

Increasing Students' Academic Success Through Research-Based Program Development, Implementation, and Evaluation

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The purpose of this paper is to discuss the educational benefits of using institutionally specific research to understand student academic achievement patterns so as to develop and implement effective academic support services. We will describe several research studies and the academic support programs that we developed based on our findings so as to exemplify our success with this technique at the University of California Santa Cruz. On our campus, we focus on developing intensive academic support programs to address two major academic issues: ensuring student retention by minimizing student academic failure and improving student access to “educational equity” and “inclusion in excellence.”

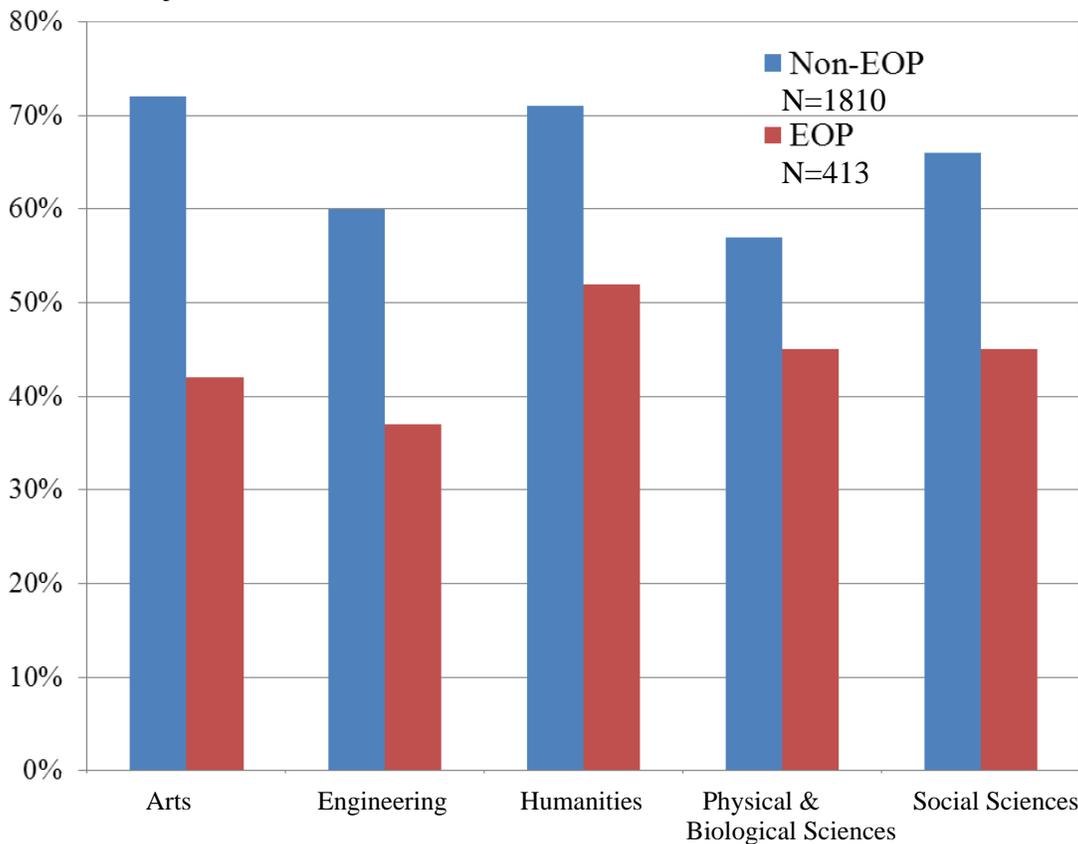
Although almost all of our students meet the academic standards of UC eligibility (only approximately 2 to 4% per year being offered Admit by Exception status), our research indicates that students who have attended low-performing high schools, come from low-income backgrounds, and are the first in their family to attend a university, are more likely to experience academic difficulty and fail-out of the university. Additionally, they are also more likely to achieve cumulative Grade Point Averages below those of their peers from more privileged backgrounds throughout their entire four to six years at UCSC. Therefore, it has become a major goal of Learning Support Services at UCSC to conduct research to identify key academic problem areas and to design course-specific academic support programs.

We will present several examples to illustrate our strategies including: a study of our two levels of Math below calculus, College Algebra (Math 2) and Pre-Calculus (Math 3), that resulted in changes to the configuration of course sections and the implementation of a Math 2 Stretch course, allowing students two quarters to master College Algebra; a study of students academic success in our required freshman composition courses resulting in changes in our placement process and our tutorial support; a study of students' academic performance in a writing-intensive Latin American/Latino Studies course and the writing-intensive support model that emerged; and research validating our conjecture that at-risk students benefit from supplemental instruction and tutoring that resulted in required Academic Success Plans for certain groups of students. In all of these instances, we sensed the existence of a serious educational problem that disadvantaged specific students. Using our findings, we designed and implemented academic support models, and continually collect quantitative and qualitative evaluation data to monitor our effectiveness in assisting students' to improve their academic performance.

Academic Support Services as a Response to Educational Inequity

Through a longitudinal study of the cohort of students who entered UCSC as frosh in 2005, Learning Support Services confirmed our suppositions that UCSC has not yet succeeded in establishing educational equity for its students. Students from low-performing high schools, the first in their families to attend a university, who are often students of color, and are given EOP status, are not achieving educational excellence as frequently as are their more privileged peers. Figure 1 presents a comparison of cumulative GPA's of fourth-year EOP and non-EOP students in the 2005 cohort by Academic Division based on their academic majors.

Figure 1 Fall 2005 Frosh Cohort: Percentage of Students Whose Cumulative GPA>2.99 by Current Major Division as of Fall 2008, EOP v. Non-EOP



It is obvious that EOP students are consistently achieving fewer cumulative GPA's of 3.0 and above, thus making it less likely that they will have options to attend graduate school programs that will prepare them for interesting, well-paying professional careers. This was especially true in the Social Science Division, a division that traditionally attracts many EOP students who attend UCSC.

Developing and implementing effective academic support programs to equalize students' opportunities to achieve academic excellence at UCSC is a major goal of Learning Support Services. These academic support programs first become available during

students' first year and continue even through such upper-division courses as senior seminars.

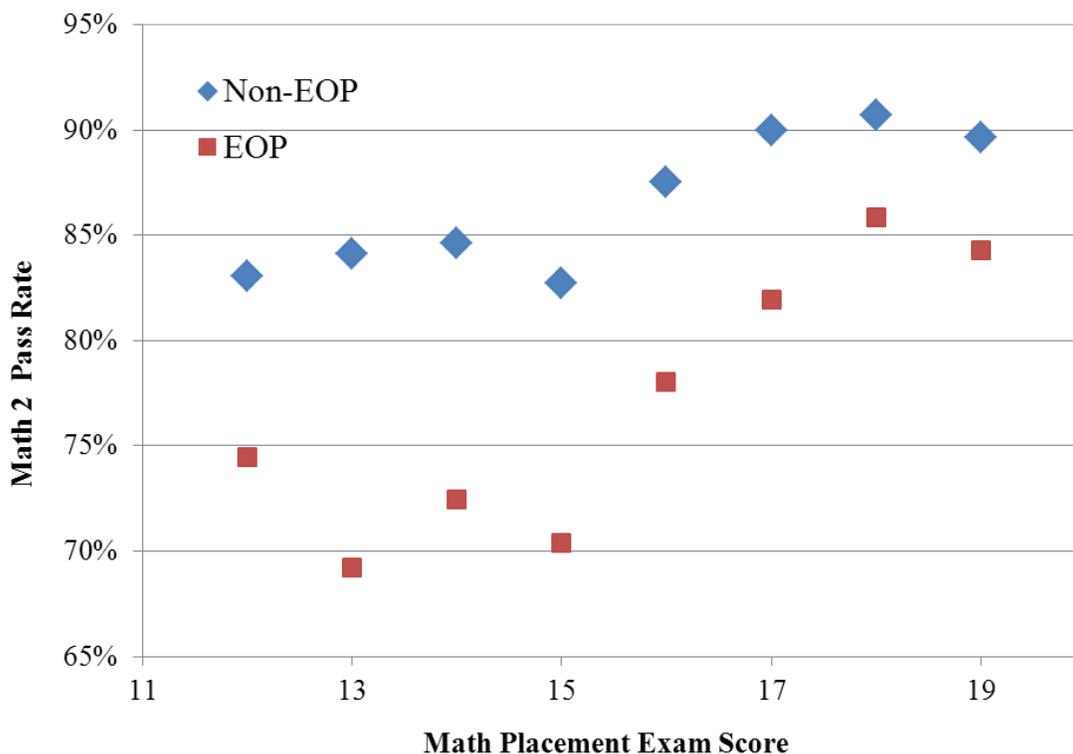
Increasing Student Success in Math 2, College Algebra and Math 3, Pre-Calculus

Several years ago it became very clear to Learning Support Services, the Mathematics Department, and the Physical and Biological Sciences Division that students who enter UCSC underprepared in mathematics were seriously hampered from pursuing their initially preferred major of study. At UCSC, mathematical competence at the level of eligibility for calculus is required of all majors in the School of Engineering, Division of Physical and Biological Sciences, Economics, and Psychology. However, the overall pass rate in Math 2 (College Algebra) was below 75% and the overall pass rate in Math 3 (Pre-Calculus) fluctuated from 64 to 97% depending on the quarter and teacher effect. Obviously, we knew that we needed to design extensive academic support programs for these students. Simply supporting these classes with supplemental instruction and tutoring that students were encouraged to use voluntarily was not adequately addressing the students' learning needs.

In our initial study, we traced the academic achievement trends of students based on their demonstrated preparation for Math 2 as assessed by the UCSC Mathematics Placement Examination (MPE) (required of UCSC students prior to enrollment in their first math class). Our first academic intervention was to restructure the required sections for Math 2. Rather than continuing to offer the traditional one hour per week required sections of 25 to 30 students, we offered twice-a-week sections of from 12 to 15 students led by trained undergraduate Learning Assistants to all students who scored below the mid-point of an Algebra Readiness Exam. We introduced this exam, now given on the first day of class, to provide a course-specific assessment focus that provides more detailed analysis of students' preparation for Math 2 than the MPE. These measures improved the pass rates in Math 2 to 82 to 87% (winter, 2005-fall, 2008).

Even while the overall class pass rate was increasing, it became apparent that students who scored below the midpoint of the MPE range for Math 2 continued to struggle. Figure 2 illustrates the differences in Math 2 pass rates for EOP and non-EOP students.

Figure 2 Math 2 Pass Rate vs. MPE for Non-EOP and EOP Students, Fall 2004-Fall 2009



In spite of the improved Math 2 pass rates based on the introduction of the twice-a-week sections, many students continued to fail the class. As the sole purpose of Math 2 from a student’s perspective is to prepare him/her for Math 3 or other Math and statistics classes, we remained concerned about a group of students who, even with the twice-a-week sections, continued to earn non-passing grades in Math 2.

One group of students, those who scored low on both the MPE and the Algebra Readiness Exam, seemed to need a different instructional option to master their college algebra skills in order to successfully pass Math 2 and move into pre-calculus or decide to seek a major devoid of mathematics requirements without the consequences of an F on their transcripts. Therefore, the Math Department, Learning Support Services and the Office of the Vice Provost and Dean of Undergraduate Education developed Math 2 Stretch, a two-quarter, 7 unit Math 2 instructional model. In this stretch course students begin and end in the Math 2 lecture setting, but spend the end of the first quarter and the beginning of the second quarter in a small section taught by a graduate student Teaching Assistant where they review the first part of the course material and pre-learn the second part of the course material. As Table 1 will indicate, the pass rate in Math 2 Stretch in fall/winter 2010-11 was higher than the pass rate in Math 2 for like students with MPE and Algebra Readiness Exam scores in the low ranges.

Table 1 Pass Rates for Math 2 and Math 2 Stretch Students with Low MPE Scores and Algebra Readiness Exam Scores

	Pass Rate
Math 2 Fall 2010	48%
Math 2 Winter 2011	60%
Math 2 Stretch Fall/Winter 2010-11	73%

Having explained our progress in increasing the likelihood of students' academic success in Math 2, we will discuss the equal challenge of assisting more students to succeed in Math 3, Pre-Calculus.

A trend that is disturbing is that students in Math 2 who move on to Math 3 tend to earn one grade lower in Math 3 than they did in Math 2. Table 2 illustrates these distressing academic achievement patterns.

Table 2 Math 3 Pass Rates Based on Math 2 Grade and Section Utilization

Math 2 Grade	Once-a- week Math 3 sections	Std Dev	Total Students N	Twice-a- week Math 3 sections	Std Dev	Total Students N
C	1.07	1.06	63	1.16	1.28	45
B	2.00	1.01	92	2.36	.94	23
A	2.99	.94	59	3.46	.70	21

The discrepancy in pass rates based on teacher-effect makes Math 3 data more difficult to study longitudinally. Yet, although student pass rates in Math 3 varied widely, a group of EOP students who scored below the mid-point of the MPE placement range for Math 3 placement exhibited academic difficulty each quarter similar to that experienced by the same level students in Math 2. Therefore, LSS implemented small twice-a-week sections in Math 3 as an option for students. Based on students' pass rates, as Table 3 illustrates, students' have demonstrated improvement when they attend these small, twice-a-week required, Math 3 sections.

Table 3 Math 3 Pass Rates Based on EOP Status, MPE Score, and Section Utilization

MPE Score 20-24	Once-a-week % Pass (N)	Twice-a-week % Pass (N)
Non-EOP	71% (351)	84% (173)
EOP	63% (141)	73% (95)

These twice-a-week sections have been helpful to all students but we are still concerned that more program innovation is needed. We still see the pattern where EOP students in the MPE score range below the midpoint used for Math 3 class placement continue to struggle to pass Math 3. Twice a week sections are helpful, but we may need to consider a stretch model for Math 3 as well.

It is our continual careful collection and analysis of student achievement data in Math 2 and 3 that has enabled us to propose a series of academic support models that have proven to be effective. Yet, students entering UCSC with underdeveloped university level mathematical skills continue to be at risk of facing academic difficulty in both required general education and major related classes.

Investigating Student Achievement Trends and Adjusting Academic Support Strategies in the Required Freshman Composition Courses

As we review data each year regarding the academic achievement trends of UCSC students sorting them by such factors as ethnicity, their High School's Academic Performance Index score, EOP status, method of satisfying the Entry Level Writing Requirement (ELWR), Math Placement Examination Score, etc., we find that first year students who do not satisfy ELWR by examination before or within their first (fall) quarter are far less likely to graduate from UCSC with a cumulative Grade Point Average of 3.0 or above. This is concerning, as their options for post baccalaureate professional licensing and graduate school programs are thus greatly diminished.

From a longitudinal study of the 2008 Frosh Cohort, we know that students who satisfied ELWR either by earning a score of 8 or higher on the Analytic Writing Placement Examination (AWPE) exam in May or September and thus satisfying ELWR before beginning their first quarter at UCSC, or by earning an 8 or above on the November AWPE and, therefore, satisfying ELWR prior to the end of fall quarter, on average earned higher grades in the required second quarter of the UCSC 2-quarter frosh composition series, as well as earning higher grades in other lower-division writing-based classes in Economics, Psychology, Sociology, etc.

At UCSC there are two ways for students to satisfy ELWR: the first is by earning a score of 8 or above on the AWPE given once before fall quarter begins (a May or a September option) or toward the end of students' first quarter in November. Students who do not satisfy ELWR by examination are allowed to do so by submitting a portfolio of their writing. The portfolio process is carefully constructed and evaluated by two or more Writing Program faculty. Yet, as Table 4 will illustrate, important composition skill-level differences reflecting students' pre-UCSC competence as writers seem to remain evident even as students move into upper-division courses.

Data presented in Table 4 is part of the Learning Support Services longitudinal study of academic writing trends. Our original cohort is 2,184 students. These students entered as first year students in fall of 2008, satisfied ELWR by exam or portfolio, and then took Writing 2, Rhetoric and Inquiry, by the end of spring, 2010. 75.5% (N=1,649) students passed ELWR by exam and at the start of spring, 2011, 15.3% (N=253) of this group were not enrolled in UCSC. 24.5% (N=535) passed by portfolio and at the start of spring, 2011, 18.7% (N=100) of this group were not enrolled in UCSC. The following

table presents cumulative GPA data for the students in the 2008 cohort that remain at UCSC.

Table 4 Cumulative GPA (Winter, 2011) of Fall 2008 Cohort By ELWR Satisfaction Method and EOP Status

Satisfaction Method	Non-EOP		EOP	
	N	Cum. Mean GPA (SE)	N	Cum. Mean GPA (SE)
Exam	1081	3.12 (0.012)	315	2.98 (0.024)
Portfolio	207	2.93 (0.027)	228	2.75 (0.023)

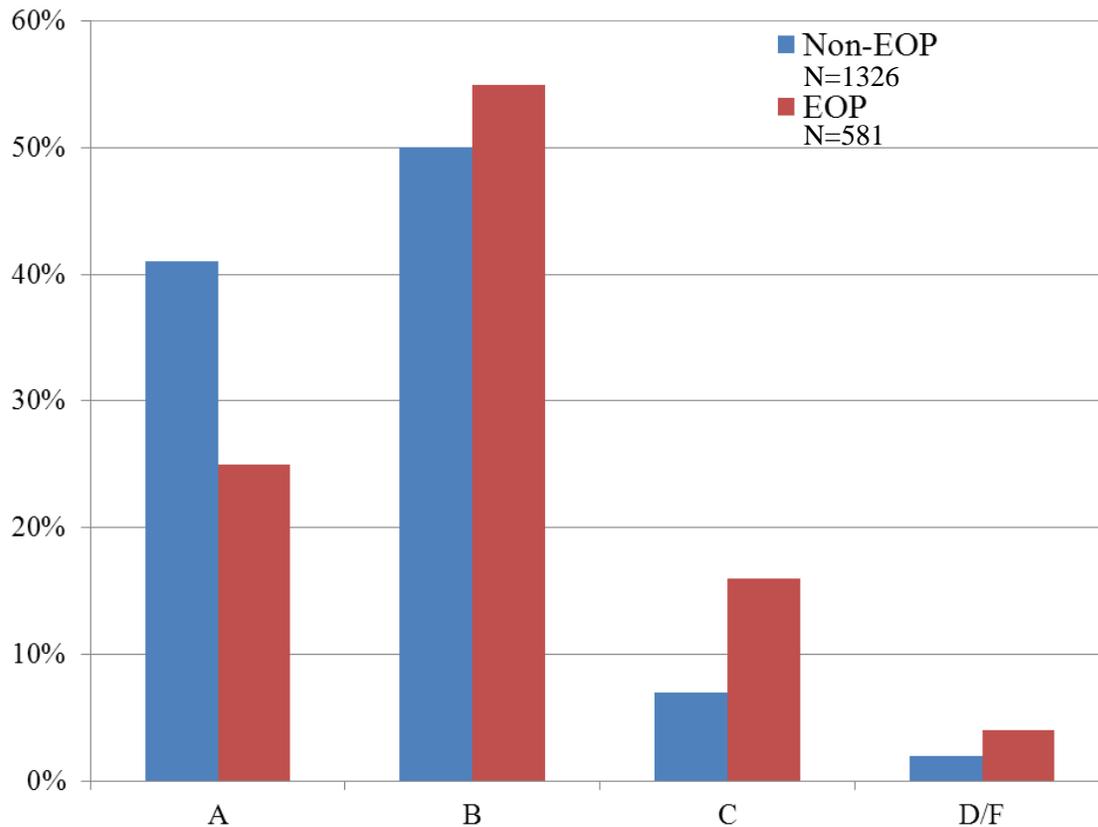
As these data make evident, the EOP students who satisfied ELWR by portfolio, as a group, have the lowest cumulative GPA, 2.75. As this data presents their cumulative GPA's as they are beginning the third quarter of their third (junior) year, if they graduate in four years, they may have only 3 additional quarters in which to improve their academic achievement records. In these very competitive times, it is highly unlikely that any UCSC graduate without a minimum of a 3.0 cumulative GPA will be likely to be accepted into a terminal Master's degree or professional licensing program (law, teaching, social work, business, etc.). Therefore, Learning Support Services remains challenged to develop and implement academic support programs in partnership with the Writing Program and academic departments that rely on analytic writing as a means of assessing students' learning.

All first quarter students at UCSC must take the first of two required composition courses, College Core. They are divided into ELWR satisfied and ELWR non-satisfied sections. Students who do not satisfy ELWR by the end of fall quarter are required to enroll in Writing 20 in winter, but those who have satisfied ELWR may enroll in Writing 2, the second required lower-division composition course at UCSC.

Before discussing student academic achievement trends in Writing 2, we will present a short summary of a finding that has influenced our academic support for Writing 20, a winter quarter required course for students who did not satisfy ELWR by the end of fall quarter. As is probably obvious, Writing 20 has a high proportion of students whose home language is a language other than English and whose backgrounds have resulted in their having EOP status. Based on our detailed analysis of the relationship of students' participation in individual tutoring offered to Writing 20 students, we discovered that there was a significant positive correlation between number of hours of tutoring and ELWR satisfaction for students who received more than four hours of tutoring by the end of the class ($r=.192$, $P=0.021$, $N=90$). Therefore, Learning Support Services/the Writing Program now requires Writing 20 students to participate in a minimum of 5 hours of tutoring.

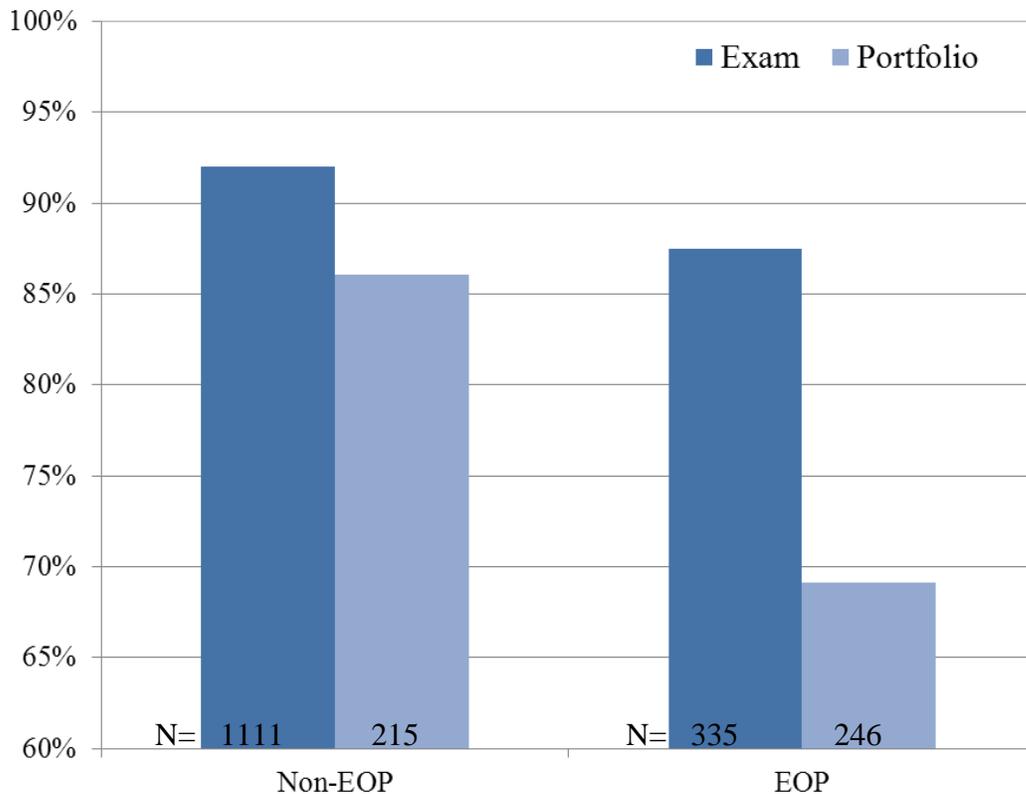
In an extensive study of students' academic success patterns in Writing 2, LSS uncovered several trends. As Figure 3 will illustrate, EOP students do less well in Writing 2 than their non-EOP peers.

Figure 3 Writing 2 Grade Distribution by EOP Status



This grade difference is especially true when EOP students satisfy the ELWR requirement by submitting a portfolio rather than satisfying the requirement by examination, as illustrated in Figure 4. Because 80% of EOP and 90% of non-EOP students earned grades of A or B in Writing 2, we simplified the analysis presented in Figure 4. It is noteworthy, though, that the EOP students did earn the majority of the C, D, and F grades given in Writing 2 (see Figure 3).

Figure 4 Percent of Students in Writing 2 with As and Bs by EOP Status and Method of ELWR Satisfaction



In essence, then, the initial writing hierarchy of student achievement apparent in incoming UCSC students, if it is not mitigated by the end of fall quarter via the Analytic Writing Placement Examination, remains visible by the end of their required lower-division composition classes. We must admit that we are still searching for remedies to this academic inequality. We will discuss a few of our initial attempts here.

In response to the data in Figure 4 illustrating the difference between EOP students' success in Writing 2 based on their satisfaction of ELWR by portfolio rather than by examination, the Writing Program has changed the configuration of its portfolio format to include more non-instructor/tutor assisted student writing. Last fall, the first quarter of this change, resulted in a decrease of the number of students who satisfied the ELWR requirement by portfolio at the end of fall quarter, thus resulting in more students being required to enroll in another ELWR non-satisfied writing class, Writing 20.

One Learning Support Services program, Writing 2, course-attached, group writing tutoring, has demonstrated success in establishing increased educational equity in Writing 2 sections. Yet, it is an expensive program, and one that is not appealing to more than a few Writing 2 instructors. We do provide some sections of Writing 2 (per instructor request and available funding) with required group tutoring. Students spend one and one-half hours per week in peer guided writing groups of five students where they share plans, drafts, and paper revisions. Our study of Writing 2 revealed that the difference

between the academic achievement trends of EOP and non-EOP students decreased in the course sections supported with required group tutoring.

As demonstrated by Figures 5 and 6, in the Writing 2 course sections within which group tutoring was required, the grade distribution differences between EOP and non-EOP students became minimal. In fact, the grade distribution favoring non-EOP students is statistically significant in Writing 2 sections not supported by Writing 2 group tutoring (Kolmogorov-Smirnov =3.189, $P < 0.00$), but this difference is almost erased in Writing 2 sections supported by required group tutoring (K-S=0.289, $P = 1.00$). Group tutoring seems to have mitigated this EOP achievement gap in Writing 2. Therefore, we have attempted to increase the number of Writing 2 sections supported with group tutoring.

Figure 5 Writing 2 Grade Distribution by EOP Status for Students not in Required Group Tutoring

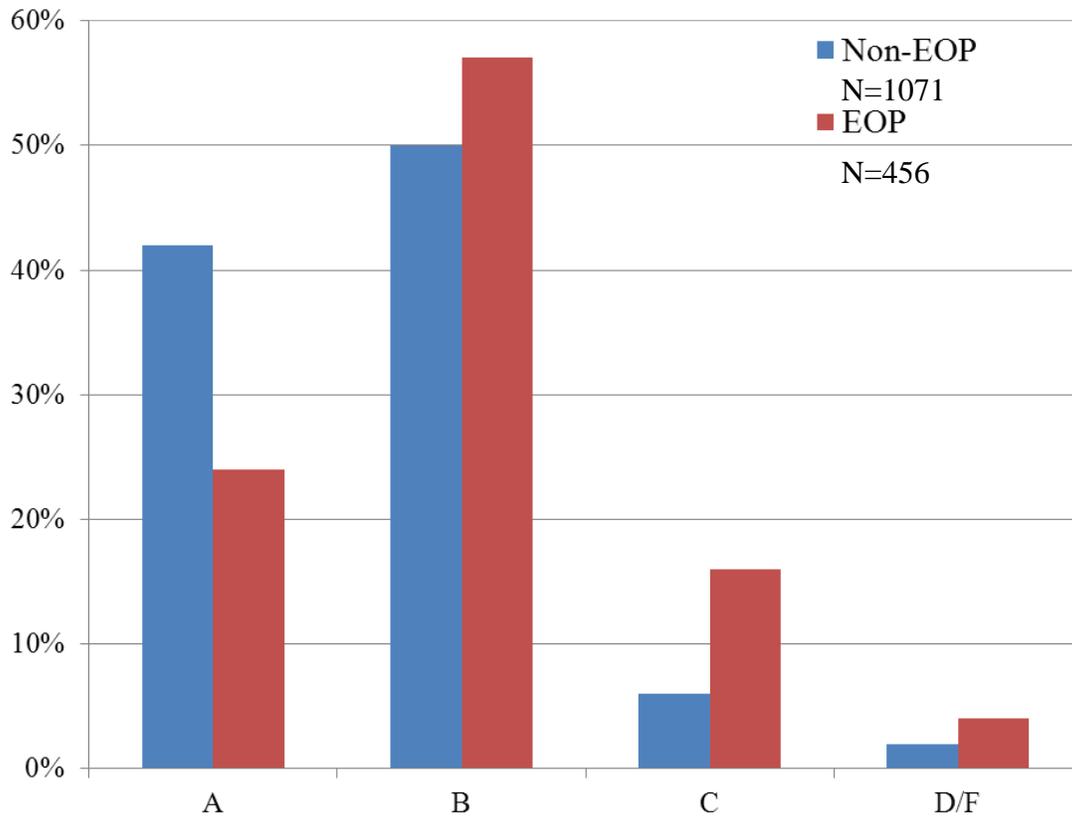
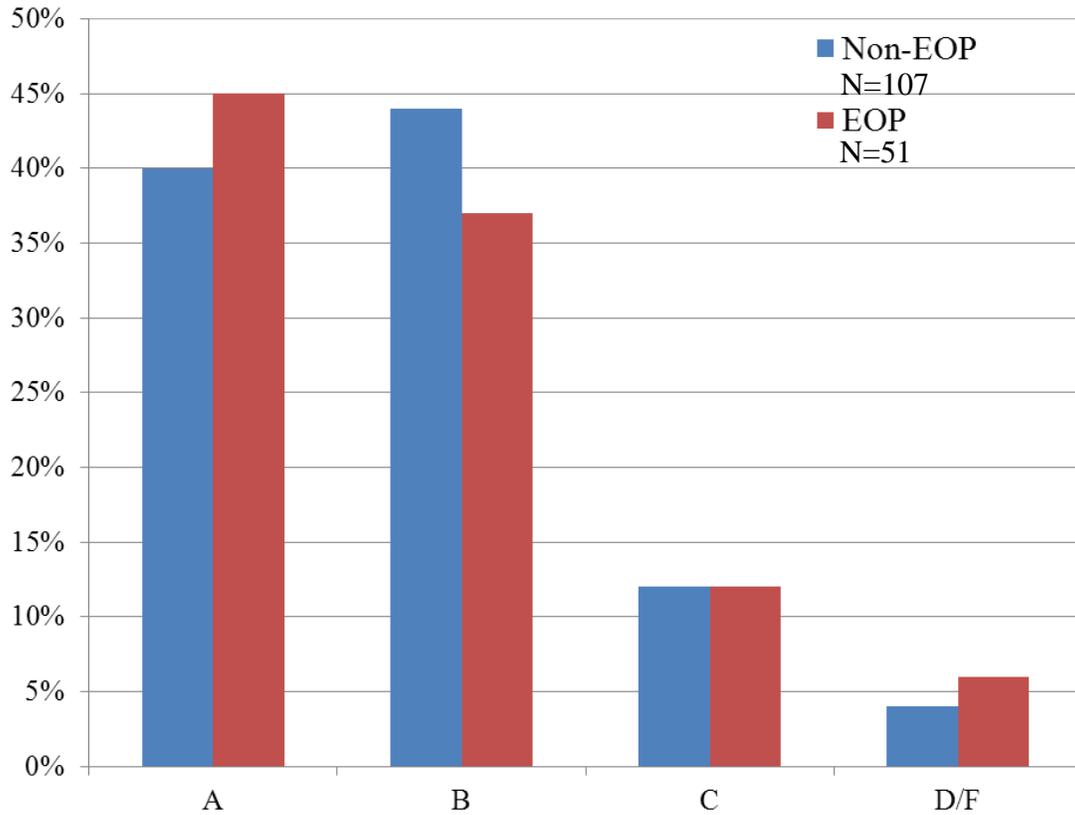
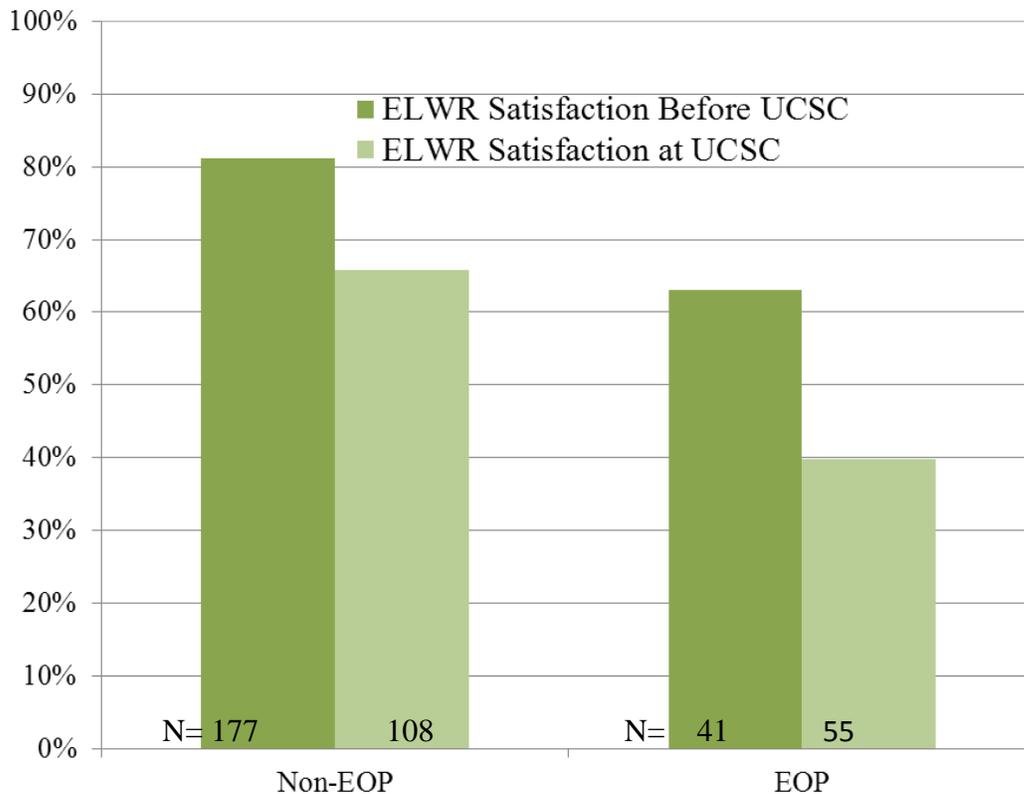


Figure 6 Writing 2 Grade Distribution by EOP Status for Students in Required Group Tutoring



Unfortunately, we still have major writing issues to address, as the relationship of students' academic achievement in Writing 2 is evident in their performance in other lower-division courses essential to gaining admission to various majors at UCSC. Figure 7 presents an example of these trends. (All of the student data presented in the following discussion of Psychology and Sociology courses refers to students in the 2008 frosh cohort who participated in the LSS Writing 2 study.)

Figure 7 Percent of Students with As and Bs in 4 Social Science Classes Based on Timing of ELWR Satisfaction



In all four classes, Psychology 1 (Introduction to Psychology), Psychology 10 (Introduction to Developmental Psychology), Sociology 1 (Introduction to Sociology), and Sociology 15 (World Society), the EOP students who did not satisfy ELWR prior to entering UCSC had substantially fewer A and B grades than those who came to UCSC already demonstrating university-level writing skills. In the case of the Sociology data, this is extremely important. In order to be certain of being accepted into the Sociology major at UCSC, students must have a grade of B or above in both Sociology 1 and 15. As has been shown thus far in this paper, students who enter UCSC lacking university level writing and mathematical skills continue to be disadvantaged. Although Learning Support Services works closely with these departments, and in spite of the successful academic support interventions that we have developed, we still have serious problems to address. Yet, our continual research allows us to evaluate our achievements and recognize our need for further innovative efforts to mitigate students' previous educational under preparedness.

Supplemental Instruction as a Successful Academic Support Option

UCSC attaches supplemental instruction to approximately 112 course sections each academic year, an average of 37 courses each quarter. In general, attendance at these sessions is voluntary, but occasionally professors offer students incentives for participating in supplemental instruction on a weekly basis. Based on historic issues

when UCSC first began its supplemental instruction, it was given the name of Modified Supplemental Instruction (MSI).

Table 5 MSI Utilization Data and Pass Rates of Students who Used MSI

Academic Year	# Courses Sections	# MSI Students	Total # students in class	Percentage of MSI usage	% of Classes Where Students Using MSI had a Higher Pass Rate Than Students Who did not use MSI
2007-08	113	5,475	19,546	28%	76%
2008-09	122	6,041	21,399	28%	75%
2009-10	101	4,831	20,306	24%	76%

Over the past 3 years, an average of 27%, just over one-quarter of the UCSC students enrolled in MSI supported classes took advantage of the supplemental instruction groups. On average, the students who did use MSI passed their classes at a higher rate than the students who chose not to participate in the program in 75% of the MSI supported classes.

Although this MSI pass rate data is encouraging, Learning Support Services needs to extend our research efforts to investigate the relationship between MSI utilization and students' academic success using the correlation between MSI attendance and course grade data. As the Economics major at UCSC has very strict admission policies requiring a 2.8 combined GPA in Economics 1 (Introductory Microeconomics) and Economics 2 (Introductory Macroeconomics), and strict major disqualification policies related to failure in Economics 11A (Mathematical Methods for Economists I), Economics 11B (Mathematical Methods for Economists I), Economics 100A (Intermediate Microeconomics) and Economics 100B (Intermediate Macroeconomics), we began our MSI/course grade correlation investigations using Economics classes.

Table 6 Achievement Data for Students Taking Economics Classes and Their MSI Utilization for Academic Years 2007-2008, 2008-2009 & 2009-2010

	Economics Class					
	1 (B- or above)	2 (B- or above)	11A (Pass)	11B (Pass)	100A (Pass)	100B (Pass)
No MSI (N grade, N total)	65% (2041, 3140)	62% (1749, 2813)	73% (371, 511)	83% (468, 566)	86% (757,876)	93% (717,769)
MSI 4 or fewer sessions (N grade, N total)	63% (235, 371)	64% (356, 557)	81% (248,306)	88% (248, 282)	91% (521,571)	97% (427, 441)
MSI > 4 sessions (N grade, N total)	73% (48, 66)	74% (76, 103)	88% (210,239)	93% (264, 285)	96% (158,165)	100% (201,201)

As Table 6 indicates, students who attended MSI for Economics 1 and Economics 2 more than 4 times during the quarter were more likely to earn a B-grade than students who did not attend MSI more than 4 times. Additionally, in Economics 11A, 11B, 100A and 100B, students who attended MSI more than 4 times were more likely to pass the class. This data begins to indicate that participating in supplemental instruction on a regular basis contributes positively to students' academic achievement. This is important, as we continually strive to convince professors to more frequently and forcefully recommend MSI attendance and/or build MSI attendance into their courses as a means for students to raise a poor homework evaluation, earn a small grade boost to mitigate an exam melt-down, etc.

In a small way Table 7 addresses the proverbially unanswerable question, does participation in tutoring and supplemental instruction actually contribute to student retention. In comparing the persistence of non-EOP students and EOP students, we discovered that participation in the Learning Support Services tutoring and supplemental instruction programs did seem to increase students' persistence.

Table 7 Fall 2005 Cohort LSS Utilization Since Fall 2007

Present Fall 2007		Used LSS Fall 2007-Fall 2009
Non-EOP	Did not persist	30%
	Persisted/degree	33%
EOP	Did not persist	39%
	Persisted/degree	51%

Certainly, in these difficult economic times as budgets for academic support services programs are necessarily being reduced, this research data may be useful. Yet, we still need to look more closely and critically at the correlation of participation in Learning Support Services sponsored programs, student retention, and student academic achievement. How do we convince more than 25% of our students to commit to supplemental instruction, and to attend on a weekly, not a hap-hazard basis?

LALS 100A, an Example of Succeeding in Offering Educational Equity

Several years ago Professor Jonathan Fox, Writing Lecturer Dan Scripture and Learning Support Services Director Holly Cordova investigated the relationship between students' academic backgrounds and their demonstrated writing ability in two Latin American and Latino Studies (LALS) classes LALS 100A (Politics and Society) and LALS 100B (Culture and Society). In order to develop a profile of more and less successful students in these classes, we categorized students by their cumulative GPA ranges using several different markers including area of academic major, students' ELWR history, ethnicity, EOP status, transfer versus native student status, and likely native language other than

English. These data reveal concerns as to educational equity. Students who entered UCSC not having satisfied the Entry Level Writing Requirement, having EOP status, and having a native language other than English (in this case, usually Spanish), had cumulative GPAs and earned grades in upper division LALS courses lower than their more privileged peers. These data supported our belief that many students seem to require continual instructional guidance as they address the challenges of upper division, content-specific, academic writing tasks. Therefore, we agreed to plan and implement a writing-intensive support program integrated into upper-division LALS classes. The course that we selected to focus on is LALS 100A, as it is a major requirement, has a specific focus on teaching analysis of research studies, and asks students to write 3 analytic essays and a take-home final examination including a brief research proposal.

The academic support model that we use involves offering students the choice to enroll in a two-unit writing support component embedded into the course. Students who choose to enroll in this writing support are required to meet with an undergraduate Writing Assistant each week in groups of approximately ten students and to produce drafts and rewrites of their course-assigned papers. For each of the three major writing assignments in the class, students are required to produce a complete rough draft to be submitted to their Writing Assistant, a revision of the draft to be turned into their Teaching Assistant for feedback and grading and a rewritten revision of the graded paper to be given to their Writing Assistant. Therefore, students produced 9 rather than 3 papers for submission.

The following two tables compare the performance of the students who chose to enroll in the two-unit writing assistance program with the students who did not make this choice. Table 8 focuses on the positive effects of this support model on EOP students using the 2010 LALS 100A course as a snapshot of this comparison. Table 9 illustrates the increasing student interest in this writing support model and the educational equity that it seems to be producing. It is important to note that during the last three years of the program, EOP students comprised the majority of the students that participated in the 2 unit writing support option (2009- 61% EOP, 2010- 80% EOP, 2011-65% EOP). Each year more students enroll in the course option with the writing support, and each year the academic performance of the two groups, those with and without the additional writing support become more similar.

Table 8 Winter 2010 Percent of EOP and Non-EOP Students with As and Bs in LALS 100A with 2 Unit Writing Support and Without Writing Support

	LALS 100A With Writing Support			LALS 100A Without Writing Support		
	N (As & Bs)	N (Total)	% A & B	N (As and Bs)	N (Total)	% A & B
Non-EOP	9	13	69%	10	15	67%
EOP	39	51	76%	8	14	57%
Total	48	64	75%	18	29	62%

Table 9 Grade Distribution of LALS 100A Students with 2 Unit Writing Support and Without Writing Support Winter 2009, Winter 2010 & Winter 2011

	LALS 100A With Writing Support	LALS 100A Without Writing Support
A	36%	32%
B	47%	45%
C	9%	15%
D/F	7%	5%
other (P,W,I)	1%	4%
Total	183	123

We used an in-class self-evaluation process to encourage students to assess their demonstrated writing competence and confidence and to decide whether to participate in the course option including the 2 unit writing support. We hope and assume that many of the students who chose to enroll in the writing support program felt that they needed assistance to become more successful writers. If our supposition that students who most needed writing assistance chose to enroll in the two-unit writing support program attached to LALS 100A is valid, then the writing-intensive support produced positive results. The grade data indicates that the LALS 100A attached writing support model has equalized the grade outcomes for EOP and non-EOP students when the EOP students have chosen to enroll in the course-embedded writing support.

As of fall, 2010, as part of the new General Education Requirements approved by the UCSC academic senate, LALS 100A has become one of the courses required to fulfill the Disciplinary Communication requirement. Disciplinary Communication is an upper-division writing requirement in each academic major.

Final Comments

Learning Support Services at UCSC remains committed to using careful research studies of students' academic achievement trends to inform our practices. Based on data that continue to support our contention that participation in our programs does increase students' academic achievement and does increase the opportunities for initially educationally underprepared students to maximize their likelihood of attaining academic excellence, we have begun to use a case management approach for entering EOP students and EOP students in academic difficulty wherein we provide these students with individual Academic Success Plans each quarter. Based on their previous high school and UCSC academic histories, we require participation in appropriate academic support activities for each of their courses each quarter. For example, we might require twice-a-week section enrollment for Math 3, individual tutoring for Writing 20, and weekly attendance at MSI for Chemistry 1A. Additionally, we use our data to encourage academic departments and individual professors to integrate supplemental instruction, group tutoring, or a combination of multiple academic support options into their course syllabi. And, perhaps of primary importance, we rely on our data to keep us informed, honest, and innovative. When the data confirms evidence of our success, we can use it to

justify budgetary decisions, and, as also happens, when our data illustrates our need to rethink our programmatic decisions, we must respond to its compelling evidence of a need for improvement. Continual research allows us to make data-driven decisions, thus using our limited resources in the best interests of our students.