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The Spotlight

SLOs & AUOs
Student Learning Outcomes & Administrative Unit Objectives

From the Desk of Joan Sholars, SLO Coordinator

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Electronics & Computer Technology

By Jonathan Hymer

Course-level student learning outcomes (SLOs) have provided the Electronics & Computer Technology Department with a valuable tool for assessing the effectiveness of recently implemented enhancements to our introductory electronics technology courses. For many years, the department offered two standalone electronics math courses that provided students with additional exposure to the basic algebra and trigonometry methods used in circuit analysis. However, faculty teaching ELEC 50A and 50B, the entry-level electronics theory courses in which problem-solving techniques were first introduced and for which the math courses were the intended companion, became increasingly aware of limitations presented by the companion-course format. One big issue was that not all ELEC 50A/B students took the math courses, either because of scheduling conflicts or because electronics math was not an A.S. degree or certificate requirement for some disciplines (e.g., Engineering Design Technology). In response the department faculty inactivated the math courses and added 18 hours of lecture time devoted specifically to numerical analysis to both theory courses in late 2007. For the first time beginning with the Fall 2008 semester, all students completing ELEC 50A/B would be exposed to an in-depth treatment of numerical circuit analysis, a foundational skill for academic and professional success.

These substantial revisions to the key introductory courses raised questions about instructional effectiveness and student success which the faculty wanted to address systematically. Course-level SLOs and assessments provided us with the promise of a consistent framework by which we could first establish a baseline measure of student success and then identify specific areas for improvement. Establishing a baseline was particularly important because, although we knew we had a much larger population of students receiving instruction in numerical analysis than had been the case previously, we did not have a means of easily or directly comparing the overall performance of students exposed to the new versus the old formats. Also, we wanted to examine further whether instructional methods employed in the math courses would translate well when addressed to a larger audience over a longer lecture period. Our goal was to demonstrate that combining electronics theory with electronics math enabled more students to numerically analyze circuits than before, thereby leading to a quantifiable improvement in the department's instructional program.

First, faculty teaching ELEC 50A jointly developed the following outcomes statement: "Students in ELEC 50A will be able to numerically analyze a series-parallel circuit." The faculty-developed assessment method involved using a final-exam question shared by all sections of ELEC 50A. The question was subdivided into ten subparts, each of which required the student to solve for an unknown quantity associated with specific components in the circuit. Additionally, the quantities would not necessarily be found by working through the subparts in the order in which they were presented on the page. The faculty considered the question to be representative of the level of sophistication commonly seen in oral interviews or job placement tests. The initial assessment criterion was that 70% of students would be able to answer at least seven of the ten subpart questions correctly, a threshold established based on experience with student responses to similar questions

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DEFINITIONS

- ***SLOs*** *(student learning outcomes) are statements about what a student will think, know, feel or be able to do as a result of an educational experience.*
- ***AUOs*** *(administrative unit objectives) are statements about what a client will experience, receive, or understand as a result of a given service.*
- ***GEOs*** *(general education outcomes) are statements that define the knowledge, skills, and perspectives acquired by students who satisfy our general education requirements.*

An Electronics student working on a circuit board.

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answered by a much smaller cohort of students completing electronics math courses in past semesters. In this context, an answer was counted as fully correct only if it was complete in all respects: numerical value, units and appropriate prefixes representing the magnitude of the quantity evaluated, and written evidence of the thought process employed to obtain the unknown quantity.

Preliminary analysis of results confirms some long-held beliefs and provides insights that will lead to course improvements. Overall, 79% of students from the Fall 2008 sample fully answered at least 7 of the 10 questions correctly. For the first time, we were able to quantify just how successfully students were able to apply some elementary principles of algebra within the context of electronic circuits. Also, we can categorically state that in Fall 2008 more students displayed these skills at the stated level in the course of one semester than has been the case over the past four semesters put together. Simply put, each semester more students are successfully performing at a higher level than in the past.

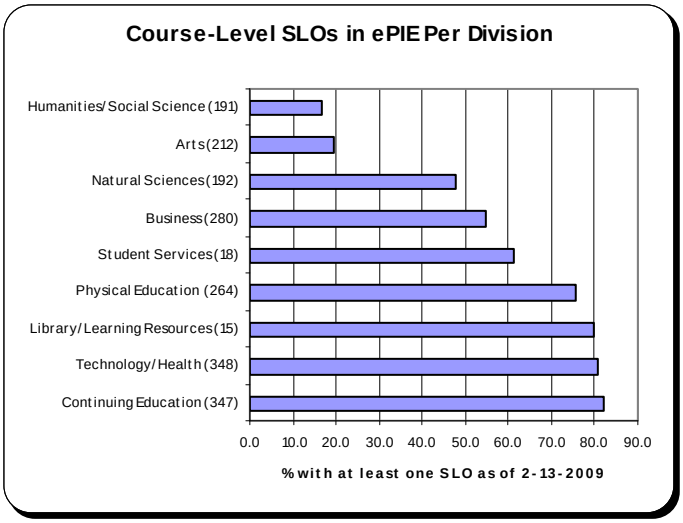
Also apparent from the results are areas for improvement. The most common errors were incorrect or missing units and lack of written evidence showing how the answers were obtained. These areas will be emphasized in the future. Somewhat surprising was the relatively "all-or-nothing" nature of the responses: fully 50% of the students answered all the questions completely correctly and 63% had either 9 or 10 correct responses. Only 15% had 5 or fewer correct answers (and some of these responses had correct numerical values but missing or incorrect units), and only two students didn't attempt the problem at all. These results keep us mindful of the quiet students in the room. Lecture periods will incorporate frequent "feedback sessions" and short, in-class assignments designed to help the instructor identify those who may struggle with a multiple-part problem but who are reluctant for whatever reason to seek assistance or speak up in class.

In implementing course-level SLOs, our department has focused on answering a simple question: "What do I really want to make sure my students know or can do as a result of taking this course?" By so focusing our efforts, we can treat SLOs as a very powerful tool for course improvement rather than as simply another process we must all endure.

Coordinator's Corner

The graph shows the cumulative progress each division has made as of February 13 in achieving course-level SLOs with the number of courses shown in parentheses.

Of the 1,867 college courses requiring SLOs, 59.2% have at least one reported in ePIE (our electronic program review system). We are in the process of evaluating this work against the Mt. SAC Course-Level SLO Plan, which includes a goal that 45% of active courses would have two SLOs and corresponding means of assessment and criteria for success by the end of 2008. The next newsletter will include this information.



Did You Know….

GLOSSARY TERM: Central

A principle that guides the development of SLOs and AUOs by aligning them with key issues in the department/unit. By examining issues that are central, the department will obtain data that can yield useful results.

FAQ: What is the relationship between course-level measurable objectives and course-level SLOs?

Course-level measurable objectives encompass the content of a course and are used to inform SLOs. Many measurable objectives resemble SLOs since they outline the central skills that a student will learn through the course and thus, need to be minimally revised to become SLOs. Other measurable objectives may need to be combined or broken down to function as SLOs. Measurable objectives can also be combined to create higher-level SLOs that look at a student's ability to synthesize various skills.

SLO Contacts

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