

World Conference on Educational Sciences 2009

The importance of group work in mathematics

Zeynep Fidan Koçak^{a*}, Radiye Bozan^a, Özlem Işık^a

^a*Faculty of Art and Science, Department of Mathematics, Muğla University, Muğla 48000, Turkey*

Received October 23, 2008; revised December 16, 2008; accepted January 4, 2009

Abstract

In recent years, mathematics education is becoming more and more important as well as the increasing studies in this area. These studies show that it is not only sufficient to know mathematics but also it is essential to have competent educators whom are able to apply what they know and give mathematical thinking ability. In this study, we emphasize on learning in group work that is one of the integrated approaches of learning theories. Group work shows that students can improve their critical thinking and problem solving skills; furthermore, their way of expressing themselves becomes better. This method helps students learn interactively and efficiently.

© 2009 Elsevier Ltd. All rights reserved

Keywords: Education, group work; integrated approach; mathematics; mathematics education.

1. Introduction

Mathematics is basically the science of patterns and formation and it occurs in our lives from the smallest daily calculations to the most complicated aerospace applications. Basic mathematical skills are needed for managing even ordinary human relations. How people see mathematics is explained as follows :

- Mathematics is counting, calculating, measuring and drawing operations for solving problems in daily life.
- Mathematics is the language that uses some symbols.
- Mathematics is the logical system which enhances logical thinking.
- Mathematics is a tool to assist us with understanding the world and improving the environment we live in.(2)

On the other hand, “the view of the necessity of mathematics education at schools of any levels is almost accepted indisputably by any country. In fact, it can be said that a nation should put mathematics education at the same place as its own language education in its education system.”(5) Karaçay pointed out that mathematics is important for education of all the countries. Mathematics plays an important role at the university entrance examinations in the competitive surroundings of state high schools and private colleges. Especially, it is clearly seen that success in mathematics is necessary whenever it is a matter of getting into the best departments at the university through the university entrance examination.

From this point of view, it is understood that we need mathematics in our lives. Education of mathematics is inarguably essential for students, especially at learning process. As part of the high education board and the world bank national education development project, students were emphasized the following points while mathematics education was provided in that framework:

*Zeynep Fidan Koçak.

E-mail address: zkocak@mu.edu.tr.

- Mathematics is useful; it can help us understand the world we are in and have control over it.
- Mathematics is enjoyable; it includes interesting patterns and relations to discover.
- Mathematics is different and has its own special scope, which deals in particular with numbers and the characteristics of space, and their applications.
- Mathematical activity consists of problem forming and solving, grouping, arranging, generalisation and proving, and using charts and symbols activities.(3)
- Mathematics is beautiful, stimulates the brain.(1)
- All these points above underline the main purposes of mathematics education. Education of mathematics should be aimed to educate people so that they are able to apply what they know, do mathematics, solve problems, connect information and enjoy it all instead of just knowing pure mathematics.

2. Group Work

Group is the social unit that is comprised of two or more people who have relationships among themselves and share common values (7) . Group work is an indispensable method hence the fact that people live together. It is necessary to communicate at all aspects with various groups for today's people who are in the position of receiving thousands of messages every second , in order to protect their existing values and keep the balance by re-arranging broken or emptied cultural porosity. Group work helps with not only individual's social development and transformation but also the feeling of responsibility and the enjoyment of participating in a group. Group work is the way of learning that students learn for common aims in a mixed group by helping each other (7). The fundamental principle of group work depends on that each person should do what he/she is supposed to. This is crucial to attain the goal. Each member of the group should know that they will not be able succeed on their own unless the others will. Accordingly, the achievement is managed in a group with the participations of each member. The essence of group work is that students discuss about one of objectives or problems, and look for solutions together. These are called intentionality and planning (4). It is impossible to benefit from group work if students are not directed towards a target and there is no planning.

The efficiency of group work increases in the intensity of the communication that is set up among the members of the group, which is free from teacher-centred studies. The group work that is carried out through a planned and programmed activity, and a healthy communication among the members of the group are the most important factors that increases the effectiveness of this technique (8).

In a learning environment, it is not possible to get the whole class working in one group. That is why it is appropriate to divide the class into smaller groups of students. The reason for that is classes are formed of students who have various skills, culture and knowledge.

The stages of determining targets, forming groups, obtaining continuity and evaluating the studies should be applied in order to achieve a successful group work.

2.1. Benefits of Group Work

In general students ;

- learn to respect others' opinions.
- are encouraged to express the new concepts of the work doing together.
- get rid of individualism and acquire the skills of working with others.
- experience of learning, participating in groups and having the pleasure of being useful.
- make new friends and reinforce the existing friendships.
- overcome the fear of making mistakes.
- gain self-confidence.
- comprehend more easily their personalities and what they are able to do.
- improve expressing themselves.
- learn to help each other.

2.2. Importance of Group Work in Mathematics

The traditional education of mathematics teach students to be passive, not to participate in lessons ,to be dependent on teachers, to memorise and not to be able to share knowledge. However, real learning that happens interactively forms the basic foundations of

permanent learning while directing students to apply and research. Bringing out the power of application of knowledge is more important than the knowledge itself. Student's own performance is the basic criterion of knowledge evaluation in mathematics education (6). By this way students put effort into their learning so that the knowledge accomplished is more permanent. That is why group work is one of the most ideal methods as it encourages students to be active and gain self-confidence.

According to the report of NCTM (National committee of teachers of mathematics) in 1989, it is said that group work in mathematics education plays an important part in students asking questions, discussing opinions, listening, having the responsibility of what to learn, criticising constructively and constituting an atmosphere of mathematical learning.

The research in this area shows that group work becomes useful for social reasons as well as the positive effects on mathematics learning. Learning within groups is more effective in terms of academic success comparison to competitive and individualised learning systems; furthermore, it helps to improve the attitude towards mathematics and get over the anxiety of mathematics.

This way of learning in group work is aimed to be more fun and enjoyable for learners by assisting them to perceive it like a game and increasing the social side of it. Thus, learning with discussions or conversations is accomplished instead of memorising during mathematics lessons.

Vygostky (1978) emphasized that language is the important tool to form mathematical knowledge and share it. That is why it is essential for students to share the related mathematical information among themselves. Learning mathematics is seen as coming to an agreement through social interaction. (1)

Having a good knowledge of mathematics does not mean that we can comprehend any mathematics questions. As mathematician Z.F. Koçak explains, "Mathematics is a matter of attention. Inattentiveness can cause us to make mistakes even if we know the whole question. In this case, mathematics is a bit selfish and jealous. Mathematics does not want us to think of anything else". Whenever this is the situation, people will notice the bemusement of one person in the group and avoid mistakes. There is a nice saying to emphasize the beauty of group work; "the more you share knowledge, the more it will get like love and happiness". Sharing knowledge in group work reproduces knowledge.

3. Conclusion and Evaluation

Mathematics is not an abstract concept. It can not be learned or taught by reading or memorising it.

Learning by the way of group work which is one of the integrated approach theories encourages students to discuss, criticise and be more attentive whilst rescuing them from memorising information. The researches and our observations show that students who studies mathematics in group work comprehend problems in a better way, put forward new ideas, are in control of the objectives and learn by applying what they understand instead of memorising mathematics that is mostly alleged formulae and their proofs. Mathematical thinking improves with mathematical activities and mathematics is learned more easily in this way.

Mathematics originated from our daily needs and is here to guide us- people who are social beings. Group work in mathematics education that starts from early childhood helps with both successes during lessons and in social life in the future.

Resources

- Baki,A.(1996).Matematik eğitiminde değişim.Ç.Ü.Eğitim fakültesi dergisi .14829,41-47
- Baykul.Y;Aşkar.P(1987).Matematik eğitimi Eskişehir:T.C.Anadolu Üniversitesi Yayınları no:193
- Busbridge,J.;Özçelik,d.a(1996).İlköğretim matematik eğitimi deneme basımı. Ankara: milli Eğitimi Geliştirme Projesi Hizmet Öncesi Öğretmen Eğitimi
- Gömlüksiz. M.(1994)'Kubaşık öğrenme yönteminin demokratik tutumlar ve erişim üzerindeki kalıcılığı'.1.Eğitim bilimleri kongresi. kuram-uygulama-araştırma: bildiriler Adana: Çukurova Ü.E. Fakültesi:421- 430
- Karaçay, T.(1985)'Matematik Eğitiminin Bugünkü durumu ve değerlendirilmesi.'Orta öğretim kurumlarında matematik öğretimi ve sonuçları. Ankara: Türk Eğitim Derneği Yayınları, Öğretim dizisi no:3,3-26
6. Orton,A. VE Frobisher,I(1996).Insights into Teaching Mathematics,Cossel:London
- 7.Tan, Ş.(2002).Öğretimi Planlama ve Değerlendirme. Ankara
- 8.Yaşar, Ş.yabancı dil öğretiminde programlı öğretim uygulaması Eskişehir: Anadolu Üniversitesi E.Fakültesi yayınları, no:14,1990