

# Success Rate Analysis of Academic Support Program Participants\*

## Akademik Destek Programından Yararlanan Öğrencilerin Başarı Oranlarının Değerlendirilmesi\*

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### ABSTRACT

Academic support is a student focused program offering university level extracurricular activities developed in line with the institutional academic goals and educational approach. The main goal of the program is to support the enhancement of a learning culture that fosters creativity which is constructed and perpetuated by the students. The core activity of this program is active learning sessions. This paper briefly summarizes the support program's activities and analysis the achievements of active learning sessions in terms of student success in some selected first year Calculus, Science of Nature and Humanity and Society courses.

**Keywords:** Student support systems, Peer support, Peer involvement, Active learning

### ÖZ

Akademik destek, kurum akademik hedefleri ve eğitim yaklaşımı doğrultusunda üniversite için geliştirilmiş müfredat dışı faaliyetler sunan öğrenci odaklı bir programdır. Programın ana amacı öğrenciler tarafından yaratılıp sürdürülen ve içerisinde yaratıcılık barındıran bir öğrenme kültürünün geliştirilmesine destek vermektir. Programın özünü aktif öğrenme oturumları oluşturur. Bu makale destek programının faaliyetlerini kısaca özetler ve aktif öğrenme oturumlarının Kalkulus, Doğa ve Bilim, İnsan ve Toplum dersleri arasında seçilmiş bazı derslerdeki öğrenci başarısı açısından kazanım analizini sunar.

**Anahtar Sözcükler:** Öğrenci destek sistemleri, Akran desteği, Akran ilgisi, Aktif öğrenme

### INTRODUCTION

Academic Support is a student focused program offering extracurricular activities developed in line with institutional academic goals and interdisciplinary educational approach. The main goal of the program is to support the enhancement of a learning culture fostering creativity that is constructed and perpetuated by students. To realize this aim Academic Support offers various programs to create an atmosphere which seeks to assist students in discovering and realizing their potential as well as the utilization of their individual talents in conjunction with their newly acquired skills, and offers settings that foster creativity and culture, tempting the creation of "genuine"

knowledge. The purpose of this research is to compare the academic success of the group of students who have benefited from Active Learning Sessions with the group of students who have not participated in program activities. The consistency of the rate of participation is also questioned because participating in activities is optional.

### Academic Support Program

Academic support differs considerably from conventional student support systems in terms of its administration and modes of function. To enable a learning culture and sustain a healthy academic environment, the unit offers programs with active

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participation of students and exclusively assigns responsibility to students in the unit's administrative organs. The program provides services to enhance the academic achievement of students with varying interests and knowledge basis as well as support them in having equal opportunity in the assessment of their class work. The core of the program is 'active learning sessions' that are composed of peer study and discussion sessions, tutorials, workshops, adjunct and remedial courses in subjects related to the university's first year courses. Active learning sessions is uniquely designed and based on 'active learning', 'critical thinking', 'peer support' and sharing peer experience by putting forth good examples to facilitate students adaptation to university environment and enhance their learning skills. In this paper, the theoretical setting of active learning sessions and its effect on academic achievement of first year students will be discussed.

While 'active learning sessions' target first year students the program offers seminars and discussions that are open to undergraduate and graduate students, administrative staff and faculty members and to the general audience. The seminars aim is to assist the students to advance their knowledge and improve their understanding of course-related subjects, as well as to increase their awareness about local and global issues. Promoting inquisitiveness, critical thinking, and enthusiasm for doing research also stand out as the main goals of these talks. Like all program activities these seminars are also organized by the active involvement of undergraduate students working for the program. Seminars are given by undergraduate, graduate students and faculty members or guest speakers from other local or international institutions as well as prominent businessmen and politicians.

Academic support offers guidance to students and directs them to appropriate resources and makes provision to meet their individual needs. All program activities are held both in Turkish and English.

Training the undergraduates and graduates who are working for the program is absolutely necessary, so training is embedded within the program as a continuous activity. The program is subject to systematic evaluation and analysis for perfection. Continuous follow-up of events, comparative analysis of participants' academic achievements and questionnaire based opinion pool formation are integral parts of the programs (Arikan, 2007).

Academic support program is founded by the author of this paper in 1999 which is the year the institution enrolled its first undergraduate students. There were no graduates in the first four years of the program. The program evolved into its present form after 2006.

### Active Learning Sessions

Active learning sessions consists of four programs peer study and discussion sessions, workshops, tutorial sessions and optional courses. The main instrument is the peer study and discussion sessions. The sessions are held in a controlled environment. They provide an enjoyable learning environment

which resembles a socially situated activity system based on Vygotsky's cultural-historical psychology (Vygotsky, 1978). The program is open to all first year students. Students can participate in any session during the announced time slots.

Peer study and discussion sessions provide the opportunity for students to study in groups where they can discuss and comprehend the subjects. The topics of the sessions are mainly Mathematics, Physics, Chemistry, Biology and Social Sciences. Peer discussions are moderated by an undergraduate who is taking the same course with the group. Participants cannot receive first-hand knowledge from the moderators; instead they are encouraged to learn by criticizing and by being active participants in the discussions. The program is structured by the principle of "learning to learn" and does not offer compact knowledge or tutorials. Instead the activities are based on learning to think critically, solving problems and collaboration skills. Students have the opportunity to enhance their learning abilities and efficiency and internalize their newly attained skills through peer interaction by participating in these groups. Program captures the basis of "active learning" methods (Topping, 1996) by using peer instruction and peer influence effectively (Arikan, 2002). Students choose to use these sessions in order to excel in their studies.

Tutorials sessions in Mathematics, Physics, Chemistry and Biology are provided to students with weaker knowledge backgrounds. Tutorials are held by experienced graduate or undergraduate students. Tutorials help the students to learn the concepts, gain perpetual problem-solving skills and enhance their understanding of the subjects they struggle with. The participants receive special attention according to their individual needs. Students join peer study and discussion sessions when they feel more confident.

In addition, program offers workshops to a broader group of students on certain topics. The topics of the workshops are proposed by the course instructors and they are mainly held by senior students working at academic support program.

Optional courses are organized for freshly enrolled students before the academic year commences. Courses facilitate students' adaptation to university and provide some basic knowledge in fundamental subjects (Arikan et al., 2014).

### METHOD

For this research study purpose, participants refer to first year students, who attend academic support's active learning sessions and take Calculus I (MATH 101) and Science Nature I (NS 101) courses during 2006-2015 fall and Humanity and Society (SPS 102) during 2006-2014 spring semesters. First year students in MATH 101, NS 101 and SPS 102 courses who do not attend to active learning sessions are called non-participants.

The research questions are:

- What are the success rates of participants who have benefited from active learning sessions for Calculus as opposed to the success rates of non-participants, among the students who have enrolled in MATH 101 course in 2006-2015 Fall semesters?

- What are the success rates of participants who have benefited from active learning sessions for Science and Nature as opposed to the success rates of non-participants, among the students who have enrolled in NS 101 course in 2006-2015 Fall semesters?
- What are the success rates of participants who have benefited from active learning sessions for Humanity and Society as opposed to the success rates of non-participants, among the students who have enrolled in SPS 102 course in 2007-2015 Spring semesters?
- What are the differences between the final grade performances in NS 101 course of participants who have benefited from the activities in relation to Science and Nature and non-participants among students who have taken NS 101 course in 2012?
- What percentage of first year students chose to have benefit from active learning sessions in general?

The target group of this study is the students who have enrolled in Calculus I (MATH 101) and Science of Nature I (NS 101) in Fall terms of 2006 till 2015 and Humanity and Society II (SPS 102) in Spring terms during 2007 to 2015. The population of the target group is  $n=16882$ . The total population is composed of 5736 participants of active study sessions and 11146 students that have not participated in activities related to these subjects during 2006 to 2015.

Data collection instruments are attendance and follow-up forms that are filled for each activity. Follow-up forms include names of the participants, name of the course, subject of the study, duration and date of the session. The database consists of the list of all students who enrolled in one of the above courses and their final letter grades from MATH 101, NS 101 and SPS 102 courses, and the information whether they received support. Students receive a letter grade from each course. The scale of the letter grades are from A, A-, B+, B, B-, C+, C, C-, D+, D and F, where F is the failing grade. The success of a student in a course is defined as the passing or failing status of that student. The success rates of the students are calculated for each group of participants and non-participants separately. T-test analysis is used to compare the success rates of the group of participants and non-participants. The students who work for academic support program are not included in the analysis for the sake of obtaining unbiased results.

## RESULTS and DISCUSSION

During 2006 -2015 a total number of 6085 students enrolled in MATH 101 and 2485 of them have benefited from active learning sessions by participating in one or more activities that are held in subjects related to this course. Table 1 gives the number of students enrolled in MATH 101, participated in activities related to that course and the number of non-participants.

The success rate of students receiving a minimum letter grade of D or above from MATH 101 are compared among the groups of participants and non-participants. The results are summarized in Chart 1: The Success Rates of Registered Students, Par-

ticipants and Non-Participants MATH 101 Fall (2006-2015). The success rates are calculated as the percentage for each group separately. The success rates of the group of participants and the non-participants do not add up to 100.

The students in the group of participants have mainly attended one or more workshops that are held on subjects in mathematics and actively participated in peer sessions in order to study and discuss mathematical concepts. Some of the participants had tutorials and attended workshops in pre- calculus and attended peer sessions to discuss course related subjects with their peers. The observation shows the success rates of participants are consistently higher than the participants in the period 2006-2015. The t-test assessment reveals that probability of the null assumption  $p (p < 0.000681146)$  is less than 0.05 and the difference in the success rates is significant.

During 2006 -2015 a total number of 6002 students enrolled in NS 101 and 2558 of them have benefited from active learning sessions by participating in one or more activities that are held in subjects related to this course. Table 2 gives the number of students enrolled in NS 101, participated in activities related to that course and the number of non-participants.

The success rates of students as receiving a minimum letter grade of D or above from NS 101 is compared among the groups participants and non-participants. The results are summarized in Chart 2. The Success Rates of Registered Students, Participants and Non-Participants NS 101 Fall (2006-2015). The success rates are calculated as percentages for each group separately. So the success rates of the group of participants and the non-participants do not add up to 100.

The students in the group of participants have mainly attended to one or more workshops that are held in subjects related to NS 101 course and actively participated in peer sessions in order to study and discuss subjects for better understanding of the concepts. Some of the participants had tutorials and attended the optional course before the school year commencement in order to strengthen their knowledge and review

**Table 1:** Fall 2006-2015 Numbers of Students in MATH 101 Who Participated in Active Learning Sessions

MATH 101 FALL			
Years	Registered Students	Participants	Non-Participants
2006	644	253	391
2007	604	267	337
2008	515	181	334
2009	545	191	354
2010	434	204	230
2011	471	222	249
2012	613	239	374
2013	742	335	407
2014	671	269	402
2015	846	324	522

**Table 2:** Fall 2006-2015 Numbers of Students in NS 101 Who Participated in Active Learning Sessions

NS 101 FALL			
Years	Registered Students	Participants	Non-Participants
2006	595	233	362
2007	579	256	323
2008	496	152	344
2009	527	221	306
2010	439	232	207
2011	440	262	178
2012	641	308	333
2013	738	354	384
2014	727	334	393
2015	820	206	614

**Table 3:** Spring 2007-2015 Numbers of Students in SPS 102 Who Participated in Active Learning Sessions

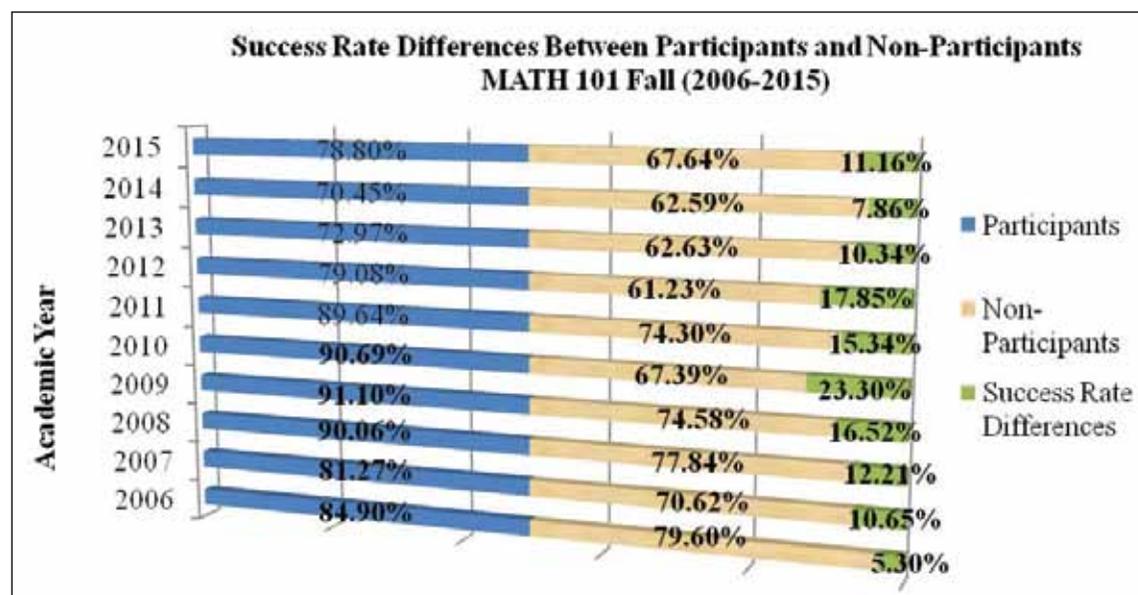
SPS 102 SPRING			
Years	Registered Students	Participants	Non-Participants
2007	707	73	634
2008	688	65	623
2009	468	72	396
2010	499	69	430
2011	381	98	283
2012	361	86	275
2013	531	103	428
2014	583	43	540
2015	577	84	493

basic subjects in Physics and Mathematics and later attended the sessions to discuss course related subjects with their peers. Chart 2 shows the success rates of the group of participants is higher than the success rates of non-participants for each year from 2006 till 2015. The t-test assessment reveals  $p < 0.000323$  and the mean of success rates of the group of participants and non-participants is significantly different.

During 2007 - 2015 a total number of 4795 students enrolled in SPS 102 and 693 of them have benefited from Active Learning Sessions by participating in one or more activities that are held in subjects related to Humanity and Society II course. Table 3 gives the number of students enrolled in SPS 102, participated in activities related to that course and the number of non-participants.

The success rates of students as receiving a minimum letter grade of D or above from SPS 102 of the groups of participants and non-participants is compared. The results are summarized in Chart 3: The Success Rates of Registered Students, Participants and Non-Participants SPS 102 Spring (2007-2015). The success rates of the group of participants and the non-participants are not adding up to 100 because the success rates are calculated as percentages for each group separately. The students who participated in active learning sessions in the scope of Humanity and Society course are only attended peer discussion sessions. The discussions are moderated by a first year student taking the same course with the group. To have a benefit out of these discussions students need to be aware of the subject matter and be prepared for the discussions. Compared to other courses the number of participants in social sciences is usually less than the number of participants of activities in mathematics and science related subjects.

The t-test assessment reveals  $p < 4.4949E-07$  and the means of two groups significantly different from each other. The students excel their academic success significantly by having benefit from discussing the subjects with their peers.

**Chart 1:** The Success Rates of Registered Students, Participants and Non-Participants MATH 101 Fall (2006-2015).

The fourth research question is: What are the differences between the final grade performances in NS 101 course of participants of activities in relation to Science and Nature and non-participants among students who have taken NS 101 course in 2012?

In year the 2012 Fall Semester 641 students are registered in NS 101 course and 308 of them participated in active learning sessions of the academic support program. The letter grade point distribution of these students is provided in Graph 1:

Academic Support and NS 101 Letter Grades 2012-2013 Fall. Letter grades are on a scale of A, A-, B+, B, B-, C+, C, C-, D+, D and F, where F is the failing grade. The target group analysis is conducted by examining letter grade distribution percentages of participants of the Active Learning Sessions and non-participants who have enrolled in NS 101 in 2012 Fall. The percentages of letter grades are calculated separately within these groups.

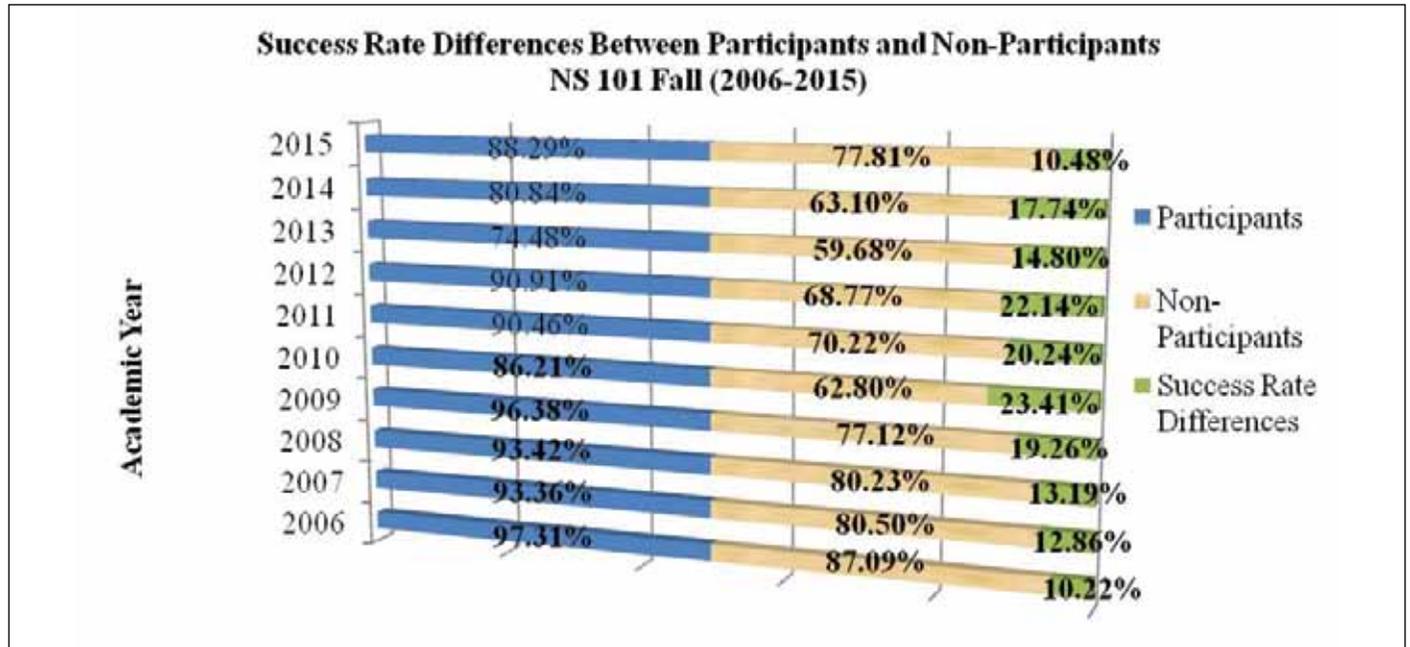


Chart 2: The Success Rates of Registered Students, Participants and Non-Participants NS 101 Fall (2006-2015).

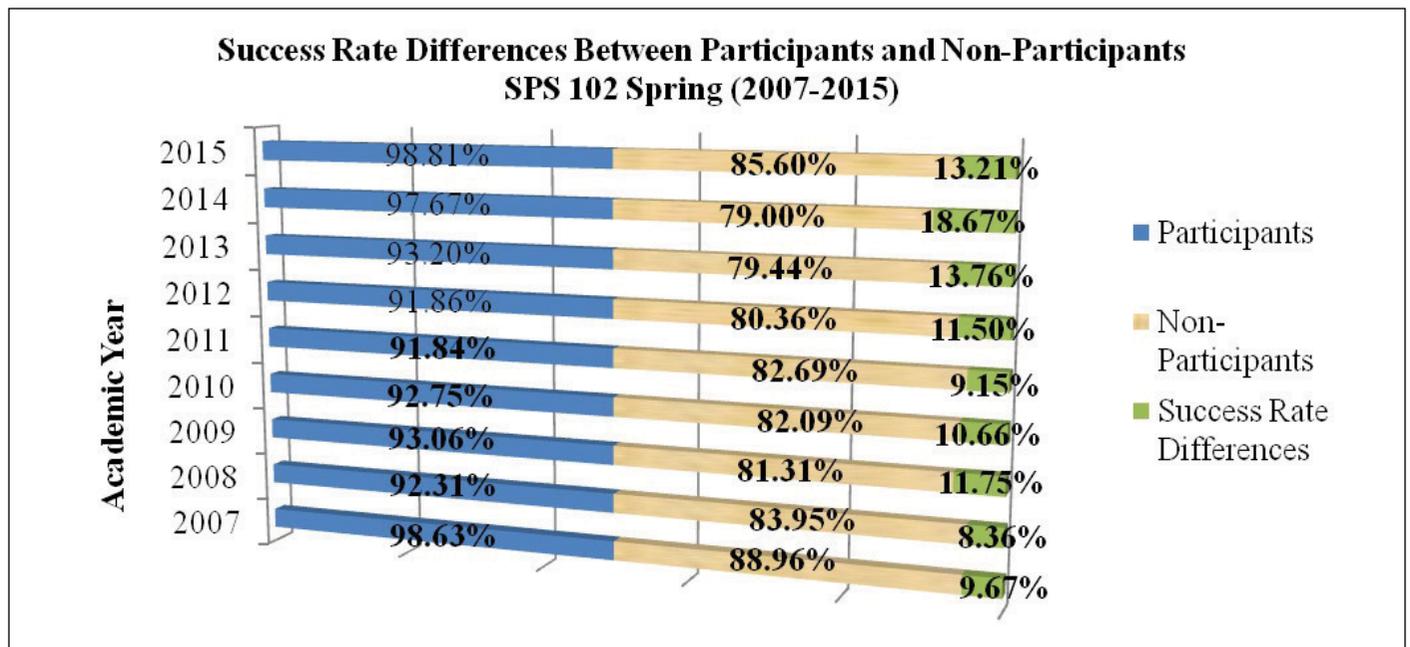


Chart 3: The Success Rates of Registered Students, Participants and Non-Participants SPS 102 Spring (2007-2015).

The students in the group of participants mainly attended the optional course Mathematical Concepts for Natural Sciences (PreNS), one or more workshops or actively participated in peer sessions in order to study and discuss the subjects. The academic performance of the attendees of the optional course Mathematical Concepts for Natural Sciences (PreNS) in 2012 was explored in more details. This research (Arikan et al., 2014) revealed that the attendees of PreNS significantly outperformed the students who did not receive any support from active learning sessions.

Graph 1 show the number of non-participants who failed from the course is larger than the number of participants who failed. This result can also be seen in Chart 2. It can be observed from Graph 1 that most of the students who received A grades are in the non-participant group. While this is an expected result, the students who participated in active learning sessions stated that they received higher letter grades than they expected. This assertion will be the subject of another research.

To answer the fifth research question data obtained during 2000-2015 is used. Table 4 provides the summary of participation rates in activities of the active learning sessions.

The database includes all the data collected since the year 2000. The data collection instruments are attendance sheets and follow-up forms. The program is subject to evaluation from its start. The data collecting instruments, follow-up forms, contain the same set of information and it is compatible with the past years. The target group of this study is all first year students for the period 2000-2015. The total number of students is calculated by counting the ones who registered in any of the MATH 101, MATH 102, NS 101, NS 102, SPS 101 or SPS 102 courses and the Number of Participants is determined by counting the attendees of any program activity. That is the

students are counted only once. Table 4: Participation Rates of Students in Active Learning Sessions 2000-2015, demonstrates the total number of students and the number of students who participated in any activity of active learning sessions for each year in question and the rate of participation as percentages.

Table 4 shows on the average 56% of the first year students participated in active learning sessions. Academic Support Program’s activities are optional and 56% is a very high rate of attendance for an optional program.

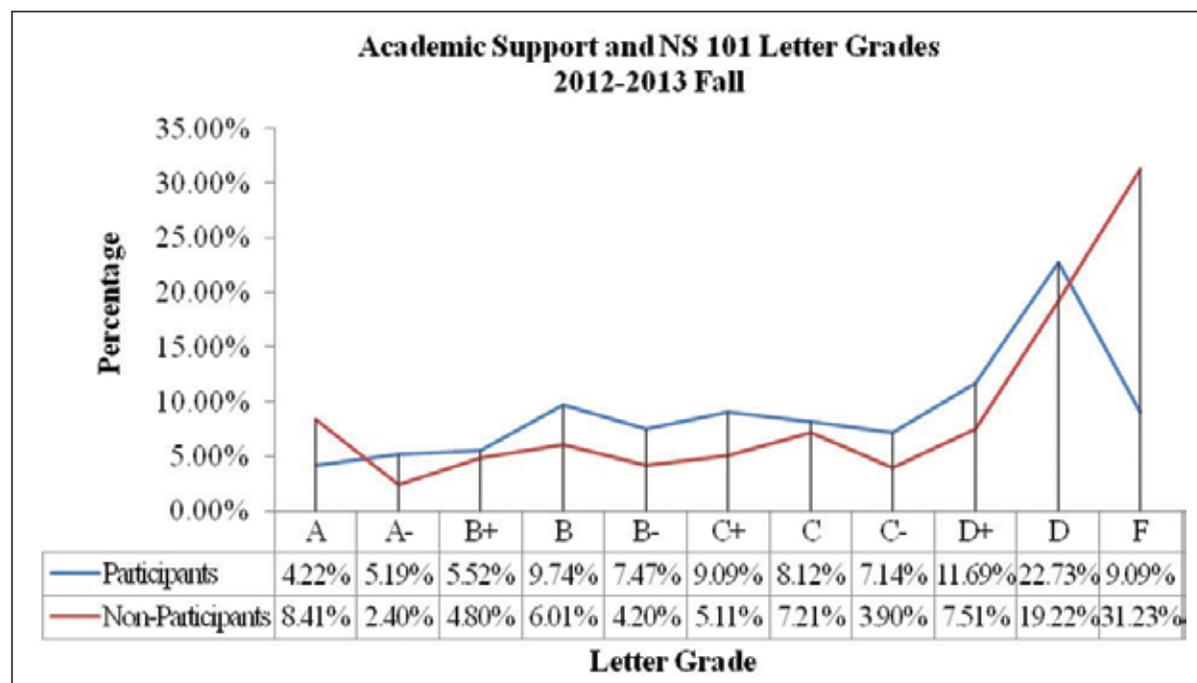
During the period 2000 to 2005 higher participation rates can be observed from Table 4. During these years students mostly attended the workshops delivered by the author of this paper. The number of sophomores, juniors and seniors were very scarce in this period. Students attended the workshops not only to understand subjects but also to ask questions about the rules and regulations of the university’s educational system.

In 2004-2005 and 2005-2006 Fall and in 2004-2005 Spring Terms SPS 101 and SPS 102 courses were left out of the scope of academic support program. During these terms academic support program participation rate became as low as 34%. Students who want to compensate their grades usually enroll in irregular and summer courses. The observed fluctuation in the participation rates is proportional to the non-existence of irregular courses and whether the course is offered in the summer term.

In the light of these observations Table 4 somehow reflects overall performance of the ‘Academic Support Program’.

**CONCLUSION**

The research results reveal active learning sessions increases student success. All the program activities are optional. This fact makes the results more significant, and the obligation to



**Graph 1:** Academic Support and NS 101 Letter Grades 2012-2013 Fall.

**Table 4:** Participation Rates of Students in Active Learning Sessions 2000-2015

Active Learning Sessions Related to MATH 101-2, NS 101-2 and SPS 101-2			
Semester	Total number of students	Number of participants	Participation rate
2000-01 Fall	303	188	0.62
2000-01 Spring	294	223	0.76
2001-02 Fall	318	261	0.82
2001-02 Spring	321	218	0.68
2002-03 Fall	432	337	0.78
2002-03 Spring	445	289	0.65
2003-04 Fall	621	360	0.58
2003-04 Spring	535	278	0.52
2004-05 Fall	926	315	0.34
2004-05 Spring	772	363	0.47
2005-06 Fall	631	227	0.36
2005-06 Spring	915	311	0.34
2006-07 Fall	704	315	0.45
2006-07 Spring	926	429	0.46
2007-08 Fall	909	508	0.56
2007-08 Spring	830	400	0.48
2008-09 Fall	842	390	0.46
2008-09 Spring	683	364	0.53
2009-10 Fall	827	461	0.56
2009-10 Spring	745	384	0.52
2010-11 Fall	736	423	0.57
2010-11 Spring	625	425	0.68
2011-12 Fall	704	434	0.62
2011-12 Spring	708	421	0.60
2012-2013 Fall	900	487	0.54
2012-13 Spring	857	471	0.55
2013-14 Fall	1056	604	0.57
2013-14 Spring	999	566	0.57
2014-15 Fall	1007	618	0.61

draw the students' attention to participate in activities enhances the quality of the program. Some factors which may seem minor play important roles in the overall success of academic support. The premises are kept open twenty four hours a day and seven days a week for students. The peer study and discussion sessions scheduled during the free hours of the students after 5 p.m. and carried out till midnight hours. More than 60 peer study and discussion sessions, at least 40 tutorials and 12 workshops are offered per week. The sessions are limited to two hours and held in small groups. The presence of an authority figure is purposefully avoided during the peer study and discussion sessions. It is worth to point that the program views learning as an end in itself. The peer study and discussions captures the essence of 21st century learning skills that are often called the 4 C's: critical thinking, creative thinking, communicating, and collaborating. These skills help students learn, and so they are vital for success in school and life.

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