

THE ROLE OF A PEER SUPPORT PROGRAM IN LEARNING

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ABSTRACT

A newly established institution Sabancı University offers highly challenging and interdisciplinary programs. The institutional structure and academic programs are based on the utilization of interdisciplinary approaches, and the traditional departmental structure does not exist providing the students with the opportunity of choosing their academic programs, to realize their goals. The students during their first two years of university education are required to take the same courses independent of their future aims, to be engineers, natural scientists, political scientists, economists, historians, art historians or artists. The university has a guidance system that includes various units to promote student success and to support the realization of the academic programs. This paper aims at presenting an academic support program that is structured as a subdivision of the guidance system and runs totally by undergraduate students. The task of motivating the students with different interests and diverse backgrounds as well as giving equal opportunity to each student in the assessment of their class work, calls for extra effort. Not surprisingly one of the main aims of the program is to motivate and encourage students to understand mathematical concepts, mathematical modeling and to use mathematical tools in various contexts. To reach its aim, program offers extra curricular activities in line with the university's academic programs and is subject to systematic evaluation. Program activities, office hours, tutorials and workshops are held by freshmen and sophomores in a friendly atmosphere encouraging peer discussions and sharing academic knowledge and experience. The evaluations and statistical results have revealed the significance of peer support as well as the role of the program in building a learning environment and a healthy academic campus climate (see www.sabanciuniv.edu).

1 Introduction

In any field of arts and social sciences or engineering and natural sciences, it is impossible for professionals to attempt to work under any global standards without the knowledge of other fields; thus, Sabancı University has an interdisciplinary organizational model allowing different faculties to interact and collaborate in contrast to traditional organizational structures of discrete institutional units. As a result, students have the opportunity to be exposed to different subjects and have degrees in the field of their choice. All students go through a common program in the first year of their education that will equip them with an interdisciplinary training so as to assist them to conceive the disciplines as a whole. While this may seem so exceptional in a global platform, it is so in Turkey. To promote the student academic performance as well as to support their individual and academic development the university has several units. One of the support programs is the “Peer Tutorials”, which is different to the traditional top-down educational system in Turkey as the “Peer Tutorials” program encourages active involvement of students and peer support.

Social sciences and natural sciences are the basis of the first year undergraduate program. The courses are structured around a lecture addressing to all students and are supported by discussions or problem solving sessions for smaller groups. Freshmen, with diverse backgrounds and interests are treated and their performances are assessed uniformly in all these classes. A number of quite competitive students with a wide variety of knowledge and ability and some lacking motivation in certain subjects, need additional assistance in the first year program. The evaluations and statistical results have revealed that the “Peer Tutorials” program had a significant role in promoting student academic performance. It is worth to state here that Sabancı University will have its first graduates in year 2003, and the institution is very young as well as the peer support program.

2 The Peer Tutorials Program

The main principles of the Peer Tutorials program are “interactive learning” and “peer support”. The program is modeled on two intertwining components, which are professional supervision and the tutorial sessions. The system has a dynamic structure with a feedback mechanism.

There are four different stages of tutorial sessions: ‘peer tutorials’, ‘individual tutorials’, ‘advanced tutorials’ and ‘workshops’. Peer tutorials are peer study or peer discussion groups moderated by a student. In peer tutorial sessions students are encouraged to share their academic knowledge and experiences, and study in a friendly atmosphere. Individual tutorials offer individual guidance, in accordance with specific student needs, the types of guidance may range from teaching, to practicing study skills. Advanced tutorials are study groups in which the group has the chance to study a specific subject intensively. The workshops are for moderately large groups of students to meet their further needs and requests and focus on supplementary subjects that are determined in line with the incoming feedback from the tutorials, instructors or students. A freshman or a sophomore holds each component of the program and

acts as a moderator or a mentor. All the tutorial sessions aim to improve the student academic performance as well as to assist the students in acquiring and using various academic skills in the course-related subjects and in general learning. To participate to the program students can drop in during the work hours or can schedule an individual appointment. A student, coordinates the program activities for each course, and helps the formation of the study groups in accordance with the students' needs and requests. In addition, a group of student coordinators does the event scheduling. Needless to say the training of the students who work for the program and supervising them, are the integrated components of the support program.

There are 14 freshmen and 5 sophomores working for the program, and they organize services primarily for the students in the 'Calculus', 'Science of Nature' and 'Society and Politics' courses.

2.1 Some Cases:

The peer tutors often use analogies to explain mathematical concepts and they relate the new concepts to some others that are well known. Unlike the experts, students do not care to choose their examples from a "real case" or make their explanations "mathematically correct" instead they tend to give an idea or produce a mental picture to explain a mathematical concept. On the other hand, being a tool and a way of thinking mathematics lies at the common denominator of many subjects and facilitates the peer interaction.

The following cases are presented for illustration.

The contents of the Science of Nature and Calculus courses are not synchronized. At the time when kinematics (motion), Newton's laws, force, work, kinetic energy, potential energy, conservation of energy and gravitation have been summarized, the formal introduction of the derivative and integral are yet to be done. Hence, a number of tutorials are organized for the students that feel less confident about their backgrounds either in physics or in mathematics.

The list below is used at a peer study group.

continuity	instantaneous	instantaneous	acceleration is the
e.g.:	velocity at t_0 is	velocity is the	rate of change
trajectory	the limit of average	derivative	of velocity and
	velocities at t_0	$\frac{dx}{dt}$	$\frac{d^2x}{dt^2}$

Where, dt is explained as the time interval that is even smaller than any attainable time and dx is explained to be the distance that is smaller than any possible distance travelled.

Furthermore the distance travelled is explained to be roughly the summation of the distances travelled in a time interval Δt . Thus the formula $x_2 = x_1 + \int_{t_2}^{t_1} v(t)dt$ where x_i are the position vectors at times t_i , $i = 1, 2$ and $v(t)$ is the velocity of the particle, has been sufficient to give an idea about the definite integral. The product rule, chain rule and integration are practiced through the work-kinetic energy theorem as: $F_{net}dx = d(\frac{1}{2}mv^2)$, where a constant net force of magnitude F_{net} acts on an object of mass m . The trigonometric functions and uniform circular motion are simultaneously covered. Projectile motion is used to explain several concepts that includes the geometric meaning of the derivative. It is observed that the peer tutorials of this sort not only

have made the students feel confident in the Science of Nature course but also helped them later to understand the mathematical concepts in calculus.

The book (Calculus, Hughes-Hallett, Gleason, McCallum, et al.) that is used for the Calculus course focuses on conceptual understanding, and presents the topics geometrically, numerically, analytically and verbally. This approach, not only helps the students to improve their problem solving skills and master mathematical concepts but also has helped them to carry out discussions. For instance, a discussion at a peer study session on chemistry about the covalent bondings and organic compounds, have revealed that for most of the students it has been difficult to visualize the molecules in 3-dimension. To solve this problem a workshop is designed and 3-dimensionaal illustrations are used to explain the subject. This workshop has helped the students to grasp the matter thoroughly and develop themselves furthermore. During the workshop students have discussed the bond angles of the molecules among themselves and not only have discovered that the bond angles in a tetrahedral molecule are the same and are equal to 109.5° but also ended up providing a geometric proof of this fact, although this has not been the aim of the workshop.

2.2 Assessment of the Program

The Peer Tutorials program is evaluated through reports that consist of program participant performances. The mentors as well as the moderators provide a written report after each tutorial session. The reports include the duration of the sessions, the names of the participants and the subjects studied, as well as remarks about the effectiveness of the sessions and the progress of each participant. The results of these reports are taken into consideration for the development of the program and are used as future references. The reports have given us reasons to believe that the peer tutorial sessions, are natural platforms for the inquisitive young minds where they can question each others' interests and learn from different perspectives.

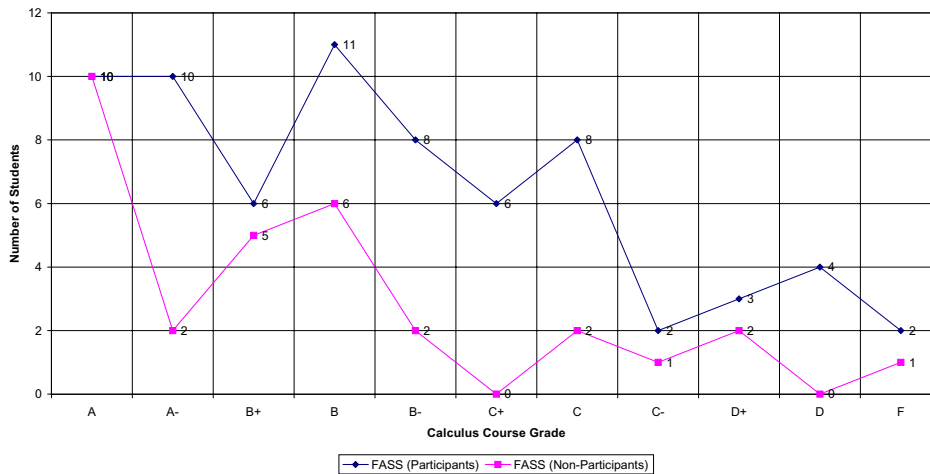
At Sabancı University there are two main groups of freshmen with respect to their educational backgrounds and future interests, namely the students in the Faculty of Arts and Social Sciences and in the Faculty of Engineering and Natural Sciences. Freshmen from both faculties with diverse educational backgrounds and motivations, are treated uniformly in all the first year courses. While the Engineering and Natural Sciences Faculty students are quite competitive in science and may have strong backgrounds in physics, biology or in chemistry, the Arts and Social Sciences Faculty students are competitive in social sciences. The mathematics backgrounds of all the students are good but their levels of mastering the mathematical concepts may vary. To obtain an even distribution of the grades among the faculties is the most desirable out come for each course, since the students' educational backgrounds and interests show a great difference. Therefore, the program aims at supporting the students of the Faculty of Arts and Social Sciences, to promote their academic performances in the Calculus and as well as in the Science of Nature course.

During this academic term, 300 peer tutorial sessions are organized and 261 of the 320 freshmen, have volunteered to attend these sessions and %90, %70 and %67 of the attendants had peer support to strengthen their backgrounds in subjects that are related to the Science of Nature, Society and Politics and Calculus courses respectively.

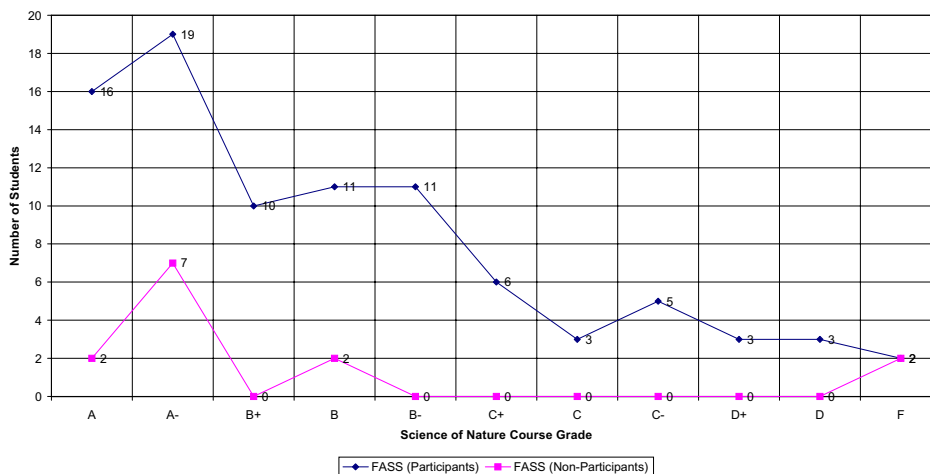
For the Faculty of Arts and Social Sciences, the grades of the students that have

participated and not participated in the peer tutorials are compared. See the charts 1.C and 1.S. for the Calculus and Science of Nature courses.

1.C. Calculus Course: The Grade Distributions among the Peer Tutorials Program Participants and Non-Participants for the Faculty of Arts and Social Sciences (FASS)



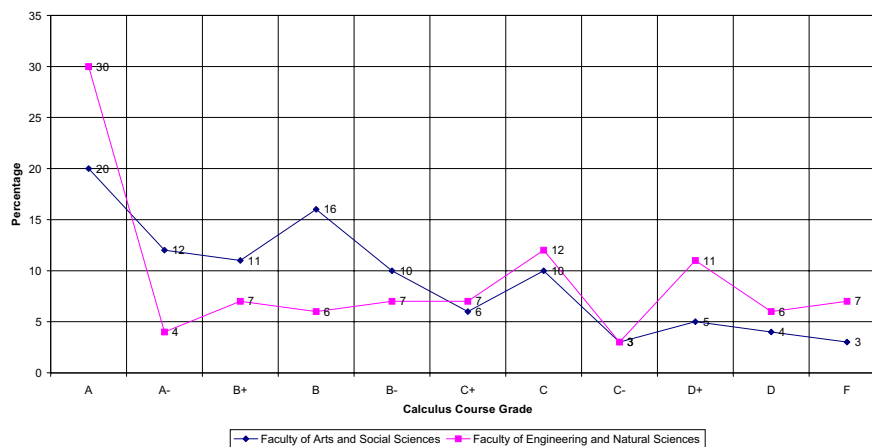
1. S. Science of Nature Course: The Grade Distributions among the Peer Tutorials Program Participants and Non-Participants for the Faculty of Arts and Social Sciences (FASS)



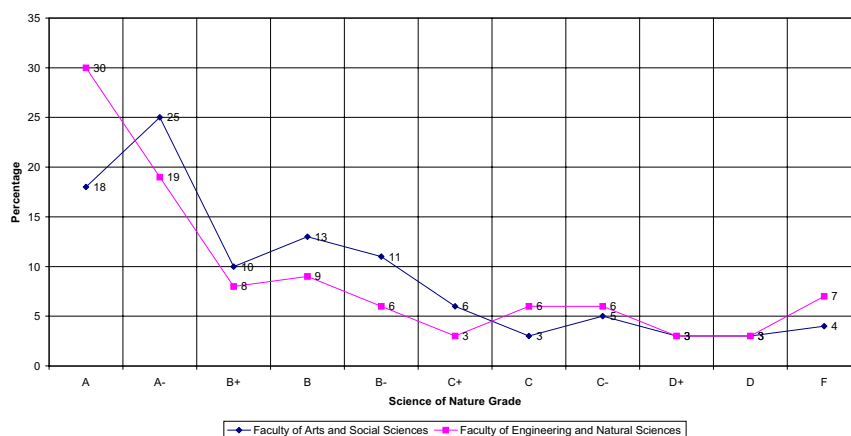
The Peer Tutorials program provides services to all students regardless of their faculties and %85 of the freshmen in the Faculty of Arts and Social Sciences and %83 of the freshmen in the Faculty of Engineering and Natural Sciences have applied to the Peer Tutorials program to have peer support. For a general view, the grade distributions among the faculties are compared and it is observed that the grades are distributed quite evenly between the two faculties and the students of the Faculty of Arts and Social Sciences have performed better than expected (see charts 2.C. and chart 2.S.).

The program is also evaluated through questionnaires. According to the questionnaire results, %86 of the 148 program participants are highly satisfied, %13 are satisfied

2.C. Calculus Course: The Distribution of the Grades for the Faculty of Arts and Social Sciences and Faculty of Engineering and Natural sciences



2.S. Science of Nature Course: The Distribution of the Grades for the Faculty of Arts and Social Sciences and Faculty of Engineering and Natural Sciences



with the program activities and %1 of the participants remained to be indifferent about the activities of the Peer Tutorials.

The peer tutorials not only promote the academic and individual student development but also encourage teamwork, collaboration, cooperation and interaction among peers. Since the students are strong in different subject matters, interaction among the peers have had a role in building up mutual respect and understanding among the students and also had a positive effect upon maintaining a learning environment.

On the other hand, along with its advantages the program has a number of drawbacks. The tutorials and workshops, may discourage students from attending classes and students may become reluctant to share what they know in addition to having a tendency to plagiarize homework To this end, utmost effort must be put in rising awareness about plagiarism and the tutorials must not be supplementary for the lectures or classes.

Although the program has been very popular among the students and seemed quite

successful, the underlying reasons for its achievements are attributed to the design and content of the academic programs as well as the supportive faculty members of the Sabancı University. Furthermore, the Peer Tutorials program does not aim to organize tutorials for the sophomores, juniors or seniors since, university is a culture where creativity blooms and students need to grow up on their own to research, discover and create.

REFERENCES

- www.sabanciuniv.edu
- Hughes-Hallett, Gleason, McCallum, et al, 1998, *Calculus Single and Multivariable* New York John Wiley and Sons, Inc.