94-1020
San Diego City

San Diego City College Applied Math Project (AMP)

CONTENTS

BACKGROUND / INTRODUCTION
IMPACT ON SYSTEMWIDE NEED
SPECIFIC EDUCATIONAL PROGRAM BEING ADDRESSED
SPECIFIC PROBLEMS BEING ADDRESSED
POPULATION TO BE SERVED
OBJECTIVES
WORKPLAN NARRATIVE
EXPECTED OUTCOMES
EVALUATION PLAN
DISSEMINATION
BUDGET NARRATIVE
San Diego City

Background/Introduction

[No information provided in this document for this section.]
The San Diego City College Applied Math Project (AMP) significantly impacts basic skills development, general education curriculum and transfer education curriculum by providing alternative methods and delivery systems for developmental, vocational and transfer math courses.

Fifty-eight percent of the students enrolled in math classes at San Diego City College are enrolled in developmental math classes. Students are "at risk" when asked to take basic skills development classes over a two to four year period. The average age of the City College student is 26. Presently, persistence studies show that San Diego City College loses 39 percent of its student population each semester. Persistence is defined as student enrollment for two consecutive semesters. Students need up to four semesters before they are ready to take transferable math curriculum. Serving an inner city population, City College students do not have the luxury of taking four years to get an associate degree.

Persistence reflects the rates of student success in class. Retention is defined as those students successfully completing a course with a "C" or better. The median retention rate for students enrolled in developmental math classes is 38 percent. Retention rates in developmental classes range for 44 percent to 35 percent. Retention rates for students in transfer courses range from 60 percent to 30 percent. The median retention rate for students in these courses is also 38 percent. We are not doing our students a service when we ignore the revolving door our students enter.

Only 25 percent of those graduating from California Community Colleges are full time university students (CA Community College LMI/SSFS, 1993.) Less than six percent of the community college students transferring to the University of California, San Diego, were from City College (UCSD Student Research and Information, 1991). When students enrolled in developmental classes do not succeed, students do not enroll and/or complete general education and transfer courses. These courses are tied to Associate Degrees, Transfer Programs and better paying jobs.

Retention can also be attributed to the means by which subject matter is presented. The traditional lecture approach currently dominates the City College math classroom. Hands-on activities with very clear and simple instructions and learning objectives foster inquiry-based learning (Biomanufacturing in Massachusetts: An
Assessment and Educational Analysis, June, 1992) Forty-four percent of the 11,672 students enrolled at City College are Caucasian. Eighteen percent of the students are African-American. The remaining 38 percent are those with varying backgrounds. It can be implied that many of those persons speak English as a second language. The complexities of teaching in a traditional lecture mode increase with this fact. Student learning increases with an increased level of student involvement, particularly with language differences.

Cutting edge, information driven technology is dependent upon theoretical concepts incorporated with opportunities for hands on learning. This content must facilitate learning in an environment that reflects the prescribed industry needs and standards. As prescribed in the SCANS Report for America 2000, curriculum that meets this challenge will incorporate five competencies. The curriculum outcomes include resources, interpersonal skills, information, systems and technology. The three-part foundation of those competencies are basic skills, thinking skills and personal qualities (What Work Requires of Schools, U.S. Department of Labor, June, 1991.)
In response to the Board of Governors' Basic Agenda Priorities Focus on basic skills, transfer and general education and the needs of City College students, the San Diego City College Applied Math Project will provide community college access to California adults for basic skills development and access to transfer and career math curricula.

This Project will provide a Self-Paced Modular Developmental Math Program. Secondly, it will provide Applied Math Curriculum Development Program for two Developmental Math Courses, one Vocational Math Course and one Transfer Math Course.

The Self-Paced Modular Developmental Math Program facilitates learning. One or more of these modules can be taken by students, as student needs dictate. Flexible times for course entry and exit will provide remediation opportunities so as not to preclude entry into specialized programs with designated math skill levels. Credits will be given to students for the completion of modules and designated lab hours completed. To assist in remediation and as a part of the efforts to expedite remediation, module programs will provide one-on-one tutoring; study groups; supplemental texts and handouts; computer tutorials, drills and practice exercises; video tapes; audio tapes; multimedia activities; and mini-lectures.

Curriculum Development will include a Testing Program. This Program will include the development of Pre and Post Tests to determine the course modules recommended for student placement and the progress of students participating in the Project. In addition, the Testing Program will include On-Line Computer Testing to facilitate student and faculty need for easy access to performance measurements.

It is the intent of the City College School of Engineering, Math and Technologies to set a pace and encourage the development of Applied Math Curriculum Modules to provide accommodations for student needs and learning styles; and provide examples of applied curriculum for core disciplines. It is not the intent to develop new courses, rather provide opportunities for industry related, hands-on activities in existing courses. Threads of application customize math courses for those persons interested and enrolled in vocational/transfer programs.

Four math courses have been selected for this two year Project by the
School of Engineering, Math and Technologies Dean, Math Department Chairperson, Engineering/Engineering Technologies Chairperson and designated Applied Math Project Coordinator. The courses and sequence of curriculum development over the two year period are as follows:

<table>
<thead>
<tr>
<th>Semester/Year</th>
<th>Developmental Math</th>
<th>Vocational/Transfer Math</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall, 1994</td>
<td>Math 35: Pre Algebra</td>
<td></td>
</tr>
<tr>
<td>Spring, 1995</td>
<td>Math 54: Elementary Algebra</td>
<td></td>
</tr>
<tr>
<td>Fall, 1995</td>
<td></td>
<td>Math 104: Trigonometry</td>
</tr>
<tr>
<td>Spring, 1996</td>
<td></td>
<td>Math 150: Calculus w/Analytical Geometry</td>
</tr>
</tbody>
</table>
The following specific problems will be addressed in this project:

1. Student Success (Retention) in Developmental Math Classes
   As a result of the Project Activities, Student Success (Retention) Rate in the targeted developmental math classes will increase ten (10) percent.

2. Length of Time for Developmental Class Completion
   As a result of the Project Activities, the length of time for students to complete the targeted developmental classes will decrease ten (10) percent.

3. Vocational/Transfer Math Class Enrollment
   As a result of the Project Activities, the number of students enrolling in vocational/transfer math classes will increase by five (5) percent.

4. Student Success (Retention) in Vocational/Transfer Math Classes
   As a result of the Project Activities, Student Success (Retention) Rate in the targeted vocational/transfer classes will increase ten (10) percent.

5. Student Persistence
   As a result of the Project Activities, Persistence (students enrolling in consecutive semesters) for targeted developmental and vocational/transfer math classes will increase by ten(10) percent.
The targeted populations are those underrepresented and underserved students enrolled in developmental, vocational/transfer math classes at San Diego City College. These students have low student success rates, low persistence rates and low transfer rates.
Objective One: Student Success (Retention) in Developmental Math Classes

By June 30, 1995, increase Student Success (Retention) Rate in the targeted developmental math classes by ten (10) percent as compared to the Spring 1994 retention rate for the targeted developmental math classes.

Objective Two: Length of Time for Developmental Class Completion

By June 30, 1995, decrease the length of time for students to complete the targeted developmental classes by ten (10) percent as compared to the Spring 1994 standard length of time to complete targeted developmental math classes.

Objective Three: Vocational/Transfer Math Class Enrollment

By January 30, 1996, increase the number of students enrolling in the vocational/transfer math classes by five (5) percent as compared to the Spring 1995 enrollment numbers in those same classes.

Objective Four: Student Success (Retention) in Vocational/Transfer Math Classes

By June 30, 1996, increase Student Success (Retention) Rate in the targeted vocational/transfer math classes by ten (10) percent as compared to the Spring 1995 Persistence Rate for the targeted vocational/transfer classes.

Objective Five: Student Persistence

By June 30, 1995, increase Student Persistence Rate for students enrolled in targeted developmental math classes by ten (10) percent as compared to the Spring 1994 Student Persistence Rate.
[No information provided in this document for this section.]
Objective One: Student Success (Retention) in Developmental Math Classes
By June 30, 1995, increase, Student Success (Retention) Rate in the targeted developmental math classes by ten (10) percent as compared to the Spring 1994 retention rate for the targeted developmental math classes.

Impact of the Project

The Fall 1993 median Student Success (Retention) Rate in developmental math classes is 38 percent. As a result of the Project Activities, the introduction of Self-Paced Developmental Courses and Applied Math Curriculum, Retention Rates will increase to 42 percent or higher. This will impact the overall retention rate for San Diego City College, San Diego Community College District and California Community Colleges. The number of students retained in the classroom will increase.

Objective Two: Length of Time for Developmental Class Completion
By June 30, 1995, decrease the length of time for students to complete the targeted developmental classes by ten (10) percent as compared to the Spring 1994 standard length of time to complete targeted developmental math classes.

Impact of the Project

By June 1995, the length of time for students to complete the targeted developmental classes will decrease from the scheduled sixteen weeks. As a result of the Project Activities, with the introduction of Self-Paced Developmental Courses, the length of time for students to complete the targeted courses will be at least 1.6 weeks less. This will impact the number of years it takes for students to get Vocational Certificates, Associate Degrees and Transfer to four year institutions. As a result, this will impact the overall measurement of time for student certificate and degree completion for San Diego City College, San Diego Community College District and California Community Colleges. The time for students to get certificates and degrees will decrease.

Objective Three: Vocational/Transfer Math Class Enrollment
By January 30, 1996, increase the number of students enrolling in
the vocational/transfer math classes by five (5) percent as compared to the Spring 1995 enrollment numbers in those same classes.

Impact of the Project

Currently, 42 percent of the San Diego City College students enroll in vocational/transfer classes. By Spring 1996, students enrolling in the designated vocational/transfer classes will increase to 44 percent or higher. Consideration must be given to the short time span between completion of curriculum development activities and Project completion date. As a result, this will increase the overall number of students enrolled in vocational/transfer math classes at City College, San Diego Community College District and California Community Colleges in long range planning. A greater number of students will be one step closer to degrees and vocations.

Objective Four: Student Success (Retention) in Vocational/Transfer Math Classes

By June 30, 1996, increase Student Success (Retention) Rate in the targeted vocational/transfer math classes by ten (10) percent as compared to the Spring 1995 Persistence Rate for the targeted vocational/transfer classes.

Impact of the Project

The Fall 1993 median Student Success (Retention) Rate in Vocational/Transfer math classes is 38 percent. As a result of the Project Activities, the introduction of Self-Paced Developmental Courses and Applied Math Curriculum, Student Success or Retention will increase to 42 percent or higher. This will impact the overall retention rate for San Diego City College, San Diego Community College District and California Community Colleges. A greater number of students at San Diego City College will experience success in the classroom.

Objective Five: Student Persistence

By June 30, 1995, increase Student Persistence Rate for students enrolled in targeted developmental math classes by ten (10) percent as compared to the Spring 1994 Student Persistence Rate.

Impact of the Project

The Fall 1993 median student Persistence Rate in developmental math classes is 40 percent. As a result of the Project Activities, the persistence rate for students enrolled in the targeted developmental math classes will be 44 percent. With the introduction of Self-Paced Developmental Courses and Applied Math
Curriculum, the Persistence Rate for San Diego City College, San Diego Community College District and California Community Colleges will increase. A greater number of students will be one step closer to degrees and vocations.

Potential Continued Support for all Project Activities In 1993-94, local VATEA funding provided over $30,000 for a Student Math Lab equipment purchases and over $50,000 for Tutorial Services to serve special population students as defined by the Carl Perkins VATEA Act. This Math Lab facility will support hands-on applied math curriculum to vocational students. In 1994-95, plans are being made to fund the staff needed to maintain a Self-Paced Curriculum and Math Tutorial facility. The Fund for Instructional Improvement will provide moneys to develop the corresponding curriculum and instructional materials for the lab and a systemic model to further develop applied core curriculum throughout the campus disciplines. This is a two year Project, providing for the curriculum and development of four courses. After the grant funding period, continued curriculum development efforts will be funded through local VATEA funds.
All performance outcomes will be reported by the Project Coordinator through preparation and dissemination of a Project Summary upon the completion of the Project. The Summary shall address and report the following:

1. Work Statement/Objective/Activity Completion and Identification of Problems that were incurred. Actual dates of completion for Project activities will be reported and compared to dates set in the Annual Workplan and Performance Indicators.

2. Identification of effective methods (processes)

3. Identification of successes (outcomes)


Enrollment records will be collected and documented by the San Diego Community College District Research and Development Office. It is the responsibility of the Project Coordinator to provide the following evaluation documentation:

Objective One: Student Success (Retention) in Developmental Math Classes

By June 30, 1995, increase, Student Success (Retention) Rate in the targeted developmental math classes by ten (10) percent as compared to the Spying 1994 retention rate for the targeted developmental math classes. Means of Measurement for this objective is a baseline number of students retained in Spring 1994 targeted developmental classes before funding and the number of students retained in the same classes, Spring 1995, after funding.

Objective Two: Length of Time for Developmental Class Completion

By June 30, 1995, decrease the length of time for students to complete the targeted developmental classes by ten (10) percent as compared to the Spying 1994 standard length of time to complete targeted developmental math classes. Means of Measurement for this objective is a baseline traditional 16 week semester before funding in Spring 1994 and the measurement of
time in number of weeks for students to complete the targeted developmental classes in Spring 1995.

Objective Three: Vocational/Transfer Math Class Enrollment

By January 30, 1996, increase the number of students enrolling in the vocational/ transfer math classes by five (5) percent as compared to the Spring 1995 enrollment numbers in those same classes. Means of Measurement for this objective is a baseline number of students enrolled in vocational/transfer math classes in Spring and the number of students enrolled in vocational/transfer math classes in Spring 1996.

Objective Four: Student Success (Retention) in Vocational/ Transfer Math Classes

By June 30, 1996, increase Student Success (Retention) Rate in the targeted vocational/transfer math classes by ten (10) percent as compared to the Spring 1995 Persistence Rate for the targeted vocational/transfer classes.

Means of Measurement for this objective is a baseline number of students retained in Spring 1995 targeted vocational/transfer classes before funding and the number of students retained in the same classes, Spring 1996, after funding.

Objective Five: Student Persistence

By June 30, 1995, increase Student Persistence Rate for students enrolled in targeted developmental math classes as compared to the Spring 1994 Student Persistence Rate.

Means of Measurement for this objective is a baseline number of developmental class students who enrolled in two consecutive semesters (persistence) in Spring 1994 targeted developmental classes before funding and the number of developmental class students who enrolled in two consecutive semesters (persistence), Spring 1995.
Dissemination to the California Community Colleges Chancellor's Office of interim and final information regarding Procedures and Activities as well as their effectiveness will be accomplished as follows:

Product to be Disseminated

1. Publish a model curricula which integrates academic and vocational competencies and provide a coherent sequence of applied math modules that meet course curriculum standards. This model will demonstrate the need to utilize multidisciplinary teams of arts and sciences and vocational faculty and industry representation so as to provide the integration and sequencing of academic and vocational curricula in one or more program areas. Instructional strategies for hands-on or applied learning will accommodate students' learning styles and be adaptable to a tech prep format.

2. Publish a model professional development program which enables faculty to acquire the knowledge, skills and methodologies required to integrate academic and vocational competencies which meet industry standards, overcome gender bias and provide support services for special populations.

Target Population for Dissemination: Dissemination of the model curriculum and professional development program will be targeted to California Secondary and Community College Faculty. Integration of math principles across curriculum lines and adaptation of hands-on application to all core courses, not exclusive of math, will be emphasized.

Timetable for Dissemination

California Tech Prep Conference: January, 1995

California Mathematics Council for Community Colleges South: March, 1995

California Engineering Liaison Committee Meeting: March, 1995

TIDE Gender Equity Conference: March, 1995

Methods Used to Disseminate to Target Populations The PROJECT will act as a statewide and national model Project to set curriculum standards for Math. Curriculum Materials and/or Professional Development Workshops will be disseminated at San Diego Community College Flex Day Activities and State Conferences and meetings. Project information will be mailed to ERIC, the
State Chancellor’s Office and the California Community Colleges, as requested.

Evaluation Methods for Dissemination Plan
To evaluate the methods used to disseminate Project information, Leikert-Type Scale evaluations will be distributed to include the following:

- Name of the Organizational Meeting:
- Usefulness of Presentation Topic
- Usefulness of Handouts and Materials
- Clarity of Presentation
- Plans for Implementation
- Knowledge of Material
- Improved Subject Knowledge
- Further In-depth Studies
- Overall Rating of Presentation
- Overall Rating of Presenter
- Suggestions for Improvement