Assessment of the LSAMP Program at Oregon State University

by

Andrew Kenichi Duvall

A PROJECT

Submitted to

Oregon State University

University Honors College

In partial fulfillment of
the requirements for the
degree of

Honors Baccalaureate of Science in Mechanical Engineering (Honors Scholar)

Presented March 11, 2013
Commencement June 2013

AN ABSTRACT OF THE THESIS OF

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Abstract approved:

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Christine Kelly

ABSTRACT:

The population of minority groups is on the rise in the US, yet still minorities are not proportionally represented in Science, Technology, Engineering, and Mathematics (STEM). Of these minorities there are 4 races/ethnicities that are vastly under represented: Blacks, Hispanics, American Indians/Native Alaskans, and Hawaiians/Pacific Islanders. For the US to stay competitive in STEM fields, these underrepresented minorities (URM) must increase their presence in such fields so that their unique backgrounds can contribute to future discoveries and inventions. A homogeneous talent pool cannot generate the creativity needed to support such a diverse population as in the US. Companies and the US government has urged the education system to increase the amount of URM talent within STEM fields. The Louis Stokes Alliance for Minority Participation (LSAMP) aims to increase the quantity and quality of URM student education in STEM majors. The LSAMP program at Oregon State University (OSU) is correlated with a positive effect on URM students in STEM majors by positively influencing: STEM retention rate, GPA, and university academic standing.

Key Words: Underrepresented Minorities (URM), Science Technology Engineering Mathematics, Math, STEM, Louis Stokes Alliance for Minority Participation (LSAMP)

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APPROVED:

Mentor, representing College of Engineering

Committee Member, representing Women & Minorities in Engineering

Committee Member, representing the LSAMP program

Dean, University Honors College

I understand that my project will become part of the permanent collection of Oregon State University, University Honors College. My signature below authorizes release of my project to any reader upon request.

Andrew Kenichi Duvall, Author

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List of Acronyms

URM- Underrepresented minorities

STEM- Science, Engineering, Technology, Mathematics

OSU-Oregon State University

LSAMP- Louis Stokes Alliance for Minority Participation

ANOVA- Analysis of Variance

Assessment of LSAMP Program at Oregon State University

1 Introduction

Diversity is one of the key factors in that makes the United States such an extraordinary country. The incorporation of so many different lifestyles in the US population has created an experience that is uniquely American. Unfortunately, this magnificent quality is not seen in science, technology, engineering, and mathematics (STEM) fields.

STEM jobs can be perceived as being stark, non-emotional, overly-technical, and mundane. In reality scientists and engineers must be extremely creative to be able to apply the laws of nature to improve human life in completely new ways. Creativity is often developed by individuals through their unique life experiences. One way to harbor such creativity is to employ a diverse workforce to include as many life experiences as possible. “Without diversity, the life experiences we bring to a [STEM] problem are limited”. [1]

Diversity is a necessary trait in STEM fields, for these are the jobs that are making the discoveries and creating the products that directly influence our standard of living. Such discovery and creativity rely on the various personalities that a diverse workforce provides. Not only does diversity aid in the discovery of new technologies and processes, but it helps companies function on a core level.

Companies that employ diverse personnel often experience great success. Enterprises that can embrace the US’s ever-changing demographics are able to reap the benefits of a diverse and inclusive workforce. [2] Diversity in the STEM workforce can play a large factor in making a team more creative, solutions more feasible, products more usable, and citizens more knowledgeable. [3] It has led to increased annual sales, revenues, market share, shareholder value, net operating profit, productivity, and total assets over homogenous groups. [4]

Due to the lack of diversity in STEM majors, companies employing STEM majors may not be reaching their full potential. The engineering field lacks cultural competence [5], "the willingness and ability of a system to value the importance of culture in the delivery of services to all segments of the population." [6] Without a diverse workforce, companies risk alienating their customer base due to cultural incompetency. [7]

A non-diverse workforce will only amplify the narrow-mindedness of a company in the days to come. The America of tomorrow will be different from today. "By the year 2050 there will be no clear racial or ethnic minority in the US". [8] This prediction is supported by the fact that in 2011 there were more minority infants than white infants. [9] [10] [11] The next generation of future students will be so diverse, that no one group can claim to be the majority. It is imperative that by then, the education system is ready and willing to develop programs to recruit and retain minority students, especially underrepresented minority (URM) students.

Underrepresented minorities are classified as any person who self identifies as Black, Hispanic, American Indian/Native Alaskan, or Hawaiian/Pacific Islander. These four races have seen historically low representation in STEM fields. Multiple sources agree that URM students do not earn as many degrees in STEM fields compared to Whites and Asians. [12] [13] [14] [15] [16] [17] [18] [19] [20]

The disparity between diversity in the general population and STEM jobs is proliferated within primary and higher education programs. Some educational institutions may not be addressing the factors that lead to the success of minority students. Although about one third of school age children are URM students, the STEM field is dominated by whites at around 77%. Asians make up about 12% of the STEM population meaning URMs only make up 11% of the STEM workforce. [5] Disinterest in STEM fields for URM students starts at a young age and is carried

out until college. “Only 10% of doctorate candidates in [STEM] fields are underrepresented minorities.” [21]

In the engineering field, degrees awarded have increased over all, but degrees awarded to underrepresented minority (URM) students have been steadily decreasing over time. [5] URM talent is being overshadowed. Such a homogenous talent pool cannot harbor the creativity needed to address the world’s problems.

Due to the stark misrepresentation in STEM fields, many entities have called for university across the US to develop programs to increase URM participation. “The NSF not only emphasized the need to broaden participation in STEM but identified it as one of their core values.” [21]

There are many challenges facing universities in the issue of URM recruitment and retention. The issues of URM attrition are so complicated that there is no consensus on a particular model. It can be shown at many universities that have underrepresented minorities who intend to graduate in a STEM field do not do so. [22] Minorities drop out of STEM majors at a disproportionally higher rate than their white counterparts. [23]

Many theories that attempt to explain URM retention agree that interaction with faculty, peers, and other staff is correlated to higher retention rates. [24] [25] Studies have shown that peer teaching and learning have assisted URM students to excel in subjects where they are typically low achievers, such as math. [22] Programs that aim to increase URM student participation and interaction with the university have shown to increase URM success at school from the very beginning of their collegiate careers. This kind of integration is a necessity to retain STEM students. Table 1 illustrates the traits needed by a STEM program to successfully retain its URM population.

Table 1. what a program needs to increase the quality and quantity of URM education. [25]

Design Principles to Expand Higher Education Capacity	
Principle	Evidence
Institutional Leadership	Commitment to inclusiveness across the campus community
Targeted Recruitment	Investing in and executing a feeder system, K-12
Engaged Faculty	Developing student talent as a rewarded faculty outcome
Personal Attention	Addressing, through mentoring and tutoring, the learning needs of each student
Peer Support	Student interaction opportunities that build support across cohorts and allegiance to institution, discipline, and profession
Enriched Research Experience	Beyond-the-classroom hands-on opportunities and summer internships that connect to the world of work
Bridging to the Next Level	Institutional relationships that help students and faculty to envision pathways to milestones and career development
Continuous Evaluation	Ongoing monitoring of process and outcomes that guide program adjustments to heighten impact

A program that can involve URM students early and often are attributed to increased URM retention. The Louis Stokes Alliance for Minority Participation is such a program.

2 Louis Stokes Alliance for Minority Participation

The Louis Stokes Alliance for Minority Participation LSAMP is a program funded by the National Science Foundation (NSF) that aims to increase the number of underrepresented minority students that obtain degrees in science, technology, engineering, or math (STEM) fields and the quality of their education. The NSF has enacted the LSAMP program to guarantee a diverse workforce in all science related fields. The programs mission statement is to "increase the quality and quantity of minority students who successfully complete baccalaureate degrees in STEM and who continue on to graduate studies in these fields." [26]

LSAMP was originally founded in 1991 and started with 6 alliances nationwide. By 2006 the number of alliances grew to 34, which included 450 institutions. [26] As of August 2012, LSAMP actively serves 220,000 students nationwide and has produced 407,000 URM bachelor level graduates. [27]

LSAMP's focus is assisting URM students: African Americans, Hispanics, American Indians, Alaskan Natives, Native Hawaiians, and Pacific Islanders. Historically, these URM students account for a low percentage of the STEM population. Since its founding, LSAMP has succeeded in its goals of increasing the number of URM students in stem fields. In fact, LSAMP students have a higher rate of matriculating to graduate level courses over their White and Asian counterparts [27].

The LSAMP agenda is carried out by alliances which are a collection of institutions of higher education, businesses and industries, national research laboratories, local, state, and Federal agencies within a geographical region. [28] Oregon State University's LSAMP program belongs to the Pacific Northwest LSAMP Alliance.

3 Pacific Northwest LSAMP Alliance

The Pacific Northwest (PNW) LSAMP Alliance bands together five major universities from Oregon, Washington State, and Idaho. The five universities are Oregon State University (OSU), Portland State University (PSU), University of Washington (UW), Washington State University (WSU), and Boise State University (BSU). The headquarters for the PNW LSAMP Alliance is at UW.

The PNW LSAMP Alliance also includes many community and junior colleges that had preexisting relationships with the universities, as well as a multitude of regional businesses, and programs aimed at URM success in grades K-12. Chemeketa Community College, Linn Benton Community College, Yakima Valley Community College, Columbia Basin Community College, Seattle Central Community College, College of Western Idaho, and Highline Community College have all lead students to the main university of the program. Other programs that aim to increase URM participation in the area are Discovery Center of Idaho, Saturday Academy, Oregon MESA, and Washington MESA.

4 Oregon State University LSAMP

The LSAMP program at Oregon State University centers around an established LSAMP center on campus. The LSAMP center provides URM students a designated area for social and academic interaction. At the LSAMP center, students are welcome to come in to socialize with other students, work on schoolwork, mentor younger students, seek advice from experienced staff and students, and attend tutoring sessions. Like other cultural centers at OSU, all students, regardless of race or ethnicity, are welcome to the LSAMP center.

Unlike many locations on campus that are dedicated to a certain facet of academia, e.g. tutoring, socializing, and school work, the LSAMP center is a multi-functional center that often plays host to simultaneous activities. The multi-functional use of the LSAMP center stems from the ideology that the LSAMP program is to a community for URM students. By allowing all forms of interaction within the center, LSAMP students are able to bond with other students on multiple layers.

The OSU LSAMP program provides many programs for students to ensure interaction with the university and one another. The first interaction an LSAMP student has with the program is through a summer bridge program. The summer bridge is a program that invites a select number of freshman URM students onto OSU's campus earlier than the general freshman population.

During the summer bridge, students live on campus and participate in a myriad of events and activities aimed to build lasting relationships, introduce them to the campus, inform them of academic resources, and integrate them into the college lifestyle. The bridge program is led by a collection of peer leaders with experience either in the LSAMP program or other outreach programs. The peer leaders on campus with the freshman students and engage with the new LSAMP students throughout the bridge.

Throughout the bridge program, students get introduced to various college personnel that can help them throughout their collegiate career. Students also rapidly form lasting friendships during the bridge programs that last throughout the school year.

The end of the bridge program is followed by the start of OSU's CONNECT program. During the CONNECT week, OSU students do not have class but are all present on campus. Various schools and programs host informational sessions that are meant to introduce all freshmen to their future classmates. LSAMP students are highly encouraged to attend all CONNECT activities associated with their major.

Once classes start, LSAMP students can start reaping the benefits that the LSAMP center offers. The first few weeks of the year usually involve helping new students adjust to college life. This can be done through presentations and/or dialogue with older LSAMP students and staff. The presence of the program coordinator in the LSAMP center provides the most amount of guidance for the students. The LSAMP coordinator takes on the responsibility of advisor, mentor, and counselor to the URM population.

Throughout the year, events are held at the LSAMP center and elsewhere on campus to reconnect bridge students. Summer bridge reunions occur every term. Presentations specific to majors are advertised or hosted. Tutoring hours from high achieving students are held in the LSAMP center.

OSU's LSAMP program is designed to offer an increased amount of involvement with the university early in the year in an attempt to retain students. The academic focus of the LSAMP center is constant and academic productivity is promoted while in the LSAMP center.

5 Methodology

To assess the LSAMP program's effect on URM students, key metrics for all URM students who entered OSU in STEM majors since 2010 were analyzed. The students who participated in LSAMP's summer bridge programs served as the measured group and will be referred to as "LSAMP students." The data from LSAMP students were compared with URM students who did not participate in an LSAMP summer bridge program. This group will be referred to as "Non-LSAMP students." Although, URM students who do not participate in the bridge program use the services provided by the LSAMP program, most of the students that frequent the LSAMP center are bridge students. Since LSAMP center use is not a measured variable, assuming that bridge students are the one primarily using the LSAMP center is the best distinction between the groups.

Five metrics were analyzed to determine the correlation that LSAMP participation had on the LSAMP group: University retention, STEM retention, grade point average (GPA), academic standing, and class pass rate. Because retention and academic success often rely on many than the five metrics analyzed direct causality cannot be shown, but strong correlations are taken as indicators of the program's success. Such correlations are referred to as positive effects of the programs.

5.1 University Retention

It is imperative to compare the university retention of LSAMP students versus other URM students because although minority students are going to college at a higher rate than in the past, they are leaving more often than their white counterparts [5] [29]. Meaning there is a net loss of minorities from many universities. Programs such as LSAMP need to keep URM students in college so that they are represented in the workforce, even if not the STEM workforce.

The LSAMP program strives to retain their students by creating a community on the campus for the students, a community that allows students to integrate themselves into the social and

academic environment at OSU. Pursuant to the Tinto model of retention, the LSAMP program strives to involve students with all the services provided.

University retention will be used as a measure to gauge the LSAMP program's ability to keep students in higher education. Keeping students in college is a benefit to the URM community in the long run. Although assessing the program's success will focus of STEM retention, it will be beneficial to investigate the affect LSAMP has on overall retention so that lessons learned can be applied to all the other majors at OSU.

5.2 STEM Retention

One of the LSAMP program's main goals is to increase the diversity in STEM fields. A major part of accomplishing this goal is to retain the minority students in STEM related majors. Keeping minority students in STEM fields benefits both the STEM workforce and the student.

Though STEM careers can provide a student with a stable income and career fulfillment [30], URM students are leaving STEM majors more often than their white counter parts. In the US, 2 out of 5 first year URM engineering students drop out of engineering. [31]

STEM retention is defined as staying in a major that is related to science, technology, engineering, or math. A student can change majors as many times as they desire within any of these fields and still be considered to be retained in STEM. A student leaving any STEM majors for any non-STEM major is considered attrition from the STEM field.

This metric will attempt to assess the OSU LSAMP program's ability to provide an environment that encourages STEM interest. Many minority students are discouraged from STEM fields due to many negative preconceived notions. A National survey of 1, 226 minority and female chemists and chemical engineers show that 60% of them feel discouraged from pursuing STEM majors, with 44% of them placing the primary blame on their professors. [32]

STEM retention will be viewed in two ways. The first will show how many students of the original matriculating group are still in STEM majors. All students that are no longer enrolled as OSU students will be included in this analysis. The second will only assess STEM retention rates for students still actively enrolled at OSU. The value of looking at STEM retention for only active students is that it can remove the student who left the university and therefore STEM majors for reason based on financial support or personal reason. Because university attrition can be caused by many factors [18] it is valuable to see how the LSAMP program can influence active students.

If LSAMP students are shown to have a higher retention rate than their non-LSAMP counterparts in both analyses, the correlation that students involved in the LSAMP program are less discouraged from pursuing a degree in a STEM field can be made.

5.3 Grade Point Average

LSAMP strives to increase the quality of education that LSAMP students receive. By offering tutoring, mentorship, and academic advising from the LSAMP center, the program strives to increase the quality of education LSAMP students receive. A significant difference GPAs of LSAMP students and non-LSAMP students can show whether or not the LSAMP academic programs are effective.

5.4 Academic Standing

The OSU academic standing policy consists of 4 levels: Good Standing, Academic Warning, Academic Probation, and Academic Suspension. [33] A student with good academic standing has a GPA of 2.0 or above. When a student receives a GPA of below 2.0 for a single term, they are put onto academic warning. Once a student has attempted more than 24 credits and obtains a cumulative GPA of lower than 2.0 they are placed on academic probation. To remove oneself from academic probation, the student needs to raise their GPA to 2.0 or above.

If a student on academic probation receives a term GPA of below 2.0 they are put on academic suspension. Once a student is placed on academic suspension they are denied all student privileges. This includes access to computer labs, Dixon recreation center, living groups, and student attendance to sporting events. Students can be reinstated after 2 years or after the completion and 24 transferable credits with a GPA of 2.5 or higher.

Assessing academic standing for both groups shows how the university views the student's academic success. Although academic standing is based on GPA, this metric can quantify if the student's academic efforts are satisfactory.

5.5 Class Pass Rate

Analyzing the attempted class passage rate of URM students can reveal how efficient the LSAMP students and non-LSAMP students are in their classes. The assumption is that a more efficient student needs to repeat fewer classes. For this analysis a perfectly efficient student passes 100% of their classes. Any number below 100% represents failed classes and therefore inefficiencies. If LSAMP students are more efficient, the correlation that LSAMP harbors efficient students can be proposed.

5.6 Statistical Analysis

Because student success can be affected by many variables, statistical analysis needs to be done to weed out the true effect the LSAMP program has on its students. To do this an Analysis of Variance (ANOVA) analysis was done for every metric. The variables to be analyzed are race, gender, high school GPA, and LSAMP participation. The ANOVA will provide statistically significant correlation between the variables and the metric analyzed and will provide insight into how much influence the LSAMP program has on its participants.

Many more factors are at play in regards to academic success, but gathering them and analyzing them are beyond the scope of this undergraduate thesis. Obtaining more data would complicate

the analysis beyond its goal. This assessment is to serve as a gut check on a developing program not a fully comprehensive audit. Also because the program is in its infancy, a comprehensive assessment would be pre-mature until at least an LSAMP cohort has graduated from OSU

6 LSAMP Cohorts and Control groups

As mentioned before, URM students at OSU in STEM majors were split into 2 distinct groups. LSAMP students are URM students who went through the LSAMP bridge program. Non-LSAMP students are URM students who did not participate in the bridge program. Although every student is welcome to use the resource that the LSAMP center offers, no data was collected that determined exactly which student utilized the resources. Therefore, the only distinction in terms of LSAMP participation is the completion of the bridge program.

Determination of the control group is any URM student that entered the university as a self-identified URM student who declared a STEM major, and did not participate in the bridge program.

6.1 2010

2010 was the first year for the OSU LSAMP program and as such, was an experimental learning year. Many of the practices that are in use today stem from the lessons learned from this pilot year. Because the LSAMP program was housed within the college of engineering, all students invited and accepted to the summer bridge program were engineering or computer science students.

6.1.1 Summer Bridge Program

The bridge program was designed to get the students comfortable with college life at OSU. A combination of social and academic activities was planned so that students could get acclimated to all the services OSU provides and to build a strong sense of community within the cohort. These goals are based of the many models of retention that claim that student interaction with the university improve retention. [24] [25]

6.1.2 Timeframe

The 2010 bridge program took place from September 7th-17th. The full agenda from the program can be viewed in Appendix A.

For the first 8 days of the program, all the students and peer leaders resided in a single residence hall on campus. Students were paired and lived in a dorm room, much like they would be doing during the school year. Having the students living together at the beginning of the program allowed the peer leaders to easily track each student, and ensure that no one got left behind during the busy days. On day 9 the students were moved into their permanent residence halls.

The bridge programs daily schedule was kept very full to keep the students busy. Since OSU's LSAMP program had no prior experience in hosting a bridge program, the planners were weary of leaving to much free time for the LSAMP students for fear of inducing boredom. This fear was alleviated when the students complained of being too busy and not having enough free time.

There was great focus of adjusting the students to collegiate level classes; therefore a math and computer science class was scheduled nearly every day. These classes were taught by OSU faculty members and were designed to offer insight into how a college class can differ from a high school class. The students were lectured on basic math and CS principles and given assignments.

Another focus on the 2010 bridge program was to introduce all the students to the various engineering majors at OSU. Most of the engineering schools hosted information sessions that presented research that was happening within the school. For example, the school of Mechanical, Industrial, and Manufacturing Engineering (MIME) presented on the bio-mechanical research that Dr. Brian Bay was leading.

Recreational activities based on teamwork and community building was also a large part of the itinerary. A half day ropes course led by OSU department of recreation consisted of "ice-

breakers" and high ropes challenges to teach the students that teamwork can overcome seemingly impossible tasks. A full day was committed to a guided whitewater rafting trip on the McKenzie River. The trip was guided by OSU's outdoor recreation center student guides, and once again reinforced teamwork and cooperation. A pizza and bowling night was schedule at an on-campus bowling alley in the Memorial Union (MU) basement.

A trip to the Intel Corporation occurred during the bridge. Because Intel was a primary sponsor for the bridge program at OSU, the group was name the Intel Engineering Summer Scholars (IESS). The trip to Intel included a complimentary lunch on the campus and a tour of the facilities.

Immediately after the bridge program ended OSU held its CONNECT week. During this time the bridge students assisted ambassadors in the main event for engineers, "Engineers in the Quad." This event brings all freshman engineering students to one location and subdivides them into smaller groups where they go through ice breakers and team building activities. Since the bridge students already did the activities during the ropes course session, there were able to assist and provide insight to the other students. The bridge student's participation in leading engineers in the quad allowed them experience what involvement with the college of engineering is like.

6.1.3 Leadership

The 2010 summer bridge program was led by 2 peer leaders. Both peer leaders had experience working in a college recruitment capacity due to their employment as College of Engineering Ambassadors. Due to the fact that this was the first year for the program, neither peer leader was a URM student. But due to their collective experience in recruitment and academic assistance capacities, they were suitable leaders for the bridge program.

6.1.4 Students

The 2010 Cohort was comprised of 20 students. All students were self-identified as URM students. Figure 1 shows the race make-up of the 2010 cohort. The multiple race option are made up of students who self-identified as being of more than one race, with at least one of those races American Indian/Alaskan Native, Black, Hispanic, or Native Hawaiian/Pacific Islander. The students came from all over the country, but most of them were form Oregon or California.

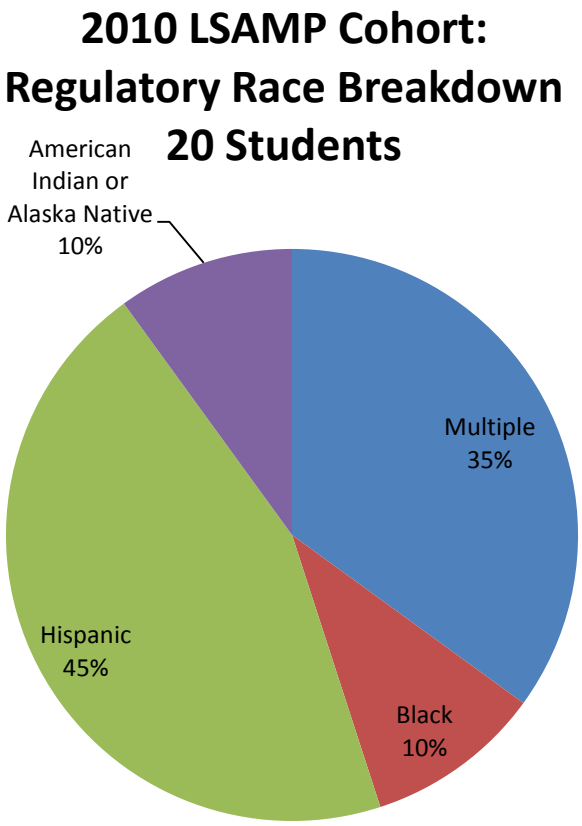

Figure 1. 2010 LSAMP cohort regulatory race percentage make up

The non-LSAMP group was made up of 194 URM students. The regulatory racial breakdown of the control group can be seen in Figure 2. The racial makeup of the control group is similar to that of the LSAMP group. Hispanics are the largest constituent, followed by the multiracial group. A Black and American Indian/Alaska Native representation is shown in both groups, but not on the same scale as the Hispanic and multiracial.

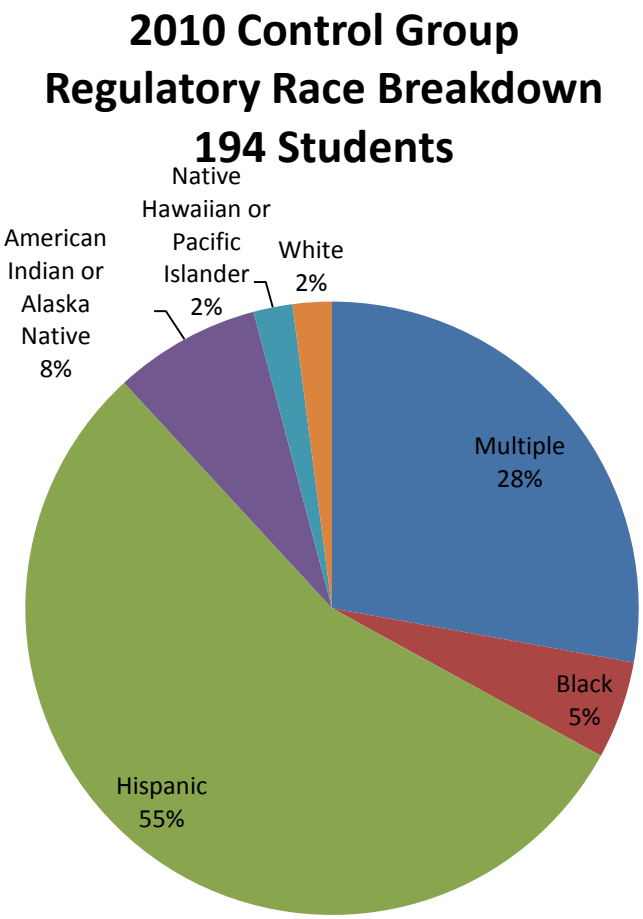

Figure 2. 2010 control group regulatory race percentage make up

6.1.5 Academic Performance Preceding OSU

Table 2 shows the GPA data of the 2010 cohort and control group. A high B average is a promising sign, due to the fact that STEM majors require a high level of academic success. Based on the fact that high school GPA is the most reliable predictor of collegiate success for URM students [29], a high B average shows the potential this year has. The LSAMP and non-LSAMP group have very similar high school GPAs, therefore a direct comparison between the two is valid.

Table 2. Graduating high school GPA of the 2010 LSAMP cohort

High School GPA		
	LSAMP	**Non-LSAMP**
Average	3.49	3.51
Median	3.50	3.55
Std. Dev.	0.32	0.46

6.2 2011

Due to the perceived success of the 2010 bridge program, the 2011 cohort was expanded to 34 incoming URM students. Furthermore, the bridge program was opened up to not only engineering majors, but also to science based majors such as biology, zoology, and physics.

6.2.1 Timeframe

The 2011 bridge program took place from September 6th-16th. The full agenda from the program can be view in Appendix B.

For the first 8 days of the program, all the students and peer leaders resided in a single residence hall on campus. Students were paired and lived in a dorm room, much like they would be doing during the school year.

Due to the differences between engineering and science majors, the cohort was split up into two summer bridge groups. The Intel Engineering Summer Scholars (IESS) group was comprised of students with a declared engineering major. The LSAMP Summer Scholars (LSS) group was comprised of students with a declared science major. The two groups followed the same general schedule, but some activities were specific to each group. The intent was to offer specific activities to each group, but retain the overall sense of community within LSAMP.

Based on feedback from the 2010 cohort, the 2011 bridge program included less class time and more free time. Student surveys indicated that students bonded with each other more freely

during the break times rather than structured time. Because building a community is such an important goal for the program, more free time was introduced in the 2011 schedule.

Some events were repeated from the 2010 year based on positive feedback. The rafting trip, ropes course, and MU bowling night were scheduled for the 2011 year. The trip to Intel was repeated for the IESS group. Since the LSS group was comprised of science majors, they took a trip to the Hatfield Science Center in lieu of visiting to Intel.

The two classes that were administered during the break were math and chemistry. Every STEM student needs to take math and/or chemistry during their undergraduate tenure; therefore OSU LSAMP reasoned it beneficial to include chemistry in lieu of computer science. The amount of time students spent in class verses other activities also went down. Many students from 2010 indicated that their least favorite part of the program were the classes. The 2011 bridge aimed to introduce students to college classes, but not overwhelm them.

In an effort to provide a structured project that takes minimal technical knowledge, the bridge students were challenged to create short videos that thanked the sponsors for funding the bridge program. Creativity was encouraged, and only minimal guidelines were put in place. Groups of 3-5 students were given cameras and delegated shooting/editing time. The videos were played to the whole group at the end of the program.

A community service activity was meant to show students the value of giving back. The community service was to mulch about 100 young trees in a recently rehabilitated wooded area. The students were able to learn a little bit of history about their surroundings while working together to accomplish a large goal. The task seemed daunting at first, but when each tree was taken one at a time, the students realized the power in working together. At the beginning of the community service, enthusiasm was low and very few students seemed to enjoy themselves. But

as the activity neared its end, outlook turned positive and students realized the rewarding feeling that comes from community service.

To familiarize the students with the campus an academic scavenger hunt was organized. The scavenger hunt sent students all over campus to locate many of the services offered to OSU students. Student health services, counseling and psychological services, cultural centers, and many more locations were on the list. The cohort was split into groups the group to take pictures of all the locations on the list were announced winners and given small prizes.

A new event to this year is the "Minute to Win It" game based on the popular TV show. The event was planned and hosted by LSAMP leaders and invited students from other bridge programs at OSU. Each bridge program selected two teams of two students to compete with the other programs in a tournament style. Every team received a prize for participating.

6.2.2 Leadership

Because of the increase in bridge students and a high number of applicants from the 2010 cohort, the 2011 peer leader team comprised of 7 peer leaders. The junior peer leader from the 2010 cohort returned. Of the other 6 leaders, 3 were from the 2010 bridge cohort, and the rest were juniors and seniors that were involved with other engineering programs.

The increased number of leaders allowed for a more relaxed leadership ensemble. Because some of the leadership was comprised of LSAMP students, the interaction between bridge students and peer leaders was much more casual than in the previous year. The lower ratio of student to leader allowed for a smother bridge program in terms of logistics.

6.2.3 Students

The 2011 bridge cohort was comprised of 34 students. All students were self-identified as URM students. Once again, most students hailed from Oregon and California, but there were students from as far away as Virginia and Hawaii. Figure 3 shows the racial makeup of the cohort.

Compared to the 2010, the 2011 cohort is a more diverse group of students. More American Indian/Alaska Natives and Native Hawaiian/Pacific Islanders are represented. The multiracial group shrunk compared to 2010, while the Black representation swelled to 15%. The Hispanic percentage remained about equal.

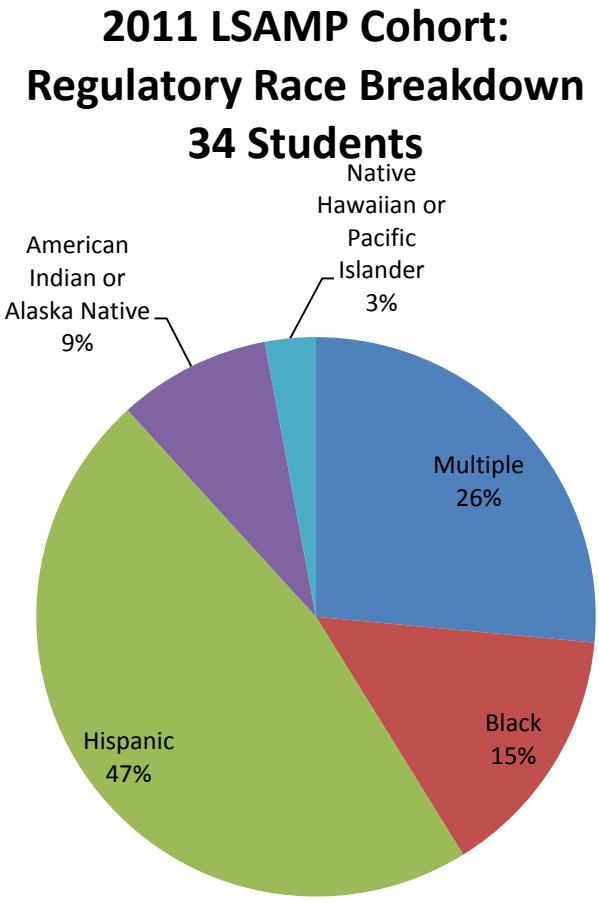

Figure 3. 2011 LSAMP cohort regulatory race percentage make up

The non-LSAMP group in 2011 was made up of 250 URM students. The regulatory racial breakdown of the control group can be seen in Figure 2. The racial makeup of the control group differs slightly from the LSAMP group. Although Hispanics are the largest constituent, they make up more of the student population than in the LSAMP group. The LSAMP cohort, by percentage, hosts more Black students. The other regulatory races are similar between the

LSAMP and non-LSAMP group. Note that the White representation in the control group most likely stems from a record keeping error. The old racial classification system at OSU allowed multiple races to be input rather than the "multiple" label. When the system was revamped, URM students that indicated they were part White first, were entered as being White.

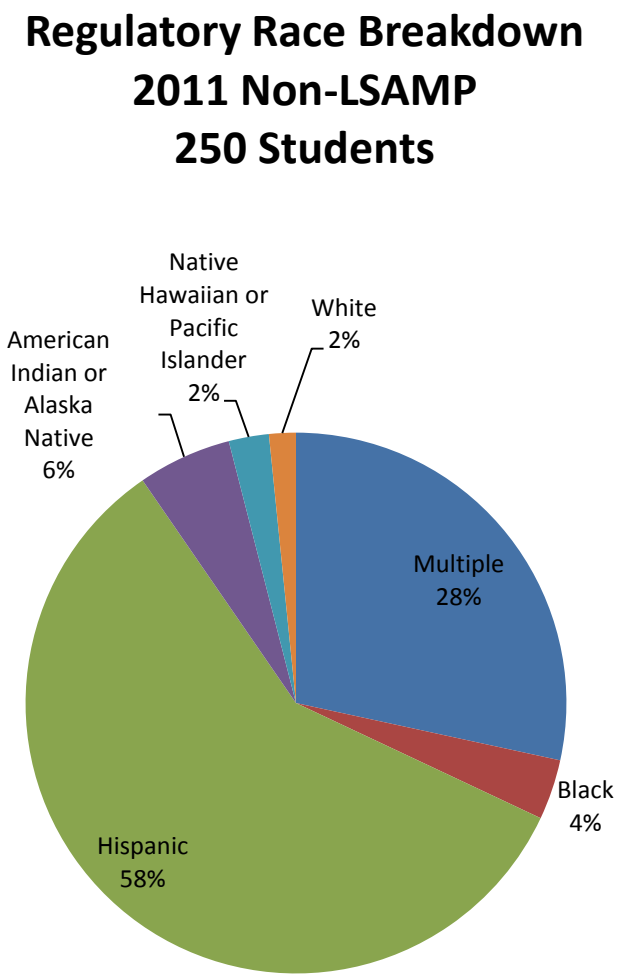

Figure 4. 2011 control group regulatory race percentage make up

6.2.4 Academic Performance Preceding OSU

The high school GPA of the 2011 cohort shows promise for academic success at OSU. The 2011 cohort had 0.20 increased high school GPA compared to the 2010 cohort. Table 3 shows the GPA data of the 2011 cohort. The B+/A- GPA show that LSAMP is drawing talented URM students.

The standard deviation of 0.32 indicates a smaller range than in the previous year and that the group is mostly comprised of successful students.

The non-LSAMP GPA remained the same as the year before, about 3.50.The difference between the two groups needs to be kept in mind when discussing the results from the analysis of the academic metrics.

Table 3. Graduating high school GPA of the 2011 LSAMP cohort

High School GPA		
	LSAMP	**Non-LSAMP**
Average	3.69	3.49
Median	3.67	3.50
Std. Dev.	0.32	0.37

6.3 2012

The 2012 cohort once again increased in size due to the perceived success of the previous year. The 2012 cohort was made up of 38 incoming freshman. There was once again an IESS group with engineering majors and an LSS group with science based majors.

6.3.1 Timeframe

The 2012 bridge program took place from September 15th-20th. The full agenda from the program can be view in Appendix B.

The schedule for the 2012 cohorts bridge schedule is much different from the previous two years due to the changes OSU made to its CONNECT week program. Historically, CONNECT week lasted a full week before classes started, but starting in 2012 CONNECT week was reduced to 3 days. This put a constraint on the bridge program due to the fact that the end of the bridge program is supposed to coincide with the beginning of CONNECT week. The 2012 bridge programs duration was reduced to 6 days versus the usual 10 days.

Due to the short CONNECT week the bridge program was scheduled so close to the general population move in date that the bridge could find a temporary residence hall to house the entire cohort in one hall. Therefore each bridge student resided in their permanent dorms for the duration of the program. This left the cohort spread throughout the campus, which lead to confusion, miscommunication, and the occasional missing student.

Due to the compressed time schedule, the bridge program needed to cut out the classes. Based on previous cohorts, classes were the least valuable aspect of the bridge. The other activities cultivated more of the community building aspect, which was a primary goal for the bridge.

Another change for the IESS group was the absence of an Intel visit. Intel was not able to accommodate the group this year, so in lieu of the Intel visit the IESS group visited the Evergreen Air & Space Museum.

6.3.2 Leadership

The 2012 cohort was led by 9 peer leaders. The high number of peer leaders was necessary due to the housing arrangements. Because the students were spread out all over campus, there needed to be enough peer leaders to cover each of the 3 main dining centers, which served the three main housing areas on campus.

The peer leader form the past two bridge programs once again returned and served as a senior peer leader for the bridge program. A junior from the 2010 cohort served as a leader and also served as a senior peer leader. The remaining 7 leaders were all 2011 cohort members. The 2012 year was the first year in which the majority of the leaders were URM students that had participated in previous bridge programs. The presence of sophomore, junior, and senior level peer leaders offered a dynamic leadership group..

6.3.3 Students

The 2011 bridge cohort was comprised of 38 students. All students were self-identified as URM students. Most students graduated high school Oregon and California. Figure 5 shows the racial makeup of the 2012 cohort. The 2012 cohort saw a slight increase in the Hispanic and Black representation compared to previous years. The multiracial representation also saw a great increase in representation. The 2012 cohort saw no representation of the Native American/Alaska Native and Hawaiian Native/Pacific Islander group. But keep in mind that some of the multiracial students were of Native American/Alaska Native or Hawaiian Native/Pacific Islander descent.

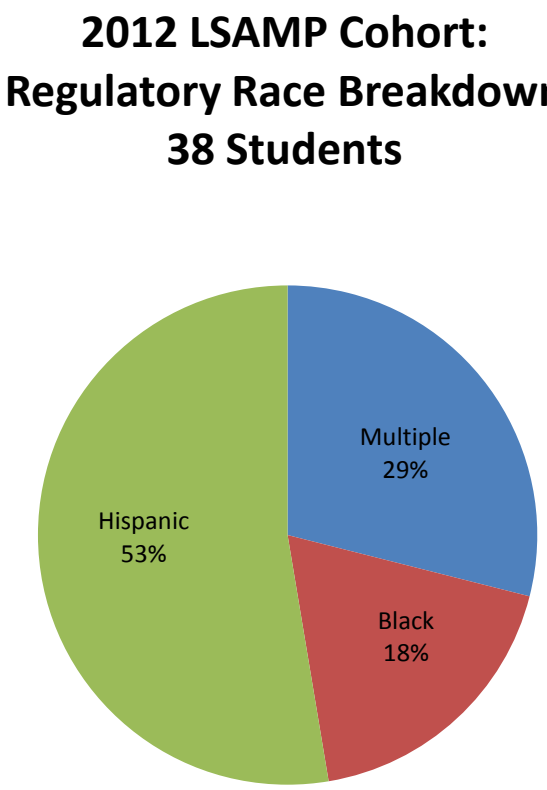

Figure 5. 2012 LSAMP cohort regulatory race percentage make up

The 2012 year saw a major difference in the racial representation between the LSAMP and non-LSAMP group. Racial representation by percent for the non-LSAMP group can be seen in Figure 6. Both groups maintained a large Hispanic representation. The LSAMP group had a much larger Black representation than the non-LSAMP group. 18% of the LSAMP group self-identified as

black, while only 4% of the control group did. The representation of multiracial students is similar, but no other races are represented in the LSAMP group. Whereas the control group saw at least a small representation of American Indian/Alaska Native and Native Hawaiian/Pacific Islanders.

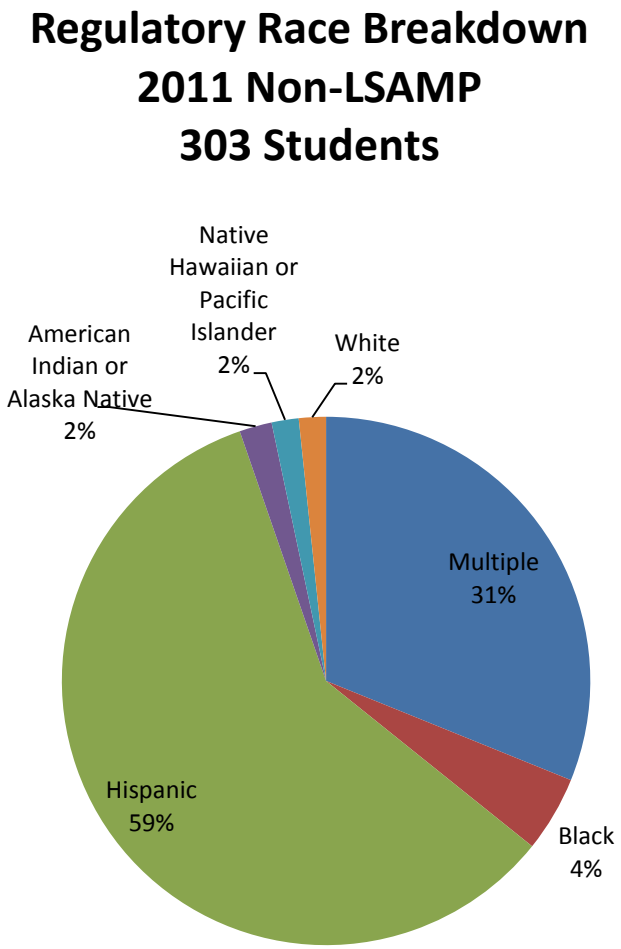

Figure 6. 2012 control group regulatory race percentage make up

6.3.4 Academic Performance Preceding OSU

The high school graduation GPA for the 2012 cohort matches the high school performance of the 2010 cohort and is only 0.10 points below that of the 2011 cohort. Table 4 shows the GPA data of the 2012 cohort. The B+ GPA shows that the LSAMP program is still drawing talented URM students. The fact that for three consecutive years, the program is attracting successful students

shows that there is great potential for the OSU program to increase the quality and quantity of URM STEM education.

The non-LSAMP group's high school GPA shows once again an average close to 3.50. Once again the LSAMP group's high school performance closely matched the non-LSAMP groups, allowing for a direct comparison between the groups.

Table 4. Graduating high school GPA of the 2012 LSAMP cohort

High School GPA		
	LSAMP	**Non-LSAMP**
Average	3.54	3.46
Median	3.54	3.49
Std. Dev.	0.29	0.41

7 Results and Discussion

Due to the variability and evolution of the LSAMP program, results will be shown for each yearly cohort. Also because earlier cohorts have received more LSAMP related assistance up to this time, the differences between LSAMP students and non-LSAMP students should be more noticeable to show any effects the LSAMP program may have had.

7.1 2010 Cohort

The 2010 LSAMP cohort was comprised of 20 students, which is compared to the non-LSAMP group comprised of 194 Students. At this point in time, the 2010 student have gone through 8 terms at OSU. All data reflect cumulative figures.

7.1.1 University Retention

Since 2010, 13 of the initial 20 LSAMP students have remained at OSU. While 185 of the initial 194 non-LSAMP students remained at the university. Table 5 shows the data for university retention for the 2010 students. The data shows that LSAMP student leave OSU at a high rate than non-LSAMP students for the 2010 year.

Table 5. 2010 University retention rate after 8 terms

University Retention 2010	Student Count	Retention Rate
LSAMP (20 Original Students)	13	65.00%
Non-LSAMP (194 Original Students)	185	94.85%

Table 6 shows the results on the ANOVA performed for 2010 university retention. The values of interest are the P-values, the lower a P-value, the stronger the correlation with the variable and GPA. A P-Value is used to attain the confidence level for statistical significance. A P-value of 0.05 signifies statistical significance at a 95% confidence level.

The ANOVA shows that LSAMP participation has a strong correlation at a 100% confidence level on university retention. Coupled with the knowledge that a higher percentage of LSAMP students drop out of OSU, it can be said that the LSAMP program has a negative effect on 2010 students for university retention.

Table 6 ANOVA Type III sums of squares results for 2010 university retention

Analysis of Variance for University Retention - Type III Sums of Squares

Source	*Sum of Squares*	*Df*	*Mean Square*	*F-Ratio*	*P-Value*
MAIN EFFECTS					
A:Race	0.0350056	5	0.00700112	0.14	0.9829
B:Gender	0.000565268	1	0.000565268	0.01	0.9160
C:High School GPA	6.19287	95	0.0651881	1.29	0.1062
D:LSAMP Participation	1.49004	1	1.49004	29.51	0.0000
RESIDUAL	4.89852	97	0.0505002		
TOTAL (CORRECTED)	13.02	199			

7.1.2 STEM retention

Table 7 and Table 8 show STEM retention for the 2010 group. The data Table 7 shows that LSAMP students are leaving STEM majors at a higher rate than their non-LSMAP counterparts. Table 8 shows if STEM retention is considered only for students who have remained as active students at OSU then LSAMP students are staying in STEM majors at a higher rate than their non-LSAMP counterparts. This finding suggests that the LSAMP program is not affecting a student's decision to stay at OSU, but if the student does deiced to stay at OSU, then they are more likely to remain in a STEM major if they are involved with the LSAMP program.

Table 7. 2010 STEM retention rates after 8 terms. This retention rate represents how many of the original 2010 URM students are still in STEM majors, including students who are no longer actively enrolled students at OSU.

STEM Retention from all 2010 URM Students	Student Count	Retention Rate
LSAMP (20 Original Students)	11	55.00%
Non-LSAMP (194 Original Students)	135	69.59%

Table 8. 2010 STEM retention rates after 8 terms. This retention rate represents how many students are still in STEM majors who are still actively enrolled at OSU.

STEM Retention from active 2010 URM Students	Student Count	Retention Rate
LSAMP (13 active students)	11	84.62%
Non-LSAMP (185 active students)	135	73.37%

Of all of the factors available to this assessment, LSAMP participation is correlation with STEM retention at a 91.75% confidence level shown in Table 9. Coupled with the data from above it can be said that the LSAMP program has a positive effect on STEM retention for active students. Because the program cannot fully account for students leaving the university, it must focus on retaining active students in LSAMP.

Table 9. ANOVA Type III sums of squares results for 2010 STEM retention

Analysis of Variance for STEM Retention - Type III Sums of Squares

Source	*Sum of Squares*	*Df*	*Mean Square*	*F-Ratio*	*P-Value*
MAIN EFFECTS					
A:Race	0.900647	5	0.180129	0.79	0.5615
B:Gender	0.0669317	1	0.0669317	0.29	0.5899
C:High School GPA	19.2729	95	0.202872	0.89	0.7219
D:LSAMP Participation	0.704474	1	0.704474	3.08	0.0825
RESIDUAL	22.2018	97	0.228885		
TOTAL (CORRECTED)	43.52	199			

7.1.3 GPA

Table 10 shows the GPAs of LSAMP students and non-LSAMP students for the 2011 year. The first three rows show the average, median, and standard deviation of all 2010 students. The fourth, fifth, and sixth rows filter out non-active OSU students. After removing the drop-out students, the LSAMP average GPA increases by 0.23 points, while the non-LSAMP GPA only increases by 0.03 points. The last three rows show the GPA data for only students still active in STEM majors. After this filter, the LSAMP average GPA remains at 2.71, while the non-LSAMP group increases by 0.02 points to 3.00.

The standard deviation of GPA decreases as the two filters are applied to the LSAMP group, while standard deviation of the non-LSAMP remains constant. The decrease in standard deviation that the LSAMP group sees as the filters are applied, suggest that the LSAMP program equalizes the academic performance of the students, meaning the program is doing something that makes the student's academic performance similar.

Table 10. 2010 cumulative GPA after 8 terms

Grade Point Average 2010	LSAMP	Non-LSAMP
Average GPA	2.48	2.95
Median GPA	2.55	2.91
GPA Standard Deviation	0.53	0.52
Active Average GPA	2.71	2.98
Active Median GPA	2.74	2.95
Active GPA Std. Dev.	0.43	0.51
Active STEM Avg. GPA	2.71	3.00
Active STEM Med. GPA	2.64	2.98
Active STEM GPA Std. Dev.	0.26	.051

It is clear that the raw data shows that non-LSAMP students have a higher GPA. To determine if this is correlated with LSAMP participation, an ANOVA is performed. The results of the ANOVA are shown in Table 11 and Table 12.

Table 11 illustrates the results of the ANOVA variable significance analysis. For the 2010 year, LSAMP participation seems to have the lowest P-value of all the factors analyzed. This implies that LSAMP participation does have a correlation with GPA among URM students after 8 terms at OSU, although this correlation can only be made with a 71% confidence level.

Table 11. ANOVA Type III sums of squares results for 2010 GPA
Analysis of Variance for GPA - Type III Sums of Squares

Source	*Sum of Squares*	*Df*	*Mean Square*	*F-Ratio*	*P-Value*
MAIN EFFECTS					
A:Race	0.549673	4	0.137418	0.58	0.6815
B:Gender	0.0149001	1	0.0149001	0.06	0.8037
C:High School GPA	19.673	78	0.252217	1.06	0.4209
D:LSAMP Participation	0.281018	1	0.281018	1.18	0.2829
RESIDUAL	12.4117	52	0.238686		
TOTAL (CORRECTED)	33.9081	136			

When looking at the raw data, it seems that LSAMP students have a lower GPA than their non-LSAMP counter parts. And because the ANOVA suggests that there is a correlation with LSAMP participation and GPA, one might be lead to the conclusion that LSAMP has a negative impact on student GPA. But keep in mind that there are many variables that can affect the GPA of a student.

The ANOVA can calculate the mean values for GPA associated with a specific variable. Table 12 shows the mean GPA associated with LSAMP participation. It can be seen that the ANOVA shows that LSAMP participation correlates with a higher GPA. LSAMP students, on average, have a 0.3 higher GPA than a similar non-LSAMP student. Though the raw data does not reflect this, the LSAMP program has had a positive effect on the 2010 cohorts GPA.

Table 12. 2010 cohort mean GPA attributed to LSAMP participation
Table of Least Squares Means for GPA with 95.0% Confidence Intervals

			Stnd.	*Lower*	*Upper*
Level	*Count*	*Mean*	*Error*	*Limit*	*Limit*
GRAND MEAN	137	2.91487			
LSAMP Participation					
No	126	2.76541	0.112731	2.5392	2.99162
Yes	11	3.06433	0.261234	2.54012	3.58853

7.1.4 Academic Standing

The LSAMP group has only 11 of its 20 students still in good academic standing. Of the 9 not in good standing, 2 are on academic warning, 4 are on academic suspension, and 3 are no longer enrolled. The non-LSAMP group has 165 of its 194 students on good standing, 16 on academic warning, 3 on academic probation, and 10 students no longer enrolled. All academic standing data for 2010 is shown on Table 13.

It is evident that the LSAMP group has a higher percentage of students not in good standing, suggesting that a higher rate of LSAMP students are struggling throughout their college tenure. The most disturbing figure is the 20% of LSAMP students on academic suspension while no non-LSAMP students are suspended due to grades.

Table 13. 2010 academic standing after 8 terms

Academic Standing 2010	LSAMP (20)		Non-LSAMP (194)	
Good Standing	11	55%	165	85%
Academic Warning	2	10%	16	8%
Academic Probation	0	0%	3	2%
Academic Suspension	4	20%	0	0%
No Longer Enrolled	3	15%	10	5%

Statistical analysis of academics standing shows that LSAMP participation has a great correlation with academic standing. This leads to the conclusion that participation in the LSAMP program has a negative correlation with academic standing. Table 14 shows the ANOVA for academic standing. LSAMP participation has the strongest correlation with academic standing. This shows that LSAMP participation is strongly connected with academic success, or lack thereof, for the 2010 group.

Keep in mind that this analysis includes all of the original students from the 2010 groups. The previous GPA analysis showed that LSAMP had a positive correlation with GPA, which is contradictory to the results of the academic standing finding. But the GPA analysis looked only at active students and threw out those no longer enrolled or on academic suspension. Because academic standing is a gauge of academic success over a student's college career, no matter how short, it does not make sense to throw out inactive students.

There could be many reasons that this negative correlation exists, but determination of a reasonable explanation is beyond the scope of this assessment.

Table 14. ANOVA Type III sums of squares results for 2010 academic standing
Analysis of Variance for Academic Standing - Type III Sums of Squares

Source	*Sum of Squares*	*Df*	*Mean Square*	*F-Ratio*	*P-Value*
MAIN EFFECTS					
A:Race	0.369373	5	0.0738746	0.10	0.9926
B:Gender	0.0373721	1	0.0373721	0.05	0.8262
C:High School GPA	100.222	95	1.05497	1.37	0.0628
D:LSAMP Participation	17.9254	1	17.9254	23.25	0.0000
RESIDUAL	74.7711	97	0.770836		
TOTAL (CORRECTED)	197.355	199			

7.1.5 Class Pass Rate

The last metric evaluates how effective LSAMP students are at completing classes compared to non-LSAMP students. Average pass rates for the 2010 students are shown in Table 15. At first glance, the non-LSAMP students have the edge by earning 89.71% of their attempted credits over the LSAMP students 79.39% of earned credits.

Table 15. 2010 Class pass rate for all students. Includes pass rate data for students who are no longer active or in STEM.

Class Pass Rate 2010	**Pass Rate**
LSAMP (20 Students)	79.39%
Non-LSAMP (194 Students)	89.71%

An ANOVA was performed on this metric to determine the effect of LSAMP participation. Table 16 shows the relationship analysis that race, gender, high school GPA, and LSAMP participation have on pass rates. Of the four factors, LSAMP participation has the highest level of correlation with a confidence level of 71.3%. This shows that the after 8 terms, the LSAMP program has an effect on how efficient its students are at taking and passing classes.

Table 16. ANOVA Type III sums of squares results for 2010 class pass rate
Analysis of Variance for Pass Rate - Type III Sums of Squares

Source	*Sum of Squares*	*Df*	*Mean Square*	*F-Ratio*	*P-Value*
MAIN EFFECTS					
A:Race	467.578	4	116.895	0.81	0.5265
B:Gender	42.8076	1	42.8076	0.30	0.5891
C:High School GPA	9627.73	78	123.432	0.85	0.7424
D:LSAMP Participation	167.703	1	167.703	1.16	0.2870
RESIDUAL	7534.68	52	144.898		
TOTAL (CORRECTED)	17939.0	136			

Now that a correlation between LSAMP participation and class pass rate has been shown, it is valuable to see the figures for class pass rate based solely on LSAMP participation. Table 17 shows the ANOVA attributes a 93.3% class pass rate due to LSAMP participation and an 86% class pass rate for non-LSAMP students. This statistical analysis flips the results from the unprocessed data and shows a new correlation. Students in LSAMP for the 2010 are earning more credits and therefore passing more of their attempted classes than non-LSAMP students.

Table 17. 2010 cohort class pass rate attributed to LSAMP participation
Table of Least Squares Means for Pass Rate with 95.0% Confidence Intervals

			Stnd.	*Lower*	*Upper*
Level	*Count*	*Mean*	*Error*	*Limit*	*Limit*
GRAND MEAN	137	89.6455			
LSAMP Participation					
No	126	85.9943	2.77755	80.4208	91.5679
Yes	11	93.2966	6.43645	80.3809	106.212

7.2 2011 Cohort

The 2011 LSAMP cohort was comprised of 34 students; the non-LSAMP group was comprised of 250 students. At this point in time, the 2011 student have gone through5 terms at OSU. All data reflect cumulative figures.

7.2.1 University Retention

Since 2010, 30 of the initial 34 LSAMP students have remained at OSU. While 229 of the initial 250 non-LSAMP students remained at OSU. Table 18 summarizes the university retention data for the 2011 year students. The 2011 LSAMP cohort has similar retention rates to that of the non-LSAMP group, around 90%. Because the university retention rates are so similar, it seems that LSAMP has little to no effect on university retention.

Table 18. 2011 University retention rate after 5 terms

University Retention 2011	Student Count	Retention Rate
LSAMP (34 Original Students)	30	88.24%
Non-LSAMP (250 Original Students)	229	91.60%

Statistical analysis proves that there is a very weak correlation between LSAMP participation and university retention. Of the 4 variable analyzed, LSAMP participation has the third highest P-value, indicating a very weak correlation between LSAMP participation and university retention as shown in Table 19.

Table 19. ANOVA Type III sums of squares results for 2011 university retention

Analysis of Variance for University Retention - Type III Sums of Squares

Source	*Sum of Squares*	*Df*	*Mean Square*	*F-Ratio*	*P-Value*
MAIN EFFECTS					
A:Race	0.192429	5	0.0384858	0.48	0.7938
B:Gender	0.181152	1	0.181152	2.24	0.1367
C:High School GPA	9.16344	110	0.083304	1.03	0.4319
D:LSAMP Participation	0.0191564	1	0.0191564	0.24	0.6272
RESIDUAL	11.4852	142	0.080882		
TOTAL (CORRECTED)	20.9654	259			

7.2.2 STEM retention

When looking at STEM retention of the whole 2011 group, it appears that LSAMP students are leaving STEM majors at a higher rate. When active students are taken into account for determining STEM retention, the LSAMP cohort does exceptionally well. STEM retention for LSAMP students jumps from 85.39% to 96.67% after filtering out students who no longer attend OSU. This suggests that students in LSAMP that continue their education at OSU tend to stay in STEM majors. The non-LSAMP group also saw a rise from 72.80% to 79.48% after filtering out students that dropped out of OSU, also showing that attrition from the university accounts for a significant portion of STEM attrition. This data is depicted in Table 20and Table 21.

Table 20. 2011 STEM retention rates after 5 terms. This retention rate represents how many of the original 2010 URM students are still in STEM majors, including students who are no longer actively enrolled students at OSU.

STEM Retention from all 2011 URM Students	**Student Count**	**Retention Rate**
LSAMP (34 Original Students)	29	85.29%
Non-LSAMP (250 Original Students)	182	72.80%

Table 21. 2011 STEM retention rates after 5 terms. This retention rate represents how many students are still in STEM majors who are still actively enrolled at OSU.

STEM Retention from active 2011 URM Students	Student Count	Retention Rate
LSAMP (30 active students)	29	96.67%
Non-LSAMP (229 active students)	182	79.48%

ANOVA is once again used to statistically determine the strength of the correlation between LSAMP participation and STEM retention. The ANOVA was done on the original population because any student that leaves OSU is also leaving a STEM major. The results in Table 22 indicate that there is no significant correlation between any of the variables analyzed and STEM retention. There must be other factors that determine why more active LSAMP students remain in STEM majors, but determination of these factors is beyond the scope of this assessment.

Table 22. ANOVA Type III sums of squares results for 2011 STEM retention

Analysis of Variance for STEM Retention - Type III Sums of Squares

Source	*Sum of Squares*	*Df*	*Mean Square*	*F-Ratio*	*P-Value*
MAIN EFFECTS					
A:Race	0.506098	5	0.10122	0.53	0.7553
B:Gender	0.0181596	1	0.0181596	0.09	0.7589
C:High School GPA	21.5007	110	0.195461	1.02	0.4571
D:LSAMP Participation	0.0802487	1	0.0802487	0.42	0.5190
RESIDUAL	27.2603	142	0.191974		
TOTAL (CORRECTED)	50.6885	259			

7.2.3 GPA

The GPAs for the 2011 group are shown in Table 23. The first three rows show the average, median, and standard deviation GPA for all 2011 students. The next three rows show GPA for only student still enrolled at OSU. After this filter is applied the LSAMP group's GPA is raised by 0.18 and the non-LSAMP group's GPA sees an increase of 0.07 points. The standard deviation of the LSAMP group decreases from 0.81 to 0.55 and the non-LSAMP standard deviation see a decrease from 0.60 to 0.55. By only looking at the students still enrolled the average GPA of the LSAMP is higher than the non-LSAMP group. Also the standard deviation of both groups is identical after the filter.

When looking only at students still in STEM majors, the last three rows, GPA or standard deviation for both groups does not significantly change. The data for GPA alone does not show any positive correlation with LSAMP increasing GPA among STEM students. But because there are so many factors that can affect a student's GPA, an ANOVA needs to be done to assess what affect the LSAMP program can have on a student's GPA.

Table 23. 2011 cumulative GPA after 5 terms

Grade Point Average 2011	LSAMP	Non-LSAMP
Average GPA	2.79	2.80
Median GPA	2.77	2.82
GPA Standard Deviation	0.81	0.60
Active Average GPA	2.97	2.87
Active Median GPA	2.85	2.90
Active GPA Std. Dev.	0.55	0.55
Active STEM Avg. GPA	2.97	2.88
Active STEM Med. GPA	2.78	2.90
Active STEM GPA Std. Dev.	0.56	0.56

The ANOVA analysis reinforces the notion that the LSAMP program does not have a significant effect on student GPA.

Table 24 shows that the factor that most affect college GPA is high school GPA. This only shows that student success is determined by the success they experience in high school.

Table 24. ANOVA Type III sums of squares results for 2011 GPA

Analysis of Variance for GPA - Type III Sums of Squares

Source	*Sum of Squares*	*Df*	*Mean Square*	*F-Ratio*	*P-Value*
MAIN EFFECTS					
A:Race	2.12913	5	0.425826	1.91	0.1014
B:Gender	0.00665835	1	0.00665835	0.03	0.8633
C:High School GPA	34.785	97	0.358609	1.61	0.0129
D:LSAMP Participation	0.00445177	1	0.00445177	0.02	0.8880
RESIDUAL	19.204	86	0.223303		
TOTAL (CORRECTED)	58.1888	190			

Further, looking at the mean GPA associated with LSAMP participation shows the indifference between an LSAMP student and a non-LSAMP student. The mean GPA for an LSAMP student is

similar to a non-LSAMP student's, as shown in Table 25. The GPA data and ANOVA show that the LSAMP program has no correlation with GPA for the 2011 year.

Table 25. 2011 cohort mean GPA attributed to LSAMP participation

Table of Least Squares Means for GPA with 95.0% Confidence Intervals

			Stnd.	*Lower*	*Upper*
Level	*Count*	*Mean*	*Error*	*Limit*	*Limit*
GRAND MEAN	191	2.68561			
LSAMP Participation					
No	162	2.69526	0.0944073	2.50758	2.88293
Yes	29	2.67596	0.145933	2.38585	2.96607

7.2.4 Academic Standing

The 2011 LSAMP cohort has a much greater percentage of students in good academic standing than the 2010 year. Of the 34 students, 27 are in good academic standing. 3 are on academic warning, 1 on academic probation, 2 on academic suspension, and 1 student is no longer enrolled.

The non-LSAMP group has 173 of the 250 students on good academic standing. 45 students are on academic warning, 44 on academic probation, 2 on academic probation, and 19 students no longer enrolled. Although the non-LSAMP group had a lower percentage of students in good standing, there were an extremely low number of students on academic suspension, indicating that students were struggling, but not to the point of failure. Both groups have two students on academic suspension, but in the LSAMP group these two students represent a lot more of the population than the two suspended non-LSAMP students.

Although, the 2011 LSAMP cohort has more students in good standing, the ANOVA will reveal if their academic standing is influenced by the LSAMP program. All academic standing data is shown in Table 26.

Table 26. 2011 Academic standing after 5 terms

Academic Standing 2011	**LSAMP (34)**		**Non-LSAMP (250)**	
Good Standing	27	79%	173	69%
Academic Warning	3	9%	45	18%
Academic Probation	1	3%	44	4%
Academic Suspension	2	6%	2	1%
No Longer Enrolled	1	3%	19	8%

The ANOVA results shown in Table 27 reveals that the LSAMP program has virtually no effect on the academic standing of the 2011 students. In fact, LSAMP participation factored the least influential of the 4 variables. Interestingly, in the 2011 year gender seemed to be the variable with the strongest correlation with academic success. In the 2011 year, LSAMP participation had no correlation with academic standing after 5 terms at OSU.

Table 27. ANOVA Type III sums of squares results for 2011 academic retention

Analysis of Variance for Academic Standing - Type III Sums of Squares

Source	*Sum of Squares*	*Df*	*Mean Square*	*F-Ratio*	*P-Value*
MAIN EFFECTS					
A:Race	5.32593	5	1.06519	0.83	0.5274
B:Gender	4.14945	1	4.14945	3.25	0.0736
C:High School GPA	133.774	110	1.21613	0.95	0.6037
D:LSAMP Participation	0.00000344613	1	0.00000344613	0.00	0.9987
RESIDUAL	181.315	142	1.27686		
TOTAL (CORRECTED)	325.304	259			

7.2.5 Class Pass Rate

The 2011 cohort was found to pass their classes at an average rate of 89.43%. The non-LSAMP group had an average pass rate of 89.81%. Because the two pass rates are so similar it is not expected that the LSAMP program has an effect on class pass rate in the 2011 year. This data is shown in Table 28.

Table 28. 2011 Class pass rate for all students. Includes pass rate data for students who are no longer active or in STEM majors.

Class Pass Rate 2011	**Pass Rate**
LSAMP (34 Students)	89.43%
Non-LSAMP (250 Students)	89.81%

Class pass rate for the 2011 year is shown to have a slight correlation with LSAMP participation as shown in the ANOVA results in Table 29. This correlation can only be made with a 70% confidence level and is the variable with the lowest P-value.

Table 29. ANOVA Type III sums of squares results for 2011 class pass rate
Analysis of Variance for Pass Rate - Type III Sums of Squares

Source	*Sum of Squares*	*Df*	*Mean Square*	*F-Ratio*	*P-Value*
MAIN EFFECTS					
A:Race	95.4323	5	19.0865	0.17	0.9743
B:Gender	7.85473	1	7.85473	0.07	0.7942
C:High School GPA	15220.6	97	156.914	1.37	0.0698
D:LSAMP Participation	120.779	1	120.779	1.05	0.3078
RESIDUAL	9870.06	86	114.768		
TOTAL (CORRECTED)	25674.5	190			

Although the ANOVA shows that LSAMP participation has a small correlation with class pass rate, investigation of the statistical mean pass rate shows that the difference between the LSAMP and non-LSAMP group class pass rate is minimal. The analysis results shown in Table 30 show that there is a slight advantage for student not active in the LSAMP program. It seems there is weak negative correlation between LSAMP participation and passing classes.

Table 30. 2011 cohort class pass rate attributed to LSAMP participation
Table of Least Squares Means for Pass Rate with 95.0% Confidence Intervals

			Stnd.	*Lower*	*Upper*
Level	*Count*	*Mean*	*Error*	*Limit*	*Limit*
GRAND MEAN	191	88.2185			
LSAMP Participation					
No	162	89.8079	2.14027	85.5531	94.0626
Yes	29	86.6291	3.3084	80.0522	93.206

7.3 2012 Cohort

The 2012 LSAMP cohort was comprised of 38 students and the non-LSAMP group was comprised of 303 students. At this point in time, the 2012 student have gone through 2 terms at OSU, which does not even constitute a full year at OSU. Because of the short time the LSAMP program has had to affect the 2012 cohort, there are only minimal expectations of the effect of the LSAMP program. All data reflect cumulative figures.

7.3.1 University Retention

After the first two terms for the 2010 students, one student from the LSAMP cohort left OSU. The non-LSAMP group retained every URM student that matriculated to OSU in the 2012 school year. University retention data for 2012 is shown in Table 31.

Table 31. 2012 University retention rate after 2 terms

University Retention 2011	Student Count	Retention Rate
LSAMP (38 Original Students)	37	97.37%
Non-LSAMP (303 Original Students)	303	100%

Because only one student left OSU, there is not enough data for the ANOVA to ascertain valid results. Further, because only one LSAMP student left OSU before any OSU policy could force him to leave to grades; this one student most likely did not leave for academic reasons. There is no data that can support whether the LSAMP program had any effect on the 2012 cohorts university retention rate.

7.3.2 STEM retention

Although the non-LSAMP group retained all 303 of their students at OSU, 9 non-LSAMP students switched from STEM majors. Conversely, the LSAMP cohort lost a student from the university, but the remaining 37 students have stayed in STEM majors through their first 2 terms. Table 32 and Table 33 show that the STEM retention rates for both cases are very close. Because the STEM retention rates are so close, a statistically significant correlation is not expected to be found.

Table 32. 2012 STEM retention rates after 3 terms. This retention rate represents how many of the original 2010 URM students are still in STEM majors, including students who are no longer actively enrolled students at OSU.

STEM Retention from all 2011 URM Students	Student Count	Retention Rate
LSAMP (38 Original Students)	37	97.37%
Non-LSAMP (303 Original Students)	292	96.37%

Table 33. 2012 STEM retention rates after 3 terms. This retention rate represents how many students are still in STEM majors who are still actively enrolled at OSU.

STEM Retention from active 2011 URM Students	Student Count	Retention Rate
LSAMP (37 active students)	37	100%
Non-LSAMP (303 active students)	292	96.37%

Data from the ANOVA show in Table 34 shows that high school GPA has the most influence on STEM retention for the 2012 group, whereas LSAMP participation had little to no correlation with STEM retention. This is to be expected because the 2012 LSAMP cohort has only been involved with the program for 2 terms. LSAMP is designed as a program that supports students throughout their whole academic career and thus results will be more clearly seen for students who have been involved for a longer amount of time,

Table 34. ANOVA Type III sums of squares results for 2012 university retention

Analysis of Variance for STEM Retention - Type III Sums of Squares

Source	*Sum of Squares*	*Df*	*Mean Square*	*F-Ratio*	*P-Value*
MAIN EFFECTS					
A:Race	0.26998	6	0.0449966	1.43	0.2056
B:Gender	0.0139093	1	0.0139093	0.44	0.5072
C:High School GPA	5.20944	119	0.0437768	1.39	0.0214
D:LSAMP Participation	0.0242589	1	0.0242589	0.77	0.3813
RESIDUAL	6.0486	192	0.0315031		
TOTAL (CORRECTED)	11.55	319			

7.3.3 GPA

Unlike previous years, LSAMP and non-LSAMP GPAs are very similar is shown in Table 35. Because of the similarity of the GPA averages, the focus must be more on the medians and standard deviations of the two groups.

The total student GPA median for the LSAMP group sits at 2.57 while the median for the non-LSAMP group is 2.82. Because the median for the non-LSAMP group is higher than the average GPA, it would suggest that there are more high achieving students, and some low achieving outliers that bring the average down. Based on the median, it seems that the non-LSAMP group is doing better than the LSAMP group. But as GPA can be affected by many variables, a statistical analysis must be done to prove this claim.

The large standard deviation of both groups also show the there is a wide range of GPA within each group. The LSAMP cohort's standard deviation was 0.86 and the non-LSAMP group's was 0.99. This suggests that there is no correlation with LSAMP and GPA, or the LSAMP cohort would see a much smaller grouping of GPAs.

Table 35. 2012 cumulative GPA after 2 terms at OSU*No Non-LSAMP University AttritionAll active students remained in STEM Majors**

Grade Point Average 2012	LSAMP	Non-LSAMP
Average GPA	2.60	2.64
Median GPA	2.57	2.82
GPA Standard Deviation	0.86	0.99
Active Average GPA	2.66	2.64*
Active Median GPA	2.63	2.82*
Active GPA Std. Dev.	0.80	0.99*
Active STEM Avg. GPA	2.66**	2.66
Active STEM Med. GPA	2.63**	2.83
Active STEM GPA Std. Dev.	0.80**	0.97

According to the ANOVA, LSAMP participation has no correlation with cumulative GPA for the 2012 group. Table 36 shows that there is virtually no connection between LSAMP and GPA due to the 0.9894 P-value. The lack of LSAMP's effect on GPA is also shown in Table 37. The ANOVA attributes GPAs of 2.88 to both LSAMP and non-LSAMP students, proving that LSAMP participation had no impact on the 2012 cohort.

Table 36. ANOVA Type III sums of squares results for 2012 GPA
Analysis of Variance for GPA - Type III Sums of Squares

Source	*Sum of Squares*	*Df*	*Mean Square*	*F-Ratio*	*P-Value*
MAIN EFFECTS					
A:Race	3.83376	6	0.638959	0.93	0.4717
B:Gender	2.28082	1	2.28082	3.33	0.0695
C:High School GPA	151.303	116	1.30433	1.91	0.0000
D:LSAMP Participation	0.000120261	1	0.000120261	0.00	0.9894
RESIDUAL	124.478	182	0.683946		
TOTAL (CORRECTED)	283.332	306			

Table 37. 2012 cohort mean GPA attributed to LSAMP participation
Table of Least Squares Means for GPA with 95.0% Confidence Intervals

			Stnd.	*Lower*	*Upper*
Level	*Count*	*Mean*	*Error*	*Limit*	*Limit*
GRAND MEAN	307	2.87672			
LSAMP Participation					
No	271	2.87553	0.212512	2.45622	3.29483
Yes	36	2.87791	0.270564	2.34407	3.41176

7.3.4 Academic Standing

The academic standing metric will not be as revealing as in the previous year because of short amount of time the students have been at OSU. The only possible standing options are good standing, academic warning, or no longer active. But it may be revealing to what percentage in each group is in good standing.

Table 38 summarizes the academic standing date for the 2012 group. The LSAMP group has 87% of its cohort still on good academic standing while the non-LSAMP group has only 78% still on good standing. Based on this data, the LSAMP program seems to foster students with generally higher cumulative GPAs.

Table 38. 2012 Academic standing after 2 terms at OSU

Academic Standing 2012	**LSAMP (38)**		**Non-LSAMP (303)**	
Good Standing	33	87%	235	78%
Academic Warning	4	10%	68	22%
Academic Probation	0	0%	0	0%
Academic Suspension	0	0%	0	0%
No Longer Enrolled	1	3%	0	0%

Based on the ANOVA shown in Table 39, participation has a weak correlation with academic standing. The two variables that have lower P-values, thus a higher level of correlation are gender and high school GPA. But because the statistics correlate LSAMP participation and academic standing at a confidence level of 21.5% it can be said the LSAMP program has a weak positive correlation with academic standing for the 2012 cohort.

Table 39. ANOVA Type III sums of squares results for 2012 academic standing

Analysis of Variance for Academic Standing - Type III Sums of Squares

Source	*Sum of Squares*	*Df*	*Mean Square*	*F-Ratio*	*P-Value*
MAIN EFFECTS					
A:Race	0.801339	6	0.133557	0.67	0.6713
B:Gender	1.11436	1	1.11436	5.62	0.0188
C:High School GPA	29.1221	119	0.244724	1.23	0.0978
D:LSAMP Participation	0.345358	1	0.345358	1.74	0.1885
RESIDUAL	38.0803	192	0.198335		
TOTAL (CORRECTED)	68.3469	319			

7.3.5 Class Pass Rate

The class pass rate data for the 2012 group is shown in Table 40. Both the LSAMP cohort and non-LSAMP group are close to earning 90% of the credits they attempt. The similarity of both rates suggests that there is minimal difference between how efficient LSAMP students are compared to non-LSAMP students.

Table 40. 2012 Class pass rate for all students. Includes pass rate data for students who are no longer active or in STEM majors.

Class Pass Rate 2012	**Pass Rate**
LSAMP (38 Students)	87.64
Non-LSAMP (303 Students)	89.81%

The ANOVA shows that LSAMP participation has no correlation with passing classes as shown in Table 41. The P-value of 0.3694 gives a correlation confidence level of 63% which is too low of a level to confirm a correlation, especially because LSAMP participation has a higher P-value than gender and high school GPA. The ANOVA does show that high school GPA serves as a

great predictor of class pass rates. For the 2012 cohort, LSAMP participation does not play a significant role in class pass rate.

Table 41. ANOVA Type III sums of squares results for 2012 class pass rate
Analysis of Variance for Pass Rate - Type III Sums of Squares

Source	*Sum of Squares*	*Df*	*Mean Square*	*F-Ratio*	*P-Value*
MAIN EFFECTS					
A:Race	1065.4	6	177.567	0.48	0.8201
B:Gender	967.992	1	967.992	2.64	0.1062
C:High School GPA	91528.8	116	789.042	2.15	0.0000
D:LSAMP Participation	297.306	1	297.306	0.81	0.3694
RESIDUAL	66470.4	181	367.24		
TOTAL (CORRECTED)	163320.	305			

7.4 Compiled Results

Table 42 compiles the correlation that LSAMP participation has to university retention, STEM retention, GPA, academic standing, and class pass rate over the three years the LSAMP program has going. It can be seen for the LSAMP program to improve the quality and quantity of URM STEM education, it needs to be a presence in its students' lives over the course of their college career. Because of the lack of correlation between LSAMP participation and academic success for the two cohorts who have been in the program the least amount of time, it seems that duration in the program is also a major factor in the success of the LSAMP program

Table 42. Statistical correlation of key metrics for the LSAMP cohorts for all three years.

LSAMP Significance		2010	2011	2012
Quantity	University Retention	Negative Correlation	Weak Positive Correlation	Insufficient Data
	STEM Retention	Positive Correlation	No Correlation	No Correlation
Quality	GPA	Positive Correlation	No Correlation	No Correlation
	Academic Standing	Negative Correlation	No Correlation	Weak Positive Correlation
	Class Pass Rate	Positive Correlation	Weak Negative Correlation	No Correlation

8 Conclusions

The data presented shows that the LSAMP program at OSU may influence retention and academic success of URM students. Because the LSAMP program is designed to provide support over a URM student collegiate career, the longer a student is involved with LSAMP, the more influential the program should be on the student's academic success. This is supported by Table 42. The 2012 cohort shows no influence from LSAMP participation using the methods described here, the 2011 cohort see some influence, and the 2010 cohorts' academic success and retention rates seem to be affected by LSAMP participation. This shows promise for the future of the program. It leads to the conclusion that the LSAMP program is influencing its student's success during their tenure at OSU.

The 2010 cohort saw the most noticeable effects from LSAMP participation. Because the 2010 cohort was involved with the LSAMP program for 8 terms, they had more time to be affected by the program. Although not all of the correlations were positive, it is promising that there was an effect at all. Although the program may not have done well in keeping students at OSU it may have met one of the LSAMP programs goals of keeping active students in STEM major. The fact that there is a positive correlation between LSAMP and the students GPA and class pass rate may indicate that academic success is influenced by the LSAMP program. The negative correlation associated to the LSAMP program with academic standing could be due to the fact that this metric looks at all students that started in 2010. Many of students that are no longer active at OSU left in other than good standing which can negatively impact the data for this metric. Overall, the LSAMP program seems to have a positive effect on increasing the quantity and quality of URM STEM education.

The 2011 cohort was only influenced by the LSAMP program in only two of the five metrics. The LSAMP program had a weak positive correlation with keeping students at OSU and a week negative correlation in terms of class pass rate. No other metrics showed any influence due to the

LSAMP program. The lack of appreciable influence from the program could be due to the fact that the 2011 cohort was already comprised of high achieving students. Remember that the average GPA of the 2011 cohort was 0.20 points greater than any other group. Because high school GPA is a good indicator for college success, the students that comprised the 2011 cohort would have most likely succeeded without the LSAMP program. But the 2011 cohort is only in their sophomore year; perhaps a reassessment at the time of their graduation can show the effects of LSAMP participation over their college career.

There was little to no effect shown in the 2012 cohort. This is due to the short amount of time that the cohort has been at OSU and in the LSAMP program. This assessment should be repeated for the 2012 cohort after 4 years to benchmark the programs influence during the student's undergraduate career.

Because the program seemingly affected only the 2010 cohort, it can be concluded that for the LSAMP program to positively influence its students, it must be a part of their academic life for the duration of the their undergraduate careers. Based on the 2010 cohort the program needs to improve its methods for keeping students at Oregon State. Also improvement must be made to keep students in good academic standing with the university. By addressing these two concerns the OSU LSAMP program can accomplish its goals of improving the academic performance of its students.

Key Points

- The LSAMP program has a greater effect on students the longer they are in the program
- The effect that LSAMP has on students is generally positive, but there are areas that need to be addressed such as university retention and academic standing.

- The program is still in its infancy and is continually changing, with assessments like these; it can characterize what is having a positive or negative impact and change the program to meet its goals.

9 Bibliography

[1] W. A. Wulf, "The Importance of Diversity in Engineering," National Academy of Engineering, 2007.

[2] C. Burns, K. Barton and S. Kerby, "The State of Diversity in Today's Workforce," 12 July 2012. [Online]. Available: http://www.americanprogress.org/issues/labor/report/2012/07/12/11938/the-state-of-diversity-in-todays-workforce/. [Accessed 17 February 2012].

[3] W. A. Wulf, "Diversity in Engineerings," *The Bridge,* vol. 24, no. 4, 1998.

[4] American Magagement Association, "Senior Management Teams: Profiles and Performance, Survey Summary and Key Findings," 1998.

[5] D. E. Chubin, G. S. May and E. L. Babco, *Journal of Engineering Education,* vol. January, pp. 73-86, 2005.

[6] Safe Schools Healthy Students, "Cultural and Linguistic Competence," [Online]. Available: http://sshs.promoteprevent.org/implementing/cultural-and-linguistic-competence-clc-toolkit. [Accessed 21 January 2013].

[7] C. J. Mote, "Lower Expectations for Higher Education?," *Washing Post,* p. B5, June 20, 2004.

[8] V. Cardenas, J. Ajinkya and D. Gibbs Leger, "Progress 2050," October 2011. [Online]. Available: http://www.americanprogress.org/wp-content/uploads/issues/2011/10/pdf/progress_2050.pdf. [Accessed 2012 February 2012].

[9] United State Census Bureau, "Most Children Younger Than Age 1 are Minorities, Census Bureau Reports," May 17, 2012.

[10] T. Sabrina, "Whites Account for Under Half of Births in U.S.," 17 May 2012. [Online]. Available: http://www.nytimes.com/2012/05/17/us/whites-account-for-under-half-of-births-in-us.html?pagewanted=all&_r=0.

[11] The Associated Press, "Census: More Minority U.S. births than white now," 17 May 2012. [Online]. Available: http://www.cbsnews.com/8301-201_162-57435957/census-more-minority-u.s-births-than-white-now/.

[12] W. S. Swail, K. E. Redd and L. W. Perna, "Retaining minority students in higher education: A framewrok for success.," ASHE-ERIC Higher Education Report, Jossey-Bass Higher and Adult

Education Series, 2003.

[13] M. Wyer, "The Importance of Field in Understanding Persistence Among Science and Engineering Majors.," *Journal of Women and Minorities in Science and Engineering,* vol. 9, no. 3-4, pp. 76-90, 2003.

[14] E. Armstrong and K. Thompson, "Strategies for Increasing Minorities in the Sciences: A University of Maryland, College Park, Model," *Journal of Women and Minorities in Science and Engineering,* vol. 9, no. 2, pp. 40-50, 2003.

[15] C. Morrison, "Retention of minority students in engineering: Institutional variability and success.," National Action Council for Minorities in Engineering (NACME), New York, 1995.

[16] R. Hayes, "Executive summary: Retention and graduation rates of 1995-2001 freshmen cohorts entering in science, technology, engineering and mathematics majors in 211 colleges and universities.," Center for Institutional Data Exchange and Analysis, University of Oklahoma, Norman OK., 2003.

[17] A. Astin, S. Parrott, W. Korn and L. Sax, "The American Freshman: Thirty Year Trends," Higher Education Research Institution, University of California at Los Angeles, Los Angeles, 1997.

[18] A. J. Mashburn, A Psychological Process of Student Dropout., vol. 2, Atlanta GA: School of Psychology, Georgia Institute of Technology, 1999, pp. 173-190.

[19] B. Marguerite, "Pathways to success: Affirming opportunities for science, mathematics, and engineering majors.," *Journal of Negro Education,* vol. 69, no. 1-2, pp. 92-111, 2000.

[20] J. Jonides, "Evaluation and dissemination of an undergraduate program to improve retention of at-risk students.," ERIC Document Reproduction Service No. ED414841, 1995.

[21] P. Hill, R. Shaw, J. Taylor and B. Hallar, "Advancing Diversity in STEM," *Innovate Higher Education,* vol. 36, pp. 19-27, 2011.

[22] T. C. Gilmer, "An Understanding of the Improved Grades, Retentionand Graduation Rate of STEM Majors at the Academic Investment in Math and Science (AIMS) Program of Bowling Green State University," *Journal of STEM Education,* vol. 8, no. 1, pp. 11-21, 2007.

[23] E. Seymour and N. M. Hewitt, Talking About Leaving: Why Undergraduates Leave the Sciences, Boulder, CO: Westview Press, 1997.

[24] J. L. White, J. W. Altschuld and Y.-F. Lee, "Evaluating minority retention programs: Problems encoutered and lesssons learned from the Ohio science and engineering alliance,"

Evaluation and Program Planning, vol. 31, pp. 277-283, 2008.

[25] Building Engineering & Science Talent (BEST), "A Bridge for All: Higher Education Design Principles to Broaden Participation in Science, Technology, Engineering, and Mathematics," BEST, San Diego, California, 2004.

[26] B. Clewell, C. Cosentino de Cohen, L. Tsui and N. Deterding, "Revitalizing the Nation's Talent Pool in STEM," The Urban Institue, 2006.

[27] J. Abdul-Alim, "Bridging the Gap," *Diverse: Issues in Higher Education,* vol. 29, no. 13, pp. 20-21, 2012.

[28] National Science Foundation, "Loius Stokes Alliances for Minority Participation," 2012. [Online]. Available: http://www.nsf.gov/pubs/2012/nsf12564/nsf12564.htm. [Accessed 27 Dec 2012].

[29] A. Seidman, "Minority Student Retention: Resources for practitioners," *New Directions For Institutional Research,* 2005.

[30] M. W. Talbert, "My Cool STEM Career," *Black Enterprise,* vol. 42, no. 10, pp. 88-91, 2012.

[31] D. Chubin and E. Babco, ""Walking the Talk" in Retention-to-Graduation: Institutional Production of Minority Engineers- A NACME Analysis,," Commission on Professionals in Science and Technology, 2003.

[32] B. Iams, "U.S. Women and Minority Students Discouraged from Pursuding STEM Careers, National Survey Shows," Bayer Corporation, Pittsburgh, PA, 2010.

[33] Oregon State University Registrars Office, "Grades, Honor Roll, & Academic Standing," Oregon State University, 2012-2013. [Online]. Available: http://oregonstate.edu/registrar/academic-standing-0.

[34] Oregon State University, "Enrollment Summary - Fall Term 2012," Office of Institutional Research, Corvallis, 2012.

10 Appendix A 2010 Summer Bridge Agenda

	Tuesday 9/7	Wednesday 9/8	Thursday 9/9	Friday 9/10
	IESS	IESS	IESS	IESS
8:00am				
8:30am				
9:00am		Wireless Laptops	CS Class (KEC1003)	CS Class (KEC1003)
9:30am				
10:00am		Orientation (KEC 1003)	Math Class (KEC 1003)	Math Class (KEC 1003)
10:30am				
11:00am		Math Class (KEC 1003)		
11:30am				Lunch (KEC 1003)
12:00pm		Lunch (West Dining Center)	Lunch (APCC)	
12:30pm				High Ropes Course
1:00pm		CS Class (KEC1003)	MIME Bio-Mecahnics Research (Kear 305)	
1:30pm				
2:00pm		EE Wind/Wave Research (KEC 1003)		
2:30pm			CS Research (Kear 305)	
3:00pm	Check In (Bloss Hall)	CBEE Plastics Research (Graf 210)		
3:30pm			Success Workshop (Kear 305)	
4:00pm				
4:30pm				
5:00pm	Dinner (Kearney Hall 212)	Dinner (West Dining Center)	Dinner (West Dining Center)	
5:30pm				
6:00pm				
6:30pm				
7:00pm	Small Group Discussion (Bloss Hall)	CS Lab	CS Lab	Pizza & Movie Night
7:30pm				
8:00pm				
8:30pm				
9:00pm				

	Saturday 9/11	Sunday 9/12	Monday 9/13	Tuesday 9/14
	IESS	IESS	IESS	IESS
8:00am		Breakfast		
8:30am				
9:00am			CS Class (KEC1003)	Travel to Hillsboro
9:30am				
10:00am			Math Class (KEC 1003)	
10:30am				
11:00am				Intel Laboratories Tour
11:30am				
12:00pm			Lunch (BCC)	
12:30pm				
1:00pm		Rafting Trip (McKenzie River)	CS Lab	
1:30pm				
2:00pm	Time Management Workshop			
2:30pm				
3:00pm			Success Workshop (Kear 305)	
3:30pm				
4:00pm				
4:30pm				
5:00pm			Dinner (West Dining Center)	Dinner (West Dining Center)
5:30pm				
6:00pm		Dinner (West Dining Center)		
6:30pm				
7:00pm			Bowling (MU Basement)	Travel To Corvallis
7:30pm				
8:00pm				
8:30pm				
9:00pm				

	Wednesday 9/15	**Thursday 9/16**	**Friday 9/17**
	IESS	IESS	IESS
8:00am			
8:30am			
9:00am	Move into Permanent Residence Hall	CS Class (KEC1003)	CS Class (KEC1003)
9:30am			
10:00am		Math Class (KEC 1003)	Final Presentations
10:30am			
11:00am			
11:30am			
12:00pm	Lunch (CCCC)	Lunch (BCC)	Celebration Lunch
12:30pm			
1:00pm	CS Class (KEC1003)	Success Workshop	
1:30pm			
2:00pm	CCEM Research (Kear 305)		
2:30pm			
3:00pm		CS Lab	
3:30pm	Ne/RHP Research (Radiation Center)		
4:00pm			
4:30pm			
5:00pm	Dinner (West Dining Center)	Dinner (West Dining Center)	
5:30pm			
6:00pm			
6:30pm			
7:00pm	Success Workshop	Study Hall	
7:30pm			
8:00pm			
8:30pm			
9:00pm			

11 Appendix B 2011 Summer Bridge Agenda

<table>
<tr><th></th><th colspan="2">Tuesday 9/6</th><th colspan="2">Wednesday 9/7</th></tr>
<tr><th></th><th>IESS</th><th>LSAMP SS</th><th>IESS</th><th>LSAMP SS</th></tr>
<tr><td>8:00am</td><td colspan="2" rowspan="2"></td><td colspan="2" rowspan="2">Breakfast (KEC) & special occassions pick up</td></tr>
<tr><td>8:30am</td></tr>
<tr><td>9:00am</td><td colspan="2" rowspan="3">Special Occasions Set up (Sackett Lawn)</td><td colspan="2">Debrief (KEC 1001)</td></tr>
<tr><td>9:30am</td><td rowspan="2">Wireless Laptop Session (KEC 1003)</td><td rowspan="2">Welcome from Sherm (KEC 1001)</td></tr>
<tr><td>10:00am</td></tr>
<tr><td>10:30am</td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>11:00am</td><td colspan="2" rowspan="4">Team Check-in/Lunch/Set-up/Move-in - Meet at West</td><td rowspan="2">Math Workshop (KEC 1003)</td><td rowspan="2">Library Tour (Valley)</td></tr>
<tr><td>11:30am</td></tr>
<tr><td>12:00pm</td><td colspan="2" rowspan="2">Lunch (KEC)</td></tr>
<tr><td>12:30pm</td></tr>
<tr><td>1:00pm</td><td colspan="2" rowspan="2"></td><td rowspan="2">Library Tour (Valley)</td><td rowspan="2">Math Workshop (KEC 1003)</td></tr>
<tr><td>1:30pm</td></tr>
<tr><td>2:00pm</td><td colspan="2" rowspan="6">Check-in/Move-in (Sackett Hall)</td><td colspan="2"></td></tr>
<tr><td>2:30pm</td><td colspan="2" rowspan="3">Academic Success Scavenger Hunt (KEC 1001)</td></tr>
<tr><td>3:00pm</td></tr>
<tr><td>3:30pm</td></tr>
<tr><td>4:00pm</td><td colspan="2" rowspan="2">Photos (KEC)</td></tr>
<tr><td>4:30pm</td></tr>
<tr><td>5:00pm</td><td colspan="2" rowspan="2">Dinner (West Dining Hall)</td></tr>
<tr><td>5:30pm</td><td colspan="2" rowspan="3">Welcome Dinner (Sackett Lawn)</td></tr>
<tr><td>6:00pm</td><td colspan="2" rowspan="2"></td></tr>
<tr><td>6:30pm</td></tr>
<tr><td>7:00pm</td><td colspan="2" rowspan="2">Back to Sackett/Settle in</td><td colspan="2" rowspan="3">Small Group Session (Sackett Hall)</td></tr>
<tr><td>7:30pm</td></tr>
<tr><td>8:00pm</td><td colspan="2" rowspan="3">Small Group Session - Icebreakers/Expectations (Sackett Hall)</td></tr>
<tr><td>8:30pm</td><td colspan="2" rowspan="2"></td></tr>
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<tr><th></th><th colspan="2">Thursday 9/8</th><th colspan="2">Friday 9/9</th></tr>
<tr><td></td><td>IESS</td><td>LSAMP SS</td><td>IESS</td><td>LSAMP SS</td></tr>
<tr><td>8:00am</td><td rowspan="2">Breakfast (Arnold Dining to-go)</td><td rowspan="2">Breakfast (KEC)</td><td rowspan="2">Breakfast (KEC)</td><td rowspan="2">Breakfast (Arnold Dining to-go)</td></tr>
<tr><td>8:30am</td></tr>
<tr><td>9:00am</td><td rowspan="3">Drive to Intel</td><td>Debrief (1001)</td><td>Debrief (1001)</td><td rowspan="3">Drive to Newport</td></tr>
<tr><td>9:30am</td><td>Pre-Health (1001)</td><td rowspan="2">Nuclear Reactor Tour</td></tr>
<tr><td>10:00am</td><td rowspan="2"></td></tr>
<tr><td>10:30am</td><td rowspan="8">Intel Visit (tentative hold)</td><td></td><td rowspan="6">Hatfield Visit (Confirmed)</td></tr>
<tr><td>11:00am</td><td rowspan="2">Vet. Med. Tour</td><td rowspan="2">CBEE Plastics Lab (Graf Hall)</td></tr>
<tr><td>11:30am</td></tr>
<tr><td>12:00pm</td><td rowspan="2">Lunch (Ropes Course)</td><td rowspan="2">Lunch (Ropes Course)</td></tr>
<tr><td>12:30pm</td></tr>
<tr><td>1:00pm</td><td rowspan="6">Ropes Challenge Course (Confirmed)</td><td rowspan="6">Ropes Challenge Course (Confirmed)</td></tr>
<tr><td>1:30pm</td></tr>
<tr><td>2:00pm</td></tr>
<tr><td>2:30pm</td><td rowspan="4">Drive back to Corvallis</td></tr>
<tr><td>3:00pm</td><td rowspan="4">Drive back to Corvallis</td></tr>
<tr><td>3:30pm</td></tr>
<tr><td>4:00pm</td></tr>
<tr><td>4:30pm</td></tr>
<tr><td>5:00pm</td><td colspan="2" rowspan="2">Dinner(West Dining Hall)</td><td colspan="2" rowspan="2">Dinner(West Dining Hall)</td></tr>
<tr><td>5:30pm</td></tr>
<tr><td>6:00pm</td><td colspan="2" rowspan="2"></td><td colspan="2" rowspan="2"></td></tr>
<tr><td>6:30pm</td></tr>
<tr><td>7:00pm</td><td colspan="2" rowspan="3">Small Group Session (Sackett Hall)</td><td colspan="2" rowspan="3">Small Group Session (Sackett Hall)</td></tr>
<tr><td>7:30pm</td></tr>
<tr><td>8:00pm</td></tr>
<tr><td>8:30pm</td><td colspan="2" rowspan="2"></td><td colspan="2" rowspan="2"></td></tr>
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<tr><td>8:00am</td><td colspan="2" rowspan="2">Breakfast (West Dining Hall)</td><td colspan="2" rowspan="2">Breakfast (West Dining Hall)</td></tr>
<tr><td>8:30am</td></tr>
<tr><td>9:00am</td><td colspan="2" rowspan="4">Video Projects</td><td colspan="2" rowspan="6">Community Service Activity</td></tr>
<tr><td>9:30am</td></tr>
<tr><td>10:00am</td></tr>
<tr><td>10:30am</td></tr>
<tr><td>11:00am</td><td colspan="2" rowspan="4"></td></tr>
<tr><td>11:30am</td></tr>
<tr><td>12:00pm</td><td colspan="2" rowspan="2">Lunch (West Dining Hall)</td></tr>
<tr><td>12:30pm</td></tr>
<tr><td>1:00pm</td><td colspan="2" rowspan="2">Class Schedule Tour/Activity</td><td colspan="2" rowspan="3"></td></tr>
<tr><td>1:30pm</td></tr>
<tr><td>2:00pm</td><td colspan="2" rowspan="5">Video Projects</td></tr>
<tr><td>2:30pm</td><td colspan="2" rowspan="5">Video Projects</td></tr>
<tr><td>3:00pm</td></tr>
<tr><td>3:30pm</td></tr>
<tr><td>4:00pm</td></tr>
<tr><td>4:30pm</td><td colspan="2"></td></tr>
<tr><td>5:00pm</td><td colspan="2" rowspan="2">Dinner(West Dining Hall)</td><td colspan="2" rowspan="2"></td></tr>
<tr><td>5:30pm</td></tr>
<tr><td>6:00pm</td><td colspan="2" rowspan="2"></td><td colspan="2" rowspan="4">MU Bowling/Pizza (MU Rec. Center)</td></tr>
<tr><td>6:30pm</td></tr>
<tr><td>7:00pm</td><td colspan="2" rowspan="3">Small Group Session (Sackett Hall)</td></tr>
<tr><td>7:30pm</td></tr>
<tr><td>8:00pm</td><td colspan="2"></td></tr>
<tr><td>8:30pm</td><td colspan="2" rowspan="2"></td><td colspan="2" rowspan="2"></td></tr>
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<table>
<tr><td></td><td colspan="2">Monday 9/12</td><td colspan="2">Tuesday 9/13</td></tr>
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<tr><td>8:00am</td><td colspan="2" rowspan="2">Breakfast (KEC)</td><td colspan="2" rowspan="2">Breakfast (KEC)</td></tr>
<tr><td>8:30am</td></tr>
<tr><td>9:00am</td><td colspan="2">Debrief (KEC 1001)</td><td colspan="2">Debrief (KEC 1001)</td></tr>
<tr><td>9:30am</td><td rowspan="2">Diversity in STEM Activity (1003)</td><td rowspan="2">Food Science Lab Tour (Wiegand Hall)</td><td>Robotics Club (1001)</td><td rowspan="2">Pharmacy Activity (Pharm 219)</td></tr>
<tr><td>10:00am</td><td>Transportation (1001)</td></tr>
<tr><td>10:30am</td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>11:00am</td><td rowspan="2">Math Workshop (KEC 1003)</td><td rowspan="2">Chemistry Workshop (KEC 1001)</td><td rowspan="2">Math Workshop (KEC 1003)</td><td rowspan="2">Chemistry Workshop (KEC 1001)</td></tr>
<tr><td>11:30am</td></tr>
<tr><td>12:00pm</td><td colspan="2" rowspan="2">Lunch (KEC)</td><td colspan="2" rowspan="2">Lunch (KEC)</td></tr>
<tr><td>12:30pm</td></tr>
<tr><td>1:00pm</td><td rowspan="2">Chemistry Workshop (KEC 1001)</td><td rowspan="2">Math Workshop (KEC 1003)</td><td rowspan="2">Chemistry Workshop (KEC 1001)</td><td rowspan="2">Math Workshop (KEC 1003)</td></tr>
<tr><td>1:30pm</td></tr>
<tr><td>2:00pm</td><td colspan="2"></td><td rowspan="2">Time Mgmt Activity (1001)</td><td rowspan="2">Diversity in STEM Activity (1003)</td></tr>
<tr><td>2:30pm</td><td colspan="2" rowspan="2">Student Panel re: Research (KEC 1003)</td></tr>
<tr><td>3:00pm</td><td colspan="2">Break (Kayla from Barometer)</td></tr>
<tr><td>3:30pm</td><td colspan="2">LSAMP Overview/Mentoring</td><td colspan="2">How to be successful in STEM</td></tr>
<tr><td>4:00pm</td><td colspan="2">IDEA Presentation (KEC 1003)</td><td colspan="2"></td></tr>
<tr><td>4:30pm</td><td colspan="2">Surviving large lectures (1003)</td><td colspan="2" rowspan="4">Capture the flag/BBQ with September Scholars McNary field</td></tr>
<tr><td>5:00pm</td><td colspan="2" rowspan="2">Dinner(West Dining Hall)</td></tr>
<tr><td>5:30pm</td></tr>
<tr><td>6:00pm</td><td colspan="2" rowspan="4">Minute to Win it? With CAMP and SSS (KEAR 112)</td></tr>
<tr><td>6:30pm</td></tr>
<tr><td>7:00pm</td><td colspan="2" rowspan="3">Small Group Session (Sackett Hall)</td></tr>
<tr><td>7:30pm</td></tr>
<tr><td>8:00pm</td></tr>
<tr><td>8:30pm</td><td colspan="2" rowspan="2"></td><td colspan="2" rowspan="2"></td></tr>
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<table>
<tr><td></td><td colspan="2">Wednesday 9/14</td><td colspan="2">Thursday 9/15</td></tr>
<tr><td></td><td>IESS</td><td>LSAMP SS</td><td>IESS</td><td>LSAMP SS</td></tr>
<tr><td>8:00am</td><td colspan="2" rowspan="2">Breakfast (KEC)</td><td colspan="2" rowspan="2">Breakfast (KEC)</td></tr>
<tr><td>8:30am</td></tr>
<tr><td>9:00am</td><td colspan="2">Debrief (KEC 1001)</td><td colspan="2">DPP Program (KEC 1001)</td></tr>
<tr><td>9:30am</td><td colspan="2" rowspan="4">Moving (Sackett Hall)</td><td>CCE (1001</td><td rowspan="2">Time Mgmt Activity (1003)</td></tr>
<tr><td>10:00am</td><td>Welcome from Ron</td></tr>
<tr><td>10:30am</td><td colspan="2"></td></tr>
<tr><td>11:00am</td><td rowspan="2">Math Workshop (KEC 1003)</td><td rowspan="2">Chemistry Workshop (KEC 1001)</td></tr>
<tr><td>11:30am</td></tr>
<tr><td>12:00pm</td><td colspan="2" rowspan="2">Lunch (KEC)</td><td colspan="2" rowspan="3">Celebration Lunch (MU 109)</td></tr>
<tr><td>12:30pm</td></tr>
<tr><td>1:00pm</td><td rowspan="2">Math Workshop (KEC 1003)</td><td rowspan="2">Chemistry Workshop (KEC 1001)</td></tr>
<tr><td>1:30pm</td><td colspan="2"></td></tr>
<tr><td>2:00pm</td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>2:30pm</td><td>Chemistry Workshop (KEC 1001)</td><td>Math Workshop (KEC 1003)</td><td>Chemistry Workshop (KEC 1001)</td><td>Math Workshop (KEC 1003)</td></tr>
<tr><td>3:00pm</td><td colspan="2" rowspan="2">How to be advised (1001)</td><td colspan="2">Debrief (KEC 1003)</td></tr>
<tr><td>3:30pm</td><td colspan="2" rowspan="2">Video Presentations (KEC 1003)</td></tr>
<tr><td>4:00pm</td><td colspan="2" rowspan="3"></td></tr>
<tr><td>4:30pm</td><td colspan="2" rowspan="2">Dinner(West Dining Hall)</td></tr>
<tr><td>5:00pm</td></tr>
<tr><td>5:30pm</td><td colspan="2" rowspan="4">Movie/Take-out (Sackett Lounge)</td><td colspan="2"></td></tr>
<tr><td>6:00pm</td><td colspan="2" rowspan="3">Small Group Session (Sackett Hall)</td></tr>
<tr><td>6:30pm</td></tr>
<tr><td>7:00pm</td></tr>
<tr><td>7:30pm</td><td colspan="2" rowspan="2"></td><td colspan="2" rowspan="2"></td></tr>
<tr><td>8:00pm</td></tr>
<tr><td>8:30pm</td><td colspan="2" rowspan="2"></td><td colspan="2" rowspan="2"></td></tr>
<tr><td>9:00pm</td></tr>
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	Friday 9/16	
	IESS	LSAMP SS
8:00am	Rafting (Confirmed) Staff need to pick up breakfast to-go and lunch to-go at Arnold Dining (8am) Students will report to Dixon Rec. at 8am	
8:30am		
9:00am		
9:30am		
10:00am		
10:30am		
11:00am		
11:30am		
12:00pm		
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1:00pm		
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3:00pm		
3:30pm		
4:00pm		
4:30pm		
5:00pm	Dinner	
5:30pm		
6:00pm		
6:30pm		
7:00pm		
7:30pm		
8:00pm		
8:30pm		
9:00pm		

12 Appendix C 2012 Summer Bridge Agenda

<table>
<tr><th rowspan="2"></th><th colspan="2">Saturday 9/15</th><th colspan="2">Sunday 9/16</th></tr>
<tr><th>IESS</th><th>LSAMP SS</th><th>IESS</th><th>LSAMP SS</th></tr>
<tr><td>8:00am</td><td colspan="2" rowspan="4"></td><td colspan="2" rowspan="2">Meet at Dixon @7:30am</td></tr>
<tr><td>8:30am</td></tr>
<tr><td>9:00am</td><td colspan="2" rowspan="15">Rafting (McKenzie River) Confirmed</td></tr>
<tr><td>9:30am</td></tr>
<tr><td>10:00am</td><td colspan="2" rowspan="4">Special Occasions Set up</td></tr>
<tr><td>10:30am</td></tr>
<tr><td>11:00am</td></tr>
<tr><td>11:30am</td></tr>
<tr><td>12:00pm</td><td colspan="2" rowspan="4">Team Check-in/Lunch/Set-up - Meet at ?</td></tr>
<tr><td>12:30pm</td></tr>
<tr><td>1:00pm</td></tr>
<tr><td>1:30pm</td></tr>
<tr><td>2:00pm</td><td colspan="2" rowspan="6">Check-in/Move-in (Wilson Hall)</td></tr>
<tr><td>2:30pm</td></tr>
<tr><td>3:00pm</td></tr>
<tr><td>3:30pm</td></tr>
<tr><td>4:00pm</td></tr>
<tr><td>4:30pm</td></tr>
<tr><td>5:00pm</td><td colspan="2" rowspan="2">Dinner(Dining Hall)</td></tr>
<tr><td>5:30pm</td><td colspan="2" rowspan="3">Welcome Dinner (McNary Lawn)</td></tr>
<tr><td>6:00pm</td><td colspan="2" rowspan="5"></td></tr>
<tr><td>6:30pm</td></tr>
<tr><td>7:00pm</td><td colspan="2" rowspan="2">Back to Res Hall/Settle in</td></tr>
<tr><td>7:30pm</td></tr>
<tr><td>8:00pm</td><td colspan="2" rowspan="3">Small Group Session - Icebreakers/Expectations</td></tr>
<tr><td>8:30pm</td></tr>
<tr><td>9:00pm</td></tr>
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<table>
<tr><th></th><th colspan="2">Monday 9/17</th><th colspan="2">Tuesday 9/18</th></tr>
<tr><th></th><th>IESS</th><th>LSAMP SS</th><th>IESS</th><th>LSAMP SS</th></tr>
<tr><td>8:00am</td><td rowspan="2">Breakfast (DC)</td><td rowspan="2">Breakfast (DC)</td><td>Breakfast (DC)</td><td>Breakfast (DC)</td></tr>
<tr><td>8:30am</td><td>Debrief (KEAR 212)</td><td rowspan="3">Drive to Newport</td></tr>
<tr><td>9:00am</td><td rowspan="2">Drive to McMinnville</td><td>Dean's Welcome (KEC 1001)</td><td>Dean's Welcome (KEAR 212)</td></tr>
<tr><td>9:30am</td><td rowspan="2">Food Science Lab Tour (Wyth 159)</td><td rowspan="2">Driving Simulator</td></tr>
<tr><td>10:00am</td><td rowspan="6">Evergreen Air & Space Museum</td><td rowspan="6">Hatfield Visit</td></tr>
<tr><td>10:30am</td><td></td><td></td></tr>
<tr><td>11:00am</td><td rowspan="2">Vet Med Tour</td><td rowspan="2">CBEE Plastics Lab (210 Graf)</td></tr>
<tr><td>11:30am</td></tr>
<tr><td>12:00pm</td><td>Lunch (Dining Center)</td><td>Lunch (Dining Center)</td></tr>
<tr><td>12:30pm</td><td rowspan="6">Ropes Challenge Course</td><td rowspan="6">Ropes Challenge Course</td></tr>
<tr><td>1:00pm</td></tr>
<tr><td>1:30pm</td><td>Travel time</td></tr>
<tr><td>2:00pm</td><td rowspan="4">Marine Discovery Tours (2:30pm)</td></tr>
<tr><td>2:30pm</td></tr>
<tr><td>3:00pm</td><td rowspan="3">Evergreen Waterpark</td></tr>
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<tr><td>4:00pm</td></tr>
<tr><td>4:30pm</td><td rowspan="2">Drive back to Corvallis</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">Drive back to Corvallis</td></tr>
<tr><td>5:00pm</td></tr>
<tr><td>5:30pm</td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>6:00pm</td><td colspan="2">Dinner(Dining Hall)</td><td colspan="2">Dinner(Dining Hall)</td></tr>
<tr><td>6:30pm</td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>7:00pm</td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>7:30pm</td><td colspan="2" rowspan="4">Minute to Win It</td><td colspan="2" rowspan="4">Movie & Sundaes</td></tr>
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<tr><td>8:30pm</td></tr>
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<tr><td>8:30am</td><td colspan="2">Photos (KEC)</td></tr>
<tr><td>9:00am</td><td rowspan="4">Diversity in STEM Activity (KEAR 212)</td><td rowspan="4">Diversity in STEM Activity (LSAMP)</td><td colspan="2" rowspan="3">Academic Success Conference - CONNECT Event</td></tr>
<tr><td>9:30am</td></tr>
<tr><td>10:00am</td></tr>
<tr><td>10:30am</td><td colspan="2" rowspan="5">College/Program Events - CONNECT</td></tr>
<tr><td>11:00am</td></tr>
<tr><td>11:30am</td><td colspan="2" rowspan="3">Celebration Lunch (KEAR 212)</td></tr>
<tr><td>12:00pm</td></tr>
<tr><td>12:30pm</td></tr>
<tr><td>1:00pm</td><td colspan="2" rowspan="2">Student Panel re: Research (KEC 1003)</td></tr>
<tr><td>1:30pm</td></tr>
<tr><td>2:00pm</td><td colspan="2">How to be successful in STEM</td><td colspan="2" rowspan="4">New Student Walk/Convocation - CONNECT</td></tr>
<tr><td>2:30pm</td><td colspan="2" rowspan="4">Academic Success Scavenger Hunt (KEC 1001)</td></tr>
<tr><td>3:00pm</td></tr>
<tr><td>3:30pm</td></tr>
<tr><td>4:00pm</td></tr>
<tr><td>4:30pm</td><td colspan="2" rowspan="3">MU Bowling & Billiards & Pizza</td><td colspan="2" rowspan="8">New Student Picnic & MUvie - CONNECT</td></tr>
<tr><td>5:00pm</td></tr>
<tr><td>5:30pm</td></tr>
<tr><td>6:00pm</td><td colspan="2" rowspan="2"></td></tr>
<tr><td>6:30pm</td></tr>
<tr><td>7:00pm</td><td colspan="2" rowspan="3">Class Schedule Activity</td></tr>
<tr><td>7:30pm</td></tr>
<tr><td>8:00pm</td></tr>
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<tr><td>9:00pm</td></tr>
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