CALIFORNIA COMMUNITY COLLEGES
AND
MT. SAN ANTONIO
COMMUNITY COLLEGE DISTRICT

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Mt. San Antonio College was able to strengthen its tutoring program to meet the needs of mathematics students. A coordinated effort between Mathematics instructors and tutorial services staff provided a well structured and focused tutoring program for remedial mathematics. The program included the concept of 'Study Tables' as well as emphasis on basic learning skills necessary for success in mathematics.
Mt. San Antonio Community College District

Group Tutoring for Underrepresented Mathematics Students

Skill deficiencies of students entering college have been the object of national attention for over a decade. Equal access to education, academic quality and levels of school and student commitments are issues that face most community colleges today. Mt. San Antonio College is dedicated to resolving these issues by strengthening its classroom instruction and support services. One of the key goals, as outlined in this project, is to help struggling students develop the necessary skills to succeed in Mathematics without sacrificing academic standards. Such assistance is designed to provide greater opportunities for underrepresented, educationally disadvantaged students to persist through an educational sequence which often starts at the community college and ideally leads to four-year colleges and universities.

Mt. San Antonio College annually serves at least 6,000 students in its Fundamental Mathematics and Elementary Algebra courses. Of these students, over 55 percent either drop out or fail their mathematics courses during each semester. The purpose of this project is to provide a coordinated effort between Mathematics instructors and tutorial services staff in the form of a well structured and focused tutoring program for remedial mathematics. The concept of “Study Tables” is devised to help students with their homework assignment and to teach them the basic learning skills necessary for academic success in mathematics.

Through this project Mt. San Antonio College will strengthen its tutoring program so that it can more effectively meet the individual needs of the mathematics students. This project will serve as an exemplary model for other departments on campus and will provide the catalyst for creating institution-wide changes in tutoring. A comprehensive evaluation of the Project will be conducted to determine the effectiveness of the linked instructor/tutor support system. Results from the Study Table project will be shared with other community colleges throughout California and the United States in an effort to enhance the quality of their tutorial programs.

Experts in both education and business alike agree that the lack of mathematics skills among our national population is at crises proportion. The need to address this issue is a top priority at many community colleges. The Study Table Project offers a direct solution to student retention and academic success by initiating a viable and cost effective tutoring program in mathematics for all higher education institutions to incorporate into their own services.
Group Tutoring for Underrepresented Mathematics Students

1. Specific Educational Program Being Addressed

Educational Program and Services Addressed
This project focuses on the components found in the Board of Governors’ 1990-91 Basic Agenda which includes the California Education Code, Article 7, Section 84381. It specifically addresses the Educational Standards component which seeks to improve retention of underrepresented students through instruction and student services. In relation to Eligible Programs and Services funded through the Fund for Instructional Improvement, the project presents a nontraditional approach to instruction by creating a bridge between classroom instruction and tutorial services. The project targets the special learning needs of underrepresented and educationally disadvantaged students by providing these students with an innovative approach to increasing their mathematics skills. In joint collaboration, the Mathematics Department and the Tutorial Services in the Learning Assistance Center will develop and implement a “Study Table” for all underprepared students enrolled in remedial mathematics courses, namely Fundamental Mathematics, MATH 50 (pre-collegiate) and Elementary Algebra, MATH 51. These “Study Tables” will serve to help students with their homework and study skills related to learning mathematics concepts. With the assistance of tutors, at-risk students will be allowed to work collectively or individually in study groups.

The project addresses the special learning needs of educationally disadvantaged students by bridging the gap between underpreparedness and college-level standards. Students enrolled in pre-collegiate and beginning algebra courses lack mathematics sophistication; therefore, these students inevitably experience poor retention and success in these mathematics courses. According to faculty members in the Mathematics Department, it is imperative that these students learn how to “engage” in mathematics. Such interaction enables the student to more fully comprehend fundamental concepts in mathematics and to build a firm foundation for future classes. With a strong basic understanding of mathematics concepts, students can successfully complete college level mathematics courses required for graduating and/or transferring to four-year institutions.

The combined effort of the Mathematics Department and the Tutorial Services offers a unique and creative approach to assisting students in remedial mathematics courses. The “Study
Table" concept encourages students to do their math homework until completion with the assistance of specially trained tutors. It also provides for greater faculty involvement and a closer working relationship between the Mathematics Department and the Tutorial Services. Such a relationship is mandatory for an effective and viable tutoring program and will serve as an exemplary model for other departments at Mt. San Antonio College and at other community colleges.
2. Specific Problems Being Addressed

Specific Problems

An increasing number of students are entering community colleges underprepared to meet the demands of college-level mathematics classes. In a 1988/89 study of 12,223 students taking the mathematics placement test for Algebra Readiness at Mt. San Antonio College, 48% placed into precollegiate mathematics and 52% placed into Elementary Algebra, the entry level collegiate course. Additional statistics show that 52% of those students enrolled in Fundamental Mathematics and 65% of those in Elementary Algebra during Spring Semester, 1989, either withdrew or received a failing grade of "D" or below. A further breakdown by ethnicity reveals that underrepresented and ethnic minorities tend to experience a higher drop out rate or failing grade of "D" or below than their white counterparts. (see Table I)

According to surveys conducted by the Mathematics Department, poor retention and student success in remedial mathematics courses can be attributed to several underlying factors. These factors include: 1) the lack of commitment on the part of the student to invest enough time and/or effort in studying for his or her mathematics course, 2) the absence of motivation and the feeling of "math phobia" which often persists when students experience repeated failure, and 3) the inability of students to actively and effectively engage in learning mathematics concepts due to poor study skills techniques.

The purpose of this project is to provide the additional assistance needed for underrepresented and educationally disadvantaged students to succeed in their Fundamental Mathematics and Elementary Algebra classes. Students will be expected to attend study tables held in the college's Learning Assistance Center on a regular basis. Trained tutors will be available at these sessions to assist students with their homework assignments. Additional time will be used to discuss mathematics concepts fundamental to mastery of the subject material through the use of concept review sheets. Skills such as note-taking techniques, time management, and test-taking strategies appropriate to mathematics will also be incorporated into the Study Table sessions. Building the student's level of confidence and motivation will be a vital part of this project. As students attend these study tables, they will become better prepared to study more effectively and receive passing grades in their mathematics courses. (See Table I)

C. Response to Need

During Spring Semester, 1990, the college obtained a grant from EOPS Special Project funds to conduct Mathematics Achievement Workshops for minority and underrepresented students enrolled in a small number of Elementary Algebra, MATH 51, and Intermediate Algebra, MATH 71, sections. The workshops were patterned after those developed by Professor Uri Treisman of the University of California at Berkeley. The model had been used with students enrolled in college level mathematics (mainly Calculus), and our project was attempted to use the model with students in remedial mathematics courses. The workshops were designed to solve
problems and learn mathematics concepts supplementary to regular homework assignments and other assigned course work. For those students motivated to spend an additional four hours per week beyond normal homework and class time, the project has been very successful. Over the past year, we have seen significant increases in retention and GPA's.

However, we discovered that for the typical community college student, time management was probably the major hurdle to his or her success in mathematics. Throughout the Fall semester, it became very obvious that the vast majority of our mathematically underprepared students did not have the time to commit to completing their homework, let alone spending extra time "talking" mathematics. Surveys conducted by the department showed that students who remained in Elementary Algebra classes beyond the twelve weeks; 52% spent less than one-half of the recommended study time for class. This statistic suggests that students who dropped out before the twelfth week probably studied even less.

We then began to rethink what we might do to create a more effective success model for our students. The "Study Table" concept was developed as a result of our previous workshops. We want to take the successful components of the Mathematics Achievement Workshops and weave them into a model which is geared to work better for our population in regard to time spent on homework and study. The project attempts to maximize on the limited amount of time students have to study and to place them in a highly structured tutorial setting designed to give them the best possible tools for learning mathematics.

In order to accomplish the "Study Table" concept, a faculty member from the Mathematics Department will function as Mathematics Coordinator and together with the Coordinator of the Tutorial Services in the Learning Assistance Center (Tutorial Coordinator) will hire and train tutors, develop supplemental material and review sheets, monitor the progress of the program, and ensure that the "Study Table" concept is truly addressing the individual needs of each student participant.

Students in Fundamental Mathematics and Elementary Algebra will be encouraged to attend the Study Tables twice a week for 90 minutes each session. Trained tutors will assist these students with their homework and study skills techniques. In addition, supplemental instruction will be provided for those students needing the extra help. Before major exams, the tutors will conduct exam review sessions incorporating major mathematics concepts to be mastered. This will increase the student's readiness to pass his or her mathematics examination. The overall objective of this project is to provide underprepared and educationally disadvantaged mathematics students with the tools and background necessary to achieve academic success in all mathematics courses required for graduation and/or transferring to four-year colleges and universities. This combined approach of helping students with their homework and study skills strategies, preparing students to successfully take and pass exams, and giving additional assistance with difficult mathematics concepts, provides the ideal ingredients for student success and retention.
Mt. San Antonio College is a comprehensive public community college which offers educational programs to a diverse, multi-ethnic population in the San Gabriel Valley of Southern California. Located 25 miles east of downtown Los Angeles, Mt. San Antonio College has a student population of over 40,000. Fifty-four percent of the students enrolled are ethnic minorities; Hispanic students account for one-third of this population. Demographic trends indicate a continued increase in underrepresented ethnic minorities entering the college. Consistent with a growing number of California Community Colleges, Mt. San Antonio College is the primary avenue to higher education for low income, first generation College students in the area.

As previously described, this project is directed at the underprepared and educationally disadvantaged students enrolled in Fundamental Mathematics, and Elementary Algebra classes. This group represents approximately 13% of the credit students currently attending Mt. San Antonio College. During Spring Semester, 1989, the ethnic composition of Fundamental Math was the following: 44% White, 12% Black, 36% Hispanic and 8% other. The ethnic breakdown of students enrolled in Elementary Algebra classes for Spring 1989 was: 48% White, 9% Black, 31% Hispanic, and 12% other.

During the Fall Semester, 1990, the college enrolled approximately 3800 students in Fundamental Mathematics and Elementary Algebra classes. Currently, for the Spring semester, that enrollment is approximately 3,000 students. It is anticipated that the same numbers of students will enroll in these courses during the duration of the project.

Although the target population includes all students enrolled in these two remedial mathematics courses, the project is expected to service about 10% of this population. All students participating in this project will be considered "at-risk" and underprepared. In addition, the project will affect the full and part-time mathematics instructors (64) and the tutors (16), who will participate in establishing and implementing these Study Tables.
4. Objectives

PROPOSAL GOALS AND OBJECTIVES

The Study Table project focuses on the following overall goals:

1) To increase by 80% the retention rate and academic performance of remedial mathematics students through the development and implementation of Study Tables.

2) To increase by 50% the number of underrepresented students who transition to college-level mathematics.

The project addresses four major objectives and their activities to meet these goals. These are contained on the Work Statement Form on the following pages.
5. Workplan Narrative

[NO “WORKPLAN” ACCOMPANIES THIS DOCUMENT.]
6. Expected Outcomes

EXPECTED OUTCOMES OF PROJECT ACTIVITIES

Mathematics has remained for many underrepresented and educationally disadvantaged students a major hurdle on the path toward achieving advanced degrees in higher education. Students participating in the project will be exposed to regularly scheduled and planned study sessions which are geared to help them with their homework and study skills techniques. Approximately 10% of the students enrolled in Fundamental Mathematics and Elementary Algebra classes for Fall/Spring Semester, 1991/92, will be involved in these Study Tables. Of these students, it is envisioned that at least 80% will successfully complete their mathematics courses and continue on to college-level mathematics classes.

IMPACT OF THE PROJECT
Retention in mathematics is a major problem throughout statewide systems of higher education in the United States as well as California. The cost of recycling students who withdraw or receive D and/or F grades in mathematics courses is no doubt staggering. Most educators would agree that learning will take place given a motivated student who is willing to spend a prescribed amount of study time outside the classroom and who successfully utilizes the proper study skills techniques. Our typical community college mathematics student has never "learned" how to study mathematics. The impact of this project is to demonstrate that by teaching mathematics students how to study and providing them with an appropriate learning environment, retention rates and student success will increase significantly. Additionally, since most community colleges in California and throughout the nation have tutorial services available to mathematics students, this model could easily be incorporated into their tutoring programs. Overall, this project is designed to impact institutions of higher education by creating a viable and cost effective tutoring service for mathematics students and to serve as a model to other academic departments.

POTENTIAL FOR CONTINUED SUPPORT AFTER GRANT EXPIRATION
The Study Tables Project has an excellent potential for continued support by Mt. San Antonio Community College. The College is committed to its Educational Master Plan 2001 which specifically addresses the issue of developing effective instructional linkages between academic departments and support services such as tutoring. During Fall Semester, 1990, the College’s tutoring program demonstrated a 62% increase in student enrollment over Fall Semester, 1989. Over 2,600 students were enrolled in Supervised Tutoring for Fall Semester, 1990, making this one of the largest tutorial programs in the state of California. Clearly, one of the major goals at Mt. San Antonio Community College is to increase student retention for underrepresented and educationally disadvantaged students. By expanding the current services in the tutoring program, the College is demonstrating significant support to this program. Funding through this grant will add the necessary assistance to develop a more structured and comprehensive tutorial services for mathematics students. In doing so, the College will be able to offer continued support after the grant expires.
7. Evaluation Plan

EVALUATION PLAN
One of the principal objectives (Objective 4.0) included in this project is dedicated to evaluating the overall success of the Study Table project. In addition to this important objective, an evaluation plan has been establish for the first three objectives. The project will compare academic achievement of the students participating in the Study Tables to a core group of students in Fundamental Mathematics and Elementary Algebra who have received no form of tutoring during the marked grant year. The evaluation plan will address student retention and academic success in the Fundamental Mathematics and Elementary Algebra for students in both control groups.

The analysis of the data and reporting procedures will be conducted by the Mathematics and Tutorial Coordinators who possess extensive experience in the related fields.

In carrying out the summative evaluation, the evaluators shall collect information on:
  a. The educational background, needs, and competencies of students identified in both control groups.
  b. The specific educational activities undertaken pursuant to the project.
  c. The pedagogical materials, methods, and techniques utilized in the program.
  d. The educational and professional qualifications of the staff responsible for planning and operating the project.
  e. The ethnic composition and backgrounds of students participating in both control groups.

The final report will include the following information:
  a. Specific information on the development and implementation of this project.
  b. Tests of academic achievement in subject matter areas for both control groups.
  c. Changes in the rate of students from both groups with respect to the following variables:
      1. Grades
      2. Dropout
      3. Absenteeism
      4. Enrollment in higher level mathematics courses.

The tables on the following pages detail the evaluation plan for the project objectives.
8. Dissemination Plan

DISSEMINATION

Dissemination of the Study Tables concept is especially important since this project offers an innovative and unique approach to tutoring mathematics students. One principal means of disseminating the Study Tables Project will be through statewide conferences scheduled both with Mathematics and Learning Assistance/Tutorial Services. Several individuals within the Mathematics Department and the Learning Assistance Center have presented papers or served as topic speakers for important conferences throughout the country as well as in California. Mt. San Antonio College is very proud of this recognition and believes that this mode of dissemination has been very effective in meeting the needs of grassroots faculty and departments.

It is our intention to present findings and disseminate information about the Study Tables Project to the following organizations: a Fall and Spring CMC 3 (California Mathematics Council - Community Colleges), the ACCTLA (Association for California College Tutorial, and Learning Assistance), CR1A (College Reading and Learning Association), and FII showcase events. Results of this project will also be shared at any other appropriate regional and nation-wide conferences. In addition, articles on the project will be submitted to the FII Newsletter and project directory.

On a wider front, the project director will ensure that the project and its activities receive the media coverage appropriate for an issue of such importance to higher education institutions. Copies of the project's abstract and final report will be distributed to all community college Mathematics Departments and Tutorial Services as well as to the Chancellor's Office FII staff and regional organizations such as ACCTLA and CRLA.
9. Budget Narrative

[NO “BUDGET NARRATIVE” ACCOMPANIES THIS DOCUMENT.]