2002) and help seeking behavior questionnaire based on Pantrich & Royan theories (1977) which were later put in to written form by Ghadampour (1998) . To accomplish the thesis at pre-test level, after answering each questionnaire, math anxiety in 40 students were homogeneously selected on the basis of the highest gained scores from two different classrooms to put into two groups of experimental and control. A couple of mathematic lessons were taught to control group traditionally while the experimental group received the treatment, learning cooperatively. After undergoing the due sessions of the experiment, all participants in both groups of experimental and control, answered the questionnaires of math anxiety and help seeking behavior one more time. Moncova was run to analyze the data and the outcome indicated not only a higher education improvement in the EG in comparison with the CG, but also the fact that cooperative learning method reduces math anxiety significantly and improves the avoidance and denial of help seeking among learners as well as increasing the application of help seeking strategies and academic achievement.

KEYWORDS: Cooperative learning, Math anxiety, Help seeking, Academic achievement.

INTRODUCTION

Statement of the problem

Cooperative learning method has got tremendous advantages, one of which accounted as the most important is providing motivation and responsibility among learners which later in working situations will be considered as the most prominent quality in team work. When students achieve a better academic success in their short term goals, such as mid-term exams, because of applying cooperative learning methods, their motivation rises and this positive experience will also affect their future career prospects. It is possible to use cooperative learning methods for a variety of different social and educational activities. They will increase individual self-esteem (Lazarvitz, 1994), academic achievement (Mirzabeigi, Farzad Vakulaee, 2009) ; (Kuam,1999), cooperation spirit(Parichard, Stratford and Bizoo, 2006), (Dink, 2009), Hoveida, Moghadam &Nickbakht, 2007), team work (Clinton & James,2005), creativity (Majidi, Kahbazi & Ghebleh, 2007), criticism spirit(Solati , Javadi , Hosseni, Tashnizi & Asghari, 2010) and positive view about educational environment(Torabizadeh, Fathi Azar, Rahmani,2009).

Those students who are not able to focus on the issues and questions during a math lesson and react negatively toward mathematical subjects for the fact that they are nervous, are generally referred to as math anxious students. This so called nervousness and anxiety leads to unwillingness from the part of learners in showing any desire for doing the math assignments as a result they would give up any further efforts to learn. At this point, the student is suffering from negative inner talk, which could be considered the root of failure in learning math among many students. (Abolghasemi, 2003)

There are a lot of different factors interfering with the learning process; the teaching method and the learning environment are recognized as the most crucial ones. Group discussion in the class or let’s say cooperative learning method is a strategy which can tackle anxiety and increase self awareness of the students about their learning process. (Pavel &Anrit, 1991). The outstanding benefit of this method is the helping hand students spread through the whole class so that their peers can comprehend the objective of the lesson.

On one hand, math anxiety affects the outcome of students negatively, leading to academic dissatisfaction; on the other hand, this unsatisfactory outcome will double the math anxiety and decreases the self-confidence and performance of students. Eventually these students will choose the university majors which involve math subjects as little as possible, although they might have had the required math talent.

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All this can make negative impacts on both individuals and society. Therefore, the necessity of applying cooperative learning in math classes is quite emphatic.

Making use of heterogeneous groups in a way that students can cooperate with each other to maximize the learning, is called cooperative learning. (Keramati, 2005).

It is an approach in which students work in small groups and try to raise the learning of all participants as much as possible. (Anoyobazi, 2002).

Cooperative learning approach will make students internalize complicated math issues easily and it will make them want to learn, to experience real life questioning practically, and to feel less tense and want to cooperate more in math classes with picking up scientific skills they will learn how they should learn and to make progress accordingly. To make use of their knowledge in real life situations and to feel more self-sufficient. This face to face communications and constructive discussions will provide the opportunity of revealing hidden creativity treasures. (Venman & colleagues, 2002; Vaiudi & Trigast, 2001).

Discussion in small groups will cause monitor learning among students, as a result they will find independence in learning and studying. Desirable conditions provide the chance of being able to share their personal ideas regarding the subjects being discussed. (Jacquez, 2003). Some research accomplished at Harvard University clarified the fact that group learning is effective most when each and every member has already done his assignment before entering the classroom; this is something totally dependent on the level of accountability of those members. (Gardner & Joolo, 2000).

Every human being experiences anxiety at some time in their life. To describe this so called anxiety, it is true to say: it is a tens feeling, rather unpleasant and vague in accordance with some physical signs; such as chest pain, heartbeat, sweating, headache, sudden feeling of loosing urine, nervousness, moving around and having butterflies in the stomach. Anxiety is indeed a warning sign, informing you of a very near upcoming danger, preparing an individual for battle. (Kaplan & Sadak, 1998, p 186).

The anxiety toward the math is a reaction from students that takes place because of the related elements on the subject, for instance, listening to a speech, teaching math concepts, solving math questions in a math classroom or during a math test. Those students, who are struggling to get over their fear, feel they’re the only one suffering from the stress.

Math anxiety is a mental situation that appears when facing a mathematical content whether teaching or learning, solving math problems or math behavior evaluation. This situation is normally accompanied with great nervousness, mental disorder, exacting thoughts, mental tension and finally stopping the ability to think. (Elmol Hoda, 2002).

Nelson-Leegal (1987) defined academic help seeking as a strategy to overcome learning troubles and improving some ones skill. In small groups, using others as sources of knowledge is not only a manner to solve questions that are associated with cognitive actions, but also improves both social and scientific abilities of their peers.

Help seeking is what kids gain from donation and actions of other individuals at times when their needs and goals can’t be reached no matter how hard they try. (Nelson & Lee Gal, 1981). The opposing point is avoidance of any help seeking efforts in the time of need.

Karabnick (2003) has defined help seeking process in the following terms: a-The tendency of students toward help seeking b- The decision to seek help c- The amount of required help to perform the task d- The preference of students whether to seek help from a formal source (the teacher) or informal one (their peers).

The students may avoid seeking help for some social reasons. Those who see themselves socially in-competent do not feel secure to ask for help, so they avoid it. Learners with social perspectives concentrate on social ranking and position, rather than on formation of connections with others, so help seeking avoidance would rise because they see that as a threat to their own worth. (Ryan, Hiks, Midgly, 1997).

Research has shown that teacher’s guide in cooperative learning performance process, has been incredibly profitable especially for weaker students. This guidance on the part of the teacher needs to be done in the appropriate time. Being too fast or too late in giving help will decrease the quality of group work. Although the best mode is when students can learn with the help of their partners and not the teacher, but there are times when giving a clue by the teacher, paves the way for the students and saves the time in addition, it won’t let the learners down. This guidance from the part of teacher is specifically vital at primary and secondary school levels where the learners haven’t made much progress yet.
METHODOLOGY

According to the content of subject and goals of the study, this research paper is a quasi-experimental one, because throughout the present study, the possibility of complete control and manipulation of variables doesn’t exist. On the basis of this method, preliminary and final test design was used where there was a control group but no randomization was considered where pre-tests and post-tests were administered.

Research population

The statistical population of the present study included all female students in Roodsar, at grade one of the state secondary schools in the educational year 2010-2011.

Statistical sample

The method of sampling through this research is set on the availability of subjects. One school has been selected randomly from among Roodsar schools and two classes of this school with 20 students in each class formed the experimental and control groups of this research.

MATERIALS

Two sets of questionnaires were applied throughout this study: A math anxiety questionnaire in addition with a help seeking behavior one. Math Anxiety Remote Sensing Scale (MARS), measures two factors: the math nature anxiety which was provided by Shokrani (2002). This scale is formed by 18 questions in which every 9 question measures one factor. There are four options in each question. The scale of the scores ranges from 0-45 in a way that a higher score equals the more math anxiety and the less score equals a smaller amount of math anxiety. The validity of the applicable questionnaire has been accounted by Alfa Cronbach method as 0.89.

Help seeking behavior questionnaire consists of two categories of help seeking admission and avoidance that is based on the opinions of Ryan and Pantrich (1977), made by Ghadampoor (1998). This scale contains 14 questions in which every 7 question measures one factor. The validity of this questionnaire has been brought on by Crobach as 0.087.

Findings

In order to test the hypothesis of the study, the difference of mean scores between the pre-test and post-test of EG and CG was investigated by MANCOVA analysis. To do so, hypothesis of the study was put into investigation. The results revealed the fact that Box test is not significant (Box M=4.851, F=3, 2599920) =1.525, P=0.206); accordingly, the hypothesis of equality between the matrix of variance and covariance is supported and with respect to the results of Lonz tests as well as the lack of significancy in dependent variables, equality of variables is proven.

The outcome of correlations also clarifies a significant relation between dependent variables. (r=0.401, P <0.01) which is less than 0.90 therefore it is possible to accomplish MANCOVA.

The results of MANCOVA covariance analysis for measuring each variable is shown at table 1.

Table 1: MANCOVA analysis comparing F with the size of multi variable

<table>
<thead>
<tr>
<th>source</th>
<th>validity</th>
<th>F(2.35)</th>
<th>sig</th>
<th>Eta</th>
</tr>
</thead>
<tbody>
<tr>
<td>multi variable(group)</td>
<td>0.168</td>
<td>86.381</td>
<td>0.000</td>
<td>0.832</td>
</tr>
</tbody>
</table>

The value of Eta in table above is a proportion of the variance that is related to the new multi variable. Generally if the value is more than 0.14, there is a significant effect; in table 2 the result is 0.832 which evidences the significant effect. The result of Willkes Lambdat test on the new multi variable is significant, so indicating that participants in the two groups of experiment performed differently.

The results of estimated marginal means and also the outcome of achieved covariance can be seen in table 2.

Table 2: Estimated means of the standard deviation and dependent variables covariance analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Experimental group</th>
<th>Control group</th>
<th>Covariance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Error</td>
<td>Mean</td>
</tr>
<tr>
<td>Math anxiety</td>
<td>31.75</td>
<td>1.276</td>
<td>44.54</td>
</tr>
<tr>
<td>Help Seeking</td>
<td>51.52</td>
<td>0.455</td>
<td>44.47</td>
</tr>
</tbody>
</table>
In the above table estimated means of dependent multi variables can be seen, the effect of extra random variables has been eliminated while the resulted means clarify that the mean of EG is at a lower level in comparison with CG. It’s been showed through ANCOVA single variable covariance analysis table regarding the fact that there are two dependent variables. Bonfarni correlation has been run by dividing 0.05 in to 2, so the significance extent is less than 0.025, this procedure is true for both variables. The outcome of Eta shows that almost 58% of the math anxiety variance and almost 77% of the help seeking behavior variance has been counted for the group.

Based on the data in tables 1 and 2 the following results have been achieved:

Research hypotheses
Hypothesis 1: there is a positive relationship between cooperative learning and math anxiety, help seeking behavior and academic achievement of the students. The results in table 2 shows a significant difference between EG and CG. (F (2.35) =86.38, P=0.000, Eta=0.832). According to the estimated means, EG has been more successful.

Hypothesis 2: there exists a positive relationship between cooperative learning and math anxiety of the students.
As it is clear in the results of covariance in table 2, there is a significant difference between estimated means of math anxiety in the two groups. (F (1.36) =49.854, P=0.000, Eta=0.581).

Hypothesis 3: there is a positive effect between using cooperative learning method and help seeking behavior among students.
The outcome of covariance table shows the significant difference between the two groups in the absence of help seeking behavior variable. (F (1.36) =118.578, P=0.000, Eta=0.767).
EG shows a greater demand in help seeking behavior than CG because cooperative learning has been covered in their class.

Results
Single factor covariance analysis scaling math anxiety has supported cooperative learning method because it has decreased the math anxiety significantly in comparison with traditional methods. Namely, the hypothesis of research stating the effectiveness of variables in EG significantly has been supported strongly. The results are in the same wave length as within the studies of Pal and Anrait (1991), Slavin and Coroit (1981), Florez and Ritz (1994); Mylis(2010), Smith(2007). As a consequence, working in small groups is seen as a strategy to reduce anxiety among students.

In fact, those methods which rely on learning strategies, prepares students to reach success in team work and have a better future. In a cooperative learning situation, the process of learning is more important than the result itself and nobody gets punished for not knowing the answer. Learners are neither compared nor competed with each other. In cooperative groups, the students have the chance to comprehend complicated math problems by seeking help and asking questions from their peers, as a result they increase the belief of being able to learn math and decrease math anxiety. This is a learning environment where students can feel secure, relaxed and calm, without any fear.

Single factor covariance analysis scaling the acceptance/rejection of help seeking behavior represents the results that cooperative learning approach in comparison with the traditional approach significantly enhances the use of help seeking strategies and reduces the avoidance strategy. Therefore, the experimental interference has significantly affected the scores of EG in comparison with CG.

The outcome of the present study as well as those obtained by Gardner &Juler (2000), Carabnick and Newman (2006), considers help seeking behavior as a continuous planned activity in coordinating learning. In fact, seeking help takes place by nature. Because through this method of learning, the focus is on the process and fluency of learning, rather than the result; that’s why students are encouraged to increase help seeking in this method. (Ryan, Chain and Midglai. 1998).

The research evidence suggests that most of the issues found in traditional non-active methods almost disappear in cooperative approach. (Vaiker & Nanri, p 42-48); Anoyobazi study has also shown those students attending cooperative learning groups make much greater academic achievements and feel more responsible than those learning individually. (Anoyobazi, 2002).

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