Final Report for the Enhancement Program on the LSU Eunice Assessment Center

LEQSF(2013-14)-ENH-PEN-06

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Contents

1. ABSTRACT

A. Goals and Objectives

The primary goal of the grant was to establish an Assessment Center for LSU Eunice, an open access, public, two-year institution, under the guiding principle of Student Access and Success.

The following objectives were submitted with the original grant.

1. Complete administrative and physical upgrades to enable the center to commence services by spring 2014.
2. Provide 100% of incoming freshmen with accurate assessment using ACT's COMPASS, increasing those assessed by 10% and reducing students placed in developmental mathematics by 3%.
3. Provide pre- and post-testing to a random sample using COMPASS to determine cognitive value gained.
4. Increase by 3% the success rate in developmental mathematics by providing a computerized modular math course.

The project immediately impacted nearly 600 students being assessed in math, English composition, and reading as just over 900 assessments were given. LSU Eunice requested $127,645 from the Support Fund and provided $93,687 in- cash and in-kind for the project.

B. Specific Contributions to Louisiana's Economic Development

The specific contributions to Louisiana's economic development and diversification are two-fold. First, ACT's COMPASS computerized assessment system replaced ACT's ASSET paper and pencil assessment which is over 20 years old. COMPASS allowed for better, more accurate placement of students into entry level math and English courses. As a result, fewer students were placed in the first developmental education mathematics course as a result of using the new assessment system. The benefit to Louisiana is that keeping students out of developmental education decreases time to graduation and decreases the expense to the student, to the institution, and to the state.

The second contribution to the state's economic development and diversification is that students who are placed into developmental mathematics sequence now have the opportunity to take the redesigned course(s) using a self-paced, computer-based, competency-based, modular program. This method of teaching developmental mathematics was LSU Eunice's Quality Enhancement Plan during the Reaffirmation visit in fall 2013. The focus of the program is to increase student learning and success in developmental and general education mathematics. Institutional data since 2007 indicated that only 67% of the students starting in MATH 0001 actually completed it with an A, B, or C. In addition, only 37% of those completing MATH 0001 then completed MATH 0002 with only 20% of those originally starting in MATH 0001 successfully completing a general education mathematics course.

During the 2013-2014 academic year, student success (grade of A, B, or C only) in the modular MATH 0001 (pre-algebra) was 73% while the success in all other methods of instruction was 63%. This is also a dramatic increase in just one year from the average of 67% since 2007 meaning that students totaling an additional 9% are now moving forward in the pipeline as a result of the modular mathematics work during the first year.

Increases in success were more dramatic for the modular MATH 0002. Students in the modular MATH 0002 succeeded at 70% while students in all other forms of instruction succeeded at 52% during the AY 2013-2014. Since 2007, MATH 0002 has had an average success rate of 61% in any given year so the 70% achieved by the modular mathematics students increased success by almost 15% in just one year! Success in general education mathematics after taking modular mathematics will be investigated beginning fall 2015 after allowing a sufficient number of student to progress through the modular program.

The benefit to students in that the new modular developmental mathematics program is more flexible allowing students to skip material they already know by taking a pretest. The program also allows students to finish both courses in one semester if they wish. During the 2013-2014 academic year, 15 (23%) of the 95 modular MATH 0001 students finished both developmental courses in one semester![1]

This rather remarkable success in developmental mathematics translates to increased student satisfaction despite the fact they are in a developmental course. Very simply, larger numbers of students are successfully completing the developmental mathematics courses in a shorter amount of time. This decreases the time in developmental education and decreases time to degree completion while also decreasing the cost to the student, the institution, and the state[2].

2. SPECIFIC ACCOMPLISHMENTS

A. & B. Goals, Objectives, and a Description of the Activities

The goal of the project was to establish an Assessment Center for LSU Eunice under the guiding principle of Student Access and Success. Each objective and a description of the activities will be taken in the order they appeared in the original grant.

Objective One

Complete administrative and physical upgrades to enable the center to commence services by spring 2014.

[1] Students who finished two developmental mathematics courses in one semester were charged $30 fee to transcript the second course. Students who finished the second course during an intersession were charged tuition for the second course, but were allowed to finish the 2nd course during the two weeks.

[2] An additional savings to students is realized when students purchase the workbook and course code for the modular program – the cost being approximately $120 less than the book in the face-to-face sections.

Table 1
Activities associated with objective one.

Objective 1: 100% of administrative tasks related to upgrading the facility, ordering and installing all furnishings, equipment, and supplies to initiate the Assessment Center will be completed to the point that the Assessment Center will open at the beginning of the spring 2014 semester.			
Activities	**Persons**	**Schedule**	**Output**
1. Prepare bids and order equipment	P.I., Administrative Personnel, Purchasing Agent	06/01/13 to 08/01/13	PRO System purchase requisitions and purchase orders; Inventory log-in sheet
2. Prepare classroom space	P.I. Physical Facilities staff	7/1/13 to 9/1/13	Physical Facilities work orders, removal of old equipment (surplus), upgrading electrical distribution and grounding, painting of walls, refinishing cabinets, installing white boards and bulletin boards.
3. Receive equipment	P.I., Purchasing Department	9/1/13 to 10/15/13	Verification of packing slips; receiving report
4. Install equipment	P.I., Physical Facilities staff, OIT Personnel, Contractors	10/1/13 to 12/1/13	Work orders; quality and safety inspection report
5. Verify equipment operation, install software	P.I., OIT Personnel	12/1/13 to 12/15/13	Verification of operation for each computer.
6. Lab open for spring 2014.	P.I., Math faculty, Developmental Education staff	Classes beginning spring 2014	Student sign in sheet in lab and AccuTrack

All construction work including

- HVAC and electrical,
- installation of furniture, chairs, and multimedia
- painting,
- refurbishing floors and cabinets, and
- installation of the switch, computers, and software were all accomplished on or before January 9, 2014.

Other work, such as the installation of the white boards, additional filing cabinets, fire extinguishers, and supplies were accomplished May-June 2014.

Objective met...labs open for student use on the first day of spring 2014 (see Figure 1 for pictures of the M-203 space before and after).

Figure 1
M-203 before and after construction and installation.

Before Installation

After Installation

Briefly, the utilization of M-203 for its first semester of operation is provided in the two graphs below. First, Figure 2 details the total usage of the lab (n = 2,640) with the largest utilization January 16 and April 23 for COMPASS testing. The lab was generally occupied by students from 8 am to 3 pm Monday through Friday. Since the Assessment Center is also doubling as the modular mathematics lab, Figure 3 details the frequency of visits to the lab for modular mathematics alone (n = 1,370).

Figure 2
Frequency of M-203 (n = 2,640) Usage Spring 2014[3].

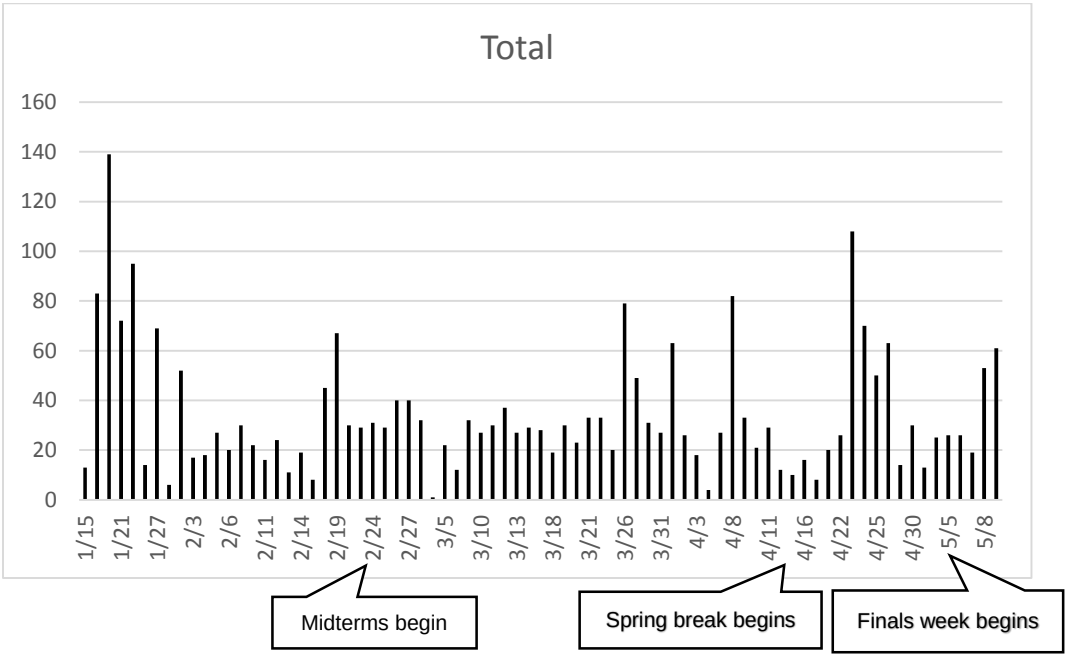
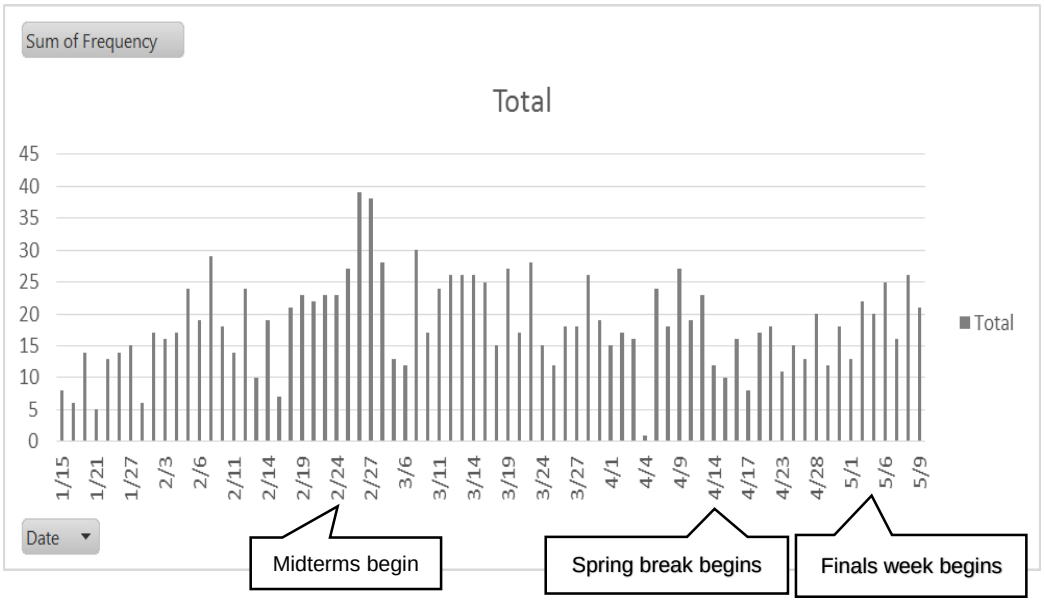


Figure 3
Frequency of M-203 Modular Mathematics Visits Spring 2014 (n = 1,370)[4].



[3] In addition, LeDoux Library reported giving 345 modular mathematics quizzes in the Commons area.
[4] Includes all reasons related to modular mathematics (tutoring, study, taking quizzes, tests, etc.)

Objective Two

Provide 100% of incoming freshmen with accurate assessment using ACT's COMPASS, increasing those assessed by 10% and reducing students placed in developmental mathematics by 3%.

Table 2
Activities for objective two.

Objective 2: 100% of incoming freshmen will have the opportunity to receive accurate assessment using ACT's COMPASS, increasing those assessed by 10% and reducing students placed in developmental mathematics by 3%.			
Activities	**Persons**	**Schedule**	**Output**
Test incoming students using COMPASS beginning fall 2013 (maintain fall 2012 levels: n = 202)	P.I. and staff	Summer 2013 (temporary lab) - ongoing	Assessment results for each student; Institutional data on the number of new students placed into developmental education courses.
Reduce the number of students in developmental education courses (using an average headcount from spring 2012 and spring 2013).	P.I. and Staff	Summer 2014	Actual enrollment for spring 2014 and percentage of increase or decrease.
Increase the number of students being assessed by 10% in spring and summer 14 (baseline: n = 137; 94 from SP 12 and 43 from SU 12)	P.I and staff	Orientations beginning in spring and summer 2014	Assessment results for students.
Diagnostically test students in developmental courses (n ≤ 570; 400 for SP 14 and 170 for SU 14)	P.I. and staff	Beginning spring 2014 – ongoing	Diagnostic test results for each student.

Increasing the Assessment of Students by 10%

According to the LEQSF(2013-14)-ENH-PEN-06 grant language, levels for fall 2013 were to be maintained at fall 2012 levels with n = 202 since a temporary lab was being used at the time. Assessment results were used to track student usage.

Levels for spring and summer 2014 were to increase by 10% over spring and summer 2012 with n = 137 (n = 94 for spring and n = 43 for summer). Assessment results were used to track student usage.

Students assessed in fall 2012 totaled 202 while students assessed in fall 2013 totaled 144. However it is worth noting that an enrollment decrease of 13% occurred from fall 2012 to fall 2013. Correcting the 202 number by 13% yields an expected value of 176. There were 144 students assessed during the fall 2013 orientation and registration cycle. Given this statistic, it appears as if a fluctuation in the number of students being assessed was taking place as the Assessment Center was moved to a temporary location and new procedures were being developed.

Levels for spring and summer 2014 were to increase by 10% over the total of 137 from spring and summer 2012. As a result, the expected value for spring and summer 2014 was 137 + 14 or 151 students.

The total number of students assessed in spring and summer 2014 was 317 students with 21 being for English and 296 for mathematics. In all, there were 87 students assessed for spring and 230 assessed for summer using COMPASS. The increase for summer was the result of the Division of Sciences recommending students to take the math assessment at orientation noting that skipping even one developmental mathematics course would save the student about $500 to $600 in tuition and books.

Since 317 > 151, this section of Objective 2 is met. It is interesting to note that 317 students being assessed during spring and summer 2014 represents an increase of 131% increase over spring and summer 2012.

Reduce the Number of Students being placed into Developmental Education Courses by Three Percent

According to the LEQSF(2013-14)-ENH-PEN-06 grant language, this objective was to reduce the number of students being placed into developmental courses by 3% using an average of headcount from the 14th day. The benchmark statistic was calculated using the average enrollment from spring 2012 and spring 2013. Results for spring 2014 was compared to the averages.

The average spring 2012 and spring 2013 headcount in developmental education courses was compared to actual enrollment for spring 2014 corrected for a 13.5% enrollment decrease (see Table 3). In developmental English composition (ENGL 0001), 161 students were enrolled on the 14th day of spring 2014. This being less than 181 indicates that fewer students were placed into ENGL 0001.

The calculations for Table 3 are as follows using ENGL 0001 as an example. First, the 216 was generated by adding the 253 and 178 and dividing by 2. The correction for a 13.5% decrease was calculated by 216 x .135 = 29 so 216 - 29 = 187. The 3% decrease as a condition of the grant was calculated by taking the 187 x .03 = 6 so 187 - 6 = 181. The 181 was then compared the actual spring enrollment. Enrollment for the other courses were calculated in a similar fashion.

Table 3
Enrollment in Developmental Courses

Course	SP 12	SP 13	Mean of SP 12 and SP 13	Class sizes decreased by 13.5% to account for enrollment decrease	Expected value of SP 14 decreasing enrollment in DE by 3%	Actual SP 14 Enrollment
ENGL 0001	253	178	216	187	181	161
MATH 0001	380	276	328	284	275	210
MATH 0002	454	405	430	372	361	376
UNIV 1005	185	147	166	144	140	145
UNIV 0008	195	172	184	159	154	154

For developmental math one (MATH 0001), 210 students were enrolled on the 14th day for spring 2014 which was less than the expected value of 275 corrected for both the enrollment decrease and a 3% decrease (see Table 3). Again, fewer students were placed into MATH 0001 as a result of using COMPASS.

Developmental math two (MATH 0002) had 376 students enrolled on the 14th day which is slightly above the expected value of 361 (Table 3). However, it should be noted that more students were placing into MATH 0002 during orientation as a result of using the COMPASS assessment. In the spring orientation cycle, all students assessed in math began the assessment in the algebra domain instead of the pre-algebra domain. Student apparently knew elementary algebra, thus placing into MATH 0002 instead of MATH 0001 saving themselves one semester of developmental coursework. A probability matrix is currently being developed to track student success after placing into MATH 0002 using the new assessment. The matrix will then be used to determine if the "cut scores" need to be adjusted to increase student success.

UNIV 1005 (orientation to university studies) is a non-transferrable study strategies course used in the Pathways to Success Program. There is no way for Pathways students to test out of this course. It is included here for completeness (see Table 3).

UNIV 0008 is a developmental reading course. It is required of Pathways students; however, they are given the opportunity to test out of the course upon the completion of UNIV 1005. Since 154 is equal to the expected value, the enrollment in UNIV 0008 was reduced by 3% (see Table 3).

This part of Objective 2 is met given that the enrollment in MATH 0002 still needs to be decreased slightly.

Diagnostically Testing Students

According to the LEQSF(2013-14)-ENH-PEN-06 grant language, this objective was to diagnostically test less than or equal to 570 students in spring 2014 and summer 2014. Assessments were conducted in ENGL 0001 (writing), MATH 0001 (mathematics),

MATH 0002 (mathematics), and UNIV 1005 (reading) during both spring 2014 and summer 2014 immediately after registration closed. The total number in the sample was 226. Regardless, in each course, the number in the sample exceeded the 30 observations needed for a sample to approach a normal distribution according to the Central Limit Theorem (see Hinkle, Wiersma, & Jurs, 1998; Minium, King, & Bear, 1993). It is important to note that students were assessed in random course sections and no attempt was made to separate the results of first-time freshmen from continuing freshmen. As a result, the data was indicative of the environment as it is in any given spring and summer semester.

For ENGL 0001, the COMPASS diagnostic assesses students' skills in punctuation, verb formation agreement, usage, relationships of clauses, shifts in construction, organization, spelling, and capitalization (see Table 4). Each score is out of 100 and may be considered as a percentage according to the ACT Compass Internet Version Reference Manual (2012). A total of 74 students took the diagnostic. If 70% is considered the lowest C by tradition, then most students are comfortable with the material as they begin the course according to the scores generated by the 74 students.

Table 4
Diagnostic Writing Result for ENGL 0001 in Percents

Statistic	ENGL 0001 Punctuation	ENGL 0001 Verb Formation Agreement	ENGL 0001 Usage	ENGL 0001 Relationships of Clauses	ENGL 0001 Shifts in Construction	ENGL 0001 Organization	ENGL 0001 Spelling	ENGL 0001 Capitalization
mean	66.8	71.1	81.4	71.1	91.4	90.0	75.1	65.0
median	67.0	71.0	84.0	73.0	94.0	94.0	76.0	72.0
s.d.	15.1	12.2	10.1	13.8	8.7	13.0	13.9	20.7
n	74	74	74	74	74	74	74	74

Using the median since it is a more stable measure of central tendency, it appears as if students have some difficulty with punctuation, but little difficulty with other areas of writing. However, it is also worth noting that nearly one-half of the sample scored below a 70% or C grade by the very nature of the measure of central tendency and standard deviation.

The ENGL 0001 results indicated that many students placed in developmental English do not need to take the course and should instead be encouraged to take the COMPASS English Assessment prior to classes beginning in order to further reduce the number of developmental sections offered.

Next, UNIV 1005 (Orientation to University Studies) was used to assess reading (see Table 5). UNIV 1005 is a prerequisite for UNIV 0008 (College Reading) that is scheduled in the second semester. Students in the Pathways to Success program are given an opportunity to test out of the UNIV 0008 course at the conclusion of the UNIV

1005 course. In any given semester, approximately one-third of the students taking UNIV 1005 test out of UNIV 0008 and move on to a social science course.

A total of 54 students took the reading diagnostic assessment during the spring 2014 and summer 2014 semesters. The COMPASS Reading Diagnostic assesses reading comprehension and vocabulary (see Table 5). Similar to English Composition, the results for reading suggest that 1/3 to 1/2 of the students sampled will test out of the College Reading course and will be successful at completing a social science course.

Table 5
Diagnostic Reading Results for UNIV 1005 in Percents

Statistic	UNIV 1005 Reading Comprehension	UNIV 1005 Vocabulary
mean	79.8	83.7
median	82.0	85.5
s.d.	14.5	9.9
n	54	54

Reading scores assessed in UNIV 1005 were slightly better than the English Composition scores indicating that many students can be successful taking a social science course. Allowing students to attempt to test out of the reading course has been practice at LSU Eunice for several years and will be maintained.

For the first developmental mathematics course (MATH 0001), 51 students were diagnostically assessed. Students were assessed using the COMPASS pre-algebra section in order to determine their level of performance with basic skills. This test assesses integers; fractions; decimals; exponents, square roots, and scientific notation; ratio and proportions, percentages, and statistics (averages) (see Table 6).

Table 6
Diagnostic Mathematics (Pre-Algebra Domain) for MATH 0001 in Percents

Statistic	MATH 0001 Integers	MATH 0001 Fractions	MATH 0001 Decimals	MATH 0001 Exponents & Square Roots	MATH 0001 Ratios & Proportions	MATH 0001 Percentages	MATH 0001 Averages
mean	48.4	32.6	54.4	42.5	31.0	31.7	36.6
median	43	32	52	40	28	29	31
s.d.	19.0	15.7	12.3	19.2	13.0	16.6	17.4
n	51	51	51	51	51	51	51

According to the results, students entering a pre-algebra class know very little about basic mathematics. Students, on average, performed the best on decimals (52%) and integers (43%); however, their performance in these two areas was well below a traditional passing grade. The results also indicated that entering students, on average, know very little about ratio and proportions (28%), percentages (29%), statistics (31%), and fractions (32%). These results seem to support the difficulty developmental mathematics students have as they enter college.

As a comparison, the same pre-algebra diagnostic was given to a sample of students (n = 47) taking the second developmental mathematics (MATH 0002) (see Table 7). While the students sampled did, on average, perform better in all categories than the MATH 0001 students, they still did not perform at a level that is considered in passing grade in five of the seven categories. This is troublesome give the fact that many of the students in the MATH 0002 course took and successfully completed the MATH 0001 course with an A, B, or C.

Table 7
Diagnostic Mathematics (Pre-Algebra Domain) for MATH 0002 in Percents

Statistic	MATH 0002 Integers	MATH 0002 Fractions	MATH 0002 Decimals	MATH 0002 Exponents & Square Roots	MATH 0002 Ratios & Proportions	MATH 0002 Percentages	MATH 0002 Averages
mean	55.9	43.1	60.1	50.0	33.3	40.9	41.0
median	55.0	41.0	62.0	51.0	33.0	36.0	38.0
s.d.	17.1	17.8	16.1	18.5	10.8	20.3	18.7
n	47	47	47	47	47	47	47

Since the diagnostic information was collected for all four developmental courses providing valuable information, this part of Objective 2 is met.

For MATH 0001 and MATH 0002, the results will be discussed with the faculty; however, it is obvious that work remains to be done. On a positive note, the modular mathematics program is showing positive gains in success and student learning. As a result, one recommendation is to monitor the data for incoming freshmen. It is possible that students might have done better on the Algebra diagnostic instead of the pre-algebra diagnostic having forgotten the basic material. The second recommendation is to monitor the progress of students through the modular mathematics class and into general education mathematics.

Objective Three

Provide pre- and post-testing to a random sample using COMPASS to determine cognitive value gained.

Table 8
Activities for objective three.

Objective 3: Pre- and post-test a random sample of at least 100 students in developmental mathematics courses, developmental English composition, and developmental reading using COMPASS to determine cognitive value gained (total of at least 400 students).			
Activities	**Persons**	**Schedule**	**Output**
Begin pre- and post-testing random sections of developmental courses (n = 400)	P.I. and staff	Spring 2014	Results of individual assessments. Data on completion results. Statistical analysis for institutional effectiveness and SACS-COC.

Pre-tests were given to students in developmental English composition (ENGL 0001), developmental mathematics (MATH 0001 and MATH 0002), and the orientation to university studies (UNIV 1005) to assess entry-level reading to students who were not diagnostically tested. The testing occurred immediately after registration closed for the spring 2014 from January 17 through Friday January 24, 2014. Posttest were given to the same sections of each developmental course at the end of the semester from April 23 through May 1, 2014. In each case, students were given the directions for the test to minimize procedural errors.

Note that the sample sizes in each course, except MATH 0002, were not the desired 100 students per course. However, in each case, the sample is larger than the 30 observations needed for it to approach a normal distribution according to the Central Limit Theorem (see Hinkle, Wiersma, & Jurs, 1998; Minium, King, & Bear, 1993).

The results for each development course follows:

Developmental English Composition (ENGL 0001)

A total of 62 students in four sections of ENGL 0001 took the writing pretest at the beginning of spring 2014; however, only 34 of the students took the posttest. As a result, only 34 students with both pretest and posttest scores were included in the analysis. A paired t-test was performed to determine if the results of the post tests were statistically significant compared to the pretest – in other words - was the posttest score > pretest score?

The observed gain score (M = 9.59, SD = 21.05, N = 34) was significantly greater than zero (mean of the posttests - mean of the pretests), paired t(33) = 2.66, one-tail p = 0.006 < .05 (see Table 9). The results provide evidence that developmental English, on average, increases a student's COMPASS writing score by almost 10 points. A 95% C.I. about the difference in the mean writing score is (2.243, 16.993) (see Table 10).

Table 9
ENGL 0001 Paired t-Test Results

	Pre Writing Skills Score	*Post Writing Skills Score*
Mean	64.79411765	74.38235294
Variance	564.1684492	434.728164
Observations	34	34
Pearson Correlation	0.561082582	
Hypothesized Mean Difference	0	
df	33	
t Stat	-2.655819336	
P(T<=t) 1-tail	0.006044627	
t Critical 1-tail	1.692360309	

Table 10
ENGL 0001 Difference in Means Results

Difference	
Mean	9.588235294
Standard Error	3.610273923
Median	7.5
Mode	8
Standard Deviation	21.05133357
Sample Variance	443.1586453
Kurtosis	0.595336039
Skewness	0.884229067
Range	91
Minimum	-22
Maximum	69
Sum	326
Count	34
Confidence Level (95.0%)	7.345157525

Developmental Reading (UNIV1005)

A total of 55 students in five sections of UNIV 1005 (Orientation to University Studies) took the reading pretest at the beginning of spring 2014; however, only 38 of the students took the posttest. As a result, only 38 students with both pretest and posttest scores were included in the analysis. A paired t-test was performed to determine if the results of the post tests were statistically significant compared to the pretest – in other words - was the posttest score > pretest score?

The observed gain score (M= 6.95, SD = 8.57, N = 38) was significantly greater than zero (mean of the posttests - mean of the pretests), paired t(37) = 5.00, one-tail p = 0.000 < .05 (see Table 11). The results provide evidence that orientation to university studies, on average, increases a student's COMPASS reading score by almost 7 points. A 95% C.I. about the difference in mean reading scores is (4.13, 9.77) (see Table 12).

Table 11
UNIV 1005 Paired t test Results

	Pre Read Score	*Post Read Score*
Mean	74.31578947	81.26315789
Variance	144.6002845	96.30725462
Observations	38	38
Pearson Correlation	0.709714452	
Hypothesized Mean Difference	0	
df	37	
t Stat	-4.998693678	
P(T<=t) 1-tail	7.08156E-06	
t Critical 1-tail	1.68709362	

Table 12
UNIV 1005 Difference in Mean Results

Difference	
Mean	6.947368421
Standard Error	1.389836799
Median	7
Mode	11
Standard Deviation	8.567529425
Sample Variance	73.40256046
Kurtosis	-0.492284529
Skewness	0.371297714
Range	36
Minimum	-9
Maximum	27
Sum	264
Count	38
Confidence Level (95.0%)	2.816076847

Developmental Mathematics Pre-Algebra (MATH 0001)

A total of 104 students in five sections of MATH 0001 took the algebra domain pretest at the beginning of spring 2014; however, only 63 of the students took the posttest. As a result, only 63 students with both pretest and posttest scores were included in the analysis. A paired t-test was performed to determine if the results of the post tests were statistically significant compared to the pretest – in other words – was the posttest score > pretest score?

The observed gain score (M = 5.03, SD = 9.88, N = 63) was significantly greater than zero (mean of the posttests - mean of the pretests), paired t(62) = 4.04, one-tail p = 0.000 < .05 (see Table 13). The results provide evidence that MATH 0001, on average, increases a student's COMPASS algebra score by 5 points. A 95% C.I. about the difference in mean algebra scores is (2.54, 7.52) (see Table 14).

Table 13
MATH 0001 Paired t test Results

	Pre-Algebra Score	*Post Alg Score*
Mean	21.47619048	26.50793651
Variance	25.83410138	86.0281618
Observations	63	63
Pearson Correlation	0.150113663	
Hypothesized Mean Difference	0	
df	62	
t Stat	-4.040382428	
P(T<=t) 1-tail	7.48073E-05	
t Critical 1-tail	1.669804163	

Table 14
MATH 0001 Difference in Mean Results

Difference in Alg Scores	
Mean	5.031746032
Standard Error	1.245363805
Median	4
Mode	4
Standard Deviation	9.884768756
Sample Variance	97.70865335
Kurtosis	2.940334677
Skewness	1.014466012
Range	60
Minimum	-18
Maximum	42
Sum	317
Count	63
Confidence Level (95.0%)	2.489446774

Developmental Mathematics Introduction to Algebra (MATH 0002)

A total of 183 students in seven sections of MATH 0002 took the algebra domain pretest at the beginning of spring 2014; however, only 112 of the students took the posttest. As a result, only 112 students with both pretest and posttest scores were included in the analysis. A paired t-test was performed to determine if the results of the post tests were statistically significant compared to the pretest – in other words – was the posttest score > pretest score?

The observed gain score (M = 8.05, SD = 11.79, N = 112) was significantly greater than zero (mean of the posttests - mean of the pretests), paired t(111) = 7.23, one-tail p = 0.000 < .05 (see Table 15). The results provide evidence that MATH 0002, on average, increases a student's COMPASS algebra score by 8 points. A 95% C.I. about the difference in mean algebra scores is (5.84, 10.26) (see Table 16).

Table 15
Paired t test Results for MATH 0002

	Pre-Algebra Score	*Post Algebra Score*
Mean	25.6875	33.74107143
Variance	52.55912162	170.8062259
Observations	112	112
Pearson Correlation	0.44526595	
Hypothesized Mean Difference	0	
df	111	
t Stat	-7.2295077	
P(T<=t) 1-tail	3.285E-11	
t Critical 1-tail	1.658697265	

Table 16
MATH 0002 Difference in Mean Results

Difference	
Mean	8.053571429
Standard Error	1.113986147
Median	6.5
Mode	9
Standard Deviation	11.78932124
Sample Variance	138.9880952
Kurtosis	2.901744544
Skewness	0.547647994
Range	85
Minimum	-35
Maximum	50
Sum	902
Count	112
Confidence Level (95.0%)	2.207437917

Based on the information presented, objective 3 is met.

There were two primary issues that let to decreased sample sizes during the assessment cycle. The first was that students mentioned that they felt "over tested" since many students were tested three times during the pretest and three times during the posttest - once in reading, mathematics, and English. As a result, some were conveniently absent on the posttest. It would be wise to only test one subject per year and rotate the subjects over a period of years to collect additional data. The second reason was decreased class sizes due to a 13% decrease from spring 2013.

Objective Four

Increase by 3% the success rate in developmental mathematics by designing and offering a computerized modular math course.

Table 17
Activities for objective four.

Objective 4: Increase the raw success rate by 3% in developmental mathematics by providing students an option to take a MATH 0001/0002 in a computerized modular format.			
Activities	**Persons**	**Schedule**	**Output**
1. Design a modular MATH 0001/0002 developmental education course	P.I., Ms. Jamie Thibodeaux and the math faculty	7/1/13 to 5/15/14	Standardized course curriculum (allows for revision in progress).
2. Begin offering a computerized modular MATH 0001/0002 developmental mathematics course	P.I. Ms. Jamie Thibodeaux and math faculty	Fall 2013	Course success rates. Student learning outcome results. Individual student COMPASS assessment results. Statistical analysis for institutional effectiveness and SACSCOC.

Basically, LSU Eunice personnel took the two developmental mathematics courses and, through course redesign, changed the courses to a computer-based, competency-based, modular format where the lectures are available online 24/7. The instructor does not "teach" like a traditional face-to-face course. Instead, the faculty member spends the class time helping students needing assistance or passwords to take the quizzes and tests. Figure 4 shows the difference in the layout between a face-to-face course and a modular mathematics course.

Figure 4
Traditional format versus modular format.

Before course redesign

After course redesign

This objective analyzes the SLOs and the overall grade distributions for the modular mathematics compared to all other methods of instruction for fall 2013 and spring 2014.

The SLOs for MATH 0001 are:
The student, upon successful completion of this course, will:
A. Manipulate the order of operations on the real numbers.
B. Perform basic algebraic operations with expressions and linear equations.
C. Analyze and compute measurements for different geometric figures.

The raw success rate for MATH 0001 based on grades in the AY 2012-2013 was 59%. An increase of 3% would be 59% multiplied by 1.03 or 60.77 or 61% rounded.

The SLOs for MATH 0002 are:
Upon successful completion of this course, the student, will:
A. Perform basic algebraic operations.
B. Perform basic operations involving the rectangular coordinate system.

The raw success rate for MATH 0002 based on grades in the AY 2013-2013 was 46%. An increase of 3% would be 46% multiplied by 1.03 or 47.38% or 47% rounded.

Modular Mathematics for MATH 0001 was designed and implemented as a pilot with students in fall 2013 with an n = 19 on the 14th day of the semester. Three sections were offered in spring 2014 with an n = 76 on the 14th day of the semester.

Modular Mathematics for MATH 0002 was designed in fall 2013 and implemented with two pilot sections in spring 2014. A total of five students were enrolled in modular mathematics 0002 in the fall since they completed MATH 0001 during the fall semester. In spring 2014, a total of 52 were enrolled in Modular MATH 0002 on the 14th day of the spring 2014 semester.

Student Learning Outcome data was analyzed for both fall 2013 and spring 2014 MATH 0001 sections at the completion of the spring semester in order to directly assess student learning. Assessment of SLOs occurs for all students taking the final exam (i.e. no sampling). Modular Mathematics students performed just below that of the peers (70% as opposed to 73%) overall. They also performed slightly below their peers on objective A. They performed above their peers on objective B and substantially below their peers on objective C. (see Table 18).

Table 18
MATH 0001 SLO Comparison for all students at all sites in Percents.

MATH 0001 SLO Description	Overall	Modular	LSUE	Dual Credit	LSUA	Online
Overall	73	70	74	none	70	77
1.1.1. Manipulate order of operations with real numbers	78	73	79		76	78
1.1.2. Perform basic algebraic operations with expressions and linear equations	71	74	71		67	77
1.1.3. Geometry	64	54	67		59	73
Total number of students tested	512	70	302		114	26

Indirectly, using final grades as detailed in Table 19, the modular mathematics students in MATH 0001 performed better than most of their peers with a 73% (69 out of 95) completion rate compared to an average of 65% (421 out of 650) overall. Attrition in the modular sections was 9% (9 out of 95) compared to an 11% (69 out of 650) overall.

Table 19
Indirect Assessment Using Grades
AY 13-14 MATH 0001[1]

Description	LSUA	Dual Credit	LSUE[2]	Modular	Online	Totals
Total n	144	0	380	95	31	650
No. of Ws	16		44	9	0	69
No. violation of attendance policy	2		3	6	0	11
Grade of A, B, C only	84		243	69	25	421
Percent raw success	58		64	73	81	64.8
Percent success using NCDE	67		73	86	81	73.9

1. Includes all students at all sites both Pathways and NonPathways.
2. Modular and online students not included in this number.

For MATH 0002, the direct assessment of student learning was completed much the same way for all fall 2013 and spring 2014 sections of MATH 0002 (see Table 20). However, for MATH 0002, the modular students outperformed the peers at all other sites except those who took the course online. This indicated a higher level of learning in MATH 0002 compared to MATH 0001.

Table 20
MATH 0002 SLO Comparison Data for all Students at all Sites in Percents.

MATH 0002 SLO Description	Overall	Modular	LSUE	Dual Credit	LSUA	Online
Overall	67	77	65	none	65	77
1.1.4. Perform basic algebraic operations	67	78	65		65	77
1.1.5. Perform operations with the rectangular coordinate system	64	64	63		63	68
Total number of students tested	491	47	319		82	43

Lastly, an indirect assessment based on final grades was completed for all students enrolled in MATH 0002 during the fall 2013 and spring 2014 semesters (see Table 21). During the AY 2013-2014, 47 (70%) of the 67 modular mathematics students completed the MATH 0002 course compared to 364 (54%) of the 679 students overall. It is also worth noting that modular mathematics had a 7% (5 out of 67) attrition rate compared to all other methods at 15% (101 out of 679), on average.

Table 21
Indirect assessment using grades
AY 13-14 MATH 0002[1]

Description	LSUA	Dual Credit	LSUE[2]	Modular	Online	Totals
Total n	113	none	445	67	54	679
No. of Ws	15		75	5	6	101
No. violation of attendance policy	3		4	3	0	10
Grade of A, B, C only	61		219	47	37	364
Percent raw success	54		49	70	69	53.6
Percent success using NCDE	64		60	80	77	64.1

1. Includes all students at all sites both Pathways and NonPathways. Also includes 15 modular students completing MATH 0002 in Intersession and alternate semesters.
2. Modular and online students not included in this number.

Objective 4 sought to increase the raw success rates of each developmental mathematics course by 3%. The raw success rate for MATH 0001 is 421/650 or 65% for AY 2013-2014 exceeds the 61% established according to the objective. The

success rate for MATH 0002 is 364/679 or 54% for AY 2013- 2014 exceeding the 48% needed according to the objective.

Based on the fact that the modular mathematics courses were offered on schedule and that raw success rates for both developmental mathematics courses exceed 3%, objective 4 is met. The student learning outcome data for modular Math 0001 will be monitored into the second year.

During the spring semester, LSU Eunice personnel became aware that a new modular mathematics textbook was released with an additional emphasis on application and geometry and application. Given the results on outcome C, the Coordinator of the Quality Enhancement Plan, Division Head of Sciences, and the math faculty decided to change to the new version. However, so as not to have to program the course again in consecutive years, the implementation of the new book will take place beginning summer 2015.

3. Nuggets

The significant accomplishments resulting from the grant are increasing student learning and success in the two developmental mathematics courses. The average completion rate (A, B, or C only) for MATH 0001 since 2007 was 67%; however, modular math students surpassed that achieving a 73% success rate in just one year – an increase of almost 9%! Similar results were noted in MATH 0002 with an average completion rate of 61% since 2007. Again, the one year results are promising for the modular mathematics student achieving a 70% in one year – a stunning increase of 15%!

The benefits in the short term are increased student satisfaction from success in developmental mathematics the first time without having to repeat the course and then moving forward to general education mathematics. The second short term benefit is decreased time spent in developmental education and moving into college level courses saving the student, institution, and state time and money. The long term benefits include an educated population in the workforce increase their own quality of life and contributing to much needed resources in the state.

Another potential accomplishment is national recognition to the state and the LSU System as LSU Eunice personnel present nationally and locally on the modular mathematics program at LSU Eunice. Currently, the Vice Chancellor for Academic Affairs and the Principal Investigator will be presenting preliminary results at the annual meeting of the Southern Association of Colleges and Schools Commission on Colleges in December 2014.

4. Variance from Original Work Plan

The major variance from the original work plan was the configuration of the room from rows to work stations that seat six students with some carrels included to add capacity (see Figure 1). This added the expense of a new electrical distribution for the rooms;

however, it did not change the purpose of the grant. The budget was adjusted to allow for the expense.

The only other major variance from the work plan was that room M-203 was to be strictly an Assessment Center. With the implementation of the modular mathematics program, it now serves a dual purpose allowing for better utilization of the space and computing equipment. Conflicts are kept to minimum since most COMPASS testing occurs during orientation when classes are not in session. Modular students are notified if the lab needs to be used for a demonstration or a test for another course. As of this writing, both of the variances have served the students and LSU Eunice well.

5. Problems Encountered

Two problems were encountered throughout the grant period. First, prior to construction, but after the grant was awarded, it was discovered that M-203 did not have proper electrical grounding even though it had been a computer laboratory since the mid-1990s. This rather serious situation and the need to better move around the room for the modular mathematics program forced the redesign since it was not possible to simply install another wire in the in the existing conduit to accommodate the grounding conductor. As mentioned previously, the budget was adjusted to allow the cost overrun in the electrical distribution by reducing expenditures in other areas such as the use of student workers, storage cabinets, attendance software, and privacy screens on the computers.

The second problem involved an enrollment decrease of 13.5% in fall 2013 which then carried over to spring 2014 leading to decreased number of sections and section sizes. As a result the desired number of subjects in each of the testing presented in this report was not possible. However, each of the subsamples contained had enough students in them to minimize random error and normalize the sample to represent the actual student population.

6. Other Comments

The success of the modular mathematics program and reduction of the number of students in first developmental mathematics course due to the COMPASS have allowed students to progress through the courses at a faster pace. Students will be tracked into their first general mathematics course to determine if the modular mathematics course is having an impact on success in college algebra.

LSU Eunice personnel, especially the PI, thank the Board of Regents Support Fund for their assistance in this project having a positive effect on the students attending LSU Eunice.