FULLERTON COLLEGE ELEVATING. EXCELLENCE.

Instructional Programs

2014-2015 Self-Study

Three-Year Program Review Template

Mathematics Program

Math/Computer Science Division

Statement of Collaboration

The program faculty listed below collaborated in an open and forthright dialogue to prepare this Self Study. Statements included herein accurately reflect the conclusions and opinions by consensus of the program faculty involved in the self-study.

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Authorization

After the document is complete, it must be signed by the Principal Author, the Department Coordinator, and the Dean prior to submission to the Program Review Committee.

*Note – the Mathematics Program does not have a department coordinator. Eight faculty members led section teams to write this program review.

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1.0 Mission and Goals

The College's Mission, Vision, Core Values and Goals drive all college activities. The Program Review committee would like to understand the connection of your program to the College's Mission, Vision, Core Values and Goals. Summarize how your program supports each area.

Mission: The mission of Fullerton College is to prepare students to be successful learners. In the math department, we focus on our students and how they can be successful, not only in their math courses, but in other courses and areas of their lives as well. We believe that part of being a successful learner is the ability to utilize resources available to an individual. We consistently encourage our students to seek assistance during office hours or in the Math Lab if they are struggling with a concept. We also direct them to resources that can be used off campus, including websites and video resources. We encourage responsibility and hard work, providing a rigorous course of study, particularly for those who pursue our higher level courses. Even those students with a different field of study benefit from the commitment necessary to succeed in our courses.

Vision: The vision of Fullerton College is to create a community that promotes inquiry and intellectual curiosity, personal growth and a life-long appreciation of learning. The Fullerton College Mathematics Program supports this vision with many "out of class" activities. We offer a weekly Math Colloquium that features a talk given by a faculty speaker or other professional. There is also a student speaker each week, who works in advance to create a presentation. There are weekly informal learning seminars and research/problem-solving seminars as well. Each available activity allows students to pursue math in a more informal and less pressured setting. These students also learn that there are unsolved problems in mathematics, which promotes the idea of life-long learning and perseverance. Inside the classroom, we promote curiosity and personal growth as well. We present challenging problems to our students that allow them to think beyond what was presented to them in class. We encourage personal growth by advocating responsibility and time management, which are skills that will benefit the students in class and beyond.

Core Values: The Fullerton College Mathematics Program supports the core values of Fullerton College. We value and promote the wellbeing of our campus community, as shown by the "out of class" activities described above, as well as the support we offer to our adjunct instructors through meetings and workshops. We respect and value the diversity of our entire community by offering a variety of courses taught by a diverse staff. Our staff uses a range of pedagogical approaches in order to present concepts to the variety of students in our classes. These include, but are not limited to lecture, group work, collaborative learning, independent learning activities, quizzes, exams, and math lab worksheets. We also work with the Disability Support Services to promote success. We value tradition and innovation, making use of the technology available to us. We are able to give

students background on a topic, showing them how to complete a task without any technology, and then show how innovations like the graphing calculator can expedite such tasks. It gives our students an appreciation for the technology. We expect everyone to display behavior in accordance with personal integrity and high ethical standards. Whether in the classroom or the Math Lab, we expect students to treat peers and faculty with respect, and any form of cheating is not tolerated. In our program, we believe in the power of the individual and the strength of the group. Math is often learned through discussion with peers. The math lab offers a place where students can work in groups with other students taking the same course. However, each student then becomes responsible for knowing the concepts on an individual basis as well.

College Goals: The Fullerton College Mathematics Program is dedicated to all of Fullerton College's goals. We promote student success in a variety of ways. To address the needs of under-prepared students, the math department has held "boot camp" type classes prior to the semester to review prerequisite concepts for courses. To increase course retention and success, we offer consistent tutoring to our students throughout the semester in our Math Lab and encourage students to use the Tutoring Center and instructor's office hours. We have also held various workshops for calculus students, covering topics that many students commonly struggle with. From 2010-2014, we have increased the number of degrees awarded each year. In working to reduce the achievement gap, we have several classes that have accompanying SI sessions. The SI sessions create a small group environment that can be more beneficial to certain students including Hispanic and African-American students. We are also looking into funding for resources such as ALEKS that will work on an individual level, concentrating on what each student needs to work on in a course. To strengthen connections with the community, we have hosted meetings with local high school math teachers. The goal of these meetings is to have open communication with the high schools so we are aware of issues regarding incoming students. In particular, we have had meetings to discuss the new Common Core math standards and how they are being implemented at the high school level. Our hope is to create a smooth transition for our students as they enter community college.

2.0 Program Data & Trends Analysis

2.1 Key Performance Indicators (KPI)

For each KPI listed below, analyze and report your findings and describe what they mean. (Attach 5-year longitudinal data from Office of Institutional Research and Planning (OIRP) to Appendix.)

KPI	Findings
Enrollment	A 21% decrease from 17,600 in 2009-10 to a recent low of 13,900 in 2011-12, followed by a 37% increase to 19,100 in 2013-14. The percent changes from year-to-year are in lock-step with the percent changes in sections offered, reflecting the high fill rates of math sections.
Total FTES	Percent changes in FTES since 2011-12 closely mirror those in enrollment – this reflects the observation that the Enrollment/FTES ratio is consistently near 7.5 in those years. This same ratio fluctuates from 8.5 in Su10, to 4.8 in Fa10, to 6.5 in Sp11, indicating that this data should be scrutinized further.
Sections	A 21% decrease from 409 sections offered in 2009-10 to a recent low of 323 sections in 2011-12, followed by a 39% increase to 448 in 2013-14. Demand for math classes is always high and there is no shortage of instructors, so the changes in the number of sections offered is very much a function of the district budget.
FTEF	The FTEF has generally followed the trend set by the sections offered, starting from 120 and 122 in 2009-10 and 2010-11, followed by a steep drop to 94 and 91 in 2011-12 and 2012-13, matching the steep cuts in offerings, and rocketing 50% to 136 in 2013-14. Since the number of regular faculty members has only changed by 1 or 2 in each year of this period, these variations mostly reflect changes in the number of courses taught by our 60 adjuncts.
Fill Rate	The fill rate is most often over 96% at census and many semesters over 100%.
WSCH/FTEF	For the most part, these values run from the high 500s to the low 700s. However, drawing conclusions about trends seems unwise with this data, for the 2010-11 year includes a low of 487 in summer and a high of 876 in fall, and the subsequent summers are 2112 and 1572.
Retention	Annual retention rates have consistently stayed near 75%. Summer retention rates are near 81%, noticeably higher than fall and spring.
Success	Annual success rates have consistently stayed near 56%. Summer success rates are near 65%, noticeably higher than fall and spring.

5-year Longitudinal KPI Data from Office of Institutional Research and Planning

Key Performance Indicator		Courses Offered	Sections Offered	Majors	New Majors	Enroll-ments	FTES	WSCH	FTE Faculty	Avg Section Size	WSCH per FTEF	Course Retention Rates	Course Success Rates
2009-2010	**An**	21	409	204	42	17,620	2491	74,714	119.7	43.1	624	75%	56%
	Su	14	43			1,900	255	7,667	14	44.2	548	82%	65%
	Fa	20	183	161	32	7,908	1132	33,970	53.6	43.2	634	75%	56%
	Sp	19	183	160	10	7,812	1103	33,078	52.1	42.7	635	73%	54%
2010-2011	**An**	22	385	226	48	16,731	2915	87,429	122.4	43.5	714	73%	56%
	Su	13	43			1,778	208	6,231	12.8	41.3	487	83%	67%
	Fa	20	169	184	30	7,441	1556	46,689	53.3	44	876	73%	56%
	Sp	19	173	179	18	7,522	1150	34,509	56.4	43.5	612	71%	53%
2011-2012	**An**	23	323	137	16	13,924	1827	64,238	94	43.1	683	75%	57%
	Su	12	22			1,060	140	13,514	6.4	48.2	2,112	79%	62%
	Fa	22	139	63	0	5,881	773	23,345	40.6	42.3	575	75%	58%
	Sp	21	162	135	16	6,983	912	27,378	47	43.1	583	74%	55%
2012-2013	**An**	24	351	266	65	15,045	2029	71,023	91.3	42.9	778	77%	57%
	Su	12	24			960	127	10,849	6.9	40	1,572	82%	68%
	Fa	22	160	181	37	6984	942	29,424	41.2	43.7	714	78%	56%
	Sp	21	167	215	28	7101	959	30,751	43.2	42.5	712	77%	56%
2013-2014	**An**	28	448	193	97	19,136	2576	86,300	136.3	42.7	633	76%	55%
	Su	14	68			2715	355	16,135	21.5	39.9	750	81%	64%
	Fa	22	190	153	64	8487	1165	37,126	57.8	44.7	642	76%	55%
	Sp	22	190	210	33	7934	1055	33,039	57.1	41.8	579	74%	52%

Percent Changes in KPI Data Relative to Previous Year

Key Performance Indicator		Courses Offered	Sections Offered	Majors	New Majors	Enroll-ments	FTES	WSCH	FTE Faculty	Avg Section Size	WSCH per FTEF	Course Retention Rates	Course Success Rates
2010-2011	**An**	4.8%	-5.9%	10.8%	14.3%	-5.0%	17.0%	17.0%	2.3%	0.9%	14.4%	-2.7%	0.0%
	Su	-7.1%	0.0%			-6.4%	-18.4%	-18.7%	-8.6%	-6.6%	-11.1%	1.2%	3.1%
	Fa	0.0%	-7.7%	14.3%	-6.3%	-5.9%	37.5%	37.4%	-0.6%	1.9%	38.2%	-2.7%	0.0%
	Sp	0.0%	-5.5%	11.9%	80.0%	-3.7%	4.3%	4.3%	8.3%	1.9%	-3.6%	-2.7%	-1.9%
2011-2012	**An**	4.5%	-16.1%	-39.4%	-66.7%	-16.8%	-37.3%	-26.5%	-23.2%	-0.9%	-4.3%	2.7%	1.8%
	Su	-7.7%	-48.8%			-40.4%	-32.7%	116.9%	-50.0%	16.7%	333.7%	-4.8%	-7.5%
	Fa	10.0%	-17.8%	-65.8%	-100.0%	-21.0%	-50.3%	-50.0%	-23.8%	-3.9%	-34.4%	2.7%	3.6%
	Sp	10.5%	-6.4%	-24.6%	-11.1%	-7.2%	-20.7%	-20.7%	-16.7%	-0.9%	-4.7%	4.2%	3.8%
2012-2013	**An**	4.3%	8.7%	94.2%	306.3%	8.1%	11.1%	10.6%	-2.9%	-0.5%	13.9%	2.7%	0.0%
	Su	0.0%	9.1%			-9.4%	-9.3%	-19.7%	7.8%	-17.0%	-25.6%	3.8%	9.7%
	Fa	0.0%	15.1%	187.3%		18.8%	21.9%	26.0%	1.5%	3.3%	24.2%	4.0%	-3.4%
	Sp	0.0%	3.1%	59.3%	75.0%	1.7%	5.2%	12.3%	-8.1%	-1.4%	22.1%	4.1%	1.8%
2013-2014	**An**	16.7%	27.6%	-27.4%	49.2%	27.2%	27.0%	21.5%	49.3%	-0.5%	-18.6%	-1.3%	-3.5%
	Su	16.7%	183.3%			182.8%	179.5%	48.7%	211.6%	-0.3%	-52.3%	-1.2%	-5.9%
	Fa	0.0%	18.8%	-15.5%	73.0%	21.5%	23.7%	26.2%	40.3%	2.3%	-10.1%	-2.6%	-1.8%
	Sp	4.8%	13.8%	-2.3%	17.9%	11.7%	10.0%	7.4%	32.2%	-1.6%	-18.7%	-3.9%	-7.1%

2.2 Peer Institution Comparison

How does your program compare with peer institutions? Provide a narrative of your comparison. (Peer institutions are colleges or programs identified by the Office of Institutional Research and Planning (OIRP)).

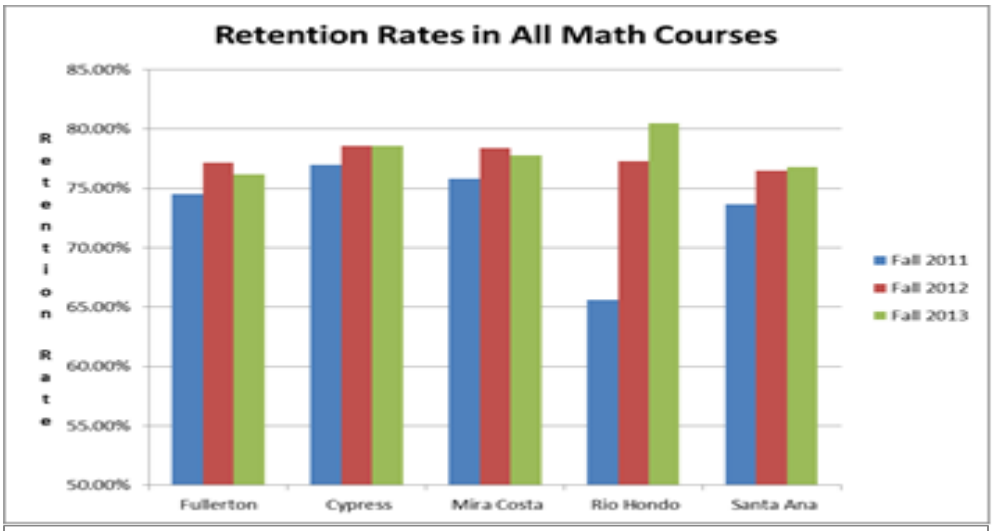
Degrees Awarded

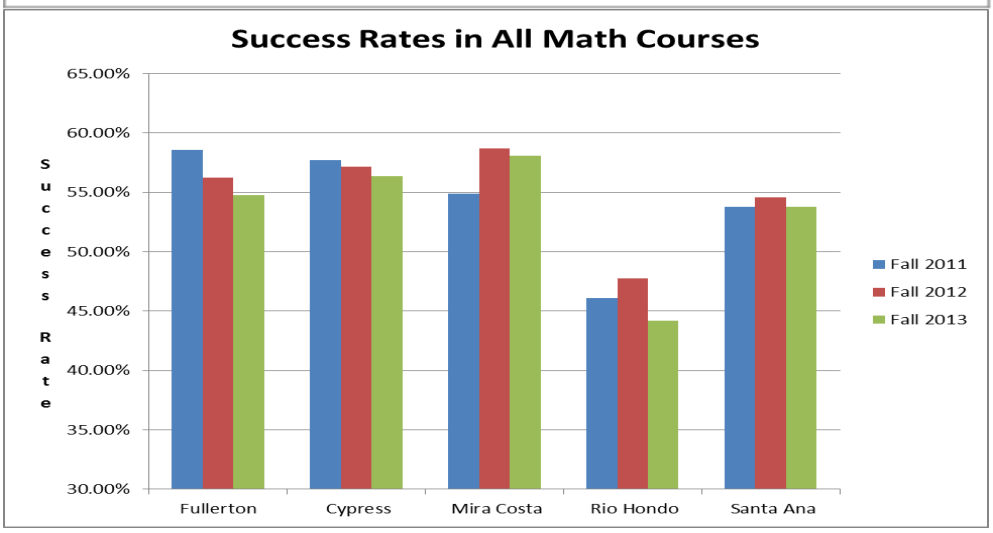
	Annual 2011-2012	Annual 2012-2013	Annual 2013-2014
Fullerton Total	**20**	**22**	**23**
Associate in Science for Transfer (A.S.-T) Degree	1	7	10
Associate of Science (A.S.) degree	17	15	13
Associate of Arts (A.A.) degree	2		
Cypress Total			**2**
Associate in Science for Transfer (A.S.-T) Degree			2
Mira Costa Total	**20**	**20**	**16**
Associate in Science for Transfer (A.S.-T) Degree	3	8	15
Associate of Arts (A.A.) degree	17	12	1
Rio Hondo Total	**7**	**11**	**10**
Associate in Science for Transfer (A.S.-T) Degree	2	10	10
Associate of Science (A.S.) degree	5	1	
Santa Ana Total	**14**	**16**	**20**
Associate in Science for Transfer (A.S.-T) Degree			5
Associate of Science (A.S.) degree	14	16	15

The above data clearly indicates that Fullerton College awards more degrees in mathematics than any of the peer institutions in any of the last three years. We are also the only institution that has awarded A.A.s, A.S.s, and A.S.-Ts in the last three years, which speaks to our ability to accommodate the diverse needs of our student population.

Retention and Success Rates
Credit Courses (includes all sections of all of our courses, except N01)

	Fall 2011 Retention Rate	Fall 2011 Success Rate	Fall 2012 Retention Rate	Fall 2012 Success Rate	Fall 2013 Retention Rate	Fall 2013 Success Rate
Fullerton Total	**74.52%**	**58.57%**	**77.18%**	**56.22%**	**76.19%**	**54.78%**
Online	69.42%	49.03%	69.43%	48.41%	75.82%	51.64%
Non online	75.03%	59.54%	77.41%	56.45%	76.20%	54.87%
Cypress Total	**76.96%**	**57.72%**	**78.59%**	**57.20%**	**78.56%**	**56.36%**
Online	56.06%	36.36%	64.90%	34.44%	66.29%	41.20%
Non online	77.28%	58.04%	79.65%	58.97%	79.36%	57.35%
Mira Costa Total	**75.79%**	**54.89%**	**78.40%**	**58.68%**	**77.78%**	**58.07%**
Online	68.47%	41.83%	67.88%	45.73%	67.06%	46.46%
Non online	77.49%	57.93%	80.26%	60.97%	79.99%	60.46%
Rio Hondo Total	**65.64%**	**46.12%**	**77.32%**	**47.77%**	**80.47%**	**44.21%**
Online	42.74%	16.72%	68.56%	28.95%	70.94%	25.91%
Non online	69.00%	50.43%	82.17%	58.19%	86.25%	55.31%
Santa Ana Total	**73.66%**	**53.77%**	**76.48%**	**54.57%**	**76.77%**	**53.81%**
Online	60.14%	36.23%	63.87%	46.22%	66.67%	46.46%
Non online	74.10%	54.34%	76.81%	54.79%	76.98%	53.97%

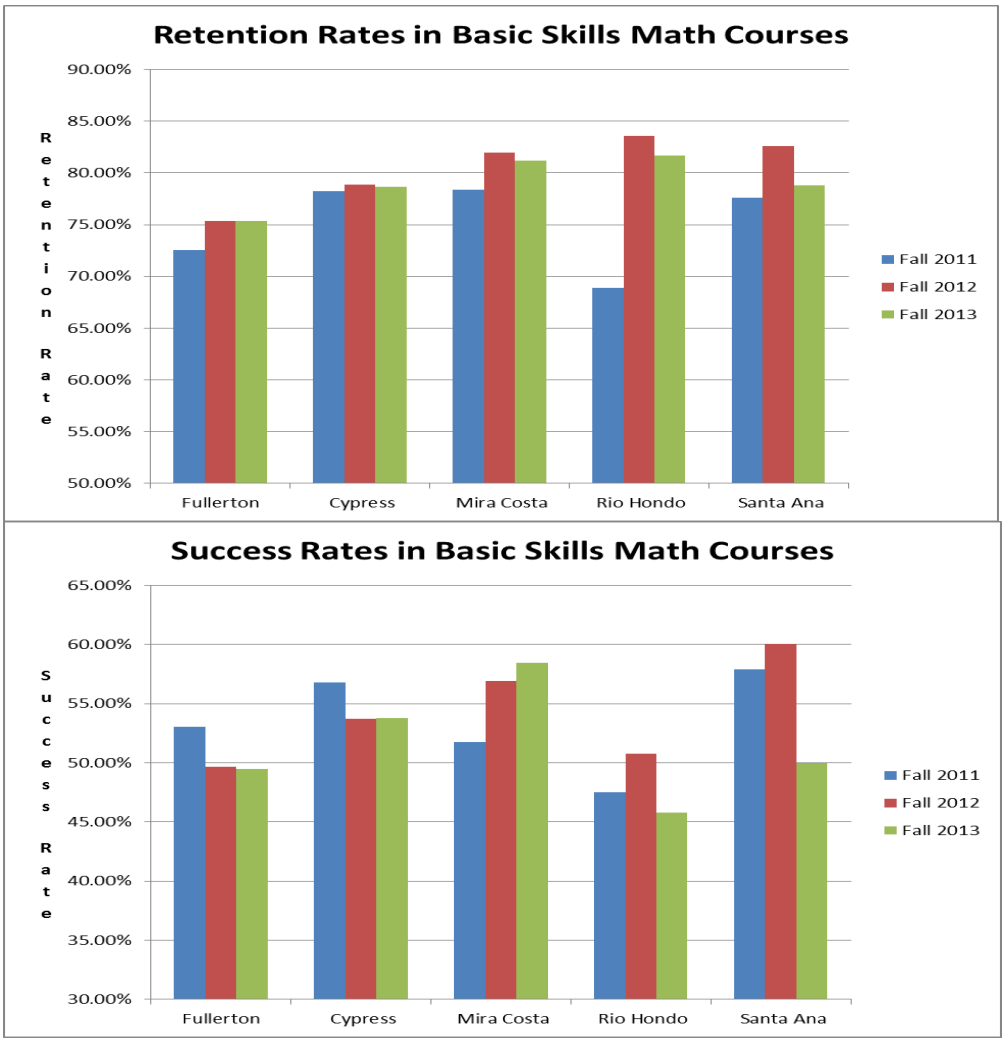




The bar graphs visually demonstrate that our retention and success rates for all credit courses over the past three years are comparable to those of our peer institutions. A closer look at the data shows that Fullerton College is doing an exemplary job with its online math courses. Over the past three years, both the retention and success rates of our online courses are higher (in some cases much higher) than any of our peer institutions during that time. Also, while every school's online retention and success rates are lower than their non-online retention and success rates, the difference between Fullerton College's online and non-online retention and success rates over the past three years is smaller (in some cases much smaller) than the differences for our peer institutions. This means Fullerton College is doing a much better job of trying to make the online class experience as successful as the in-class experience.

Retention and Success Rates
Basic Skills Courses

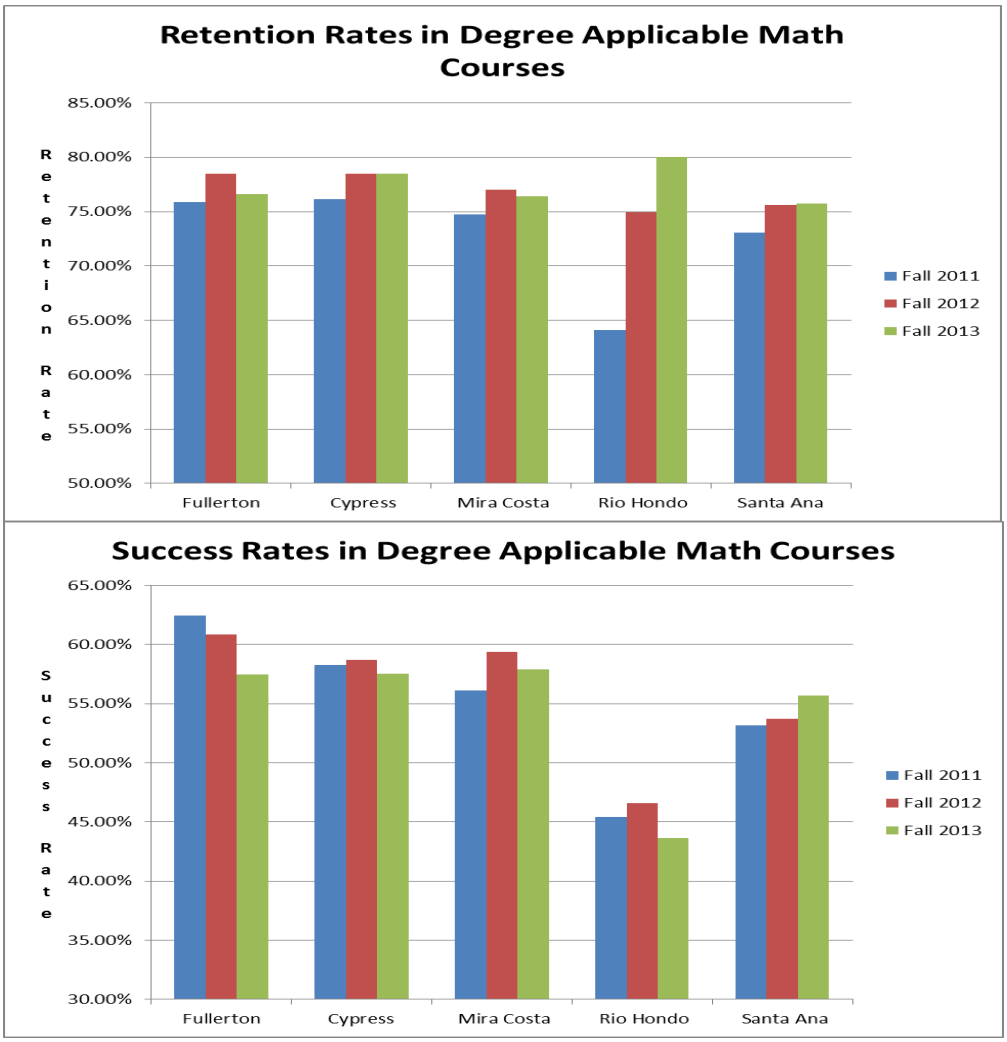
	Fall 2011 Retention Rate	Fall 2011 Success Rate	Fall 2012 Retention Rate	Fall 2012 Success Rate	Fall 2013 Retention Rate	Fall 2013 Success Rate
Fullerton Total	**72.53%**	**53.04%**	**75.37%**	**49.65%**	**75.37%**	**49.49%**
Online	70.25%	48.75%	69.43%	48.41%	77.30%	51.06%
Non online	72.94%	53.81%	75.82%	49.74%	75.28%	49.41%
Cypress Total	**78.24%**	**56.82%**	**78.88%**	**53.72%**	**78.68%**	**53.78%**
Online						
Non online	78.24%	56.82%	78.88%	53.72%	78.68%	53.78%
Mira Costa Total	**78.39%**	**51.75%**	**81.95%**	**56.93%**	**81.21%**	**58.46%**
Online	75.08%	45.57%	67.31%	44.23%	71.79%	47.65%
Non online	79.56%	53.93%	86.04%	60.47%	84.31%	62.02%
Rio Hondo Total	**68.88%**	**47.54%**	**83.61%**	**50.79%**	**81.67%**	**45.82%**
Online	60.08%	29.41%	74.81%	35.27%	70.90%	31.46%
Non online	69.96%	49.77%	87.06%	56.85%	88.49%	54.91%
Santa Ana Total	**77.64%**	**57.92%**	**82.57%**	**60.03%**	**78.83%**	**50.00%**
Online					75.86%	48.28%
Non online	77.64%	57.92%	82.57%	60.03%	78.88%	50.03%



Similar to the overall data on the previous page, the above data indicates that retention and success rates for our basic skills courses are comparable to those of the identified peer institutions. There is also a similar exceptional level of retention and success of our online basic skills courses relative to the peer institutions', as well as a relatively small difference between online and non-online basic skills retention and success rates; in fact, in fall 2013 Fullerton College's online retention and success rates were higher than the retention and success rates for non-online courses, evidence of the effectiveness of our online basic skills sections.

Retention and Success Rates
Degree Applicable Courses

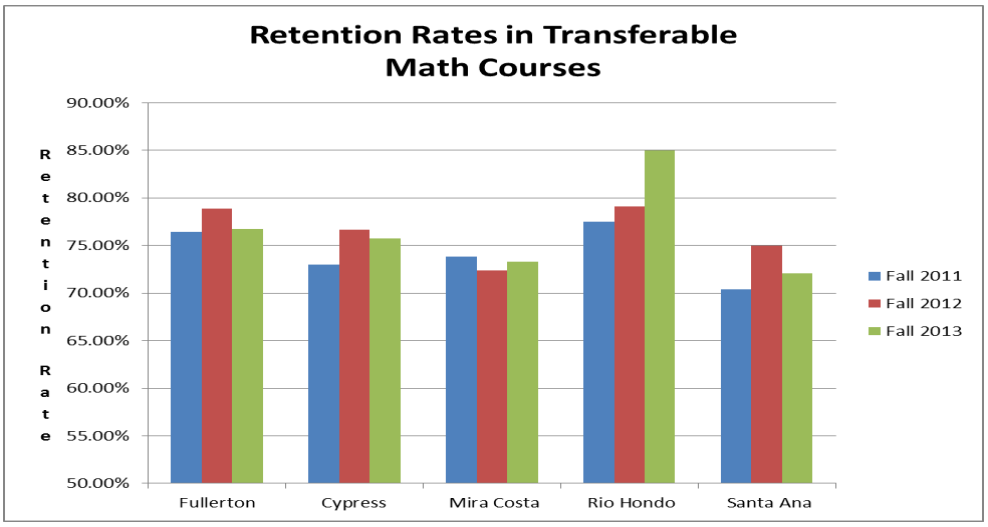
	Fall 2011 Retention Rate	Fall 2011 Success Rate	Fall 2012 Retention Rate	Fall 2012 Success Rate	Fall 2013 Retention Rate	Fall 2013 Success Rate
Fullerton Total	**75.90%**	**62.43%**	**78.46%**	**60.87%**	**76.61%**	**57.49%**
Online	67.67%	49.62%			73.79%	52.43%
Non online	76.33%	63.11%	78.46%	60.87%	76.67%	57.59%
Cypress Total	**76.12%**	**58.31%**	**78.46%**	**58.70%**	**78.50%**	**57.54%**
Online	56.06%	36.36%	64.90%	34.44%	66.29%	41.20%
Non online	76.63%	58.86%	80.02%	61.49%	79.70%	59.14%
Mira Costa Total	**74.75%**	**56.13%**	**77.00%**	**59.38%**	**76.39%**	**57.92%**
Online	64.19%	39.41%	68.28%	46.77%	63.66%	45.60%
Non online	76.77%	59.33%	78.23%	61.15%	78.46%	59.91%
Rio Hondo Total	**64.09%**	**45.44%**	**74.91%**	**46.61%**	**80.02%**	**43.62%**
Online	36.12%	11.88%	66.81%	27.18%	70.95%	23.78%
Non online	68.52%	50.75%	79.99%	58.79%	85.43%	55.46%
Santa Ana Total	**73.07%**	**53.15%**	**75.57%**	**53.75%**	**75.75%**	**55.71%**
Online	60.14%	36.23%	63.87%	46.22%	62.86%	45.71%
Non online	73.56%	53.79%	75.92%	53.98%	76.04%	55.93%

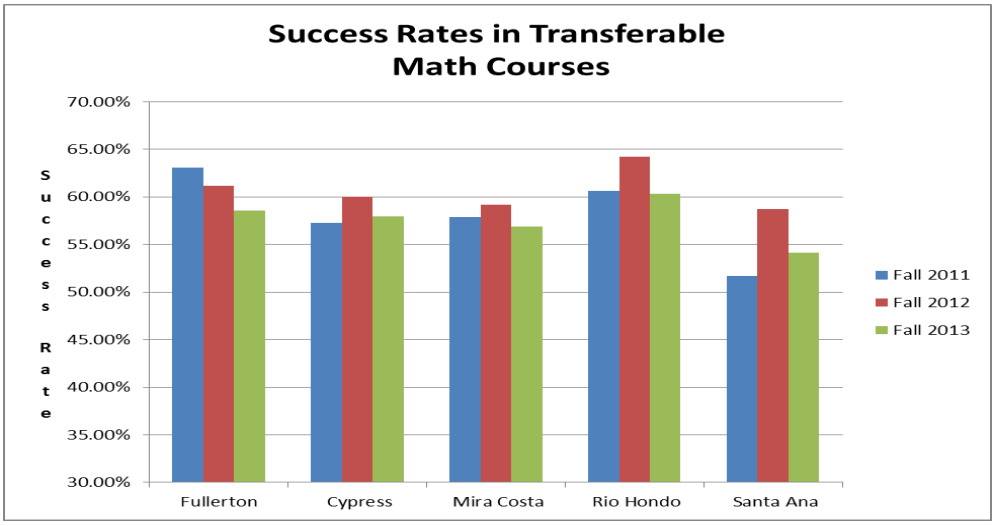


The aggregate data for degree applicable courses indicates our retention and success levels are comparable to those of the chosen peer institutions. Similar to the overall and basic skills online data, the online retention and success rates for degree applicable courses is significantly higher than peer institutions', and relatively close to non-online retention and success rates (with the exception of Fall 2013, for which either no data for online courses was available or no online courses were offered or made census).

Retention and Success Rates
Transferable Courses

	Fall 2011 Retention Rate	Fall 2011 Success Rate	Fall 2012 Retention Rate	Fall 2012 Success Rate	Fall 2013 Retention Rate	Fall 2013 Success Rate
Fullerton Total	**76.42%**	**63.07%**	**78.90%**	**61.15%**	**76.76%**	**58.54%**
Online	67.67%	49.62%				
Non online	76.91%	63.82%	78.90%	61.15%	76.76%	58.54%
Cypress Total	**73.01%**	**57.24%**	**76.67%**	**60.04%**	**75.73%**	**57.96%**
Online	56.06%	36.36%	59.48%	31.90%	56.78%	38.14%
Non online	73.76%	58.17%	78.05%	62.28%	77.27%	59.57%
Mira Costa Total	**73.87%**	**57.87%**	**72.40%**	**59.15%**	**73.30%**	**56.89%**
Online	61.38%	38.21%	59.87%	44.08%	54.91%	38.73%
Non online	75.68%	60.72%	73.44%	60.41%	74.95%	58.52%
Rio Hondo Total	**77.53%**	**60.62%**	**79.08%**	**64.25%**	**85.00%**	**60.36%**
Online	52.38%	35.71%	34.38%	21.88%	45.45%	30.30%
Non online	78.56%	61.65%	80.38%	65.49%	86.20%	61.27%
Santa Ana Total	**70.42%**	**51.73%**	**74.99%**	**58.70%**	**72.09%**	**54.11%**
Online	62.71%	33.90%	51.61%	38.71%	50.00%	35.71%
Non online	70.69%	52.36%	75.38%	59.04%	72.39%	54.36%

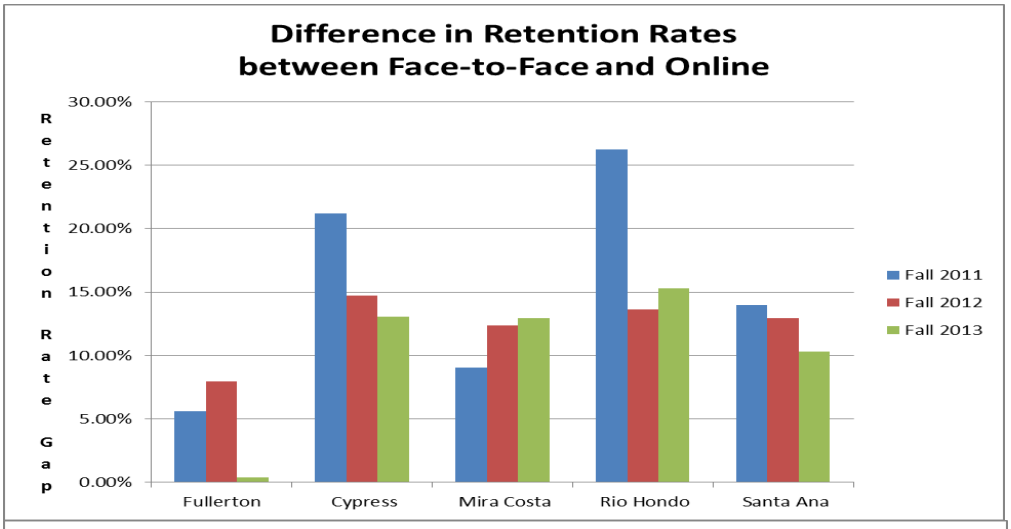


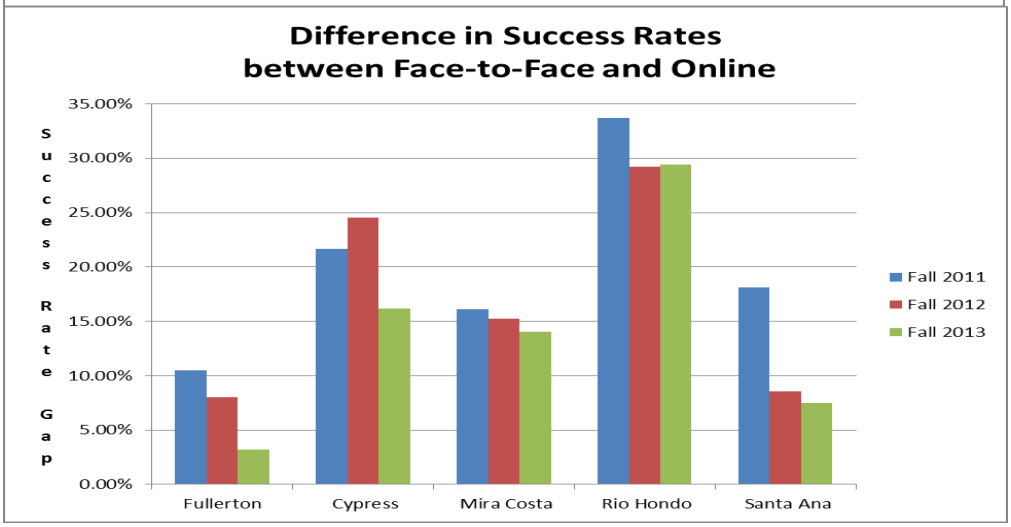


For transferable courses, the aggregate retention and success rates are on the whole better than average when compared to peer institutions. Also, when online classes are available, their relative success to both the peer institutions and to the non-online courses is readily evident.

Retention and Success Rates
Difference between all face-to-face and all online courses

	Fall 2011 Retention Rate	Fall 2011 Success Rate	Fall 2012 Retention Rate	Fall 2012 Success Rate	Fall 2013 Retention Rate	Fall 2013 Success Rate
Fullerton Total	74.52%	58.57%	77.18%	56.22%	76.19%	54.78%
Online	69.42%	49.03%	69.43%	48.41%	75.82%	51.64%
Non Online	75.03%	59.54%	77.41%	56.45%	76.20%	54.87%
Fullerton Difference	**5.61%**	**10.51%**	**7.98%**	**8.04%**	**0.38%**	**3.23%**
Cypress Total	76.96%	57.72%	78.59%	57.20%	78.56%	56.36%
Online	56.06%	36.36%	64.90%	34.44%	66.29%	41.20%
Non Online	77.28%	58.04%	79.65%	58.97%	79.36%	57.35%
Cypress Difference	**21.22%**	**21.68%**	**14.75%**	**24.53%**	**13.06%**	**16.15%**
Mira Costa Total	75.79%	54.89%	78.40%	58.68%	77.78%	58.07%
Online	68.47%	41.83%	67.88%	45.73%	67.06%	46.46%
Non Online	77.49%	57.93%	80.26%	60.97%	79.99%	60.46%
Mira Costa Difference	**9.03%**	**16.10%**	**12.38%**	**15.25%**	**12.93%**	**14.01%**
Rio Hondo Total	65.64%	46.12%	77.32%	47.77%	80.47%	44.21%
Online	42.74%	16.72%	68.56%	28.95%	70.94%	25.91%
Non Online	69.00%	50.43%	82.17%	58.19%	86.25%	55.31%
Rio Hondo Difference	**26.26%**	**33.70%**	**13.62%**	**29.24%**	**15.31%**	**29.40%**
Santa Ana Total	73.66%	53.77%	76.48%	54.57%	76.77%	53.81%
Online	60.14%	36.23%	63.87%	46.22%	66.67%	46.46%
Non Online	74.10%	54.34%	76.81%	54.79%	76.98%	53.97%
Santa Ana Difference	**13.96%**	**18.11%**	**12.95%**	**8.57%**	**10.32%**	**7.50%**





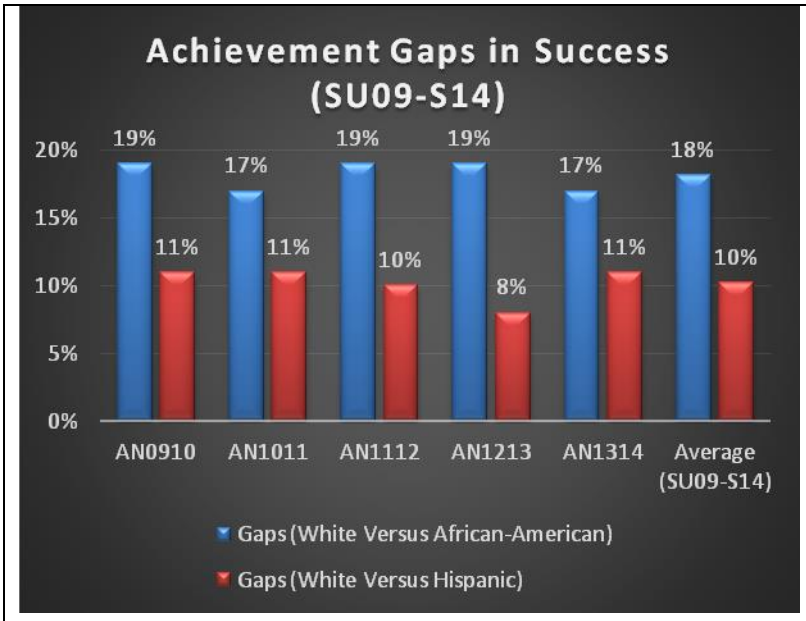
When analyzing the data for retention and success rates for all online courses versus all non-online courses, it is clear that Fullerton College is well ahead of peer institutions in getting online retention and success rates up to retention and success rates of non-online classes.

2.3 Achievement Gap

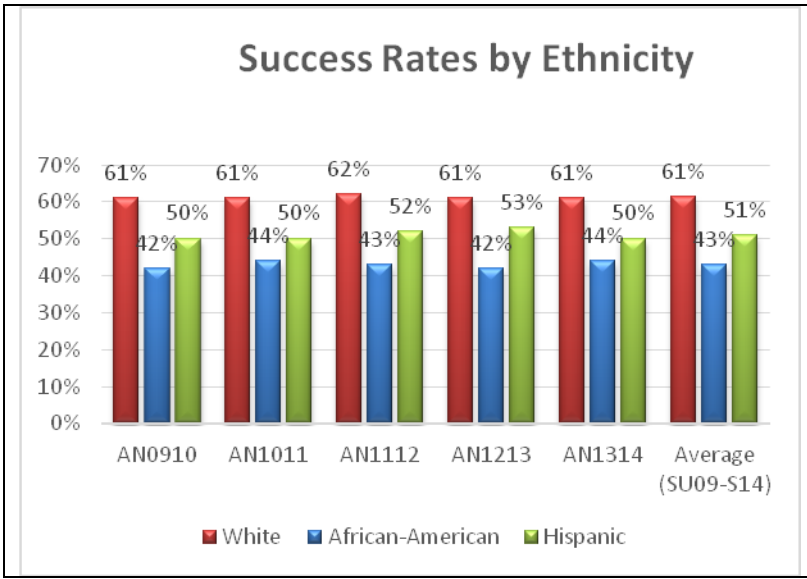
Indicate achievement gap for each of the groups listed below. (Attach to Appendix the Success and Retention by Ethnicity Data as identified by the Office of Institutional Research and Planning.)

Group	% Retention		% Success	
Males	AN0910	75%	AN0910	56%
	AN1011	73%	AN1011	55%
	AN1112	74%	AN1112	56%
	AN1213	76%	AN1213	56%
	AN1314	75%	AN1314	55%
Females	AN0910	76%	AN0910	57%
	AN1011	74%	AN1011	57%
	AN1112	75%	AN1112	57%
	AN1213	79%	AN1213	58%
	AN1314	76%	AN1314	55%
Asian-American	AN0910	82%	AN0910	69%
	AN1011	80%	AN1011	68%
	AN1112	80%	AN1112	67%
	AN1213	81%	AN1213	67%
	AN1314	81%	AN1314	66%
African-American	AN0910	71%	AN0910	42%
	AN1011	67%	AN1011	44%
	AN1112	68%	AN1112	43%
	AN1213	69%	AN1213	42%
	AN1314	71%	AN1314	44%
Filipino	AN0910	77%	AN0910	60%
	AN1011	75%	AN1011	60%
	AN1112	77%	AN1112	61%
	AN1213	78%	AN1213	60%
	AN1314	81%	AN1314	64%
Hispanic	AN0910	72%	AN0910	50%
	AN1011	70%	AN1011	50%
	AN1112	73%	AN1112	52%
	AN1213	76%	AN1213	53%
	AN1314	74%	AN1314	50%
Native American	AN0910	75%	AN0910	55%
	AN1011	76%	AN1011	55%
	AN1112	69%	AN1112	52%
	AN1213	70%	AN1213	56%
	AN1314	75%	AN1314	57%

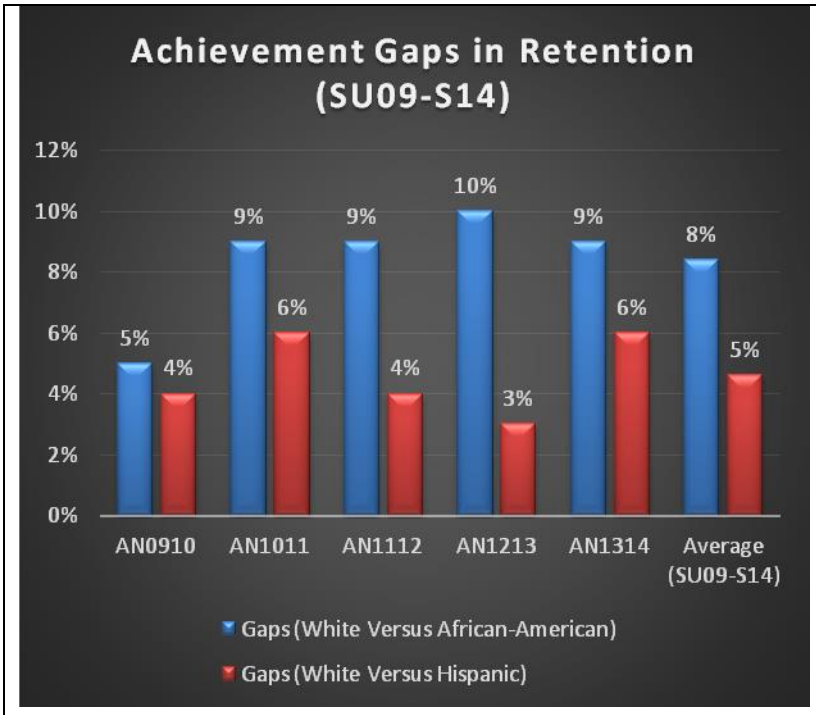
Group	% Retention		% Success	
Other Non-White	AN0910	77%	AN0910	59%
	AN1011	69%	AN1011	53%
	AN1112	72%	AN1112	57%
	AN1213	76%	AN1213	58%
	AN1314	77%	AN1314	77%
Pacific Islander	AN0910	79%	AN0910	56%
	AN1011	72%	AN1011	48%
	AN1112	70%	AN1112	46%
	AN1213	75%	AN1213	36%
	AN1314	54%	AN1314	28%
White	AN0910	76%	AN0910	61%
	AN1011	76%	AN1011	61%
	AN1112	77%	AN1112	62%
	AN1213	79%	AN1213	61%
	AN1314	80%	AN1314	61%
Unknown	AN0910	79%	AN0910	62%
	AN1011	73%	AN1011	58%
	AN1112	72%	AN1112	57%
	AN1213	77%	AN1213	58%
	AN1314	73%	AN1314	55%
Range (Max-Min)	AN0910	82%-71%=11%	AN0910	69%-42%=27%
	AN1011	80%-67%=13%	AN1011	68%-44%=24%
	AN1112	80%-68%=12%	AN1112	67%-43%=24%
	AN1213	81%-69%=12%	AN1213	67%-36%=31%
	AN1314	81%-54%=27%	AN1314	77%-28%=49%
	Average (SU09-S14)	15%	Average (SU09-S14)	%31



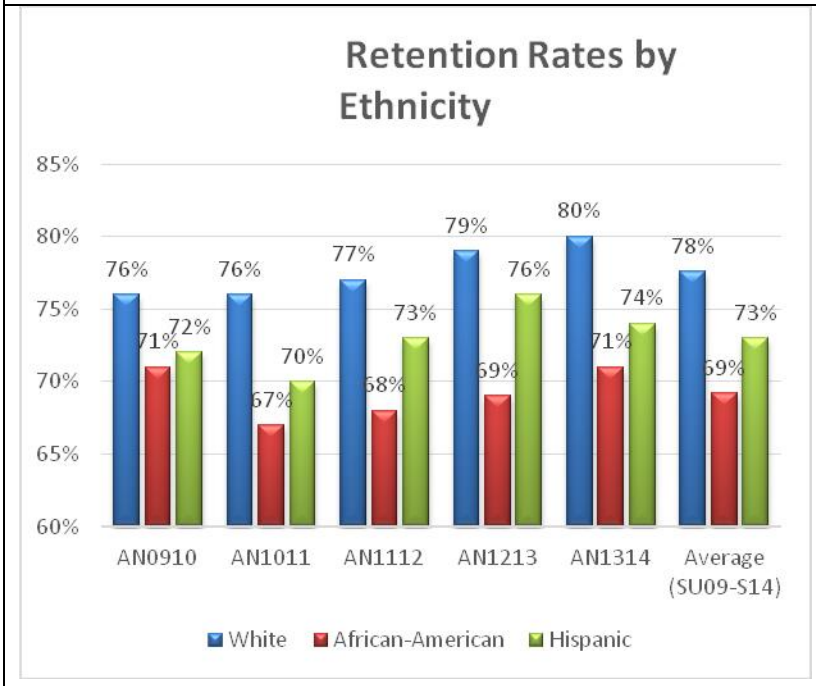
The traditional definition of the achievement gap looks at the difference in success between African-American and Hispanic students compared with White students. The achievement gap between White and African- American students in the last 5 years was 18% on average. The achievement gap between White and Hispanic students was 10% on average. Both gaps are significant and thus possible reasons for lower success rates amongst African-American and Hispanic students must be determined and action plans must be developed.



In the last five years there was no significant growth or decline in success rates for each category of students. Success rate for African- Americans increased by 2% in the last year.



In the last five years retention rates for White students were on average 8% higher than those for African-American students and only 5% higher than those for Hispanic students. We're working to close the gap in retention by providing tutoring in the Math Lab for all basic- skills classes and by participating in the TAP and SI programs.



Over the period of last five years retention rates for White students were growing at a rate of approximately 1% per year. Retention rates for African-American students grew by about 1% a year in the last four years. There was a 2% decrease in retention rate for Hispanic students in 2013-2014. Growth for the first two groups of students could be explained by eliminating the arranged hour and by our active involvement in the campus-wide TAP and SI programs.

2.4 Program Effectiveness

Since your previous Program Review Self-Study, what significant changes have occurred that impact the effectiveness of your program?

- The 16-week calendar. Anecdotally, the compressed calendar has made it more difficult for faculty to collaborate and accomplish committee work; not only are there now fewer weeks available, but more time in each week is spent in class and office hours.
- Math 43 was added as an alternative to Math 40 for non-STEM majors who need to take Math 100 or Math 120 to transfer. There have been challenges to a successful roll-out of the course including CSU insisting that the official prerequisite for Math 100 and Math 120 remain Math 40 only, although they will allow us to locally accept Math 43 as an alternative prerequisite. This causes confusion for students, so Math 43 sections have had initial low enrollment.
- Math 15 is now the entry-level math course with no prerequisite (it was previously Math 10). The Math 20 prerequisite was changed to an advisory of one previous algebra course, allowing students to self-place into Math 20.
- Replaced the basic arithmetic course, Math 10 (4 units), with Math 7 (3 units), designed to serve students with very low arithmetic skills who do not feel comfortable enrolling in Math 15. Students can enroll in Math 7 concurrently with Math 15 or Math 20 to remediate their arithmetic skills while remaining in their current math course. Enrollments in Math 7 have been much lower than they had been for Math 10, possibly due in part to students being able to self-place in Math 20.
- Removed the basic skills course requirement of an assigned hour in the Math Lab.
- Opened the Math Lab to all math students (it was previously only open to students in Math 10-43, 141, and 142). There is evidence that the increased number of potential users has resulted in attendance levels closer to those of the required hour days, and this has created a need for more space and funding for tutors. Since tutors must now be able to assist students in more courses, such as calculus and statistics, higher pay may be necessary to attract qualified applicants.
- Expanded the math colloquium/seminar offerings on Tuesday and Thursday afternoons
- Since there is a big push to offer more sections of most courses, the need to hire and evaluate adjuncts for all the added sections has grown so acute that in some semesters as much as 50% FTEF has been dedicated to an adjunct coordinator.
- Anecdotally, more calculus classes are now taught by adjuncts than was typical in previous years, e.g., as of census in Fall 2014, 141/264 = 53% of students enrolled in Math 150B and 30/62 = 48% of students enrolled in Math 250B had an adjunct instructor. Other courses with half or more students taught by adjuncts at the most recent census are Math 15 (50%), Math 20 (52%), Math 30 (100%), Math 40 (55%), Math 43 (86%), Math 100 (84%), Math 120 (65%), Math 129 (80%), Math 130 (79%), and Math 141 (52%).
- Two full-time instructors were hired, two retired, and two are “on leave.” More full-time instructors are needed to accommodate growth.
- Math Program faculty have investigated the alignment of its curriculum with the new C-ID standards and made changes where appropriate. Along these lines, a new course in discrete structures (Math 170) and, per the 2011 Program Review, separate courses in linear algebra (Math 255) and differential equations (Math 260), are in the process of being added to the curriculum.

- Revisions to the textbook selection policy have been made to clarify the steps that must be taken when new editions of books come out, and to insure that, page for page, our students are using the best and most current instructional materials available.

2.5

Describe any laws, regulations, trends, policies, procedures or other influences that have an impact on the effectiveness of your program. Please include any other data (internal or external) that may be relevant to student achievement, learning, and trends within your Basic Skills, CTE, or Transfer Education programs.

a. Access to math courses has been a continuing and growing problem for students. The fill rate for math courses is close to (often over) 100% in regular semesters. As a result, hundreds of petitioners are turned away each semester. Budget constraints and classroom availability are major barriers to achieving the goals of the program.

b. The demographics and learning styles of our student population are changing. Analysis of data provided by the campus research office, along with anecdotal evidence seen in the classroom, indicates that today's students are busier, have a multitude of learning styles, and need variety in the way content is presented to them. To accommodate these students, we offer multiple sections of Hybrid, Online and Saturday classes. We also expanded the available math lab tutoring to include some college-level math courses at all times and all college-level math courses at some times.

c. Most of our students are juggling multiple commitments to their work and their family as well as their education. It is increasingly difficult for them to find solid blocks of time to dedicate to studying and it is often difficult for them to come to campus on a regular basis for classes. In addition, it is well documented that the "Millennial" generation, which now comprises the majority of our students, is adept at multitasking and more accustomed to multimedia than listening to lectures.

d. These trends of increasingly complex student lifestyles and learning styles of younger students support the following considerations:
    - Increasing distance education offerings
    - Supporting teacher training in effective distance education pedagogies through workshops and conference attendance where ideas can be brought back to share with FC faculty
    - Incorporating in-class technology, such as smart boards and student response systems
    - Incorporating online multimedia technology

    Making hardware (such as Bamboo boards, webcams and microphones) and software (such as Camtasia) readily available and accessible to faculty to create instructional videos and effectively communicate with students regarding math concepts. Faculty need these tools installed on their office and personal computers to facilitate quick turn-around to meet student needs as they arise.

2.6

Provide any other data that is relevant to your self-study.

Student Math Research Presentations					
	2009	2010	2011	2012*	2013*
Males	1	27	50	50	32
Females	0	5	6	19	15
Hispanic	1	9	12	18	14
African American	0	3	2	0	0
Pacific Islander	0	0	1	5	0
Total	1	32	56	69	47

Student Math Conference Research Presentations					
	2009	2010	2011	2012*	2013*
Males	1	14	23	23	4
Females	0	3	2	7	1
Hispanic	1	6	7	8	1
African American	0	2	2	0	0
Pacific Islander	0	1	1	3	0
Total	1	17	25	30	5

Putnam Exam Scorers					
	2009	2010	2011	2012*	2013*
Males	1	1	2	0	2
Females	0	0	0	0	0
Hispanic	0	0	0	0	0
African American	0	0	0	0	0
Pacific Islander	0	0	0	0	0
Total	1	0	2	0	2

** ENGAGE in STEM Project manager Dana Clahane was on sabbatical during Fall 2012 and Spring 2013*

3.0 Strengths, Weaknesses, Opportunities, Challenges (SWOC)

Based on your analysis in 2.1 through 2.6, answer the following questions:

3.1 What are the strengths of your program?

Reviewing the data in Section 2 we can come away with a clear idea of the strengths of the Math Program. The program responds well to campus initiatives to either contract course offerings in lean years or expand course offerings in flush years. It maintains this flexibility because there is a high demand for math classes among students (whatever sections are offered quickly fill up) and because of a large pool of adjunct faculty. We also see that success and retention rates have been very stable over the past five years—we would prefer to see them improve, but at least they haven't deteriorated.

Additionally, the Math Program's full-time faculty have undertaken a considerable number of initiatives to increase student success and access to classes. The Math Program has a long-standing relationship with the Transfer Achievement Program and its program of Supplemental Instruction for basic skills classes. Starting in the 2013-2014 academic year, various Math Program faculty began to participate in the Fullerton College Supplemental Instruction (SI) program, extending SI to transfer-level classes. In the current Fall 2014 semester, SI facilitators are attached to several calculus and statistics classes.

The Math & Computer Science Division has also changed the concept of its Math Lab, which was always a resource for basic skills students, so that it now supports all math students, whether basic skills or transfer-level. This expansion of support was initiated in the Fall 2014.

The Math Program's faculty members have also been responsive to calls for streamlining the standard mathematics sequence. Elementary Algebra, rather than Pre-Algebra, has become the standard entry point for basic skills students into the math sequence. Basic Math (Math 10) has been replaced by a new Essentials of Basic Math (Math 07) course for students who can absolutely not place into Elementary Algebra (Math 20). Faculty have been willing to experiment with different course structures, including four-day-a-week instruction. And an alternative pathway to meet the Intermediate Algebra requirement—Intermediate Algebra for Statistics and Liberal Arts (Math 43)—has been planned, proposed, and implemented.

The Math Program has continued its involvement with campus-wide special programs--like the previously-mentioned Transfer Achievement Program, the Honors program, and the teacher preparation (Apple) program—and increased its involvement in the Science, Technology, Engineering, & Math (STEM) program. Faculty have increased opportunities for math majors to give talks through Math Seminar classes and compete in nationwide math tests including the American Mathematical Association of Two-Year Colleges (AMATYC) Student Math League (SML) test and the William Lowell Putman Mathematical Competition. World-class lecturers from neighboring universities regularly come to Fullerton College and give talks to students and the community at large through the Math Colloquium. The vibrant activities of the Math Club, Math Seminars, and Math Colloquium fill up an activities calendar every Tuesday, Thursday, and Friday of the semester.

The Math Program has also been responsive to calls for articulation with feeder high schools and the four-year universities. The entire program has responded to the curriculum guidelines published by the California State University, bringing all course descriptions into compliance

with these Course Identifier Descriptors (C-ID). In the 2012-2013 academic year, the Math/CS Division hosted monthly round-table discussions with representatives of local feeder schools, four-year universities, and the Orange County Department of Education to establish articulation agreements and discuss current issues, including the new Common Core Curriculum. Several area high schools have undertaken initiatives to keep students in math classes during their senior year as a result of these talks.

3.2. What are the weaknesses of your program?

Some weaknesses in the Math Program can be articulated. One is a lack of local informal study space that can be utilized by math students apart from the library. There are a few study tables outside teacher offices in the Rooms 625 & 627, but otherwise there are no spaces that can be identified with informal math study (as opposed to the Math Lab, where students must sign in).

Similarly, even the "Math Building" has been overrun by other divisions which have taken control of the classrooms, forcing math instructors to travel extensively across the campus to meet their classes. This lack of a cohesive space for the study of math and computer science flies in the face of division attempts to provide additional support to students and the school's putative support of Science, Technology, Engineering, and Mathematics (STEM) studies.

Again, the lack of a dedicated computer lab for STEM students is a noticeable weakness. The 611L computer lab is a resource busily used by many divisions of the school crowding out STEM students.

There is a desperate need for increased space and funding to staff the newly-increased coverage of the Math Lab, which is now open to students in all math courses but retains only the same space and funding as it previously enjoyed. The increased demand for services cries out for additional funding, space and support.

There is also a lack of readily-available technology, software, and tools for distance education teachers to use. Software (such as Camtasia) and tools (such as Bamboo boards, webcams, and microphones) are needed in faculty offices and on their personal computers to facilitate communication with students and timely responses to student inquiries.

3.3 What opportunities exist for your program?

There are many opportunities available to the Math Program. As faculty seek to streamline the math sequence, there are plans to experiment with a combined Elementary/Intermediate Algebra class, perhaps meeting four days a week. There is discussion on improving student success in the first semester of calculus, considered to be the gateway to higher mathematics studies. Ideas include increasing the unit weight of the course to five units or making Supplemental Instruction (SI) mandatory for students.

The new support of the Math Lab for all courses has exposed strong demand for such a service from transfer-level students—if staffing and space concerns can be addressed, this represents a huge opportunity to support all math students.

In addition to offering online sections, the program has also decided to emphasize hybrid (half on-campus and half online) classes. This represents an opportunity to support students who find a difficulty with regular on-campus attendance for whatever reason. If we are able to provide and make readily available needed software and tools to distance education teachers, we have the opportunity to provide improved instruction in these modalities.

Another opportunity is the opportunity to support more students—when the college decides it has the budget to staff math classes, the program consistently finds the faculty to deliver the instruction and the students to fill the classes.

3.4 What challenges exist for your program?

Challenges naturally ensue from the previously-mentioned strengths, weaknesses, and opportunities. The Math/CS Division's articulation meetings with local schools did not continue regularly after the 2012-2013 academic year. We need to continue to meet with math faculty from our feeder high schools to stay informed of the new K-12 Common Core curriculum, and to get their ideas about how we need to adapt.

The expansion of the Math Lab to support all math students is another challenge. The Math Lab as currently staffed and funded is clearly ill-equipped to provide a quality experience for all visitors. The Math/CS Division hopes that the college will support the Math Lab with funding and/or additional space (such as 611L or an area in the Natural Sciences proposed Campus STEM Resource Center) so that the expansion of services will not cause inordinate wait times for students.

In addition to the need for expanded Math Lab space, the paucity of informal study space for math students continues to be a problem. If the bond measure supporting campus construction and upgrades passes, hopefully any modifications to the 600 building will increase common space for students rather than decrease it. Similarly, the building should be returned to its role as the site for the majority of the math classes and the site of a dedicated math/computer science computer lab such as 611L or an area in the Natural Sciences proposed Campus STEM Resource Center.

College support would also be appreciated in the funding of technological resources that could help Fullerton College students succeed. The Assessment and Learning in Knowledge Spaces (ALEKS) software, for example, provides individualized remediation to students, helping them to shore up whatever weaknesses they have in math basic skills so that they can succeed in college-level studies—funding for student access to this program could pay off big dividends in student retention and success numbers. Funding for other educational technologies or for teacher training for hybrid instruction and other pedagogies or for support of Math Club activities would also show the college is serious in supporting student success in the STEM fields.

4.0 Student Learning Outcomes (SLO) Assessment

4.1 List your program level SLOs and complete the expandable table below.

Program Student Learning Outcomes (PSLOs)	Date Assessment Completed	Date(s) Data Analyzed	Date(s) Data Used For Improvement	Number of Cycles Completed
1. Upon successful completion of courses leading to the Mathematics Associate in Science Degree, the student will be able to analyze a mathematical function. (Linked to ISLO #2A, 2B, 2D)	Spring 2012	Oct 2012	October 2012-present	1
2. Upon successful completion of courses leading to the Mathematics Associate in Science Degree, the student will be able to determine and use an appropriate method to solve a mathematical problem. (Linked to ISLO #2A, 2B, 2D)	Spring 2012	Oct 2012	October 2012-present	1

4.2 Assessment: Complete the expandable table below.

Program Student Learning Outcomes **Assessment for Instructional Programs at Fullerton College**			
Intended Outcomes	**Means of Assessment & Criteria for Success**	**Summary of Data Collected**	**Use of Results**
1. Upon successful completion of courses leading to the Mathematics Associate in Science Degree, the student will be able to analyze a mathematical function.	PSLO #1 was assessed through CSLOs: *MATH 150AF SLO #3 (analyze a function for continuity, relative extrema, intervals of increasing/decreasing, concavity, and/or points of inflection) - one question answered correctly was deemed to meet the outcome. *MATH 250AF SLO #1 (analyze a vector-valued function and produce the associated vector-valued or scalar functions that describe the motion which it defines) - correctly	79% of 140 MATH 150AF students met SLO #3, and 90.2% of 41 MATH 250AF students met SLO #1. A weighted average of 81.5% of students met this PSLO (.79(140) + .902(41) = .815)	Faculty met to discuss the results of assessment. Some discussion centered on the alignment of PSLOs with CSLOs, and if other or additional CSLOs might be appropriate to use in program student learning outcome assessment in the future. Other discussion pertained to teaching methodologies, with teachers sharing ideas about presenting topics related to analyzing functions.

	computing three out of four functions was deemed to meet the outcome. All sections of each course were assessed, whether taught by full-time or part-time faculty. Faculty of each course wrote questions to assess each CSLO. These common questions were incorporated into each teacher's final exam. Each teacher assessed their own students' work, and submitted a reporting form summarizing their data (number of students assessed, number that met the outcome). The data was aggregated and reported to program faculty for analysis and discussion.		Faculty also discussed potential curricular changes. An extra hour (increased from 4 to 5) in calculus classes would be very helpful to give teachers the necessary time for the intense content of these courses. The extra hour could be in class, lab, or SI (Supplemental Instruction). Another intervention would be providing access to ALEKS or a similar system to students for just-in-time remediation of algebra and trigonometry skills that are important for success in calculus. These systems charge fees on a per-user basis, so money is needed to purchase access codes for students that could benefit from this intervention.
2. Upon successful completion of courses leading to the Mathematics Associate in Science Degree, the student will be able to determine and use an appropriate method to solve a mathematical problem.	PSLO #2 was assessed through CSLOs: *MATH 150AF SLO #2 (analyze a function to determine an appropriate method of differentiation, and apply the method to determine the derivative) - one question answered correctly was deemed to meet the outcome. *MATH 150BF SLO #2 (analyze an integral to determine an appropriate method of integration and apply that method to determine the antiderivative) – correctly identifying an appropriate method and solving two out of three integrals was deemed to meet the outcome. *MATH 250AF SLO #3 (construct and evaluate double integrals in both rectangular and polar coordinates in order to solve applied problems involving area, mass, volume, and other physical phenomena) – students were asked to construct a rectangular integral,	91% of 140 MATH 150AF students met SLO #2, 81.7% of 49 MATH 150BF students met SLO #2, and 97.6% of 41 MATH 250AF students met SLO #3. A weighted average of 90.2% of students met this PSLO (.91(140) + .817(49) + .976(41) = .902)	Faculty met to discuss the results of assessment. Some discussion centered on the alignment of PSLOs with CSLOs, and if other or additional CSLOs might be appropriate to use in program student learning outcome assessment in the future. Other discussion pertained to creating and sharing assignments to help students master problem solving. Teachers considered the pros and cons of providing review worksheets for students. Review worksheets have been written and provided for instructors to use. Also, the need for increased out-of-class support for math students was discussed. The Math Lab is now available to calculus students, but the current space and level of staffing does not meet demand. The lab is often crowded with lines of

	a polar integral, and to compute the result. Correctly performing two of those three tasks was deemed to meet the outcome. All sections of each course were assessed, whether taught by full-time or part-time faculty. Faculty of each course wrote questions to assess each CSLO. These common questions were incorporated into each teacher's final exam. Each teacher assessed their own students' work, and submitted a reporting form summarizing their data (number of students assessed, number that met the outcome). The data was aggregated and reported to program faculty for analysis and discussion.		students waiting for assistance. The Math Lab needs money for increased staffing, and needs more space or additional rooms (perhaps regaining permanent Math/CS Division use of 611L) for expansion.

4.3 What percentage of your program level SLOs have ongoing assessment? Comment on progress/lack of progress.

100% of our program level SLOs have ongoing assessment. The PSLOs are formally assessed through the core courses of the degree programs, MATH 150AF, MATH 150BF, and MATH 250AF. One cycle has been completed, including data collection and analysis, reflection by faculty on results, and implementation of instructional and program improvement strategies.

We are currently nearing the end of our second cycle. A second round of data has been collected. The data is in the process of being analyzed, and will be followed by faculty reflection and adjustment of instructional and program improvement strategies.

However, although PSLOs speak only to the Mathematics Degree programs, the mathematics program in its interpretation as "a discipline and as an organized sequence or grouping of courses leading to a defined objective such as the acquisition of selected knowledge or skills, or transfer to another institution of higher education" is much broader and has many other purposes other than awarding an AS degree in mathematics. Virtually every Fullerton College student needs math classes to meet his or her transfer or degree goals. Basic skills math courses support students' efforts to remediate their basic skills and prepare to succeed in college-level courses. MATH 040 F and MATH 043 F, though not transferable, meet the associates' degree general education requirement. A variety of transferable math courses meet the CSU GE and IGETC math requirement. Even the core courses of the mathematics degrees are needed by many more students in other STEM programs. Therefore it is appropriate for us to speak throughout the remainder of Section 4 to assessment of the SLOs of all math courses, since the Math Program is much broader than just the mathematics associate degrees.

Mathematics SLO assessment is a continuous endeavor that is conducted on a cyclical basis so that every semester there are some math courses being assessed. Every course is

assessed at least once every three years. Discussions on all results take place at one division meeting each semester, so that all math faculty participate in and benefit from the reflections process.

4.4 How has assessment of program level SLOs led to improvements in student learning and achievement?

As mentioned above, it is appropriate for us to speak throughout the remainder of Section 4 to assessment of the SLOs of all math courses, since the math program is much broader than just the mathematics associate degrees.

Mathematics SLO assessment is a continuous endeavor that is conducted on a cyclical basis so that every semester there are some math courses being assessed. Discussions on all results take place at one division meeting each semester. These discussions have led to numerous adaptations and improvements to assessment, curriculum, teaching methodologies, assignments, faculty communication and collaboration, and Math Program support systems. Some of these improvements are already in place; some are in the process of implementation; and some need campus or monetary support to implement. The list of improvements and changes to the Math Program based on SLOA reflection include:

1. Assessment Process
    a. Allow SLOs to be embedded in final exams rather than presented as a separate page
    b. Rewrite assessment questions for clarity
    c. Involve more faculty members in writing/selecting SLO assessment questions
    d. Put SLO questions at the beginning of the final exam
    e. Consider allowing instructors to write their own SLO questions and use a Math Program rubric to assess rather than using common questions
2. Curriculum
    a. Select a different textbook that more thoroughly covers the SLO topics
    b. Restructure the schedule of the course to dedicate more time to SLO topics
    c. Restructure the schedule of the course to introduce SLO topics earlier
    d. Add an advisory requisite of a reading level to some courses
    e. Consider adding an extra hour to some courses, particularly the calculus sequence Options include:
        i. Add an additional in-class hour
        ii. Add one required hour of lab or SI (supplemental instruction)
        iii. Provide optional SI sessions (need money to hire SI facilitators and to pay faculty stipends for coordinating with facilitators)
3. Teaching Methodologies
    a. Incorporate more review throughout the course
    b. Emphasize a particular topic with low SLOA results throughout the course
        i. Provide more in-depth discussions on the topic
        ii. Dedicate more time to class activities on the topic
        iii. Implement periodic checks throughout the semester on the topic
    c. Incorporate in-class activities in both group and individual settings containing SLO topics
4. Assignments

    a. Give assignments throughout the semester that reflect the format of SLOA questions
    b. Provide SLO review assignments throughout the course
5. Faculty Communication and Collaboration
    a. Share SLOA results and ideas for improvement with part-time instructors
    b. Share classroom worksheets and materials with part-time instructors and all faculty
    c. Jointly create assignments specific to SLO topics for all faculty to incorporate
    d. Attach a flier to the Course Coverage sheet given to part-time instructors asking them to emphasize particular SLO topics that had a low success rate
6. Math Program Support Systems
    a. Make a database of review resources (e.g. Kahn Academy videos) for students to use on their own for review (need professional expert pay for research and design of database)
    b. Purchase access codes to ALEKS (an adaptive online learning program) or a similar system for faculty to provide to students in need of remediation to meet SLOs (need money to purchase the codes)
    c. Expand Math Lab space and staffing to provide needed out-of-class help and student support (need more space, and more money for staffing)

4.5 How has assessment of program-level SLOs led to improvements in transfer or certificate/degree awards?

The number of Mathematics AS degrees awarded increased from 22 in 2012-13 to 32 in 2013-14. But equally important to math degrees awarded is the fact that math courses impact virtually all transfer students and all degree programs at Fullerton College. Without meeting the math requirement, no student can transfer and no student can earn an associate degree.

Through the reflection process that completes each SLO cycle, math faculty continually adjust and improve instruction, teaching methodologies, assignments and curriculum. These continuous improvements help more students succeed in their math courses, bringing them one step closer to their transfer or degree goals.

4.6 What challenges remain to make your program level SLOAs more effective?

The Math Program SLOA process is now well-established and regularly used for continuous quality improvement. Ongoing, pervasive dialogue about student learning takes place every semester. Program faculty members continuously use SLOA results to improve instruction and support student learning.

Many of the improvements listed in Section 4.4 above have already been implemented or are in process of implementation. The challenges that remain are to gain the needed campus support and money to implement the remaining interventions and improvements:

1. Adding an extra hour to some courses, particularly the calculus sequence:
    a. Add an additional in-class hour, or add one required lab or SI hour – these options would require campus and district support through the curriculum process
    b. Provide optional SI sessions – this option would require money to hire SI facilitators and to pay faculty stipends for coordinating with facilitators

2. Make a database of review resources (e.g. Kahn Academy videos) for students to use on their own for review - need professional expert pay for research and design of database
3. Purchase access codes to ALEKS (an adaptive online learning program) or a similar system for faculty to provide to students in need of remediation to meet SLOs - need money to purchase student access codes
4. Math Lab expansion to provide needed out-of-class help and student support:
   For many years, Math Lab access was limited only to students enrolled in certain courses. Summer 2014 was the first time the Math Lab was open to students of all math courses. With Fall 2014 in full swing, the crowded Math Lab and lines of students waiting for tutoring help make it clear that this support is indeed needed for all students. It is also abundantly clear that the current Math Lab space and funding level is woefully inadequate to meet the need for student support.
   a. More space is needed, which could be accomplished by:
      i. Dedicating additional rooms to the Math Lab
      ii. Reverting control of Room 611L to the Math/CS Division as was originally planned and promised during the previous remodel of this area
      iii. Dedicating an area for math in the Natural Sciences proposed Campus STEM Resource Center
      iv. For the future, incorporate additional Math Lab space into the next 600 building remodel
   b. More money is needed in the budget for Math Lab staffing to provide sufficient out-of-class help and student support

5.0 Evaluation of Progress Toward Previous Goals/SAP's (Future program review templates for this section will identify "previous goals" as "previous *strategic action plans*"-- SAP's.)

In the previous program review, the Math Program wrote two different reviews – one for basic skills (BS) math, and one for transfer level (TL) math. In this review, math department faculty are writing only one review of the entire Math Program. The goals below are combined from both previous program reviews - BS and TL.

5.1 List the goals from your last self-study/program review.

BS short-term (2 years) goal #1: Revise Basic Skills Curriculum.
Measurement: Increased success and retention as well as transfer rate.

- Create alternative pathways through the math sequence for non-STEM majors
- Incorporate "just-in-time remediation" into developmental courses
- Develop new math requirement (equivalent to Math 40) for associate degree gen-ed
- Develop an accelerated basic skills course sequence in math
- Investigate short-term and other options for course offerings

BS short-term (2 years) goal #2: Investigate and implement alternative placement models and other support initiatives
Measurement: Increased success and retention

- Improve math placement process
- Interventions for students who are failing classes to support them in continuing
- Mandatory interventions for students who drop/fail classes
- Develop orientation tools for potential online math students to better prepare them for online classes

BS long-term (6 years) goal #1: Improved facilities for student success.
Measurement: Students will have access to the resources they need on campus to complete their math courses in a lab designed for mathematics.

- In order to accommodate the large number of students using the math lab, the old math lab (room 611) needs to be back under the control of the Math/CS Division as was promised when the lab moved to the LLRC. (The 611 computer lab was created from the western half of the old lab). The Math Program intends to create a Math Success Center in room 611. This center will be staffed by math faculty and available to all basic skills math students, particularly those taking online and hybrid courses, courses using MyMathLab, and any courses incorporating self-pacing or "just-in-time" remediation. We intend to continue to operate the math lab for more traditional face-to-face tutoring utilizing both faculty and student tutors

BS long-term (6 years) goal #2: Continue to improve placement and advising.
Measurement: Students will be more appropriately placed in the basic skills sequence and will have access to enhanced counseling/advising opportunities.

- The placement process will include a combination of informed self-placement, the placement exam, and high school agreements
- The Math Program will have agreements with area feeder high schools for student placement directly into transfer level math classes provided they have adequate grades on the state exam and required grades in Intermediate Algebra

- A designated faculty member will work as math advisor to students. This faculty member will work with counselors and students to assure students are placed appropriately. This person will also meet regularly with students who are repeating a math course, with the intent of making the student more accountable

TL short-term (2 years) goal #1: Increase the number of students who earn an AS or AS-T mathematics degree.
Measurement: An increase in the number of mathematics degrees awarded.

- Advertise and encourage completion of degrees in mathematics and computer science (especially the new MATH AS-T degree)
- Support opportunities for math majors to study math outside of class through expansion of involvement of faculty and students in the math colloquium, math seminar, and mathematics independent study.

TL short-term (2 years) goal #2: Increase the number of students who successfully transfer to a 4-yr institution.
Measurement: An increase in the transfer rate.

- Sponsor and support activities designed to improve the transfer rate for all students with an emphasis on initiatives to assist students meet their mathematics requirement for transfer
- Continue to monitor demand for transfer level courses and adjust course offerings accordingly
- Investigate support programs for underrepresented groups in transfer-level courses, such as peer mentoring and involvement in campus initiatives
- Strengthen contracts between high schools, Fullerton College, and four-year institutions to foster more interaction between programs

TL long-term (6 years) goal #1: Expand offerings of core transfer-level courses for non-STEM majors MATH 100, 120.
Measurement: Increased number of students who meet the math requirement to transfer.

- Request additional unit allocation to allow for increased offerings of MATH 100 and MATH 120, courses required for transfer by non-STEM majors.
- Increase support mechanisms available to non-STEM students such as additional tutoring support for non-majors

TL long-term (6 years) goal #2: Restructure our calculus sequence in terms of unit value and class size.
Measurement: An increase in the retention and success rates in these courses.

- Investigate the structure of these courses at other 2- and 4-year colleges
- Submit to the curriculum committee a request for class size reduction from 35 to 30 in Math 150A and Math 150B
- Investigate additional ways to increase student success in degree-applicable courses, such as a 5^{th} in-class hour or course-wide supplemental instruction in Math 141, 150A, and 150B
- Provide tutorial support in calculus sequences by developing positive attendance lab course(s) in a designated location

TL long-term (6 years) goal #3: Expand opportunities for enrichment and enhanced rigor in STEM math courses.
Measurement: Increases in the number of associate degrees awarded in mathematics and/or the number of students who transfer to a 4-year college or university with the intent to major in mathematics or a closely related field.

- Develop an honors section of Math 150A
- Offer Math 295 as a stacked course (dual enrollment)
- Investigate the creation of additional courses aimed at math majors such as separate courses in differential equations and linear algebra, transition to advanced mathematics, and calculus IV with differential geometry
- Investigate support courses, such as a course in scientific computing to introduce such software as Mathematica, Maple, MATLAB, Sage, LaTeX, etc.
- Establish scholarships for excellent talks, websites, or research papers by students

5.2 Describe the level of success and/or progress achieved in the goals listed above.

BS short-term (2 years) goal #1 - Revise Basic Skills Curriculum:
The level of success for this goal was excellent.

- Math 43 Intermediate Algebra for Statistics and Liberal Arts was created as an alternative pathway through the math sequence for non-STEM majors. Upon successful completion of Math 43, non-STEM majors would fulfill the prerequisite for the transfer level courses Math 100 Liberal Arts Mathematics and Math 120 Statistics.
- We incorporated "just-in-time remediation" into developmental courses by creating Math 7 Essentials of Basic Math. Students enrolled in Math 15 Pre-Algebra or Math 20 Elementary Algebra can strengthen their fundamental arithmetic skills required for success by concurrently enrolling in this course. The incorporation of a late start course option allows students struggling in Math 15 or Math 20 to also enroll in Math 7 during the semester to strengthen these skills.
- Math 43 also serves as an equivalent to Math 40 Intermediate Algebra within the gen-ed requirements for an associate degree.
- As part of a possible accelerated basic skills course sequence, Math 41 Combined Elementary and Intermediate Algebra was developed. This six unit course allows a student to complete Math 20 and Math 40 in one semester long course.
- For those students who preferred to take both Math 20 and Math 40 in a single semester, we offered the courses as back to back eight week courses. The Math Program expanded the hybrid course offerings to include Math 100 and increased the number of hybrid sections offered.

BS short-term (2 years) goal #2 - Investigate and implement alternative placement models and other support initiatives:
The level of success was good.

- To improve proper math placement, a timely email is sent by instructors explaining the scope and content of the course to the registered students. A student can then decide if he or she is placed correctly. If a student is incorrectly placed, he or she has time to go through the proper channels to enroll in the correct course. In addition, the class schedule provides a brief description of all basic skills courses as well as information about the online and hybrid formats.

- An intervention tool for instructors to inform students who are failing a class is the early alert system within MyGateway. Additionally, instructors utilizing MyMathLab have the ability to alert students with substandard grades via email.
- The Math Program has developed a standard email that is required to be sent to all students registered in a hybrid or online course prior to the beginning of the semester. This email properly informs the students of course expectations in these formats and allows them to change their schedule if they so desire. Instructors provide an orientation, online or on campus, within the first week of the semester to familiarize students with the online course management system and provide any additional information about how the course will be conducted.
- An agreement was put in place between FC and the Fullerton High School district to allow students who take certain high school math courses and/or achieve sufficient scores on various readiness tests to place directly into 100-level math courses without taking the FC placement test.
- Students must now go to a group advising session with a counselor to receive their placement test scores. This allows multiple measures to be used for placement rather than relying solely on the placement test score.

BS long-term (6 years) goal #1 - Improved facilities for student success:
The level of success was excellent.

- The math lab is now available for use by any student enrolled in a math course at Fullerton College. Calculus and statistics students are no longer precluded from accessing a lab designed for mathematics.
- In order to accommodate a larger population of math students, the Math/CS Division has begun to formally utilize room 611 by staffing math faculty during certain hours of operation.
- However, with the increased demand for tutoring and services by students in newly served courses, expansion of Math Lab staffing and space is sorely needed.

BS long-term (6 years) goal #2 - Continue to improve placement and advising:
The level of success was fair.

- The prerequisites for Math 15 and Math 20 have been removed, thus allowing students to self-place into either Math 15 or Math 20. Math 20 does have an advisory of Math 15 or any previous course in algebra.
- The Math Program is currently working with local high schools to develop alternatives to the placement process and formal articulation of courses with basic skills courses in our curriculum.
- Students must now go to a group advising session with a counselor to receive their placement test scores. This allows multiple measures to be used for placement rather than relying solely on the placement test score.

TL short-term (2 years) goal #1 - Increase the number of students who earn an AS or AS-T mathematics degree:
The level of success was excellent.

- Fullerton College now offers two degrees in mathematics – the long-standing AS degree, and the new AS-T degree.
- Informative posters have been displayed in campus buildings indicating various careers that can be obtained with a mathematics degree. In order to promote and encourage

more students to achieve math or computer science degrees, the division has brochures displaying the requirements for such degrees. STEM has been utilized to inspire students in the field of mathematics.

- The Math Program provides students opportunities outside the classroom to study mathematics with weekly colloquiums. This includes guest lecturers as well as student presentations.
- Furthermore, the program now offers independent study and seminars in mathematics. The courses are guided by an instructor and range in unit value. The course is designed to increase the knowledge of mathematics through individual study and small group conferences.

TL short-term (2 years) goal #2 - Increase the number of students who successfully transfer to a 4-yr institution:

The level of success was good.

- In consultation with Math Program faculty, the dean monitors and adjusts the course offerings accordingly for the transfer level courses.
- The Math Program has investigated expanding supplemental instruction to include transfer level courses such as Math 130 Business Calculus, Math 150A Calculus I, and Math 150B Calculus II.
- The Math Program continues to support programs for underrepresented groups in transfer-level by supporting college initiatives such as Legacy and the Student Diversity Success Initiative (SDSI).
- The division continues to strengthen contracts between high schools and four year institutions by meeting with representatives from the Mathematics and Computer Science Division, area high schools, and CSUF. These meetings were held monthly in 2012-13, and once a semester thereafter.

TL long-term (6 years) goal #1 - Expand offerings of core transfer-level courses for non-STEM majors MATH 100, 120:

The level of success is poor.

- The 2013-2014 academic year saw and increase of 23% in the Math 100 and Math 120 course offerings compared to the 2010-2011 academic year.

TL long-term (6 years) goal #2- Restructure our calculus sequence in terms of unit value and class size:

The level of success is good.

- Some instructors have investigated how other 2 year and 4 years colleges structure their calculus sequence. For example, Golden West College Calculus courses are 5 units instead of 4. Also, CSUF calculus sequence offers 4 unit courses but also has 1 unit optional supplemental instruction for their courses.
- Math Program faculty members continue to discuss, annually, the most effective way to request a class size reduction from 35 to 30 in Math 150A and Math 150B.
- Math Program faculty also continue to discuss, regularly, how to get a 5th hour of instruction in dense courses such as Math 141 College Algebra and Math 150A and Math 150B. We are contemplating supplemental instruction, adding a 5th unit or both.

TL long-term (6 years) goal #3 - Expand opportunities for enrichment and enhanced rigor in STEM math courses:

The level of success is great.

- The program has developed a section of Honors Math 150A. The first course offering was Fall 2013.
- Math 295 General Math Seminars has been offered and been expanded to include Math 290 Pure Mathematics Seminar and Math 291 Applied Mathematics Seminar. An honors version of each seminar course is also now in place. The seminar courses are scheduled so that students enrolled in any seminar course have class meetings together.
- The Math Program is adding additional courses aimed at math majors:
    - Separate courses in ordinary differential equations (Math 260) and linear algebra (Math 255) are in the curriculum process for Fall 2016.
    - Other courses such as transition to advance mathematics, and calculus IV with differential geometry are under consideration.
- The Math 290, Math 291, and Math 295 seminar courses incorporate the use of LaTex to properly format and display a mathematical document. These seminars are now also offered as honors courses.

5.3 How did you measure the level of success and/or progress achieved in the goals listed above?

After considering the bulleted items within each of the desired goals, the scale used was
Excellent = 90 – 100% of the goal achieved.
Great = 80 – 89% of the goal achieved.
Good = 70 – 79% of the goal achieved.
Fair = 60 – 69% of the goal achieved.
Poor = 0 – 59% of the goal achieved.

5.4 Provide examples of how the goals in the last cycle contributed to the continuous quality improvement of your program.

Our program has continued to improve from achieving the majority of the goals set from our last program review.

- Restructuring of basic skills sequence (new courses Math 7 & Math 43, change in prerequisites for Math 15 and Math 20) provides students alternative pathways with fewer barriers to reaching transfer level courses
- New transfer level courses –Math 150AH, Math 290, Math 291, Math 290H, Math 291H, Math 295H – provides enriched experiences for STEM students
- Improved placement measures (agreement with Fullerton HS district, group advising with placement test scores, increased communication with students regarding placement during registration) help students begin their math sequence in the right place to maximize their chance for success
- Opening math lab services to more courses now provides needed support for the success of all math students (although increased space and funding for staffing is sorely needed)

5.5 In cases where resources were allocated toward goals in the last cycle, how did the resources contribute to the improvement of the program?

- Strategic Plan and Program Review funds were used to offer a series of boot camps, review sessions and other interventions for students in math courses. Boot camps, designed as an intense review of prerequisite topics for the succeeding course, helped support student success and retention by strengthening the student's mathematical knowledge, note taking skills, and or time management required for his or her subsequent coursework. Review sessions were geared towards preparing students for their exams.
- Strategic Plan funds were used to purchase copies of the ALEKS software which was incorporated into certain sections of Math 007 to provide intense remediation for students in basic skills classes.
- Staff Development funds were used for various breakout sessions to strengthen teacher pedagogy.

5.6 If funds were not allocated in the last review cycle, how did it impact your program?

- No funds were allocated for the remodel of Room 611 into the Math Success Center. Since the Math Lab has been designated for all levels of mathematics courses, overcrowding has been an issue.
- No funds were allocated in the creation to specifically advertise and encourage students to apply for the AS-T degree.
- Although we have the highest, and a steadily increasing number of, awarded AS-T degrees in Mathematics, we believe that this increase would be far greater if we had financial support for getting the word out about this degree. Many students still remain uninformed that they qualify not only for one, but often, two or three different STEM degrees upon transfer.

6.0 Strategic Action Plans (SAP) [formerly called Goals (6) and Requests for Resources (7)]

Using the tables below, list the strategic action plans (SAPs) for your program. These plans should follow logically from the information provided in the self-study. Use a separate table for each SAP.

SAPs for this three-year cycle:

STRATEGIC ACTION PLAN # 1	
Describe Strategic Action Plan: (formerly called short-term goal)	**Increase Math Lab faculty hours by 25 additional hours per week**
List College goal/objective the plan meets:	College Goals: Goal #1: Fullerton College will promote student success. Goal #2: Fullerton College will reduce the achievement gap. Objectives: 1.1: Address the needs of under-prepared students. 1.2: Increase course retention and success. 1.5: Increase the persistence rate of students. 2.2: Increase retention rate of Hispanic and African-American students by at least 2%. 2.3: Increase success rate of Hispanic and African-American students by at least 2%. 2.4: Increase persistence rate of Hispanic and African-American students by at least 2%.
Describe the SAP: (Include persons responsible and timeframe.)	Chris Larsen (Math Lab Coordinator) will coordinate with Mark Greenhalgh (Dean of Mathematics/Computer Science) to schedule faculty Math Lab hours
What *Measurable Outcome* is anticipated for this SAP?	• Increased retention and success rates in math courses • Increased persistence rate in math courses • Increased retention and success rates for Hispanic and African-American students in math courses • Increased persistence rate for Hispanic and African-American students in math courses
What specific aspects of this SAP can be accomplished without additional financial resources?	This plan is highly dependent on funding.

If additional financial resources would be required to accomplish this SAP, please complete the section below. Keep in mind that requests for resources must follow logically from the information provided in this self-study.

Type of Resource	Requested Dollar Amount	Potential Funding Source

Personnel	$45/hour x 25 hours x 37 weeks (16 Fall, 16 Spring, 5 Summer) = $41,625/year	
Facilities		
Equipment		
Supplies		
Computer Hardware		
Computer Software		
Training		
Other		
Total Requested Amount	$41,625/year	

STRATEGIC ACTION PLAN # 2	
Describe Strategic Action Plan: (formerly called short-term goal)	**Increase FC student retention, success and persistence by providing Math Lab services for STEM students by returning Room 611L to the Math Division or designating an area in the Natural Sciences proposed Campus STEM Resource Center. This will also increase opportunities for students to get support for their learning needs and feedback on problem-solving and mathematical writing.**
List College goal/objective the plan meets:	College Goals: Goal #1: Fullerton College will promote student success. Goal #2: Fullerton College will reduce the achievement gap. Objectives: 1.2: Increase course retention and success. 1.5: Increase the persistence rate of students. 2.2: Increase retention rate of Hispanic and African-American students by at least 2%. 2.3: Increase success rate of Hispanic and African-American students by at least 2%. 2.4: Increase persistence rate of Hispanic and African-American students by at least 2%.
Describe the SAP: (Include persons responsible and timeframe.)	• The Math Program is requesting that Room 611L (or a designated area in the Natural Sciences proposed Campus STEM Resource Center) be utilized by the math program throughout the day as a space for student-faculty and/or student-tutor contact in transfer-level math courses, which are proving to be a challenge for the existing Math Lab in the LLRC to handle with the given small space. • We are requesting funds for faculty to supervise the students in this proposed extension of the Math Lab. Now that the Math Lab is handling a larger variety of courses with no current increase in space or funding of staff, it is time to concentrate efforts on supplying students with space and computers to work

	on STEM-oriented transfer level math coursework with higher levels of staffing of the proposed extended Math Lab. • We propose to have one instructor on duty in Room 611L (or an area in the Natural Sciences proposed Campus STEM Resource Center) at all times that the Math Lab in the LLRC also has help available for basic skills or non-STEM courses, beginning Fall 2016. (The Math Lab Annex in Room 611 is not appropriate for these activities, as it is now a work area/meeting location for students who are consulting with the ten math faculty whose offices open up to the Math Lab Annex. This work area must be preserved for the students of these faculty and for our division meetings.) • To minimize confusion over the extended nature of the Math Lab, we propose to call Room 611L (or an area in the Natural Sciences proposed Campus STEM Resource Center) the Math Success Center, which will supplement the Math Lab by providing enhanced assistance for students in STEM math courses.
What *Measurable Outcome* is anticipated for this SAP?	• Increases in student success, retention and persistence are expected in lower level courses serviced by the Math Lab in the LLRC due to newfound space of the proposed Math Success Center. • Increases in retention, success and persistence rates for students taking math classes from part time instructors are expected. • With the increased attention to student writing, we believe that Hispanic students and African American students will enjoy higher retention, success and persistence rates in STEM-oriented math courses at FC due to the increased attention to their writing.
What specific aspects of this SAP can be accomplished without additional financial resources?	The aspect of this SAP that can be accomplished without additional financial resources is the proposed return of Room 611L to our division.

If additional financial resources would be required to accomplish this SAP, please complete the section below. Keep in mind that requests for resources must follow logically from the information provided in this self-study.

Type of Resource	Requested Dollar Amount	Potential Funding Source
Personnel	32 weeks times 56 hours per week times $45/hour at the Lab rate	
Facilities		
Equipment		
Supplies		
Computer Hardware		

Computer Software		
Training		
Other		
Total Requested Amount	$80,640	

STRATEGIC ACTION PLAN # 3	
Describe Strategic Action Plan: (formerly called short-term goal)	**Increase supplemental enrichment and community building, rigor, depth, retention, persistence in problem-solving, and success, as well as mathematical writing skills, for students in Math 150A and 150B, by reducing class size to the Mathematical Association of America's guideline/recommended class size of fewer than 30 students.**
List College goal/objective the plan meets:	College Goals: Goal #1: Fullerton College will promote student success. Goal #2: Fullerton College will reduce the achievement gap. Objectives: 1.1: Address the needs of under-prepared students 1.2: Increase course retention and success. 1.4: Increase the number of transfers. 1.5: Increase the persistence rate of students. 2.2: Increase retention rate of Hispanic and African-American students by at least 2%. 2.3: Increase success rate of Hispanic and African-American students by at least 2%. 2.4: Increase persistence rate of Hispanic and African-American students by at least 2%.
Describe the SAP: (Include persons responsible and timeframe.)	• The Math 150A, 150HF, and 150B course coordinators will facilitate the curriculum revision process in Curricunet, in consultation with program faculty and Cindy Zarske, the Division Curriculum Committee Representative. The curriculum approval processes will be completed in time so that the changes can be implemented in Fall 2016. • Our calculus sections are different than those at Cypress College, because our calculus students and faculty are attaching enrichment components and community building directly into the classroom setting and class homepages. • Cypress College does not currently integrate research opportunities and math competitions/other enrichment activities into its calculus sequence. These integrations require more one-on-one attention to students at FC than calculus courses have adopted in the past.
What *Measurable Outcome* is anticipated for this SAP?	• Increased retention and success percentages in Math 150A/B during the 2016-17 school year compared to the previous

	academic year. • Increased involvement of Math 150A/Math 150H/Math 150B students in the math program's enrichment activities, such as the colloquia, seminars, and competitions, as well as external research conferences. • We also expect increased success and retention rates for Hispanic students in particular and also in particular, for African American students, in Math 150A and Math 150B, as a result of these class size reductions, due to the consequent increased ability of our Math 150A/B instructors to interact with students.
What specific aspects of this SAP can be accomplished without additional financial resources?	• Faculty work on the curriculum revision and approval process in Curricunet does not require additional financial resources. • Classrooms under control of the Math/CS Division will need to be increased by at least one to two more classrooms that are appropriate for class sizes 30 and under such as 622 and 622B.

If additional financial resources would be required to accomplish this SAP, please complete the section below. Keep in mind that requests for resources must follow logically from the information provided in this self-study.

Type of Resource	Requested Dollar Amount	Potential Funding Source
Personnel	55 sections per year times 5 students=275 seats=the cost of approximately 9 sections per year=$36,000 at $4,000 per section, per instructor (rough estimate)	
Facilities		
Equipment		
Supplies (advertising conferences and events to students)	$300	
Computer Hardware		
Computer Software		
Training		
Total Requested Amount	$36,300	

STRATEGIC ACTION PLAN # 4	
Describe Strategic Action Plan: (formerly called short-term goal)	**The Math Program will strengthen its ties with feeder high schools and transfer institutions in Orange County and with the community.**
List College goal/objective the plan meets:	College Goals: Goal #1: Fullerton College will promote student success. Goal #2: Fullerton College will reduce the achievement gap. Goal #3: Fullerton College will strengthen connections with the

	community. Objectives: 1.1: Address the needs of under-prepared students 1.2: Increase course retention and success. 1.4: Increase the number of transfers. 1.5: Increase the persistence rate of students. 2.2: Increase retention rate of Hispanic and African-American students by at least 2%. 2.3: Increase success rate of Hispanic and African-American students by at least 2%. 2.4: Increase persistence rate of Hispanic and African-American students by at least 2%. 3.2: Strengthen partnerships with local feeder high schools and universities. 3.4: Increase funding capabilities of the college. 3.5: Increase engagement of the college with the community through college events, community service, and other partnerships.
Describe the SAP: (Include persons responsible and timeframe.)	• The Math Program will continue to offer Math Colloquia featuring guest speakers from 4-year colleges and universities and student and faculty speakers. Math Program faculty and students will interact with these visitors at the talks and at dinners held afterwards. More time and energy will be devoted to advertising the events to local high schools. • Math Program faculty and staff will continue to be encouraged to advertise the Colloquia and Seminars to their students and also to high school math faculty in the region. • The Math Program will also continue its participation in the Southern California Conference for Undergraduate Research (SCCUR) and the Pacific Coast Undergraduate Math Conference (PCUMC), which brings together students from colleges and universities along the Pacific Coast and promotes student investigations into open mathematical research problems. • Math Program faculty will continue to schedule meetings with high school math faculty to promote their and their students' possible involvement in the enrichment activities acted at the College. • Math Program faculty will also interact with feeder high school math faculty to discuss placement and such things as implications of the Common Core.
What *Measurable Outcome* is anticipated for this SAP?	• Increases in the number of students giving a talk at the PCUMC. • Increases in the number of students giving a talk at the Math/CS Division colloquium or campus event. • Increases in the number of high school students participating in Math/CS Division enrichment opportunities.

What specific aspects of this SAP can be accomplished without additional financial resources?	Meetings with faculty from high schools should not require additional financial support.

If additional financial resources would be required to accomplish this SAP, please complete the section below. Keep in mind that requests for resources must follow logically from the information provided in this self-study.

Type of Resource	Requested Dollar Amount	Potential Funding Source
Personnel	16 hours conference attendance times 2 faculty members times $35/hour prof. expert pay=$1120	
Facilities		
Equipment		
Supplies		
Computer Hardware		
Computer Software		
Training		
Other (meeting subsistence)		
Total Requested Amount	$1120	

STRATEGIC ACTION PLAN # 5	
Describe Strategic Action Plan: (formerly called short-term goal)	**Expand emerging educational technology use by students and faculty in math courses.**
List College goal/objective the plan meets:	College Goals: Goal #1: Fullerton College will promote student success. Goal #2: Fullerton College will reduce the achievement gap. Objectives: 1.1: Address the needs of under-prepared students 1.2: Increase course retention and success. 1.5: Increase the persistence rate of students. 2.2: Increase retention rate of Hispanic and African-American students by at least 2%. 2.3: Increase success rate of Hispanic and African-American students by at least 2%. 2.4: Increase persistence rate of Hispanic and African-American students by at least 2%.
Describe the SAP: (Include persons	• Math Program faculty will develop a database of electronic resources that students can use to review.

responsible and timeframe.)	• A faculty member will need to be compensated for the time involved in organizing this database. • Also needed are Bamboo boards (or similar technology) & microphones for math instructors to use for online office hours, etc. • We would also like to be able to purchase enough licenses for Camtasia so that each distance education math instructor has convenient access for creation of instructional videos in a timely manner in response to student needs. Training will be needed for faculty on this technology.
What *Measurable Outcome* is anticipated for this SAP?	An increase in success and retention rates in FC Math courses.
What specific aspects of this SAP can be accomplished without additional financial resources?	None.

If additional financial resources would be required to accomplish this SAP, please complete the section below. Keep in mind that requests for resources must follow logically from the information provided in this self-study.

Type of Resource	Requested Dollar Amount	Potential Funding Source
Personnel	$35 per hour Prof. Expert Pay times 20 hours times two instructors=$1400	
Facilities		
Equipment	$ for Bamboo boards, webcams and microphones ($125 x 20 teachers=$2500)	
Supplies		
Computer Hardware		
Computer Software	$4000 for Camtasia ($200 x 20 licenses)	
Training	Four 2-hour training sessions times $35/hour Prof. Expert pay for trainers=$280.	
Other		
Total Requested Amount	$8180	

STRATEGIC ACTION PLAN # 6	
Describe Strategic Action Plan:	**The Math Program will pilot instructor-led Supplemental Instruction sessions at the proposed Math Success Center for STEM students in**

(formerly called short-term goal)	**room 611L (or designated area in the Natural Sciences proposed Campus STEM Resource Center) to increase student facility with problem-solving and also computational technology helpful in gaining better understanding in STEM-oriented math courses, particularly, Math 150A-295.**
List College goal/objective the plan meets:	College Goals: Goal #1: Fullerton College will promote student success. Goal #2: Fullerton College will reduce the achievement gap. Objectives: 1.1: Address the needs of under-prepared students 1.2: Increase course retention and success. 1.4: Increase the number of transfers. 1.5: Increase the persistence rate of students. 2.2: Increase retention rate of Hispanic and African-American students by at least 2%. 2.3: Increase success rate of Hispanic and African-American students by at least 2%. 2.4: Increase persistence rate of Hispanic and African-American students by at least 2%.
Describe the SAP: (Include persons responsible and timeframe.)	• Supplemental Instruction sessions will be held and will be coordinated with classes to ensure maximal participation. • The sessions will be led by Math Program faculty teaching transfer level courses and will focus on mathematical writing, problem-solving strategies, study skills and habits, and development of persistence in students. • SI Instructors will be paid at the laboratory rate.
What *Measurable Outcome* is anticipated for this SAP?	• An increase in retention and success, during the 2016-17 school year, in transfer level mathematics courses. • Also anticipated are increases in retention and success for students coming from underrepresented groups in mathematics. • We anticipate higher retention rates and higher success rates among Hispanic students in STEM oriented math courses Math 150A-295 and also among African students in these courses.
What specific aspects of this SAP can be accomplished without additional financial resources?	• The only aspect of this SAP that can be accomplished without additional financial resources is returning Rooms 622A and B and/or other similarly sized classrooms and Room 611L to the Math/CS Division.

If additional financial resources would be required to accomplish this SAP, please complete the section below. Keep in mind that requests for resources must follow logically from the information provided in this self-study.

Type of Resource	Requested Dollar Amount	Potential Funding Source

Personnel	32 weeks times 2 weekly 2 hour SI sessions for each of 150A/H and 150B times $45/hr (or Math Lab rate)	
Facilities		
Equipment		
Supplies (copying for advertising)	$200	
Computer Hardware		
Computer Software		
Training		
Other		
Total Requested Amount	$4680	

STRATEGIC ACTION PLAN # 7	
Describe Strategic Action Plan: (formerly called short-term goal)	**Increase retention, success, persistence and narrow achievement gaps for as many groups of students as possible in basic skills courses and transfer level courses taken by students after they take a basic skills course at Fullerton College.**
List College goal/objective the plan meets:	College Goals: Goal #1: Fullerton College will promote student success. Goal #2: Fullerton College will reduce the achievement gap. Objectives: 1.2: Increase course retention and success. 1.3: Increase the number of degrees ad certificates awarded. 1.4: Increase the number of transfers. 1.5: Increase the persistence rate of students. 2.2: Increase retention rate of Hispanic and African-American students by at least 2%. 2.3: Increase success rate of Hispanic and African-American students by at least 2%. 2.4: Increase persistence rate of Hispanic and African-American students by at least 2%.
Describe the SAP: (Include persons responsible and timeframe.)	• The Math Program will meet to find ways to mitigate some existing overlap in the basic skills math sequence, such as between Math 20 and 40, or between Math 40 and Math 141, in order to reduce the number of exit points in these courses and thus increase persistence/retention, as well as success. • Course coordinators for these courses will pursue the Curricunet process on the relevant curricular additions/deletions. • The Math Program has also agreed to submit three new courses, Math 255 Linear Algebra, Math 260 Ordinary Differential Equations, and Math 170 Discrete Structures to the curriculum

	via Curricunet, during Fall 2014. Co-contributors in Curricunet include Dana Clahane, Bill Cowieson, Robert Diaz, Paul Sjoberg, and Cindy Zarske, as well as other interested faculty. These new courses are intended to give the Math Program more flexibility in its offerings so that students who transfer to UC schools or some state universities do not have to retake courses there that contain material from the current Math 250B combined Linear Algebra/Differential Equations course that is our sole offering in this area currently. We want to remove existing barriers to transfer institution graduation for FC transferring students. • The Math Program will also host optional Supplementary Instruction sessions, led by instructors and/or graduate student interns, in the Math Lab in the LLRC or in designated classrooms. Included will be sessions devoted to developing persistence as well as time management and study skills. Some sessions will feature student speakers who have eventually succeeded in moving from a basic skills course in math to a higher level course. Note that these SI sessions are basic skills oriented, as opposed to the SI instruction sessions proposed in another SAP above, for transfer-level/STEM-oriented math courses.
What *Measurable Outcome* is anticipated for this SAP?	• Any excessive curricular overlap in the above-mentioned basic skills/algebra courses that we can identify and eliminate will result in fewer exit points and an increase in retention and success rates in basic skills courses and other math program courses that contain students whose last course taken was a basic skills course at FC. • The SI instruction sessions focusing on success and persistence and study skills will result in increased retention and success for all students in the above-mentioned courses. • Retention and success rates will increase for students in groups for which there has been an identified achievement gap or a high rate of under-preparedness for college. • We anticipate increased success and retention in particular for African American students and also for Hispanic students in Basic Skills courses and in courses for which a Basic Skills math course is a prerequisite, due to the closer attention that can be paid to these students during SI sessions, for example. • The Math Program's proposed offerings of new courses Math 255, Math 260, and Math 170 will increase success of transferring students and decrease the number of units that they need to take in mathematics at their transfer institutions, particularly at UC schools and at such schools as San Francisco State University, for example.
What specific aspects of this SAP can be accomplished without	The curriculum revision portion of this SAP requires no additional financial resources.

additional financial resources?	

If additional financial resources would be required to accomplish this SAP, please complete the section below. Keep in mind that requests for resources must follow logically from the information provided in this self-study.

Type of Resource	Requested Dollar Amount	Potential Funding Source
Personnel	32 weeks times 4 SI Sessions per week times $35/hour Prof. Expert Pay times 2 hours=$4840	
Facilities		
Equipment		
Supplies (advertising)	$200	
Computer Hardware		
Computer Software		
Training		
Other		
Total Requested Amount	$5040	

STRATEGIC ACTION PLAN # 8	
Describe Strategic Action Plan: (formerly called short-term goal)	**The Math Program will host ten AMATYC Practice Sessions at the FMI during the 2015-16 school year and Round 1 and Round 2 of the local AMATYC competition, in order to build student interest and achievement in mathematics as well as improve student test-taking skills. The Math Program will also encourage participation in the Putnam competition by offering two practice sessions in November 2015 prior the annual Putnam Competition on the first Saturday in December. Special emphasis will be placed on recruiting participants among women, Hispanic students, and African American students, in particular, among all groups that are traditionally underrepresented in mathematical science and in math competitions, in particular.**
List College goal/objective the plan meets:	College Goals: Goal #1: Fullerton College will promote student success. Goal #2: Fullerton College will reduce the achievement gap. Objectives: 1.2: Increase course retention and success. 1.4: Increase the number of transfers. 1.5: Increase the persistence rate of students. 2.2: Increase retention rate of Hispanic and African-American students by at least 2%. 2.3: Increase success rate of Hispanic and African-American students by at least 2%. 2.4: Increase persistence rate of Hispanic and African-American

	students by at least 2%.
Describe the SAP: (Include persons responsible and timeframe.)	• The practice sessions will be held by Dana Clahane, Bill Cowieson, RJ Dolbin, and/or Paul Sjoberg, and/or other faculty members during 8 Fridays during each of the semesters Fall 2015 and Spring 2016. To strengthen community-building among the student and faculty participants, two faculty will be coaching each practice session whenever possible. These faculty members, or a subset of at least three of them, will administer Rounds 1 and 2 of the AMATYC competition which will last an hour each but are scheduled for two separate times during the day, 10-11am and 11am-noon. Two Putnam sessions will be included, in addition. All practice sessions will last two hours and include at least two faculty mentors. • ENGAGE in STEM has occasionally provided subsistence to students, but with grant funds low and the term of the grant expiring, this is no longer occurring, and it is time to institutionalize financial support for faculty coaching, to ensure that this practice continues beyond the grant. Previous activities of this sort have been scattered all over campus, and our success makes it clear that central space, easily found by students in the Math building, should be committed to this. We request that our proposed Room 611L be the standard location for all mathematics competition practices.
What *Measurable Outcome* is anticipated for this SAP?	• To move beyond our current records in this area (a national ranking of sixth on the AMATYC exam two years ago and two Putnam scorers last December in the top 1500 of all 4400 students at 4-year colleges and universities, as well as 3 other community colleges), Fullerton College will rank at least 5th or higher nationally in the AMATYC competition overall. • At least two women will score among the top ten Fullerton College students in the AMATYC competition. • At least three students will earn a positive score in the Putnam competition. • At least one of these positive scores will be obtained by a woman at FC. • At least one African American student, and at least one Hispanic student score positively on the Putnam exam or place in the top 5 of all FC students on at least one Round of the AMATYC competition.
What specific aspects of this SAP can be accomplished without additional financial resources?	None.

If additional financial resources would be required to accomplish this SAP, please complete the section below. Keep in mind that requests for resources must follow logically from the information provided in this self-study.

Type of Resource	Requested Dollar Amount	Potential Funding Source
Personnel	16 practice/competition sessions X 2 faculty members X 35/hr Prof. Expert pay X 2 hours + 2 faculty members X 8 hours X 35/hr Prof Expert Pay for the date of the Putnam competition =$2720	
Facilities		
Equipment		
Supplies (copying)	$100	
Computer Hardware		
Computer Software		
Training		
Other (subsistence)	$800	
Total Requested Amount	$3620	

STRATEGIC ACTION PLAN # 9	
Describe Strategic Action Plan: (formerly called short-term goal)	**The Math Program continues to strive toward the goal of building a stronger sense of community among students and faculty by enrichment through extracurricular mathematics so that performance of students, especially from underrepresented groups for which there is an achievement gap, is increased, along with persistence and success.**
List College goal/objective the plan meets:	College Goals: Goal #1: Fullerton College will promote student success. Goal #2: Fullerton College will reduce the achievement gap. Goal #3: Fullerton College will strengthen connections with the community. Objectives: 1.2: Increase course retention and success. 1.4: Increase the number of transfers. 1.5: Increase the persistence rate of students. 2.2: Increase retention rate of Hispanic and African-American students by at least 2%. 2.3: Increase success rate of Hispanic and African-American

	students by at least 2%. 2.4: Increase persistence rate of Hispanic and African-American students by at least 2%. 3.5: Increase engagement of the college with the community through college events, community service, and other partnerships.
Describe the SAP: (Include persons responsible and timeframe.)	• The Math/CS Division Office Staff and instructors teaching transfer-level mathematics courses with mathematics majors in them will host a mixer in the College Center at the beginning of the Fall 2015 school year during the second week of September. • All math faculty and students majoring in mathematics or interested in majoring in math will be invited. • The mixer will raise awareness of mathematics as a good choice of major and will help math majors meet other math majors and faculty. • The mixer will introduce our courses, colloquia, competition activities, and seminars. • The mixer will also have a time set aside for discussions about the growth mindset and the importance of persistence through tough material in courses. • Math Program faculty will also continue to be encouraged to begin including links to the Math Events Google Calendar webpage to their own webpages so that their students are maximally informed and updated in a timely manner about the many great enrichment opportunities available to students in mathematics at Fullerton College.
What *Measurable Outcome* is anticipated for this SAP?	• An increase in the number of Mathematics majors at Fullerton College. • An increase in attendance at Math Events. In particular, we would like to see an increase in the number of African American students who participate in our extracurricular Math Events and an increase in the number of Hispanic students who participate in our extracurricular Math events. • An increase in the number of African-American Math majors, as well as an increased number of Hispanic Math majors.
What specific aspects of this SAP can be accomplished without additional financial resources?	• Participation of faculty and staff will be on a volunteer basis and no additional funds are required to ensure that participation. Math Program faculty are excited to build up the number of math majors on campus.

If additional financial resources would be required to accomplish this SAP, please complete the section below. Keep in mind that requests for resources must follow logically from the information provided in this self-study.

Type of Resource	Requested Dollar Amount	Potential Funding Source
Personnel	4 hrs planning times $35 Prof.	

	Expert pay=$140	
Facilities		
Equipment		
Supplies (advertising the mixer)	$250	
Computer Hardware		
Computer Software		
Training		
Other – Refreshments/Food	$300	
Total Requested Amount	$690	

STRATEGIC ACTION PLAN # 10	
Describe Strategic Action Plan: (formerly called short-term goal)	**Continue to expand enrichment opportunities for students in a way that promotes stronger interest in mathematics as a career path and in a way that increases student retention, persistence and success in difficult math courses.**
List College goal/objective the plan meets:	College Goals: Goal #1: Fullerton College will promote student success. Goal #2: Fullerton College will reduce the achievement gap. Goal #3: Fullerton College will strengthen connections with the community. Objectives: 1.2: Increase course retention and success. 1.5: Increase the persistence rate of students. 2.2: Increase retention rate of Hispanic and African-American students by at least 2%. 2.3: Increase success rate of Hispanic and African-American students by at least 2%. 2.4: Increase persistence rate of Hispanic and African-American students by at least 2%. 3.2: Strengthen partnerships with local feeder high schools and universities.
Describe the SAP: (Include persons responsible and timeframe.)	• With financial support from ENGAGE in STEM via the Office of Special Programs, the Math Program will host a 2 hour per week Informal Learning Seminar in Mathematics at the current Math Lab Annex in Room 611, to offer students opportunities to start and maintain research projects on the cutting edge of mathematics. • Dana Clahane or other interested faculty members will hold these seminars. • Students will be trained in giving talks and will see focused lectures on topics in mathematics that are not discussable in

	great detail at colloquia and that are not part of the current math curriculum. Possible topics include computational science, multiscale cancer modeling, geometric analysis, celestial dynamics, number theory, probability, statistics, and abstract algebra, giving students stronger preparation for upper division mathematics and, for interested students, graduate work in mathematics. The Seminars will be held throughout the 2015-16 school year. • The Proceedings of the Informal Learning Seminar will result in student-authored and faculty-student authored mathematical research in the form of a new journal established at Fullerton College and called the *Fullerton Mathematics Journal.* The journal will be electronic and contain one issue per year. • With financial support from ENGAGE in STEM, Dr. Dana Clahane and other interested faculty will be involved in the establishment and maintenance of the journal. • Students and faculty at local high schools, community colleges, and 4-year colleges and universities will be invited to submit well-written articles that only assume Math 40 as a prerequisite. This journal will popularize mathematics research and establish creative mathematical interactions between FC faculty, students, and faculty and students from other colleges and universities. The requirement of ensuring Math 40 as a prerequisite for article readability will make all articles accessible to FC students. Since 2009, nearly 300 student mathematical research presentations have been given by FC students at the Math Colloquia and regional conferences such as the Pacific Coast Undergraduate Math Conference, and the Southern California Conference for Undergraduate Research. We would like to now provide incentives for students to prepare publishable mathematics documents on open problems.
What *Measurable Outcome* is anticipated for this SAP?	• At least thirty student research presentations will be given at FC and at regional and/or national conferences during the 2015-16 school year. • At least five of these presentations will be given by students from underrepresented groups in mathematics. • At least five of these presentations will be written in Beamer format, the latest cutting edge scientific presentation package in LaTeX. • At least ten seminar research theses in LaTeX will be completed by students during the 2015-16 school year. Of these, at least five will be written by females and at least three will be written by students coming from underrepresented groups in mathematics at FC. • Four articles will be electronically published in the proposed electronic *Fullerton Mathematics Journal.*

	• At least one article will be written jointly between FC faculty and/or students and faculty/students from another institution, thus strengthening relationships with these institutions.
What specific aspects of this SAP can be accomplished without additional financial resources?	None.

If additional financial resources would be required to accomplish this SAP, please complete the section below. Keep in mind that requests for resources must follow logically from the information provided in this self-study.

Type of Resource	Requested Dollar Amount	Potential Funding Source
Personnel		ENGAGE in STEM, via the Office of Special Programs, has agreed to financially support this SAP, so resources will be requested from the College in the short-term.
Facilities		
Equipment (ID card readers for attendance monitoring)	$500	ENGAGE in STEM, Dr. Clahane, Co Ho, and Mike Cortez are working with Karen Rose to procure these card readers, so we are not requesting dollars from the College for this equipment at this time.
Supplies (copying and printing of research documents for student use)	$100	ENGAGE in STEM will financially support this item financially, so we are not requesting funds from the College for this expenditure in this Program Review cycle.
Computer Hardware		
Computer Software		
Training		
Other		
Total Requested Amount	$600	Although we have estimated this budgeted amount, ENGAGE in STEM is likely to fund this and we are not requesting that the College supply these funds during this cycle.

STRATEGIC ACTION PLAN # 11	
Describe Strategic Action Plan: (formerly called short-term goal)	**Continue to increase the number of full-time faculty members**
List College goal/objective the plan meets:	**College Goal:** Goal #1: Fullerton College will promote student success. **Objective #:** Objective 1.2: Increase course retention and success.

	Objective 1.3: Increase the number of degrees and certificates awarded. Objective 1.4. Increase the number of transfers. Objective 1.5: Increase the persistence rate of students.
Describe the SAP: (Include persons responsible and timeframe.)	We continue to need fulltime faculty to provide the best possible instruction to students. While we have an excellent pool of adjuncts, the Division believes that students have a more meaningful experience when they can access their instructor out of class during office hours and have the consistency in instruction that a fulltime faculty member can provide. Data used to justify hiring in 2014 shows that over 45% of all sections taught in the Division are taught by adjunct faculty and that adjuncts make up 38% of the FTEF within the Division. We request additional fulltime hires to address this disparity.
What *Measurable Outcome* is anticipated for this SAP?	• Increased retention and success of students in mathematics classes • Students will have increased access to faculty • Faculty involvement in campus-wide initiatives will increase • Faculty involvement in special programs, grants, outreach etc. will increase
What specific aspects of this SAP can be accomplished without additional financial resources?	None. The hiring of fulltime faculty requires considerable financial resources

If additional financial resources would be required to accomplish this SAP, please complete the section below. Keep in mind that requests for resources must follow logically from the information provided in this self-study.

Type of Resource	Requested Dollar Amount	Potential Funding Source
Personnel	$56,764 - $85,940	District Budget
Facilities		
Equipment		
Supplies		
Computer Hardware		
Computer Software		
Training		
Other		
Total Requested Amount	$56,764 - $85,940	

7.0 Long Term Plans

Describe the long-term plans (four-six years) for your program. Please consider future trends in your narrative. (Identifying financial resources needed for these plans is optional.)

Goal 1: **Improved facilities for student success**
Measurable Outcome: Students will have access to the resources they need on campus to complete their math courses in a lab designed for Math
Plan:

- In order to accommodate the large number of students using the Math Lab, Room 611L (or a designated area in the Natural Sciences proposed Campus STEM Resource Center) needs to be back under the control of the Math/CS Division as was promised when the lab moved to the LLRC. The Math/CS Division intends to create a Math Success Center in room 611L. This center will be staffed by math faculty and available to all math students. We intend to continue to operate the Math Lab for more traditional face-to-face tutoring utilizing both faculty and student tutors.

Goal 2: **Restructure our calculus sequence in terms of unit value and class size.**
Measurable Outcome**:** An increase in the retention, success and persistence rates in these courses.
Plan:

- Investigate the structure of these courses at other 2- and 4-year colleges.
- Submit to the curriculum committee a request for class size reduction from 35 to 30 in Math 150A and 150B.
- Investigate additional ways to increase student success in degree-applicable courses, such as a 5th in-class hour or course-wide supplemental instruction in Math 141, 150A, and 150B.
- Designate an area on campus for SI and group study activities relating to STEM-oriented math courses.

Goal 3: **Expand opportunities for enrichment and enhanced rigor in STEM math courses.**
Measurable Outcomes: Increases in the number of associate degrees awarded in mathematics and/or the number of students who transfer to a 4-year college or university with the intent to major in mathematics or a closely related field.
Plan:

- Create additional courses aimed at Math majors such as separate courses in Differential Equations and Linear Algebra, Transition to Advanced Mathematics, and Calculus IV with Differential Geometry.
- Investigate support courses, such as a course in Scientific Computing to introduce such software as Mathematica, Maple, MATLAB, Sage, LaTeX, etc.
- Establish scholarships for excellent talks, websites, or research papers by students**.**

Goal 4: **Improve communication and outreach with the local community**
Measurable Outcome**:** An increase in participation of colloquium events and math program sponsored social media.
Plan:

- Create Facebook, Twitter, and or Instagram pages for the math program.

- Advertise colloquium events on social media
- Continue to meet with area high schools to discuss Common Core and improve transition and placement.

Goal 5: **Continue to improve distance education instruction and models**
Measurable Outcome**:** An increase in the retention and success rates in these courses.
Plan:
- Offer increased opportunities for teacher training through workshops and conferences
- Continually update equipment and software as new technologies emerge

8.0 Self-Study Summary

This section provides the reader with an overview of the highlights, themes, and key elements of this self-study. It should not include new information that is not mentioned in other sections of this document.

Many steps have been taken since the last Program Review to bolster and even augment the facets of the Mathematics Program which were already successful, and to improve the areas which needed help. In light of analysis of the data from the preceding three years, as well as unforeseen external changes that have affected our program over this period, there is more we can do to continue this upward trend of progress.

The following are goals which we have set for ourselves and have either completed or are in the process of completing, in an effort to improve our program:

- Streamline basic skills course sequences to reduce excessive overlap;
- Create a new transfer level math sequence (Math 255 Linear Algebra, Math 260 Ordinary Differential Equations, and Math 170 Discrete Structures) to better serve students who will transfer to schools other than CSU Fullerton, available starting in Fall 2016;
- Reduce maximum enrollment for 150A, 150HF, and 150B to 30 students, starting in Fall 2016;
- Increase awareness of the Math Events Google Calendar page among faculty and students;
- Host a 2-hour-per-week Informal Learning Seminar to offer students opportunities for research projects.

In order to effectively implement these changes, as well as address the concerns and suggestions outlined in this Program Review, we are requesting the following from Fullerton College:

- Provide the Math Lab with additional funding to attract high quality tutors and staff capable of assisting students in all levels of math courses;
- Provide the Math Lab with additional space to help deal with increased demand;
- Return control over 611L to the Math/CS Division (or designating an area in the Natural Sciences proposed Campus STEM Resource Center) to use as an extension of the Math Lab that focuses on transfer-level courses, called the Math Success Center;
- Provide funding to staff the Math Success Center during all operating hours with faculty capable of assisting students with transfer-level course material;
- Provide funding for instructor-led Supplemental Instruction sessions in the Math Success Center;
- Increase the number of classrooms under the control of the Math and Computer Science Division to accommodate both the extra sections of 150A, 150HF, and 150B created by reducing class sizes (particularly 622A and 622B);
- Provide funding for hardware and software necessary to create and successfully utilize an online database of electronic resources with which students can review material for their classes;
- Dedicate space and provide funding to compensate faculty for hosting AMATYC and Putnam Exam review sessions throughout the academic year;

- Provide funding for a Mathematics Mixer for faculty and both current and prospective math majors at the beginning of each academic year.
- Fund additional fulltime positions for the Department.

These changes will help the Mathematics Program better serve its students by increasing retention, success and persistence in its courses through the development of interest in the subject, intellectual curiosity, and mental persistence over difficult problems.

Division Deans' or appropriate Immediate Management Supervisor (IMS)
Response Page

☐ *I concur with the findings contained in this Program Review.*

☐ *I concur with the findings contained in this Program Review with the following exceptions (include a narrative explaining the basis for each exception):*

Area of exception:

_____

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_____

_____

☐ *I do not concur with the findings contained in this Program Review (include a narrative exception):*

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