August 22, 2003

TO: Herminio Hernando
             MPS Program Coordinator

FROM: Dr. Andrew LaManque
             De Anza College Researcher

SUBJECT: Math Performance Success Program (MPS), 2002-03

Summary

       The Math Performance Success Program (MPS) is in its third year at De Anza College. The program targets students who have had a particularly challenging time in previous math course attempts and provides additional faculty, counseling and tutoring support. As outlined in Attachment 1 written by Diane Mathios in fall 2002, the program requires that students take a sequence of math courses (Math 101, 105 and Math 10) in a calendar year and requires a commitment to additional instructional time.

       The results of the program are impressive. Students in the program are clearly motivated to do well, but the results seem to point to an environment conducive to learning. As outlined in Attachment 2, in 2001-02, course success rates were 30-40 percentage points higher for MPS students than students not in the program taking the same course during the same term. As will be outlined below, these success rates have continued with the 2002-03 academic year.

       The high success rates for program participants are accompanied by additional costs to the institution. A full assessment of the program would compare the marginal cost of additional student success and learning for the MPS program with the cost for non-MPS sections of the same course. Such an assessment should be conducted under the direction of program faculty to determine if there are aspects of the program that can be replicated for additional students.

Enrollment in 2002-03

       The MPS program ran two sections each term in 2002-03. Figure 1 below identifies the MPS sections.

Figure 1

Term	Course	MPS Sections
Fall 2002	Math 101	10 and 13
Winter 2003	Math 105	15 and 17
Spring 2003	Math 10	13 and 15

As outlined in Figure 2, 52-64 students enrolled in MPS math courses during the three terms, and 739-807 students enrolled in other sections of the same math courses.

Figure 2

Term	Course	# MPS Sections	# Other Sections		MPS Course Enrollment	Other Section Enrollment
Fall 2002	Math 101	2	21		52	739
Winter 2003	Math 105	2	23		55	807
Spring 2003	Math 10	2	21		64	748

Figure 3 lists the ethnic group percentages in each course. The MPS sections have twice as many African American and Hispanic students on a percentage basis, as compared to the non-MPS sections. Overall, about 40% of MPS students are of Hispanic origin. For De Anza College, about 10% of students each term identify themselves as Hispanic.

Figure 3

MPS and Non-MPS Section Student Ethnicity
By Percentage of Course Enrollment
De Anza College, 2002-2003

	Asian	African American	Filipino	Hispanic	Native American	Pacific Islander	White	Other
MATH101. MPS	8%	10%	4%	40%			15%	23%
Other	15%	5%	8%	19%	1%	1%	30%	22%
MATH105. MPS	5%	7%	4%	42%			15%	27%
Other	25%	4%	6%	16%	0%	1%	26%	22%
MATH010. MPS	11%	11%	3%	45%			11%	19%
Other	40%	2%	7%	10%	0%	1%	18%	22%

Source: End of Term Enrollment File.

Methodology

      The computation of Pass (i.e. course "success") uses the grades captured in the end of term enrollment file. Figure 4 outlines the major definitions used in the calculations. As noted in Figure 4, the pass rate for each course does not include students who dropped before receiving a grade of W.

Figure 4

<u>Definitions</u>

The following definitions were used in the calculations. The data reported is from the official end of term enrollment files.

       <u>Pass</u>: includes grades of A,B,C or P
       <u>Did Not Pass</u>:   D,F,NP or I
       <u>Withdrew</u>:   W

For the course GPA calculation, A = 4, B = 3, C =2, D =1, all other grades are coded as 0.

Percents are based on the total grades for the class (including W's) at the end of the term. Students who drop the class before the 3rd week are not counted.

<u>Ethnicity- 'Under Represented'</u> includes students who selected on the application for admission one of the following groups: African American, Filipino, Hispanic, Native American, Pacific Islander.

All other groups, including Asian, White, Other and Decline to State are listed as "All Other."

<u>Language</u> results are based on an application for admission question that reads:
"Primary Language: English [or] Not English."

Not English has been translated into "English Learner." Not all students answer this question.

<u>Results</u>

As graphed in Figure 5 below, for the three terms / courses combined, 89% of MPS students passed compared to 59% of non-MPS students. Similar results outlined in Attachment 3 hold for each course, with Math 101 showing the largest difference in pass rates between MPS students (90%) and non-MPS students (49%) in fall 2002.

Figure 5

**MPS and Non-MPS Students 2002-03
Math 101, 105, 10, De Anza College**
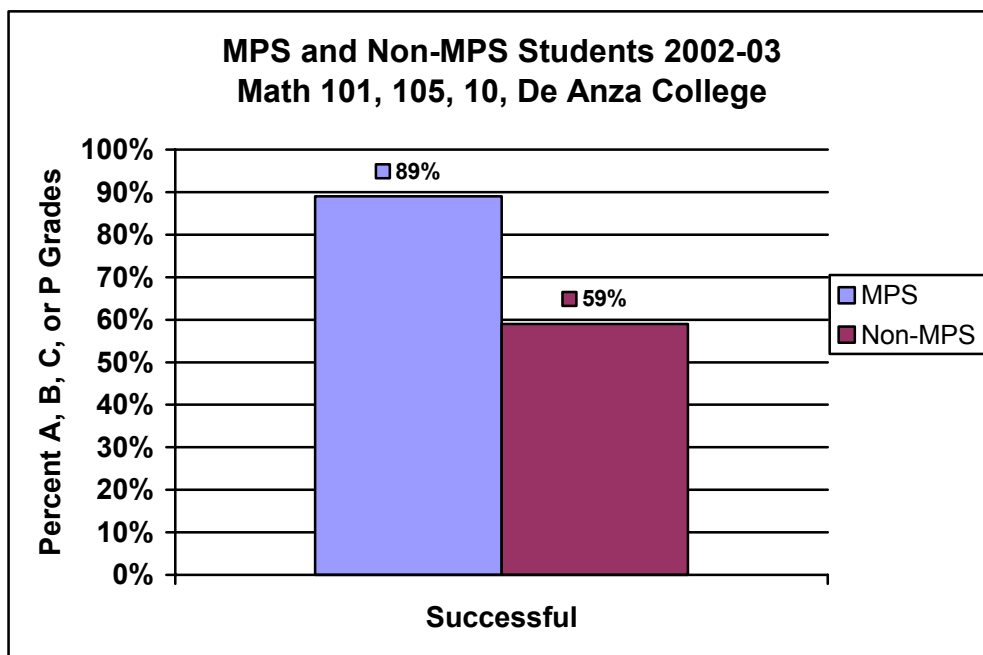
Attachment 3 outlines additional comparisons on the program. When course grades are converted to numerical scores, the average course grades for the two groups are statistically different, with MPS students scoring higher grades on average.

The difference in program results holds across ethnicity. However, further analysis reveals that African American student success as a group lags behind that of Hispanic students. For example, while 95% of Hispanic students passed Math 101, only 60% of African American students passed. The African American numbers are small: Only 5 students were enrolled in the MPS Math 101 in fall 2002, and the success rate is still well above the rate for non-MPS students (35% in Math 101, fall 2002) but the difference suggests further tracking is warranted.

In Math 101 and Math 10, male students in the MPS program had higher pass rates than female students (94% versus 89% and 95% versus 87%, respectively). This result was the opposite for non-MPS students, with female students scoring higher pass rates in Math 101 and Math 10 but not Math 105. While the number of students is small, it may warrant additional investigation into the learning / teaching styles of the participants and instructors.

Again, while the number of students in each category is small, it is interesting to note that English Learners tended to pass at higher rates than students who indicated that English was their primary language. These results held true for both MPS and non-MPS students.

<u>Summary</u>

As measured by course pass rates, MPS students do better on average than students not in the program. While not measuring learning directly, this result suggests that students learn more math skills / knowledge in the MPS program than they would have otherwise. It is suggested that future assessments examine the learning that takes place in both MPS and non-MPS sections via an instrument that measures learning directly, for example, the same end of term exam given to all students passing the same course. Future work might also compare the instructional methods used in the MPS sections to those found in non-MPS sections.

Attachment 1

Math Performance Success Program
Diane Mathios, Fall 2002

The Math Performance Success Program (MPS) offers students a team approach to success, particularly for those who have had difficulty in previous math courses. Instructors, counselors and tutor/mentors collaborate to help students complete their mathematics requirements. Students take elementary algebra in the fall, intermediate algebra in the winter, and a college-transferable math class in the spring. Two sections each quarter of MPS classes are offered.

The MPS Program serves a diverse group of students. Students are recruited from several De Anza College programs, including SLAMS, STARS, EOPS, PUENTE, DSS and EDC. In addition, the program actively seeks to include students from those groups who have traditionally had poor success in basic skills and college math courses.

Students in the MPS Program attend class for two hours of instruction. This instructional time provides both whole class activities as well as collaborative group work, with group work comprising about 50% of the instructional time. The course instructors collaborate on the instruction, using a common calendar, similar activities and common tests. Mentor/tutors are available during the class to assist students who have questions about the material.

A counselor is available for each class section. The counselor and instructor work closely to ensure student success. The counselor is available daily during class to talk to students regarding their grade to date, missing assignments and absences. In addition, the counselor provides individual and academic counseling for students in the program. The MPS team of instructors and counselors meets on a weekly basis to plan program activities and discuss concerns related to students' achievement in the class.

In addition to in-class tutoring, the program offers students group tutoring outside of class. Each week, approximately 40 hours of tutoring are offered at various times throughout the day and early evening. The tutors are trained to reinforce the methods and approach taught in the regular class. For students interested in working with other students outside of class, study groups have been formed. Whenever possible, a tutor also attends the study group to assist with student questions.

The program also arranges for guest speakers to visit the classes. These speakers have included men and women working in technical fields, motivational speakers, and informational sessions on transfer agreements to the UC or CSU system.

MPS Program team members are dedicated to the philosophy that any willing student with the proper support and services can be successful in mathematics. The MPS Program has served more than 325 students in the previous three years.

Attachment 2

Math Performance Success Program
Statistics for 2001 – 2002 Academic Year
December 10, 2002

QUARTER	COURSE	COURSE SUCCESS		COURSE NON-SUCCESS		COURSE WITHDRAW		RETENTION		TOTAL #	
		MPS	Non-MPS	MPS	Non-MPS	MPS	Non-MPS	MPS	Non-MPS	MPS	Non-MPS
Fall 2001	Math 101	80%	52%	11%	23%	9%	25%	91%	75%	82	709
Winter 2002	Math 105	88%	52%	9%	22%	3%	27%	97%	73%	101	750
Spring 2002	Math 10	93%	72%	6%	11%	1%	17%	99%	83%	68	716
Spring 2002	Math 11	92%	71%	0%	14%	8%	15%	92%	85%	24	378

Source: De Anza College MPS Program; FHDA Institutional Research

Definitions:

Course Success %:   Number of students receiving an A, B, C, CR, or P grade / total number of students receiving a grade.

Course Non-Success %:   Number of students receiving a D, F, or NP grade/ total number of students receiving a grade.

Course Withdraw %:   Number of students who withdrew after 3rd week census/total number of students enrolled at end of 3rd week census.

Retention %:   Number of students receiving a successful or non-successful grade/total number of students receiving a grade.

MPS: All math sections offered by the MPS Program.

Non-MPS: All math sections offered excluding math sections offered by the MPS Program.

De Anza Research: http://dilbert.fhda.edu/daresearch/   22-Aug-03

MATH101.   ELEMENTARY ALGEBRA

Overall Rate

	Pass Percent	Did Not Pass Percent	Withdrew Percent
MPS	90%	6%	4%
Other	49%	25%	25%

Avg Grade	
2.87	* Difference Statisitically Significant
1.43	

Student Enrollment (HC)

			Pass HC	Pass Percent	Did Not Pass HC	Did Not Pass Percent	Withdrew HC	Withdrew Percent	Total HC	Total Percent
MATH101.	2002F	MPS	47	90%	3	6%	2	4%	52	100%
		Other	365	49%	187	25%	187	25%	739	100%

By Gender

			Pass HC	Pass Percent	Did Not Pass HC	Did Not Pass Percent	Withdrew HC	Withdrew Percent	Total HC	Total Percent
MATH101.	MPS	Female	31	89%	2	6%	2	6%	35	100%
		Male	16	94%	1	6%			17	100%
	Other	Female	222	54%	92	22%	100	24%	414	100%
		Male	143	44%	95	29%	87	27%	325	100%

By Ethnicity

			Pass HC	Pass Percent	Did Not Pass HC	Did Not Pass Percent	Withdrew HC	Withdrew Percent	Total HC	Total Percent
MATH101.	MPS	Under Represented	25	89%	2	7%	1	4%	28	100%
		All Other	22	92%	1	4%	1	4%	24	100%
	Other	Under Represented	100	40%	77	31%	71	29%	248	100%
		All Other	265	54%	110	22%	116	24%	491	100%

By Language

			Pass HC	Pass Percent	Did Not Pass HC	Did Not Pass Percent	Withdrew HC	Withdrew Percent	Total HC	Total Percent
MATH101.	MPS	English	35	90%	2	5%	2	5%	39	100%
		English Learner	3	100%					3	100%
		Not Reported	9	90%	1	10%			10	100%
	Other	English	290	49%	148	25%	154	26%	592	100%
		English Learner	26	57%	8	17%	12	26%	46	100%
		Not Reported	49	49%	31	31%	21	21%	101	100%

De Anza Research: http://dilbert.fhda.edu/daresearch/   22-Aug-03

MATH105.   INTERMED ALGEBRA

Overall Rate

	Pass	Did Not Pass	Withdrew
	Percent	Percent	Percent
MPS	89%	4%	7%
Other	58%	21%	21%

Avg Grade
2.73 * Difference Statisitically Significant
1.78

Student Enrollment (HC)

			Pass		Did Not Pass		Withdrew		Total	
			HC	Percent	HC	Percent	HC	Percent	HC	Percent
MATH105.	2003W	MPS	49	89%	2	4%	4	7%	55	100%
		Other	471	58%	168	21%	168	21%	807	100%

By Gender

			Pass		Did Not Pass		Withdrew		Total	
			HC	Percent	HC	Percent	HC	Percent	HC	Percent
MATH105.	MPS	Female	34	89%	1	3%	3	8%	38	100%
		Male	15	88%	1	6%	1	6%	17	100%
	Other	Female	253	57%	100	23%	88	20%	441	100%
		Male	218	60%	68	19%	80	22%	366	100%

By Ethnicity

			Pass		Did Not Pass		Withdrew		Total	
			HC	Percent	HC	Percent	HC	Percent	HC	Percent
MATH105.	MPS	Under Represented	26	90%	1	3%	2	7%	29	100%
		All Other	23	88%	1	4%	2	8%	26	100%
	Other	Under Represented	120	55%	51	24%	46	21%	217	100%
		All Other	351	59%	117	20%	122	21%	590	100%

By Language

			Pass		Did Not Pass		Withdrew		Total	
			HC	Percent	HC	Percent	HC	Percent	HC	Percent
MATH105.	MPS	English	37	86%	2	5%	4	9%	43	100%
		English Learner	3	100%					3	100%
		Not Reported	9	100%					9	100%
	Other	English	361	57%	129	21%	138	22%	628	100%
		English Learner	37	67%	8	15%	10	18%	55	100%
		Not Reported	73	59%	31	25%	20	16%	124	100%

MPS Grade Distributions for 2002-03

De Anza Research: http://dilbert.fhda.edu/daresearch/   22-Aug-03

MATH010.   ELEM STATS/PROBABILITY

Overall Rate

	Pass Percent	Did Not Pass Percent	Withdrew Percent
MPS	89%	6%	5%
Other	69%	11%	21%

	Avg Grade	
MPS	2.81	* Difference Statisitically Significant
Other	2.12	

Student Enrollment (HC)

			Pass HC	Pass Percent	Did Not Pass HC	Did Not Pass Percent	Withdrew HC	Withdrew Percent	Total HC	Total Percent
MATH010. 2003S		MPS	57	89%	4	6%	3	5%	64	100%
		Other	513	69%	79	11%	156	21%	748	100%

By Gender

			Pass HC	Pass Percent	Did Not Pass HC	Did Not Pass Percent	Withdrew HC	Withdrew Percent	Total HC	Total Percent
MATH010.	MPS	Female	39	87%	3	7%	3	7%	45	100%
		Male	18	95%	1	5%			19	100%
	Other	Female	274	69%	39	10%	82	21%	395	100%
		Male	239	68%	40	11%	74	21%	353	100%

By Ethnicity

			Pass HC	Pass Percent	Did Not Pass HC	Did Not Pass Percent	Withdrew HC	Withdrew Percent	Total HC	Total Percent
MATH010.	MPS	Under Represented	33	87%	2	5%	3	8%	38	100%
		All Other	24	92%	2	8%			26	100%
	Other	Under Represented	99	64%	19	12%	37	24%	155	100%
		All Other	414	70%	60	10%	119	20%	593	100%

By Language

			Pass HC	Pass Percent	Did Not Pass HC	Did Not Pass Percent	Withdrew HC	Withdrew Percent	Total HC	Total Percent
MATH010.	MPS	English	42	89%	3	6%	2	4%	47	100%
		English Learner	5	83%			1	17%	6	100%
		Not Reported	10	91%	1	9%			11	100%
	Other	English	335	66%	57	11%	119	23%	511	100%
		English Learner	71	79%	7	8%	12	13%	90	100%
		Not Reported	107	73%	15	10%	25	17%	147	100%

SQL Program

```sql
CREATE VIEW IRPASL.VW_MPS_CRSE_GRADES
                              (INST,
                              INST_CD,
                              FISCAL_YEAR,
                              TERM,
                              TERM_CD,
                              COURSE,
                              SECTION_3,
                              COURSE_TITLE,
                              SID,
                              OFFICIAL_GRADE,
                              GPA,
                              SUCCESS_GROUP,
                              SUCCESS_IND,
                              ETHNICITY,
                              ETHNIC_GROUP,
                              GENDER,
                              NATIVE_LANGUAGE,
                              DISTANCE_LEARNING_IND,
                              MPS_SECTION_IND,
                              RECORD_COUNT)
AS SELECT DISTINCT
                              AL1.College,
                              'De Anza College',
                              AL1.FISCAL_YEAR,
                              AL1.TERM,
CASE
WHEN SUBSTRING (AL1.TERM,5,1) = 'W' THEN SUBSTRING(AL1.TERM,1,4) + '01'
WHEN SUBSTRING (AL1.TERM,5,1) = 'S' THEN SUBSTRING(AL1.TERM,1,4) + '02'
WHEN SUBSTRING (AL1.TERM,5,1) = 'M' THEN SUBSTRING(AL1.TERM,1,4) + '03'
WHEN SUBSTRING (AL1.TERM,5,1) = 'F' THEN SUBSTRING(AL1.TERM,1,4) + '04'
ELSE 'NA'
                              END AS TERM_CD,
                              AL1.Course,
                              AL1.SECTION_3,
                              AL3.COURSE_TITLE,
                              AL1.Sid,
                              AL1.Official_Grade,
                              case when al1.official_grade = 'P' then 3
                                        when AL1.official_grade = 'A' then 4
                                        when AL1.official_grade = 'B' then 3
                                        when AL1.official_grade = 'C' then 2
                                        when AL1.official_grade = 'D' then 1
                                   else 0 end AS GPA,
                              case when al1.official_grade = 'P' then 'Pass'
                                        when AL1.official_grade = 'A' then 'Pass'
                                        when AL1.official_grade = 'B' then 'Pass'
                                        when AL1.official_grade = 'C' then 'Pass'
                                        when AL1.official_grade = 'W' then 'Withdrew'
                                        when AL1.official_grade = 'WR' then 'Withdrew'
                                   else 'Did Not Pass' end AS SUCCESS_GROUP,

                              case
                                        when al1.official_grade = 'P' then 'Y'
                                        when AL1.official_grade = 'A' then 'Y'
                                        when AL1.official_grade = 'B' then 'Y'
                                        when AL1.official_grade = 'C' then 'Y'
                                        when AL1.official_grade = 'W' then  'N'
                                        when AL1.official_grade = 'WR' then 'N'
                                   ELSE 'N' END AS SUCCESS_IND,
                              ETHNICITY,
                              CASE
                                   WHEN AL1.ETHNICITY = 'Black' then 'Under Represented'
                                   WHEN AL1.ETHNICITY = 'Hispanic' then 'Under Represented'
                                   WHEN AL1.ETHNICITY = 'Pacific Islander' then 'Under Represented'
                                   WHEN AL1.ETHNICITY = 'Filipino' then 'Under Represented'
                                   WHEN AL1.ETHNICITY = 'Native American' then 'Under Represented'
                                   ELSE 'All Other' END AS ETHNIC_GROUP,
```

```
CASE  WHEN AL1.GENDER = 'Unrecorded' THEN 'Female' ELSE AL1.GENDER END AS GENDER,
case   when AL2.Native_Language_Cd = 'E' then 'English'
       when AL2.Native_Language_Cd = 'N' then 'English Learner'
       else 'Not Reported' end AS NATIVE_LANGUAGE,
CASE
       WHEN SUBSTRING (AL1.SECTION_3,3,1 )= 'Z' THEN 'Distance Section'
       ELSE 'Traditional Section' END AS DISTANCE_LEARNING_IND,
CASE
WHEN AL1.TERM+AL1.COURSE+AL1.SECTION_3= '2002FMATH101.10' THEN 'MPS'
WHEN AL1.TERM+AL1.COURSE+AL1.SECTION_3= '2002FMATH101.13' THEN 'MPS'
WHEN AL1.TERM+AL1.COURSE+AL1.SECTION_3= '2003WMATH105.15' THEN 'MPS'
WHEN AL1.TERM+AL1.COURSE+AL1.SECTION_3= '2003WMATH105.17' THEN 'MPS'
WHEN AL1.TERM+AL1.COURSE+AL1.SECTION_3= '2003SMATH010.13' THEN 'MPS'
WHEN AL1.TERM+AL1.COURSE+AL1.SECTION_3= '2003SMATH010.15' THEN 'MPS'
ELSE 'Other' END AS INCLUDED_MPS_SECTION_IND,
                                                    '1'
FROM
                           IRPASL.LOOKUP_COURSE_TITLE AL3,
                           IRPASL.ENROLLMENT AL1 LEFT OUTER JOIN
                                        IRPASL.LA_NATIVE_LANGUAGE AL2 ON AL1.SID = AL2.SID
WHERE
                                 AL1.College = 'DA'
AND (NOT AL1.Official_Grade IS NULL)
AND AL1.TERM+AL1.COURSE IN ('2002FMATH101.','2003WMATH105.','2003SMATH010.')
AND AL1.COURSE = AL3.COURSE
/* */
```