The Academic Excellence Program: A new look to an old and reliable tool

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Abstract *- The Academic Excellence Program seeks to develop individual problem solving skills and good study habits. This is accomplished using peer group meetings and involves developing the process to obtain the solution to mathematical problems. Participation is voluntary in nature. The performance of the participants is compared to that of the students that did not participate. The results are excellent. The participants obtained on average one letter grade above the non-participants.*

Introduction

One of the hardest experiences for a freshman student is to adapt to the university environment. This first year is important for the development of good study habits. The purpose of the Academic Excellence Program (AEP) is to guide the student toward the development of good individual study habits during the first year using a peer group environment. The study groups are formed using Math as the subject courses to be discussed during the meetings. Similar approaches had been used in the past to increase the retention of minority students and to help them help themselves in becoming successful [1,3].

We first present a general description of how the program was implemented at the University of Puerto Rico – Mayaguez (UPRM) during the 1997-1998 academic year and the first semester of the 1998-1999 academic year. In this program there are two important elements: the participant students and the mentors. What we expect from the participants is described. Then the characteristics that the mentors should have and their responsibilities are outlined [2]. The results are presented and discussed.

Almost 100% of the students at UPRM are Hispanic and the vast majority of them are Puertoricans. UPRM ranks No. 1 in minority engineering baccalaureates granted and is among the top 20 universities in engineering enrollment in the USA. Women make up over 37% of our engineering enrollment, which is approximately double the national average.

Academic Excellence Program

The AEP is experimental in nature and is constituted by freshmen students from five different engineering disciplines hereinafter referred to as the participants, the student mentors, and the authors (coordinators). The program seeks to develop good study habits through a group environment. Participation is voluntary in nature and all engineering freshmen at UPRM are invited to join, but it is made very clear to them that the AEP is not a remedial program and that they should only join if they are willing to put an extra amount of effort and time in their work. The authors are the only two faculty members directly involved with the program. In the group meetings the students try to arrive at the solution to mathematical problems. We started out with pre-calculus I and II and Calculus I. A student mentor acts as a facilitator to the discussion. The groups meet at least twice a week during an hour and a half. A study room was made available to them from 7:00 A.M. to midnight. The room had tables rather than regular classroom chairs in order to facilitate the discussions.

Problems were solved and discussed during the meetings. These problems were not homework problems and were chosen by the mentor. The set of problems is known as the problem worksheet. The discussion was based on questions raised by the participants rather than having the mentor solve the problems for them. There was an informal environment increasing the possibility of communication among the participants.

The participant students were free to participate in the program; it was not a requisite of their Math course. It was asked that the participants would commit themselves to attend the meetings on a regular basis. A participant would be removed from the program if he/she did not comply with the rules mentioned above. The participants signed a document, in which the rules of the program were described. Among the items in this document are the number of days a participant is permitted to be absent, that the program does not substitute their visits to their instructor's office, and that we expected a vivid collaboration during the meetings. The character of the meetings was challenging rather than condescending.

During the discussion of the problems, the students were expected to develop their ability to discuss the concepts learned in class and to try to explain them. This was accomplished through the group dynamics.

The mentor would guide the meeting in order to promote the participation and the use of the concepts presented in class. The mentor encouraged the participants to study by telling of his/her own experiences. It is important that the mentor establish a good relationship with the participants (mentor as a big brother).

The mentors should be students with at least one year ahead of the participants in Mathematics in order to provide their

own experience and leadership to the participants. The mentors should be students with good study habits so they can share their experience, anecdotes, and advice. They met with the coordinators every week, where they received continuous training and they shared their experience with their groups. We had an average of seven mentors per semester from different engineering disciplines. It is important to mention that it has been noticed that it is best if the mentors have a high GPA so that the time they spent in the program will not affect them adversely. As of now, most of the mentors were in their third and fourth years of their five-year engineering program at UPRM. Mentors are not required to attend the classes their students are taking but they should feel comfortable with the subject. A stipend is given to the mentors at the end of the semester.

The coordinators performed several visits to the groups. The purpose of the visits was to make recommendation if any deficiency was observed and to point out any good characteristic of the dynamics of the group.

Results

The program was evaluated objectively using a comparison of groups of participants and non-participants. Results are shown in the following figures for each year. Figures 1 to 4 consist of the general point average and grade distribution in math courses. There are two subgroups of participants in 97. The first group is composed of those who participated during only the first semester and are referred to as PP97-26; the digits after the dash (-) indicates the number of students in the group. The second group participated during both the first and second semester and is denoted as PS97-7. The students included in the first group are not in the second. There is only one group for 1998. Note that the sample group of non-participants is the rest of the Engineering freshmen population at UPRM for both 1997 and 1998.

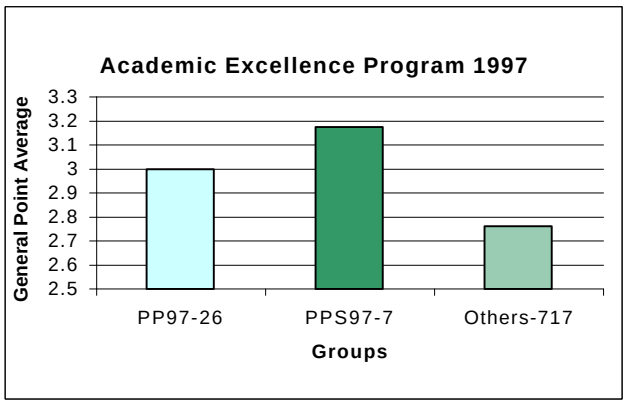

Figure 1. General Point Average 1997

Figures 1 and 2 show the results for the 1997 Engineering freshmen class at UPRM. Similarly, figures 3 and 4 display the results for 1998. Figures 1 and 3 represent the general point average whereas figures 2 and 4 the percent of credits per letter grade. Looking at figures 1 and 3 we find that the GPA for the Engineering freshmen (excluding the AEP groups) is at most 2.81 for both 1997 (2.76) and 1998 (2.81). In contrast, we notice that the AEP groups PPS97-7 and PP98-52 both have GPAs of at least to 3.14.

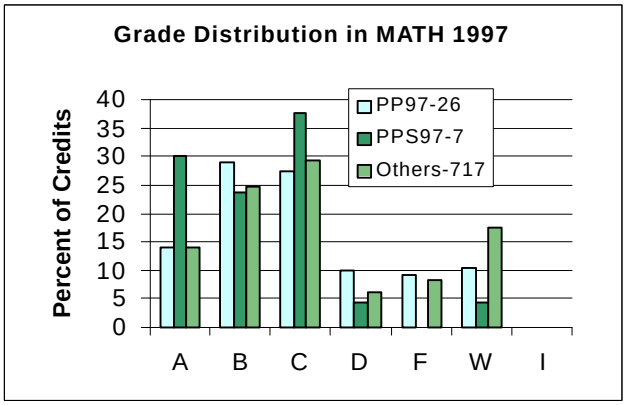

Figure 2. Math Grade Distribution 1997

When we look at the Math Grade Distribution charts in figures 2 and 4 we find that the percentage of credits with grades A and B in Math courses is 43.1% for AEP group PPS97-7 versus 38.68% for the Others-717. Similar results were obtained for AEP group PP98-52 and Others-713 were 44.89% and 32.43% were observed, respectively. The entrance index obtained by the AEP groups after taking entrance exam is certainly higher though not significantly. The original AEP group for 1997 obtained a 341 index on average versus 337.5 for Others-717. In 1998 the AEP group obtained 346 versus 343 for Others-713.

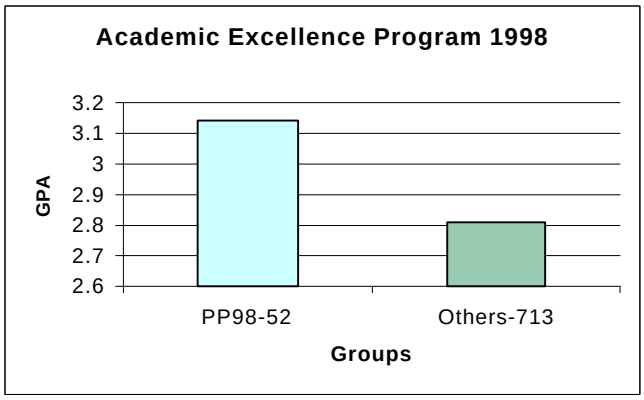

Figure 3. General Point Average 1998

In figures 1 and 2 we have also included AEP group PP97-26, which together with AEP group PPS97-7 form the original AEP group for year 1997. PP97-26 represents the students who participated in the AEP during the first semester of 1997 but did not participate during the second semester. PPS97-7 represents those who participated during

the entire 1997 academic year. Though group PP97-26 is still doing better than Others-717 in terms of GPA and the percentage of As and Bs credits in Math courses, its performance is deteriorating and approaching that of Others-717. This performance is very peculiar especially when we know that during their first semester in college, which was also the semester they participated in the AEP, on average PP97-26 behaved very much like PP98-52 during their first semester in college [4]. PP97-26 GPA was 3.16.
This seems to indicate that the participating in the program for only one semester has immediate and temporary effects. This was good for that first semester (August to December 1997), but we are looking for more stable results. An example of this are the results observed from those students that kept attending the program during the second semester (PPS97-7) and a group of three students which continue for three semesters in a row. This group of three has a GPA above 3.60. We will continue to monitor all groups for at least four more years to see the end results.

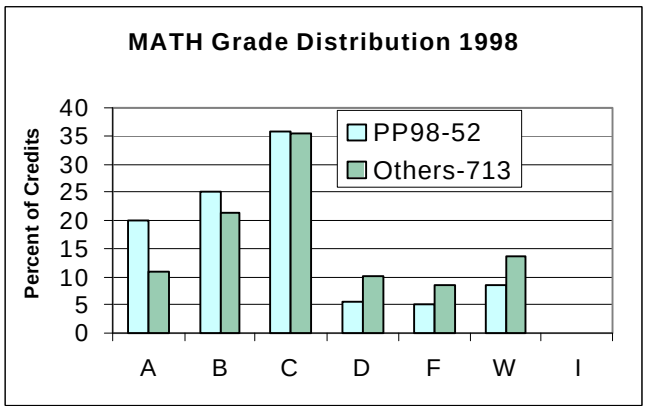

Figure 4. Math Grade Distribution 1998

A questionnaire, prepared by the coordinators, was administered to the participants during the semester in order to monitor how they felt about the program and how effective was the program in certain areas. Each mentor wrote a brief report about the program including items such as recommendations for improvement of the program, problems they observed, and comments.

From the evaluation of the participants we obtained the following. There was a complaint about the poor choice for the meeting time for some of the groups; some groups mentioned that the material of the worksheet were different from the material discussed in class (this could be because some groups were composed of students from different instructors). Some participants wanted the mentor to just solve homework problems (this is what is done in tutoring). Some of the participants were meeting to study for other classes and this is what we were looking for. Networking is an important part of this program in order to have a support group in addition to a study group; some of the groups developed a good network. The mentor was asking question regularly. The mentor was prepared for the meetings. The meetings helped them to better understand what was taught in class. The program was a nice way of studying and it made them feel that to study could be delightful. They liked to discuss their doubts with the others students and to be part of a group.

From the mentors' report: they mentioned how their participants improved their self-esteem by solving hard problems chosen by the mentor (especially the word problems). They also mentioned the good relationship developed between them and the participants that this experience helped them to develop their leadership skills and that they realized that they have not lost their time in the University and how much they have learned. They believed that the success of the program was a great deal on their hands, in their attitude and quality of work. Some of the mentors complained about the fact that the number of instructors represented in their participants made it difficult for them to prepare the worksheets. They also complained that some of the participants expected to receive tutoring and that the mentor was there to solve the homework problems for them. Another problem was the time chosen for the meetings, at which many other activities were taking place.

As coordinators we noticed that what we told the mentors about answering questions by asking more questions was very hard for them to implement and to comprehend. We noticed a lecture type approach at the beginning of the group meetings. This was very hard to get rid of because it is the way they have been taught and what they were exposed to. But we got a nice improvement. We noticed that some mentors were not on time for the meetings, which makes for a poor role model. We pointed this out to them. Mentors must be chosen very carefully, evaluated continually, and some may even have to be replaced if they do not follow the mentoring approach as it is expected from them. They must be kept under continuous training or at least reviewing some basic study techniques (time planning, memorization techniques, outline summary, class summary) so that this would be fresh in their minds and that they may introduce them to the participants. We were meeting with them as a group at the beginning. Later, we were meeting with each individually so we could address their weaknesses. For example, a tendency to a lecture type of meeting similar to what is done in class by the instructors is observed in all mentors the first time they have a group. This is regardless of how many times it has been explained to them that this must be avoided.

Conclusions

The academic excellence program is worthwhile to be kept at UPRM and to be implemented at schools where what is learned is as important as what is taught. The students, both participants and mentors, obtained benefits from the AEP. The participants obtained on average one letter grade above

the non-participants. They applied the same techniques to other courses. The mentors developed their leadership skills.

Some features that will improve the program implementation are to make the groups register in blocks in order to guarantee the availability of a common time slot for the meetings and the same class instructor which have so far proved to be the program's greatest hindrances.

Future work

We will try to identify those factors of the program that are most important for the success of the student. We expect to extend the program to second year engineering courses such as statics, dynamics, and physics. Another idea is to bring the program to the senior year of a local high school.

A questionnaire for when our participants graduate needs to be developed and administered in order to find out if they continued forming groups and how they perceived the program has helped them.

Acknowledgements

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