Math 082: Intermediate Algebra

Learning Outcomes Assessment Project

Executive Summary

Stage 1: **Designing and Proposing a Learning Outcomes Assessment Project**

Math 082 – Introductory Algebra is the second course in the development mathematics sequence of Math 081 – Basic Mathematics, Math 082, and Math 083 – Intermediate Algebra, and focuses on Real Numbers, Equations and Inequalities in One Variable, Graphs of Functions, Systems of Equation, Polynomials, and Factoring. The assessment instrument consisted of an internally designed 20 item test consisting of 12 multiple choice items and 8 open response items. The instrument was externally validated by Mathematics Department chairpersons at several public community colleges in Maryland during the summer of 2004.

Stage 2: **Implementing the Design and Collecting and Analyzing the Data**

In the Fall of 2004 the LOA instrument was administered on all three campuses and then a random sample of the exams was selected and graded using a 3 point rubric. For the multiple choice questions the rubric awarded 2 points for the correct response and 0 points for an incorrect response. For the free response items the rubric awarded 2 points for a correct response, 1 point partial credit (as judged and agreed upon by two separate graders) and 0 points for a completely incorrect response. The mean score was 22.6 out of a possible score of 40 with no significant differences between campuses for any of the five key content areas of: Systems of Equations, Polynomials, Solving Equations, Factoring, and Graphing. The mean test scores for African-Americans (20.8) and Whites (24.5) were significantly different at the institutional level. Campus level mean test scores between African-Americans and Whites were not significant. Within gender, mean test scores were significantly different between male African-Americans and Whites at the institutional level. There were no significant differences between female African-Americans and Whites.

The Accuplacer cut off scores for placement into Math 082 were changed college-wide in the Spring of 2005, so it was decided to re-administer the LOA instrument in the Fall of 2005 to serve as a new baseline. The test was administered again in Fall 2006. Students who took the assessment test prior to the change in cut off scores in Spring 2005 were grandfathered for two years and allowed to take Math 082.

Stage 3: Redesigning the Course to Improve Student Learning

As a result of the Fall 2005 test results it was decided to place more emphasis in the three content areas of Systems of Equation, Factoring, and Graphing. Following the administration of the LOA instrument in the Fall of 2006 it was further decided to expand the instruction for literal equations in Systems of Equations, Negative Numbers in Factoring, and Negative Slopes in Graphing.

Stage 4: Implementing Course Revisions and Reassessing Student Learning

The final administration of the Math 082 LOA instrument occurred in the Fall 2007 semester. The mean score increased from 22.97 in Fall 2005 to 25.00 in Fall 2007 (a significant difference). Caucasian/White students scored significantly higher on all three years' assessments than African-American/Black students and scores for female students showed a slight increase. African American/Black male student scores increased from Fall 2006 to Fall 2007. There were no significant differences between scores of students taught by full and part-time faculty.

Stage 5: Final Analysis and Reporting Results

The results from Fall 2007 showed small increases from the 2006 assessment with significant differences from the Fall 2005 data, both overall and at the item analysis level. Comparisons between sections taught by full and part-time faculty revealed no differences.

The recommendations from this LOA were integrated into the five year plan for Developmental Mathematics and include items such as using a common appeal test on all campuses, piloting the inclusion of study skills in Math 082 and piloting a departmental final to be administered at all three campuses. Once the departmental final exams for Math 081, Math 082 and Math 083 are standardized and adopted, the data in aggregate form will be analyzed on a yearly basis.