Assessment: Assessment Unit Four Column

FALL 2015

El Camino: PLOs (MATH) - Computer Sciences

PLOs	Assessment Method Description	Results	Actions
PLO #2 Tracing the Execution - Upon completion of their course of study in the Computer Science Department, students, when given a code segment, will be able to trace the execution and give the output. **PLO Status:** Active **PLO Assessment Cycle:** 2015-16 (Fall 2015) **Input Date:** 07/01/2013	**Multiple Assessments -** We have used variety of assessment methods that included projects and programs, examination questions, and performing operating system specific tasks in class such as UNIX. Details are given in the attached PLO report. **Standard and Rubric:** In Computer Science we went with 70-70 rule. If seventy percent or higher percentage of students scored seventy percent or higher in SLO assessment, then that SLO was met. Detailed rubric is attached in PLO report.	**Semester of Current Assessment:** 2015-16 (Fall 2015) **Standard Met:** Standard Met The statistical Properties of student scores are given below: Statistical Property Measured Value of Statistical Property (%) Mean 76 Median 80 Standard Deviation 2.5 Mean student score in SLO tests was 76%. Median score was 80%. The median score is more reliable as a central tendency of the data, because the outliers affect it to a lesser degree. The standard deviation of 2.5% is small, and indicates that most data clusters around the central tendency. That gives high confidence in the reliability of the mean and median. Assessment/Analysis of Results In 2015, across all classes in Computer Science we assessed 316 students for SLO #2. Macroscopic result is that about 234 or 74 % student successfully completed SLO #1 as per rubric given in table 1. (Meeting level 3 or higher). Thus the 70/70 rule was met and this indicates that computer science students met the standards set for PLO #2. Based on further statistical analysis, the percentage of students accomplishing various levels of competences (as shown in Table 1 rubric) is given below by Table .	**Action:** Action and Follow-Up It would appear that SLO # 2 was accomplished in all computer science courses in 2015.It appears that rigor of the SLO #2 is just enough that department should consider keeping same grading rubric when this set of SLO is evaluated again in future. Department should further analyze the student success data from the point of view of obtaining student equity funding to help improve those students who are performing at scoring levels below 70% at this time. (12/01/2019) **Action Category:** Program/College Support

PLOs	Assessment Method Description	Results	Actions
		Understanding and its level Percentage of students accomplishing that level Excellent comprehension of course SLO. Student demonstrates the mastery of SLO being measured. (Level 5) 42.7 -- -- ----------------------- Very good comprehension of course SLO. Student exhibits a strong understanding of SLO being measured. There are minor errors in understanding principles and procedures. (Level 4) 21.2 -- -- -------------------------- Successful completion of SLO. Errors made are usual average errors made by students learning key concepts of Computer Science. (Level 3) 10.1 -- -- --------------------------------- Can successfully complete SLO upon repeating the course. Errors made are high enough that projects and problems of average difficulty were not completed. (Level 2) 9.5 -- -- ----------------------------- May need substantial remedial work even when repeating the course. Only scant understanding of the principles of the course taken. (Level 1) 16.5 -- -- ------------------------------------- Students reaching up to level 3 have accomplished the SLO/PLO outcomes. About 74% students reached this required level. Overall, it seems that Computer Science	

PLOs	Assessment Method Description	Results	Actions
		department is successfully meeting its 70-70 rule with comfortable margin. If this success pattern continues then Computer Science department may consider adapting a 75-75 rule in future. From Table above as well as from histogram analysis, a bimodal distribution of student population is evident. That means that computer science department has students who perform at a very high level, combined with a population that does not. Department should consider strategies to reduce this bimodal distribution by, perhaps getting student equity funding to raise level of those students who are not performing at the level below 70% score in SLO tests. (02/29/2016) **Faculty Assessment Leader:** Satish Singhal **Faculty Contributing to Assessment:** Satish Singhal, Massoud Ghyam, Juan Leon, Dave Akins, Ralph Taylor, Edwin Ambrosio, Greg Scott, Solomon Russell, Nikjeh, Esmaail **Courses Associated with PLO Assessment:** CSCI 1, CSCI 2, CSCI 3, CSCI 12, CSCI 16, CSCI 40 **Related Documents:** ComputerSciencePLO_2015.docx	

Assessment: Assessment Unit Four Column

FALL 2015

El Camino: PLOs (MATH) - Developmental Math

PLOs	Assessment Method Description	Results	Actions
PLO #1 Solving Application Problems - A students completing PreCollegiate Mathematics will recognize the underlying mathematical concepts in a given context (word problems, data, diagrams, etc.) and apply those concepts correctly. **PLO Status:** Active **PLO Assessment Cycle:** 2015-16 (Fall 2015) **Input Date:** 07/10/2013	**Exam/Test/Quiz -** During the spring 2015 semester, SLO #1, application problems, was assessed for 8 development mathematics classes: Math 12, 23, 37, 40, 60, 67, 73, and 80. A variety of application problems were used across these courses in the form of word problems, data, and diagrams, and in the context of real-world applications. Math 12 (Basic Arithmetic Skills): Calculate the subtotal, tax, and change from a given purchase at a restaurant. Math 23 (Pre-Algebra): Find the perimeter of a rectangle with one side missing. Math 37 (Basic Accelerated Mathematics): Complete five computer-based application problems. Math 40 (Elementary Algebra): Set up and solve a linear system of equations related to the cost of cell phone plans.	**Semester of Current Assessment:** 2015-16 (Fall 2015) **Standard Met:** Standard Not Met Of the 2481 students who were assessed in spring of 2015, 1720 of them, or 69.3%, received a passing mark. In particular: Math 12: 226/297 (76.1%) passed with a 2 or 3 (Target: 70%) Math 23: 84/189 (44.4%) passed with 4 or 5 (Target: 70%) Math 37: 146/174 (83.9%) passed with a 3, 4, or 5 (Target: 80%) Math 40: 268/407 (65.8%) passed with a 2 or 3 (Target: 60%) Math 60: 79/114 (69.3%) passed with a 2 or 3 (Target: 75%) Math 67: 106/139 (76.3%) passed with 2 or 3 (Target: 70%) Math 73: 444/623 (71.3%) passed with a 2 or 3 (Target: 70%) Math 80: 367/538 (68.2%) passed with a 2 or 3 (Target: 60%) Being just 0.07% below the standard, the results are encouraging but still can be improved upon. Six of the eight	**Action:** 1. Reassign time for developmental course coordinators, in part to facilitate better discussion of SLO results and follow-up actions, among other duties. Permitting course coordinators such time would allow for more beneficial actions to be developed and more care given to the manner of their implementation. This could include preparing materials and discussing the results with instructors in person to get a more complete picture of the results from the SLO reports. Rough cost estimate: 10% to 16.5% reassignment per semester is approximately $11,000 - $18,150. 2. Institute follow-up professional development workshop series on how to implement activities for instructors. These workshops might take place either during the year or possibly during the summer, with compensation for adjunct faculty and facilitators.

PLOs	Assessment Method Description	Results	Actions
	Math 60 (Elementary Geometry): Sketch a trapezoid with certain characteristics, labels parts of it, and find the measure of its angles.

Math 67 (General Education Algebra): Answer a series of questions related to cost functions, graphs, and data.

Math 73 (Intermediate Algebra for General Education): Compare two different gym memberships by forming and solving relevant equations.

Math 80 (Intermediate Algebra for Science, Technology, Engineering, and Mathematics): Form a quadratic revenue function for the sale of toys and use it to find the maximum revenue.
Standard and Rubric: Most of the developmental math classes used a similar 3-point rubric of:

3: The student's answers are correct and the student demonstrates complete understanding of the material.

2: The student's answers are mostly correct, with a few small errors, and the student demonstrates a reasonable understanding of the material.

1: The student has few, if any, answers correct and demonstrates | courses met their target percentage. Many of the difficulties for students were related to understanding or setting up the problems. For example, across several courses, students struggled with unit conversion. Discussion of these results has identified a need for more time devoted to these topics and nonstandard problems in general. It is the hope that making these changes will push the success rate above the standard set, which is well within reach.

Viewing the results, a standardization of rubric and target percentage may be helpful in the future to make it easier to compare across courses. For example, Math 23 and 37 both use a 5-point scale but have different standards for success. If Math 23 included scores of 3 as successful, the percentage of passing would move up to 110 or 58.2%. This would push the overall rate to 70.4% and the standard would be met. So while the passing rate currently sits slightly below the standard, it may be due to how "success" is defined for each course. (02/04/2016)
Faculty Assessment Leader: Matthew Mata
Faculty Contributing to Assessment: Susan Taylor | This could be done immediately after the SLO assessment and be used as a way to allow instructors to interact face-to-face and discuss the results of the SLO and possible actions to improve student success. Such a workshop would be beneficial to both the course coordinators and the instructors of these courses, as it would expedite the process of understanding and reacting to the results of the SLO. Rough cost estimate: The structure of these workshops would be two 4-hr days prior to a semester, followed by two more follow-up 4-hr workshops during the semester. With two faculty facilitators and up to 12 participants, the total anticipated cost, based on the assumption that all participants would be compensated adjunct instructors, would break down as follows: Facilitators would be paid for 16 hours at Rate 1; adjuncts would be paid 16 hours at Rate 2. With two workshops offered per year (one a semester), the total cost would be $21,284. (02/04/2017)
Action Category: Program/College Support |

PLOs	Assessment Method Description	Results	Actions
	minimal understanding of the material.

0: The student has no answers correct or has left the questions blank, and shows no understanding of the material.

However, Math 23 and Math 37 utilized as 5-point scale, which is a more refined version of the above. The goals, in terms of percentage and score, for each course are as follows: Math 12 (70% with a 2 or 3), Math 23 (70% with a 4 or 5), Math 37 (80% with a 3, 4, or 5), Math 40 (60% with a 2 or 3), Math 67 (75% with a 2 or 3), Math 73 (70% with a 2 or 3), Math 80 (60% with a 2 or 3).

The overall goal was a 70% across all of developmental mathematics. Success would mean that at least 70% of the students had a reasonable understanding of the concepts related to application problems. | | |

Assessment: Assessment Unit Four Column

FALL 2015

El Camino: PLOs (MATH) - Math (Math and Science Majors)

PLOs	Assessment Method Description	Results	Actions
PLO #2 Solving Problems - Students will solve problems, including application problems, relevant to the course concepts and content. **PLO Status:** Active **PLO Assessment Cycle:** 2015-16 (Fall 2015) **Input Date:** 05/19/2014	**Exam/Test/Quiz -** For our CM1 courses (Mathematics for STEM Majors), we utilized a variety of test and quiz problems assessing students mastery of problem solving skills essential for being successful not only in their current STEM coursework but in their future STEM mathematics and science coursework at their transfer institutions. Our ultimate goal is to prepare our students for the rigors of science and math courses as well as an increasingly competitive job market. Mathematics 170 (Trigonometry) – Assessment consisted of students applying the laws of trigonometry to solve real-world applications. Mathematics 180 (Pre-Calculus) – Our SLO verifies student understanding and application of exponential and logarithmic functions to analyze a biology population growth problem. Mathematics 190 (Calculus I) –	**Semester of Current Assessment:** 2015-16 (Fall 2015) **Standard Met:** Standard Met Across all the CM1 courses administered during Fall 2015, we have the following results for SLO #2 (Problem Solving): Total Students Assessed: 1134 Scoring a '3' – 48.9% of students (or 550 students) – Demonstrate complete understanding of the problem being assessed. Scoring a '2' – 25.0% of students (or 283 students) – Demonstrate most understanding of the problem being assessed. Scoring a '1' – 16.1% of students (or 183 students) – Demonstrate some understanding of the problem being assessed. Scoring a '0' – 10.4% of students (or 118 students) – Demonstrate no understanding of the problem being assessed. Overall, we have attained a 73.5% success rate (that is, scoring a 2 or 3 on the assessment). This meets our target for success. Analysis:	**Action:** Having attained a 70% success rate for our Fall 2015 CM1 assessment of SLO2, we establish an action to increase this success rate further to 72% while maintaining the rigor of our assessments. We hope to assess problem solving in our STEM courses by increasing the difficulty and rigor of assessed problems as well as changing the application area being assessed. (01/26/2019) **Action Category:** SLO/PLO Assessment Process

PLOs	Assessment Method Description	Results	Actions
	Students were assessed on their ability to solve problems related to projectile motion using derivatives and anti-derivatives. Mathematics 191 (Calculus II) – We assess students' ability to use integration techniques to solve problems involving volumes and surface area. Mathematics 210 (Discrete Math) – Students were required to solve problems involving basic number theory (essential to studying computer science, cryptography, and other STEM fields). Mathematics 220 (Multivariable Calculus) – Students were assessed on optimization problems involving multiple variables. Mathematics 270 (Differential Equations and Linear Algebra) – Students were assessed in applying differential equations to model behavior of application problems. **Standard and Rubric:** Across our CM1 courses, we establish a goal of at least 70% of our students enrolled in the STEM mathematics coursework to score a '2' or a '3' on the SLO assessments. This would mean at least 70% of our students will attain most to complete understanding of the problem solving involved. We utilize the following general rubric across the	Overall, instructors across our CM1 courses have commented on many ways we are helping our students succeed and methods we can be utilizing to further help them achieve success. For our STEM track students, we hold them to a very high standard and we expect students to work hard, complete homework exercises regularly, and seek out assistance when needed using our on-campus resources such as the tutoring center or MESA center. Utilizing a variety of technologies and online resources in the classroom continues to help provide students with different ways of seeing, interacting and learning the material. Graphing calculators and computer visualization software such as Mathematica help to speed up computations and bolster conceptual understanding. We continue to devise ways to utilize this technology in the classroom and strive to remain current and relevant. Exposure to technology has become increasingly important in today's modern job market. We continue to explore and utilize a variety of teaching methods to reach our diverse student population including collaborative group activities and project-based learning. We find it helpful to establish real world applications of the concepts being studied to further demonstrate to students that their success in STEM career fields can be bolstered with strong mathematics understanding. (01/26/2016) **Faculty Assessment Leader:** Zachary Marks **Courses Associated with PLO Assessment:** Math 170, Math 180, Math 190, Math 191, Math 210, Math 220, Math 270	

PLOs	Assessment Method Description	Results	Actions
	SLO assessments: Score of 3 (Complete Understanding) - Student demonstrates mastery of the problem being presented. Problem solving techniques and strategies are well thought out and clearly presented. Student can clearly utilize the concepts of the course to solve application problems in a variety of areas. Score of 2 (Most Understanding) - Student demonstrates most understanding of the problem and problem solving techniques involved. With the exception of some computational errors, the student demonstrates strong conceptual understanding and how to apply appropriate problem solving strategy. Score of 1 (Some Understanding) - While some understanding of the concepts and problem solving being assessed is evident, there are significant gaps. Conceptual and procedural errors in problem solving and/or logic are evident. Score of 0 (No understanding) - Student demonstrates very little to no understanding of the problem solving strategies and/or techniques used to solve the assessed problem.		