CSULB DATA FELLOWS

OPEN FORUMS ON STUDENT SUCCESS MARCH 21, 2018

Success of CSULB Students in Introductory Mathematics and Statistics Courses

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Success of CSULB Students in Introductory Mathematics and Statistics Courses

- 1. WHY INTRODUCTORY MATHEMATICS?
- 2. FIRST MATHEMATICS COURSE AND STUDENT SUCCESS
- 3. COURSE REDESIGN IMPROVED PLACEMENT AND TARGETED STUDENT SUPPORT
- 4. CONCLUSIONS AND RECOMMENDATIONS



DATA SETS

- IPEDS DATA ON 4Y AND 6Y GRADUATION RATES
- CSUCO DASHBOARD
- CSULB IR TABLEAU FRESHMAN DATASET
- FALL 2017 FIRST TIME FRESHMAN ADMISSION SCORES, ESM DATA, F'17 MATH GRADES, DEMOGRAPHICS
- FALL 2016 FIRST TIME FRESHMAN ADMISSION SCORES, ESM DATA, F'16 MATH GRADES, RETENTION
- IR CONFIDENTIAL GRADE ANALYSIS REPORTS
- EAB



Why Millions of Americans Never Finish College Michael Lawrence Collins Joel Vargas Feb 27, 2017



https://www.citylab.com/

• Less than half of America's college students ever graduate.

 Seventy percent of students assigned to developmental courses never complete college.

LONG BEACH STATE UNIVERSITY

- There are two central reasons that students don't complete college, and they typically operate in tandem:
- inadequate preparation \rightarrow non-completion of courses
- difficulty navigating college \rightarrow not taking correct courses





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A California State University Campus http://www.collegeresults.org/

- There are two central reasons that students don't complete college (or take longer than necessary), and they typically operate in tandem:
- inadequate preparation \rightarrow non-completion of courses
- difficulty navigating college \rightarrow not taking correct courses

CSULB NON-COMPLETION OF COURSES

CSULB TOP 100 "NON-PASSING" COURSES

IN THIS GROUP

AY 16-17:

2,462 COURSES 284,090 ENROLLED STUDENTS 19,403 D, F, WU GRADES (6.8%)

AY 16-17:

100 COURSES 86,882 ENROLLED STUDENTS 9,875 D, F, WU GRADES (11.4%) AY 16-17:

13 COURSES IN MATH 8,001 ENROLLED STUDENTS 1,763 D, F, WU GRADES (22.0%)

	TOTAL # OF GRADES	UNIV SHARE	D+F+WU GRADES	D+W+WU UNIV SHARE	NON COMPLETION RATE	50% S	
CSULB	284090	100.00%	19403	100.00%	6.83%	ü 40%	
CLA	97633	34.37%	7573	39.03%	7.76%	GRA	
CHHS	52057	18.32%	1972	10.16%	3.79%		
CNSM	33780	11.89%	4501	23.20%	13.32%		
СОТА	32143	11.31%	1179	6.08%	3.67%	≈ 20%	11
COE	28244	9.94%	1735	8.94%	6.14%	10%	
СВА	27092	9.54%	2109	10.87%	7.78%	10/0	
CED	10012	3.52%	255	1.31%	2.55%	0%	
UNIV	3129	1.10%	79	0.41%	2.52%	20	00



SOURCE: CSU CO DASHBOARD

MATHEMATICS PATHWAYS





MATHEMATICS PATHWAYS AND EQUITY

% URM \downarrow MAPB \rightarrow MATH 113 \rightarrow MATH 122 \rightarrow MATH 123

GPA GAP ~ 0.2 IN EACH COURSE OF THE SEQUENCE

EQUITY GAPS IN EACH GRADE CATEGORY

CNSM DATA FELLOWS PRESENTATION MAY 11, 2018



MATHEMATICS PATHWAYS



COURSE REDESIGN 2012-16



PRE-BACCALAUREATE MATHEMATICS



HS GPA AND MATH SAT SCORES DO NOT PREDICT OUTCOMES

MAPB ENROLLMENT CORRELATES WITH LOWER RETENTION AND LOWER GRADUATION RATES

CSULB ENTERING FRESHMAN REMEDIATION NEEDS



CSULB 6Y GRADUATION RATES



CSULB 4Y GRADUATION RATES



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MATH 113 (COLLEGE ALGEBRA) DFW RATE



• MULTIPLE REDESIGN EFFORTS

• BOTH HS GPA AND MATH SAT PREDICT OUTCOMES

• "C, D, F GRADES " PREDICT STEM NON-RETENTION

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CALCULUS REDESIGN

- ALEKS PPL is highly effective as a placement tool for STEM freshman
- Uniform homework and "benchmark" pre-tests administered through WebAssign and early interventions have improved completion
- Identification of at-risk students and mandatory intervention in the form of 75-minute weekly tutorials for the bottom 30% based on exam scores (4 midterm exams) taught by TAs or undergraduate students
- Freshman in calculus have high CSULB and STEM retention regardless of the grade



MATHEMATICS PATHWAYS



COURSE REDESIGN 2012-16





CSULB EARLY START

JEN-MEI CHANG

ASSOCIATE PROFESSOR MATHEMATICS & STATISTICS





One's ability to accomplish their current and future academic, personal, and professional goals through the development of knowledge, a sense of responsibility, and a connection to the university and wider community.

Academic Success

Course completion, subsequent course completion, accurate course placement, transferring of content knowledge, on-time graduation.

ESM: Early Start Mathematics

Intended for incoming students who do not demonstrate readiness for college-level math to begin developmental work during the summer before coming to the CSU.

> **ALEKS:** Assessment and LEarning in Knowledge Spaces **PPL**: Placement, Preparation and Learning

History of ESM at CSULB

- In June 2010, Executive Order 1048 established the Early Start Program (ESP).
- Students were required to have achieved proficiency in English and/or Mathematics on or before the end of their first year of enrollment at a CSU campus, as directed by Executive Order 665.
- Early Start Mathematics Program (ESM) at CSULB was implemented in the summer of 2012.
- 1-unit and 3-unit ESM classes were offered during 2012-2016, both lecturebased.

>1-unit: meets 3 hr/day for 1 week

>3-uint: meets 3 hr/day for 4 weeks

2017 Early Start Mathematics Program at CSULB



Student Information Most Recent Placement Result Learning Pie lations and Inequalities Exponents and Polynomials Lines and Systems Functions and Prep for College Algebra lacement Assessment 3 Last Login Date: 07/13/2017 Access Expires % 68% 53% 06/22/2018 64% Prep and Learning Module Prep for College Algebra Prep and Learning Module Duration: 48 31 Topics 28 of 41 Topics 18 of 28 Topics 9 of 17 Topics 06/22/2017 - 12/19/2017 10 Mastered Learned Remaining Mastered Learned Remaining Mastered Lea ed Learned Remaining Account Summary » View Full Report » View Full Report » Learning Progress History Most Recent Learning Activity Learning Timeline Hide All Topics View All Topics Progress Knowledge Check Adding rational expressions with Learned Jul 6 common denominators and Ready to Learn 52 binomial numerators 24m 15s | 9:07 AM 60 +6% Equations and Inequalities (E) 🛇 (E) 🖉 🖉 🛇 (E) 🖉 🛇 (E) 000 Solving an absolute value inequality: Basic Progress Knowledge Check Word problem on inverse Jun 30 Solving a linear inequality: Problem type 4 Annual Associational Social Specific variation 25m 5s | 9:32 AM Algebraic symbol manipulation: Problem type 2 51 +9% MO TU WE TH FR SA SU Solving a decimal word problem using a two-step linear inequality speed input input input input View All » View All » View Detail »

3-unit (ESM 3, 21, 33)

1-unit (ESM 1, 11)

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1-unit ESM with ALEKS PPL in 2017

Course Outcomes

CR: advance to the next level

- **30-45**: beginning algebra \rightarrow intermediate algebra
- 46 or higher intermediate algebra \rightarrow GE math

(e.g., CR in ESM 11 advances to MATH 113 equivalents in fall)

RP: satisfied the CSU ESM requirement, but do not advance to the next level

(e.g., RP in ESM 11 means taking MAPB 11 in fall)

NC: did not complete CSU ESM requirement, fall admission is jeopardized

	N.4	т I		T I I	- · I	0.1.1	0 1
	Monday	luesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 1	7/10	7/11	7/12	7/13	7/14	7/15	7/16
	Take the initial proctored assessment	Work in A	LEKS for a mir	iimum of 5 h	ours bet\	<i>w</i> een class i	meetings.
	Visit the tutoring center	for addition	al support				
Week 2	7/17	7/18	7/19	7/20	7/21	7/22	7/23
	Continue working in ALEKS; take unproctored assessment for practice	Work in A	LEKS for a mir	imum of 5 h	ours betv	ween class i	meetings.
	Visit the tutoring center	for addition	al support				
Week 3	7/24	7/25	7/26	7/27	7/28	7/29	7/30
	Continue working in ALEKS; take unproctored assessment for practice	Work in A	LEKS for a mir	imum of 5 h	ours bet\	ween class i	meetings.
	Visit the tutoring center	for addition	al support				
Week 4	7/31	8/1	8/2	8/3	8/4	8/5	8/6
	Take the final proctored assessment						
	Visit the tutoring center	for addition	al support				





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Improving academic success

ESM is the key, data analysis is the vehicle



LONG BEACH STATE UNIVERSITY PPL Items In toc order A California State University Campus

2018 Early Start Mathematics Program at CSULB

		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	Week 1	6/25	6/26	6/27	6/28	6/29	6/30	7/1
Recommend	9:00 - 12:00	 Go over syllabus with lead instructor Create ALEKS logins Take the ALEKS tour Take the initial proctored assessment (1) and work in ALEKS for 20 minutes Go over students' responsibilities/homework 	LEARN in ALEKS a	a minimum of 20 topics <u>AND</u> for a m	iinimum of 5 hou	rs before ti	he next class	s meeting
doctination	Week 2	7/2	7 <i>/</i> 3	7/4	7/5	7/6	7/7	7/8
	9:00 - 9:05	Meet in lab to receive break-out (BO) schedule						
atudanta ta	9:05 - 9:50	Attend BO 1	LEARN in ALEKS	a minium of 20 topics AND for a m	ninimum of 5 hou	rs AND tal	ke an unpro	ctored
students to	9:55 - 10:40	Attend BO 2		assessment (2) before the	e next class meetir	ng In	1	
	10:45 - 11:30	Attena BO 3 Mark in ALEKS						
take ESM at	Week 3	7/9	7/10	7/11	7/12	7/13	7/14	7/15
	9:00 - 9:05	Meet in lab to receive break-out (BO) schedule						
CSULB to	9:05 - 9:50	Attend BO 1	LEARN in ALEKS	G a minium of 20 topics AND for a m	ninimum of 5 hou	rs <u>AND</u> tal	ke an unpro	e an unproctored
	9:55 - 10:40	Attend BO 2		assessment (3) before the	e nexticlass meetir	ng		
Ansura a	11:30 - 12:00	Work in ALEKS						
	Week 4	7/16	7/17	7/18	7/19	7/20	7/21	7/22
coomloce	9:00 - 9:05	Meet in lab to receive break-out (BO) schedule						
Sealliess	9:05 - 9:50	Attend BO 1						
	9:55 - 10:40	Attend BO 2	LEARN in ALEKS	a minium of 20 topics <u>AND</u> for a mi	nimum of 5 hour	s before th	e next class	meeting
placement	10:45 - 11:30	Attena BU 3 Mark in ALEKS						
	Week 5	7/23	7/24	7 <i>1</i> 25	7/26	7/27	7/28	7/29
	9:00 - 10:00	Logistics and last minute ALEKS catch-up						
	10:05	1. Take the final proctored assessment (4)						
	-	2. Discuss math placement outcome with individual						
	12:00	students						

CSULB ENTERING FRESHMAN REMEDIATION NEEDS



MATH REMEDIATION AND MAJOR-SWITCHING PATTERNS

CONSIDER 2009, 2010, AND 2011 COHORTS OF FRESHMAN (JOINTLY) HOW MANY STUDENTS GRADUATED IN 6 YEARS IN EACH COLLEGE (TOTAL FROM 3 COHORTS)?

		BY	
	BY ENTRY	GRADUA	
	COLLEGE	TION	
		COLLEGE	
СВА	756	1010	254
CED	199	206	7
COE	848	757	-91
CHHS	1544	1808	264
CLA	1289	2635	1346
CNSM	1036	546	-490
СОТА	900	828	-72
UNDCL	1218	0	-1218
	7790	7790	

THERE ARE 7 POSSIBLE "GRADUATION COLLEGES": CBA, CED, COE, CHHS, CLA, CNSM, COTA

THERE ARE 8 POSSIBLE "FRESHMAN ENTRY COLLEGES": CBA, CED, COE, CHHS, CLA, CNSM, COTA, UNDCL THERE ARE 7 POSSIBLE "GRADUATION COLLEGES": CBA, CED, COE, CHHS, CLA, CNSM, COTA

THERE ARE 8 POSSIBLE "FRESHMAN ENTRY COLLEGES": CBA, CED, COE, CHHS, CLA, CNSM, COTA, UNDCL

WHICH "ENTRY COLLEGE – GRADUATION COLLEGE" COMBINATIONS PRODUCE MOST GRADUATES?

WHICH "ENTRY COLLEGE – GRADUATION COLLEGE" COMBINATIONS PRODUCE MOST GRADUATES?

Graduation College	Entry College	NO REMED	ONLY ENGLISH	1 MATH AND 1 ENGL	ONLY 1 MATH	2 MATH AND 1 ENGL	2 MATH ONLY	TOTAL
CLA	CLA	587	97	47	83	123	75	1012
CHHS	CHHS	511	202	59	52	115	29	968
СОТА	СОТА	432	84	21	37	42	22	638
COE	COE	397	159	15	3	15		589
CLA	UNDCL	215	96	54	36	86	26	513
СВА	CBA	266	151	25	13	16	5	476
CLA	СННЅ	145	76	47	28	76	21	393
CNSM	CNSM	301	62	8	6	4	2	383
CLA	CNSM	157	51	32	16	37	4	297
СННЅ	UNDCL	112	80	35	11	50	7	295
СВА	UNDCL	94	67	14	7	10	4	196
CHHS	CNSM	96	55	20	6	13	6	196
CLA	СВА	62	30	13	7	28	5	145
CHHS	CLA	61	18	11	5	37	5	137
CLA	СОТА	79	18	12	8	15	5	137
CED	CED	70	22	8	9	20	3	132
CLA	COE	56	20	6	4	9	2	97
СННЅ	СВА	29	23	14	3	18	3	90
СВА	CNSM	46	20	7	4	4	3	84
СВА	CHHS	42	26	5	4	2	1	80

WHICH "ENTRY COLLEGE – GRADUATION COLLEGE" COMBINATIONS PRODUCE MOST GRADUATES WHO STARTED IN MATH REMEDIATION?

Graduation College	Entry College	NO REMED	ONLY ENGLISH	1 MATH AND 1 ENGL	ONLY 1 MATH	2 MATH AND 1 ENGL	2 MATH ONLY	TOTAL	1 OR 2 REMEDIAL MATH	2 REMEDIAL MATH
CLA	CLA	587	97	47	83	123	75	1012	328	198
CHHS	СННЅ	511	202	59	52	115	29	968	255	144
CLA	UNDCL	215	96	54	36	86	26	513	202	112
CLA	СННЅ	145	76	47	28	76	21	393	172	97
СОТА	СОТА	432	84	21	37	42	22	638	122	64
СННЅ	UNDCL	112	80	35	11	50	7	295	103	57
CLA	CNSM	157	51	32	16	37	4	297	89	41
СВА	СВА	266	151	25	13	16	5	476	59	21
CHHS	CLA	61	18	11	5	37	5	137	58	42
CLA	СВА	62	30	13	7	28	5	145	53	33
CHHS	CNSM	96	55	20	6	13	6	196	45	19
CED	CED	70	22	8	9	20	3	132	40	23
CLA	СОТА	79	18	12	8	15	5	137	40	20
CHHS	СВА	29	23	14	3	18	3	90	38	21

WHICH "ENTRY COLLEGE – GRADUATION COLLEGE" COMBINATIONS PRODUCE LEAST GRADUATES WHO STARTED IN MATH REMEDIATION?

Graduation College	Entry College	NO REMED	ONLY ENGLISH	1 MATH AND 1 ENGL	ONLY 1 MATH	2 MATH AND 1 ENGL	2 MATH ONLY	TOTAL	1 OR 2 REMEDIAL MATH	2 REMEDIAL MATH	1 OR 2 REMEDIA L MATH %	2 REMEDIAL MATH %
COE	CNSM	35	7					42	0	0	0.00%	0.00%
CNSM	CLA	14	4					18	0	0	0.00%	0.00%
COE	CLA	10	3		0			13	0	0	0.00%	0.00%
CNSM	СОТА	9	2					11	0	0	0.00%	0.00%
COE	СННЅ	5	5	0				10	0	0	0.00%	0.00%
CNSM	СВА	5	3					8	0	0	0.00%	0.00%
CED	CBA		3					3	0	0	0.00%	0.00%
CNSM	CED	1						1	0	0	0.00%	0.00%
CNSM	COE	18	5	1				24	1	0	4.17%	0.00%
CNSM	CNSM	301	62	8	6	4	2	383	20	6	5.22%	1.57%
COE	COE	397	159	15	3	15		589	33	15	5.60%	2.55%
СОТА	СВА	8	4			1		13	1	1	7.69%	7.69%
CNSM	СННЅ	33	12	4		1		50	5	1	10.00%	2.00%
COE	UNDCL	45	17	5	0	2		69	7	2	10.14%	2.90%
СВА	CLA	39	16	3	2	2		62	7	2	11.29%	3.23%
СВА	СВА	266	151	25	13	16	5	476	59	21	12.39%	4.41%
COE	СВА	12	6	2		1		21	3	1	14.29%	4.76%
CED	CNSM	9	3	1			1	14	2	1	14.29%	7.14%
СВА	СННЅ	42	26	5	4	2	1	80	12	3	15.00%	3.75%

2009-11 FTF WHO STARTED IN REMEDIAL MATHEMATICS AND GRADUATED IN 6 YEARS BASED ON THE COLLEGE OF ORIGIN

	# OF REMEDIAL FTF WHO GRADUATED	# OF REMEDIAL FTF WHO SWITCHED
CNSM	20	157
COE	33	57
СВА	59	95
CED	40	32
CHHS	255	202
CLA	328	74

2013 FIRST TIME FRESHMAN WHO GRADUATED IN 4 YEARS (BY COLLEGE OF GRADUATION)

	Null	СВА	CED	COE	СННЅ	CLA	CNSM	СОТА	TOTAL GRADUATED	FTF COHORT	4Y RATE
NO REMEDIATION NEEDED	111	69	12	91	192	281	38	93	887	3054	29.04%
ONE MATH AND ONE ENGLISH REMEDIATION NEEDED	8	5	0	3	2	6	0	0	24	191	12.57%
ONLY ENGLISH REMEDIATION CLASS NEEDED	21	22	1	17	11	24	1	5	102	550	18.55%
ONLY ONE MATH REMEDIATION CLASS NEEDED	11	3	0	0	5	25	0	5	49	228	21.49%
TWO MATH AND ONE ENGLISH REMEDIATION NEEDED	8	7	1	12	5	5	0	3	41	241	17.01%
TWO MATH REMEDIATION CLASSES NEEDED	4	0	0	0	1	4	0	3	12	79	15.19%
								TOTAL	1115	4343	25.67%
							MATH R	EM TOTAL	126	739	17.05%



Can we predict whether a student can pass Math113 in the first fall semester using high school GPA and math SAT?

> TIANNI ZHOU ASSOCIATE PROFESSOR MATHEMATICS & STATISTICS



FALL 2017 FRESHMAN IN CACLULUS PATHWAY



FailPass



High School GPA

FALL 2017 FRESHMAN IN ALGEBRA



Logistic Regression Model

 \succ Binary outcome is common in research:

- Pass/fail
- Graduate in 4 years (Yes/No)
- Dead / Alive
- Hospitalisation (Yes / No)
- Met target e.g. total cholesterol < 5.0 mmol/l (Yes / No)

Outcome Variable Y, takes on a value of either 1 or 0

> We predict the probability of an outcome occurring

p: P(Y=1)

> Use explanatory variables to predict the probability of an outcome

- Example: use high school GPA and math SAT scores to predict the probability of students passing Math 113 (Pre-calculus Algebra)
- Logistic model is used to estimate the probability of a binary response based on one or more explanatory (or independent) variables.



How do we formulate relationship between probability of an outcome and explanatory variables?

Probability of the
ith student pass
Math 113
$$\rightarrow p_i = \beta_0 + \beta_1 * GPA_i + \beta_2 * SAT_i$$
This would not work.
(0,1)
$$(-\infty, \infty)$$

$$\logit (p_i) = \beta_0 + \beta_1 * GPA_i + \beta_2 * SAT_i,$$
where logit $(p_i) = \ln \left(\frac{p_i}{1-p_i}\right)$

$$(-\infty, \infty)$$

$$odds of the ith student pass Math 113$$

Solve for p_i , we have

$$p_{i} = \frac{e^{(\beta_{0} + \beta_{1} * GPA_{i} + \beta_{2} * SAT_{i})}}{1 + e^{(\beta_{0} + \beta_{1} * GPA_{i} + \beta_{2} * SAT_{i})}}$$

The estimated logistic regression model based on Fall 2016 data is
logit
$$(\hat{p}_i)$$
= -10.544 + 2.08 * GPA_i + 0.0077 * SAT_i
OR
 $\hat{p}_i = \frac{e(-10.544 + 2.08 * GPA_i + 0.0077 * sAT_i)}{1+e(-10.544 + 2.08 * GPA_i + 0.0077 * sAT_i)}$

- -Build the model based on Fall 2016 data
- -Apply the model to a new data set, Fall 2017 data
- -Make prediction of each student who took the class in Fall 2017

Case Summaries

	High GPA	Math SAT	Pass Math 113 in Fall 2017 (actual Outcome)	Predicted Probability of pass Math 113 in Fall 2017	Predicted Outcome	
1	3.30	560	Fail	0.656	Pass	Dangerously
2	3.12	590	Pass	0.622	Pass	misclassified
3	3.55	630	Pass	0.846	Pass	
4	2.84	540	Pass	0.385	Fail •	Safely misclassified
5	4.03	570	Pass	0.904	Pass	

- Sensitivity: measures the proportion of positives that are correctly identified as such
- Specificity: measures the proportion of negatives that are correctly identified as such

actual

outcome

	Cut-point=0.65	fail	pass
predicted	fail	117	96
outcome	pass	72	307

Sensitivity (true positives) : 307/(96+307) =0.762
 Specificity (true negatives) : 117/(117+72)=0.619
 1-sensitivity (false negatives): 96/(96+307)=0.238
 1-specificity(false positive): 72/(117+72)=0.381



ROC (Receiver Operating Characteristics)

The model has fairly good discriminant performance. Predicted probability of passing Math 113 as a function of math SAT and different categories of high school GPA



level **** 1 000 2 +++ 3 +++ 4 +++ 5

FALL 2016 FRESHMAN IN MAPB 11 – COLLEGE RETENTION AS OF MARCH 2018

		FALL 2016	COLLEGE	-
S'18 COLLEGE	UNDCL	CBA	COE	CNSM
СВА	7	50	0	3
CED	3	2	0	0
COE	0	0	2	0
CHHS	19	5	1	8
CNSM	2	1	0	9
CLA	13	5	1	3
СОТА	2	1	1	1
UNDCL	49	2	6	3
NOT RETAINED	33	31	8	18
TOTAL	128	97	19	45
CSULB RET	74.22%	68.04%	57.89%	60.00%

FALL 2016 CNSM FRESHMAN IN MATH 113 AND CALCULUS – COLLEGE RETENTION AS OF MARCH 2018

	FALL 2016 MATH 113 GRADE			
S'18 COLLEGE	Α	В	С	D-W
СВА	1	2	2	0
CED	0	1	4	1
COE	1	1	2	0
CHHS	3	11	8	3
CLA	0	4	3	5
CNSM	17	26	16	3
СОТА	0	1	3	0
UNDCL	1	5	3	2
NOT RETAINED	1	2	7	22
TOTAL	24	53	48	36
CSULB RET	95.83%	96.23%	85.42%	38.89%
CNSM RET	70.83%	49.06%	33.33%	8.33%

	FALL 2016 MATH CALCULUS GRADE			
S'18 COLLEGE	Α	В	С	D-W
СВА	1	4	2	0
CED	0	0	0	1
COE	7	2	4	1
CHHS	5	9	4	6
CLA	2	3	1	1
CNSM	42	30	29	10
СОТА	0	1	0	1
UNDCL	0	1	3	1
NOT RETAINED	1	3	2	5
TOTAL	58	53	45	26
CSULB RET	98.28%	94.34%	95.56%	80.77%
CNSM RET	72.41%	56.60%	64.44%	38.46%

SUMMARY AND RECOMMENDATIONS



COURSE REDESIGN 2012-16

- EARLY START COMBINED WITH ADAPTIVE LEARNING IS VERY EFFECTIVE IN IMPROVING STUDENTS' PREPARATION AND PLACEMENT
- STUDENTS WHO START MATH SEQUENCE IN MAPB (PARTICULALRY STEM MAJORS) ARE AT INCREASED RISK FOR ATTRITION OR GRADUATING LATE
- FIRST MATH FRESHMAN COURSE PREDICTS MAJOR-SWITCHING PATTERNS (MAPB VS 113 VS CALCULUS)
- HS GPA AND SAT COMBINATION
 CORRELATES WITH FRESHMAN SUCCESS
 IN ALGEBRA
- ALEKS PPL PLACEMENT AND TARGETED
 SUPPORT IMPROVE STUDENT SUCCESS IN
 CALCULUS



ACKNOWLEDGEMENTS

GE B2 REDESIGN COM	IMITTEE		
Name	Department	Title	Role
Annabelle Cariaga	EOP - Retention	Associate Director	EOP Liaison
Carlos Ayon	College Assistance Migrant Program	Recruiter	CAMP Liaison
Dr. Babette Benken	Math & Stat	Professor	LBCP Liaison/TA TRAINING
Dr. Bill Pedersen	Psychology	Professor	PSY 110
Dr. David Sanfilippo	Disabled Students Services	Director	DSS Liaison
Dr. Florence Newberger	Math & Stat	Professor	Algebra/Business Calc
Dr. Isabella Lanza	Human Dev	Assistant Professor	HDEV 190
Dr. Jen-Mei Chang	Math & Stat	Associate Professor	QR Course
Dr. Josh Chesler	Math & Stat	Associate Professor	MTED 110 / QR Course
Dr. Kagba Suaray	Math & Stat	Professor	STAT 108
Dr. Kris Slowinski	CNSM	Associate Dean	COORDINATION/COMMUNICATION
Dr. Nancy Martin	Sociology	Assistant Professor	SOC 170
Dr. Ryan Blair	Math & Stat	Assistant Professor	QR Course
Dr. Tangan Gao	Math & Stat	Chair	CURRICULUM/SCHEDULE
Dr. Tianni Zhou	Math & Stat	Associate Professor	STAT 108

Dr. John Brevik

Dr. Chung-Min Lee

Dr. Xuhui Li

Dr. Kent Merryfield