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# Preservice teachers' attitudes towards cooperative learning in mathematics course

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## Abstract

Research on classroom cooperative learning techniques, in which students work in small groups and receive rewards or recognition based on their group performance, has been increasing in the past few years. This study aims to examine the attitudes of prospective teachers towards cooperative learning and its potential effects on teacher candidates through collecting data qualitatively via questionnaire and interview. The outcomes from the questionnaires formed the interview structure. The interviews were explored by content analysis. The findings of the study supports the utility of cooperative learning methods in general for increasing student achievement, positive race relations, mutual concern among students, student self-esteem, and other positive outcomes. Prospective teachers seem to have positive attitudes towards courses that integrated cooperative learning stages.

*Keywords:* Cooperative learning; mathematics course; teacher education.

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## 1. Introduction

Cooperative learning is an instruction that involves students working teams to accomplish a common goal, under conditions that include the following elements (Johnson, Johnson, and Smith, 1991): positive interdependence, individual, accountability, face-to-face promote interaction, appropriate use of collaborative skills, group processing.

Cooperative learning model has been widely used in the last two decades as an alternative way to the traditional pedagogical methodology (Mills & Durden 1992; Slavin 1991 – cited in Hendrix, 1999). The research shows that cooperative learning has significance effect on success, and a variety of cognitive and affective factors like keeping

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something in mind longer, transfer, meta cognitive perceptions, friendship, integration of handicapped into the mainstream, self-respect, attitude, anxiety and control (Açıköz 1992 – cited in Özder, 2000).

Cooperative learning has been used to refer to cooperative behaviour, or the division of labor within tasks, the primary interests has been in motivation and incentive (Slavin, 1983); cooperative, competitive, and individualistic incentive structures are compared and contrasted (Johnson&Johnson, 1974, 1975). In-depth consideration of the actual thinking is rare. Researchers have been mainly concerned with whether or not cooperative settings result in better products or learning outcomes, than competitive and individualistic environments. Sharan (1980) has argued that even these products tend to tap rote learning of the content of the interacted-on material, rather than higher level thinking such as “elaboration of ideas, analysis and problem solving”, the type of thinking processes that are supposed to be exercised in group discussions.

A large and rapidly growing body of the research confirms the effectiveness of cooperative learning in higher education (Astin, 1993; Cooper et al., 1990; Goodsell et al., 1992; Johnson et al., 1991; McKeachie, 1986). Relative students taught traditionally-i.e., with instructor-centered lectures, individual assignments, and competitive grading-cooperatively taught students tend to exhibit higher academic achievement, greater persistence through graduation, better high-level reasoning and critical thinking skills, deeper understanding of learned material, more on-task and less disruptive behaviour in class, lower levels of anxiety, and stress, greater intrinsic motivation to learn and achieve, greater ability to view situations from others’ perspectives, more positive and supportive relationships with peers, more positive attitudes towards subject areas, and higher self-esteem. The main findings from this literature indicate that cooperative settings do result in significant improvement in outcome measures.

Cooperative learning should follow these stages (Sönmez, 2007:132):

1. Topic selection
2. Planning in cooperation
3. Beginning the study
4. Analyzing and synthesizing
5. Presenting the information to the class
6. Assessment

The advantages of the cooperative learning can be summarized as follows:

- Supports learning and academic success of the students,
- Increases keeping useful information in mind longer,
- Helps feel satisfied while learning,
- Improves communication skills,
- Develops social skills,
- Enhances self-respect,
- Improves meta cognitive thinking skills,
- Helps express their ideas during discussions and be critical.

The new basic compulsory education curriculum in Turkey enacted starting at the academic year of 2005–2006 is based on constructivist approach replacing behaviorism. Cooperative learning is appropriate for any instructional task. The more conceptual the task, the more problem solving and decision making that are required, and the more creative the answers need to be, the greater the superiority of cooperative over competitive and individualistic learning (Johnson & Johnson&Holubec, 1991:2:3).

Faculties of Educational Sciences in Turkey offer ‘Contemporary Teaching Methods and Approaches’ course where the instruction is mainly theoretical. Nevertheless, prospective teachers at these faculties need to see the methods in practice in real applications. The purpose of this study was to examine the attitudes of prospective teachers towards cooperative learning and its potential effects on teacher candidates.

## 2. Methods

This study examines the attitudes of prospective teachers towards cooperative learning and its potential effects on teacher candidates. The qualitative research design of the study embedded a questionnaire with 12 statements of 3 Likert scale as “Always, Sometimes, Never” and interviews. The interviews with the prospective teachers were recorded and then transcribed to conduct content analysis.

## 2.1 Participants

The participants of the study were 50 first year students studying at the department of Primary Education, Ankara University Faculty of Educational Sciences during 2007–2008 spring semester. The study took place in Mathematics course. Out of 50 students, 30 of them were female whereas 20 were male.

## 2.2 Data collection instrument

“Group Work Evaluation Questionnaire” was developed to determine the effects of cooperative learning approach on the prospective teachers. The findings of the questionnaire applied to the prospective teachers formed the content of the interviews. All participants were interviewed for twenty minutes. They are recorded, analyzed and evaluated.

## 2.3 Procedure

- A questionnaire was developed to examine the attitudes of prospective teachers towards the cooperative learning model.
- The questionnaire was piloted, some items were omitted and it was finalized.
- The questionnaire was administered during mathematics course to 50 first year students at the Primary Teaching department, Ankara University.
- Prospective teachers were informed about cooperative learning.
- Groups of 5 were formed in class.
- Each group was assigned different topics.
- Groups worked on their tasks and presented their work.
- Each week a different group member presented their work.
- After group presentations, all students filled in the questionnaire “Group Work Evaluation Questionnaire” selecting “Always”, “Sometimes” and “Never”.
- Group works lasted for 5 weeks.
- The questionnaire findings formed the interview questions.
- The interview composed of four questions and lasted 20 minutes.
- All participants were interviewed.
- The recorded interviews were transcribed and evaluated.
- The results were analyzed using Microsoft Excel program.

## 3. Findings

The findings of the “Group Work Evaluation Questionnaire” are presented in a table and interview analyses are provided in this part. The first stage of the study includes “Group Work Evaluation Questionnaire”. The findings of the questionnaire are given in Table 1.

Five statements (1,2,6,7,10) out of 12 in the questionnaire are related to group work, three statements (8,11,12) of the questionnaire are related to learning styles and processes, and four statements (3,4,5,9) are related to communication in or out of the group.

The findings on group work statements show that prospective teachers can be said to have positive attitudes towards group work. The findings on learning styles and processes, and communication statements show that cooperative learning in the group work helped prospective teachers to have better communication both with friends and the teacher. The important findings in this study are; cooperative learning in the group work enabled distributing the tasks within the group, solving the problems occurred friends by talking and negotiating, finding chance to talk, interact with classmates, and using the time effectively.

The second stage of study covers interview questions and content analysis of the interviews conducted with the prospective teachers. This stage of the study aims to let participants express their ideas clearly with their own expression. The interview questions were:

1. What did the group gain through activities?
2. How did you help each other during the activities?
3. Did the delivery of the course and the activities provide a good learning model?
4. Did these activities contribute to your academic success or your communication with your classmates?

Table 1. Group work evaluation questionnaire findings

STATEMENT	ALWAYS	SOMETIMES	NEVER
1. We worked in harmony.	32	15	3
2. We decided as a group.	37	12	1
3. We found chance to talk, interact with classmates we do not communicate much except for this study.	35	18	7
4. We warned our classmates who did not participate in the group work properly.	28	16	6
5. We listened to other groups' presentations quietly.	29	17	4
6. We distributed tasks within the group.	43	6	1
7. All group members performed the assigned tasks.	37	11	2
8. We helped each other learn.	33	15	2
9. We solved the problems occurred among friends by talking and negotiating.	35	15	0
10. All members contributed when making decisions.	26	21	3
11. We asked questions to our teacher where necessary.	30	15	5
12. We completed our tasks on time.	45	5	0

For the first three questions of the interview the categories for the analysis are “statements on interaction, positive/negative statements and the ones on professional skills”.

The responses to the first question, “*What did the group gain through activities?*”, analyzed under the topic interaction had these subtopics: 17 declared to have acquired skills of working in cooperation, 8 to have developed role distribution and responsibility in groups, 11 to have had chance to recognize, talk and integration, 1 to have improved their skills to be developed, 2 to have shared the different references, 4 to have learned the importance of harmony of the group, 4 to have asked questions and discussed, 2 to have spent time together and helped each other, 2 to have learned the benefits of studying within a group.

Positive statements out of the responses to the first question are: 1 participant stated to have learned new things, 3 to have increased their self confidence, 2 to have used the creativity, 1 to have become more sincere, 1 to have learned what can be done by individually and within a group, 3 to have respected to each others' ideas, 1 to have used the time effectively, 1 to have been more conscious, 1 to have learned using the time effectively out of the school, 1 to have been altruistic, 1 to have developed using computer and preparing presentations.

There are not any negative judgements for the first question.

The statements on professional skills for the first question are: 3 to have had experience before the future profession, 3 to have had experience speaking in front of society, 1 to have experienced the first steps fort he academic life, 1 to have learned control of the class.

Interaction related statements under the second question “*How did we help each other during the activities?*” are that 14 participants stated to have shared stages of the study and 9 to have warned each other about the mistakes to be corrected, 8 to have worked in cooperation, 7 to have found different references and shared, 4 to have discussed, 3 to have helped each other both within a group and in other lessons, 1 to have learned the benefits of the group study.

Positive statements on the second question are 3 to have integrated creativity to the tasks, 3 to have developed using the computer and preparing presentation, 2 to have lost to feel excitement, 1 to have learned patience, and 1 to have felt confidence.

One negative statement from 1 participant is the clashes in the group studies. The statements on professional skills are; 1 participant pointed out to have discussed different teaching-learning techniques, 3 to have developed strategies to solve problems.

Interaction related statements under the third question *“Did the delivery of the course and the activities provide a good learning model?”* are; 2 participants to have asked questions to each other without any fear

The positive statements are; 3 participants stated to have learned better since they had taken part in the study, 2 to have found effective to use a different model and different materials.

Negative statement for the third question is uttered by 4 participants as the model could be effective itself but is not easy to apply in all fields, 3 to have let the possibility to noise, 1 to have had the problem about the harmony in the group.

Statements on professional skills are; 18 participants told that it was a beneficial experience for future reference, 12 stated to have had the chance to see the problems that they will face during the job.

The fourth and last question of the interview: *“Did these activities contribute to your academic success or your communication with your classmates?”* was answered by 27 as to have had contributions to the communication with friends; 3 to have had a role on academic achievement, 19 to have positive influence both on the relationship between friends and on academic achievement.

#### 4. Discussion and Conclusion

In the end of this research it is found that prospective teachers have an overall positive attitude towards courses delivered where cooperative learning model at the center. the results of the questionnaire display that helps improve group awareness and acting as a group while they work in harmony.

It is believed that cooperative learning promoted relationships and communication among students while fostering learning process. So, cooperative learning can be used especially in the groups that see each other by the first time, for example the first year of the universities. Another benefits of the cooperative learning is that it let them to have experience in their future profession. In addition, some negative opinions were stated such as difficulty in the implementation, noise in the class and problems about the harmony in the group.

In conclusion, it is observed that implementing cooperative learning in class promotes learning process, interaction and communication in the classroom.

#### References

- Astin, A. (1993). What Matters in College: Four Critical Years Revised San Francisco, Jossey-Bass.
- Brown A.L. , Palincsar A.S.(1989). “Knowing, Learning, and Instruction: Essays in honour of Robert Glaser”
- Cooper, J., “From flunking to mastering calculus” Black Issues in Higher Education, Feb. 1, 1990, pp. 5-6.
- Felder, Richard. M.; Brent, Rebecca. (1994). “Cooperative Learning In Technical Courses: Procedures, Pitfalls, And Payoffs” ERIC Document  
Reproduction Service Report ED 377038 (1994)  
(<http://www4.ncsu.edu/unity/lockers/users/f/felder/public/Papers/Coopreport.html>)
- Goodsell, A., M. Maher and V. Tinto. (1992). Collaborative Learning: A Sourcebook for Higher Education. National Center on Postsecondary Teaching, Learning, and Assessment, University Park, PA.
- Hendrixs, J.C. (1999). “Connecting Cooperative Learning and Social Studies”. Clearing House, 73 (1). Database: Academic Search Premier (Mills & Durden, 1992)
- Johnson, D.W. & Johnson, R.T. & Holubec. Cooperation in the Classroom, 5th Edition. Edina, MN: Interaction Book Company, 1991
- Johnson, D.W.; R. T. Johnson and K.A. Smith. (1991). Cooperative Learning: Increasing College Faculty Instructional Productivity, ASHE-ERIC Higher Education Report No.4, George Washington University.
- McKeachie, W., Teaching Tips, 8th Edition. Health & Co. Lexington.
- Özder, H. (2000). “Tam Öğrenmeye Dayalı İşbirlikli Öğrenme Modelinin Etkililiği” Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 19, 114-121
- Sönmez, V. (2007). Öğretim İlke ve Yöntemleri, Ankara: Anı Yayıncılık