Fall 2007/Spring 2008 Math Program Assessment Report

Narrative Submission:

1. What goals or learning objectives/outcomes were assessed in the AY ending June 30?

At the end of 2006/2007, the Learning Skills math Program decided to assess the ability to use pre-algebra, algebra, and geometry to successfully master the appropriate GE mathematics course. The purpose of this focus was to determine if students have mastered the underlying skills that are required to be successful in the appropriate GE math class. This goal implies the intermediate goal of being either to successfully pass the Intermediate Algebra Diagnostic (IAD) Exam, pass the Elementary Algebra and Geometry Diagnostic (EGAD) Exam, or successfully pass Math 1, Mathematical Reasoning. Passing the IAD is a prerequisite set by the Mathematics department for Pre-calculus, Business Math, Statistics, and the math class for Liberal Studies. Passing the EGAD is the prerequisite for Intermediate Algebra. Simply clearing the ELM requirement is the prerequisite for Math 1. We routinely require a passing score on the EGAD in order for the student to pass our final remedial math course which in turn clears the student’s ELM requirement. We provide an optional mini-workshop for those that need to pass the IAD at the end of the student’s final semester in math remediation. So, the bottom line is that assessing the student’s ability to use pre-algebra, algebra, and geometry is passing a uniform LS math courses.

2. How did you assess these learning out comes? Describe the measures you used and the information gathered.

Measures Used to Access the Learning Outcomes

The following course assessment strategies will be used:

- Tracking of student test grades in LS 7A, LS 7B, LS 10A, and LS 10X.
- Tracking of all exams and Department-wide finals.
- Tracking by class the Second Year Algebra exam scores at the end of LS 10A and LS 7B.

Program assessment will focus on the following.

- The Completion of the ELM requirement using pass rates
- The evaluation of the LS math curriculum including the ELM version ALEKS, the McGraw-Hill e-learning system.
- The evaluation of the effects of decreased tutoring and course coordination due to budget reductions.
- The effect of class size increase.

Activities Used to Reflect on Learning Outcomes

LS Math gathered and compiled the following data at the end of each session:

- The percent of students that have passed each class: LS 7A, LS 7B, LS 10A, and LS 10X
- Course summary of student evaluations.
The department chair and four math coordinators met weekly to discuss the LS math program curriculum and outcomes. The LS math faculty met bimonthly to discuss learning outcomes, objectives, curriculum, teaching methods, and rubric for scoring of common LS math exams.

**Assessment Findings by Class**

The percent passed by class indicated that there was a slight increase for all classes from Fall 06 to Fall 07.

<table>
<thead>
<tr>
<th>Fall 06</th>
<th>CR</th>
<th>NC</th>
<th>W</th>
<th>Total %(#)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS 7A</td>
<td>83.6</td>
<td>14.3</td>
<td>2.0</td>
<td>39.8(587)</td>
</tr>
<tr>
<td>LS 7B</td>
<td>64.2</td>
<td>32.5</td>
<td>3.3</td>
<td>8.1(120)</td>
</tr>
<tr>
<td>LS 10A</td>
<td>72.3</td>
<td>22.7</td>
<td>1.0</td>
<td>47.7(704)</td>
</tr>
<tr>
<td>LS 10X</td>
<td>73.8</td>
<td>23.1</td>
<td>3.1</td>
<td>4.4(65)</td>
</tr>
<tr>
<td>Total</td>
<td>78.1</td>
<td>20.2</td>
<td>1.7</td>
<td>1476</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fall 07</th>
<th>CR</th>
<th>NC</th>
<th>W</th>
<th>Total %(#)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS 7A</td>
<td>82.1</td>
<td>17.2</td>
<td>0.6</td>
<td>41.2(588)</td>
</tr>
<tr>
<td>LS 7B</td>
<td>70.1</td>
<td>28.9</td>
<td>0.9</td>
<td>7.8(114)</td>
</tr>
<tr>
<td>LS 10A</td>
<td>85.0</td>
<td>13.8</td>
<td>1.2</td>
<td>46.7(667)</td>
</tr>
<tr>
<td>LS 10X</td>
<td>78.9</td>
<td>19.3</td>
<td>1.7</td>
<td>4.0(57)</td>
</tr>
<tr>
<td>Total</td>
<td>82.3</td>
<td>16.6</td>
<td>1.0</td>
<td>1426</td>
</tr>
</tbody>
</table>

For Spring 07 to Spring 08 the results were mixed by class. The pass rate was up for LS 7A and LS 10X only.

<table>
<thead>
<tr>
<th>Spring 07</th>
<th>CR</th>
<th>NC</th>
<th>W</th>
<th>Total %(#)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS 7A</td>
<td>50.5</td>
<td>46.3</td>
<td>3.2</td>
<td>13.5(95)</td>
</tr>
<tr>
<td>LS 7B</td>
<td>83.8</td>
<td>15.3</td>
<td>1.0</td>
<td>59.3(419)</td>
</tr>
<tr>
<td>LS 10A</td>
<td>65.2</td>
<td>33.1</td>
<td>1.7</td>
<td>25.2(178)</td>
</tr>
<tr>
<td>LS 10X</td>
<td>42.8</td>
<td>57.1</td>
<td>0</td>
<td>2.0(14)</td>
</tr>
<tr>
<td>Total</td>
<td>73.7</td>
<td>24.8</td>
<td>1.4</td>
<td>706</td>
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</table>

<table>
<thead>
<tr>
<th>Spring 08</th>
<th>CR</th>
<th>NC</th>
<th>W</th>
<th>Total %(#)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS 7A</td>
<td>54.7</td>
<td>41.3</td>
<td>4.0</td>
<td>18.6(126)</td>
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<tr>
<td>LS 7B</td>
<td>84.8</td>
<td>11.6</td>
<td>1.0</td>
<td>68.5(396)</td>
</tr>
<tr>
<td>LS 10A</td>
<td>64.8</td>
<td>33.8</td>
<td>2.1</td>
<td>20.9(142)</td>
</tr>
<tr>
<td>LS 10X</td>
<td>57.1</td>
<td>35.7</td>
<td>0</td>
<td>2.1(14)</td>
</tr>
<tr>
<td>Total</td>
<td>71.6</td>
<td>19.6</td>
<td>1.9</td>
<td>678</td>
</tr>
</tbody>
</table>
The pass rate for LS 10A in fall 06 was quite low. It was also noted that the pass rate was up for LS 7A and LS 10X. So, to see if this was a single year drop, an analysis was done for the pass rate for the years 2002 to 2007. The following is a graph of pass rates. It was noted that there was a downward trend in the pass rate from fall 05 to fall 06 in several classes LS 10A and LS 7B and then a return to the overall trend in Fall 2008. The most startling drop was for LS 10A from fall 2005 to fall 2006. In addition, there seemed to be an overall drop in pass rate from fall 02 to fall 07.

Of concern was the seemingly more significant drop in LS 10A for fall 06. The data was separated for the multimedia and lecture classes. Below is a chart of the pass rates.
Conclusions Regarding Pass Rates

The formats differ widely between LS 10a multimedia and lecture formats. LS 10A is divided into the roughly the same number of classes. LS 10A lecture uses Math Zone as a homework vehicle and is taught by a lecturer. The nine or ten multimedia classes are a tutorial format using ALEKS e-learning package. ALEKS assess the student in Introductory algebra and based on the assessment learning packages are presented. The learning and tutoring is quite unlike the traditional lecture. A course coordinator orientates novice Math majors to run the classes and be tutors. Mini-lectures are given by the tutors on material identified by ALEKS. Close mentoring by the course coordinator is needed to achieve results that are sometimes better than the lecture format. The drop in the pass rate for Fall 06 was most likely due to a decrease in coordination. The course coordinator had major surgery and was recovering during fall 06. As a result, a seemly, less effective mentoring was done. The next year the percent returned to above the fall 05 rate.

Two other variables could account for the overall drop in the pass rate. The first is that over the last few years more first-time freshmen have been scoring into LS 7A/B, the two semester remedial option and less directly to GE math. A second likely variable is the increase in class size due to a reduced budget. As the LS Math budget was decreased from fall 04 to fall 07, more students were packed into the LS Math classes, causing the teacher to adapt the pedagogy to a less individualized instruction. In addition, hours for the walk-in tutor labs have decreased. Both were judged to result in a drop in overall pass rate.
Summary of Student Evaluations Using the Course Summary Sheet

Learning Skills requires that all instructors be evaluated using thirteen statements on a five point scale with five as the most positive score. Each course is summarized for each statement (See Appendix) and average scores are reported. If the course total average is used, each statement can be judged as above or below average. For each course the following were judged to be well below average by the Mathematics Coordinator.

fall 07

For LS 7A, 7B, LS 10A lecture, LS 10A multimedia inclusive

- The instructor explains the subject manner in a clear, easy to follow manner.
- The instructor encourages me and helps to increase my confidence in the subject.

LS 10A Multimedia only

- The instructor is enthusiastic about the subject matter.
- The instructor is well organized and lessons show careful planning.
- Feedback provided by the instructor is helpful.

spring 08

For LS 7A, 7B, LS 10A lecture inclusive (LS 10A multimedia is not offered this semester.)

- The instructor explains the subject manner in a clear, easy to follow manner.
- The instructor encourages me and helps to increase my confidence in the subject.

The LS mathematics coordinator hypothesized that the low ratings by students were due to the fact that in fall 02 the class sizes in LS 7A/B were increased from 24 to 28 and LS 10A lecture was increased from 30 to 34 for the lecture classes and from 30 to 32 for LS 10A multimedia. The lower rating on more statements appeared to be due to the fact a tutor is used instead of an instructor.

To verify the class size hypothesis, student evaluation summaries were analyzed from fall 2001. In fall 02, the student evaluations statements were edited to reflect the change in pedagogy. So, the student evaluations were analyzed for fall 2001 to regarding the parallel statements below.

- The instructor provides academic guidance I need for success.
- The instructor encourages me and helps to increase my confidence in the subject.

For the smaller class size in fall 2001, these statement ratings were mixed by class and statement with some results above average and others below (See appendix). No conclusion could be made regarding class size even though the overall values tended to be higher for fall 01.
3. As a result of faculty reflection on these results, are there any program changes anticipated?
   a. If so, what are those changes?

The LS Mathematics Coordinator has been involved this past year in the CSU Project *Transitioning Developmental Math*. Whereas, Sac State LS Math has piloted many ideas presented by the project, he is looking forward to gleaning the Project report for ideas in the following areas:

- Further involvement of select groups in the *Fast-track* ideas for incoming freshmen, e.g. MEP, EOP, CAMP, and chemistry.
- Further use of on-line tutoring to assist instruction and become more effective, such as perfecting the use of Math Zone and ALEKS.
- Involving more students that have high ELM scores in a fast paced independent study.
- Move LS 10X from a student tutorial base to an independent instruction/tutorial/computer assisted instruction.
- Look for ways to deliver quality instruction to larger groups.

b. How will you know if these changes achieved the desired results?

We will continue to assess the pass rate, the uniform application of curriculum and practices in our weekly math coordinator meeting s and well as the monthly faculty meeting. In addition in these meetings, we will explore ways to increase student self confidence and ways to strengthen the teaching of the more difficult concepts.

4. Did your department engage in any other assessment activities such as the development of course alignment?

Our faculty has produced the following to assist course alignment.

- Common syllabus with a few modifications by the teacher.
- Common schedule of assignments.
- Common test and final objectives.
- Common attendance policy.
- Common books and supplements.
- Common advising regarding EO 665.

In order to produce learning outcomes common to all, we have focused on standardizing the grading of exams. Over the next year we will create and execute a common grading rubric and train our instructors to use this rubric.

5. What assessment activities are planned for the upcoming year?

We plan to maintain the quality of the program in the face of on-going budget cuts. Next year, we have implemented 50% reduction of assigned time in the LS 7A/B and LS 10A lecture program. We aim to maintain the following program strengths.
• Common syllabus with a few modifications by the teacher.
• Common schedule of assignments.
• Common test and final exam objectives.
• Common attendance policy.
• Common books and supplements.
• Common advising regarding EO 665.

We will no longer produce a common tests and finals. Nor will be aim for a reduced cost of books for the student by using a common homework engine like Math Zone. We will provide less open tutoring hours and less advising by the course coordinator. This counseling will be shifted to the instructor. The faculty will look for ways to be more effective with fewer resources, but predict a continued decrease in the pass rate as a result of fewer resources.

In LS Math faculty meetings, we will address the statements identified as below average on student assessment by class. These statements and how to raise the outcomes will be discussed in at least three faculty meetings in Fall 08 and in Spring 09.

In addition, the faculty will focus on the following learning outcome: To explain the overall process and the particular steps by which a mathematical problem is solved. We will work specifically on the subarea of two step problem solving in area and volume. From LS 7A and LS 10A several exemplary solutions were selected from the Spring 08 finals representative of three different levels of student work. These exemplars will be analyzed and discussed by the entire LS math faculty to ascertain best teaching practices over the 08-09 academic year.

Finally, LS mathematics plans to rewrite the assessment plan for next academic years to continue the practice of continual improvement. But, we plan to include more faculty discussion on exemplars of learning outcomes and “best practices”.