Math Assessment in the Core Curriculum
The University of Texas as Dallas
Spring 2003

Introduction

In compliance with the University of Texas System mandate to assess mathematics competency in the core curriculum, UTD created a mathematics assessment committee in the fall of 2001 to plan the implementation of the evaluation program. The Mathematics Planning Committee, comprised of members of the mathematics faculty, made the initial decisions as to the scope and depth of the assessment. The creation of the Implementation Committee, comprised of faculty directly responsible for the relevant math instruction, was charged with the implementation of the program. The evaluation was completed during the spring 2002 semester.

Planning

The mathematics planning committee made several decisions regarding the organization, scope, and target population for the math assessment.

1. The assessment should include only those students who complete their math core curriculum requirements at UTD. Therefore, assessment will be limited to students who begin UTD as first-time freshmen.
2. Students whose degree plans include at least one year of calculus are judged to have surpassed the core curriculum objectives in mathematics and are exempt from assessment. This includes all students with majors in the School of Business, School of Engineering and Computer Science, and School of Natural Sciences and Mathematics. This represents about 67% of all native undergraduate students.
3. All native students who complete the core curriculum in mathematics by taking courses in college algebra and quantitative methods will be subject to the assessment.
4. Assessment should be limited to students in College Algebra 1300, 1306, and 1314; Statistics 1342, Psychology 2317, and Social Science 3305. The last three courses all involve statistics and quantitative methods.
5. Assessment of educational objectives should be embedded in homework assignments, quiz and examination questions, and projects that are ongoing components of classes.

Implementation

At the recommendation of the Mathematics Planning Committee, the Implementation Committee was formed to operationalize their recommendations. This committee was comprised of the faculty responsible for teaching the targeted classes in algebra and statistics. This committee was chaired by Professor Wiorkowski from the mathematics department and included faculty members from behavioral and brain sciences, mathematics, and social sciences. Their first task was to develop a series of questions deemed suitable to assess the following exemplary objectives in mathematics set down by the UT System.

II. MATHEMATICS

The objective of the mathematics component of the core curriculum is to develop a quantitatively literate college graduate. Every college graduate should be able to apply basic mathematical tools in the solution of real-world problems.

Exemplary Educational Objectives

1. To apply arithmetic, algebraic, geometric, higher-order thinking, and statistical methods to modeling and solving real-world situations.

2. To represent and evaluate basic mathematical information verbally, numerically, graphically, and symbolically.

3. To expand mathematical reasoning skills and formal logic to develop convincing mathematical arguments.

4. To use appropriate technology to enhance mathematical thinking and understanding and to solve mathematical problems and judge the reasonableness of the results.

5. To interpret mathematical models such as formulas, graphs, tables and schematics, and draw inferences from them.

6. To recognize the limitations of mathematical and statistical models.

7. To develop the view that mathematics is an evolving discipline, interrelated with human culture, and understand its connections to other disciplines.

Over several months this committee generated a pool of questions thought to represent each mathematics objective and met several times to discuss the adequacy of specific questions. The pool of questions (See Attachment 1) underwent several revisions in reaction to the concerns of specific committee members. Two questions from each of the seven objectives were selected by individual faculty to include in their standard evaluations and homework

assignments. All instructors agreed to keep permanent records of all students'
answers to the assessment questions and release them to the Office of
Undergraduate Education at the end of the spring 2003 semester.   Responses
to assessment items were scored as percent correct.

Results

The responses of all eligible students (N=75) were extracted from the population
of students taking college algebra and quantitative methods classes during the
spring semester. Data were aggregated by course and objective. Scores were
expressed as percent correct.

Table 1

		Exemplary Educational Objective						
	One	Two	Three	Four	Five	Six	Seven	Total
Percent Correct	93.28%	79.60%	77.02%	83.20%	85.80%	88.93%	92.67%	85.74%

Table 1 collapses responses across classes to view the assessment results by
objective. Student proficiency ranged from a high of 98.28% for the objective
relating to mathematical skills and real-world situations to a low of 77.02% on the
objective assessing mathematical arguments. The average percent correct,
85.74% would correspond to an approximate grade of B- for students.

Table 2 repartitions the results by course having collapsed across objective. The
slight difference in total percent correct between the two tables results from
rounding errors in aggregating the data. Student performance varied minimally
based on whether the course was taught within the math department (84.3%) or
by faculty from other schools (86.9%). There were also small differences
between classes in college algebra (85.7%) and quantitative methods (87.5%).

Table 2

Course	Number	Average Correct
MATH 1306-001	13	93.08%
STAT 1342-002	8	79.78%
MATH 1314-001	12	77.78%
PSYCH 1372	21	91.84%
SOC 3305 BRAY	9	80.56%
STAT 1342-001	10	81.97%
STAT 3305 TARAS	2	88.93%
Total Number	75	
Average over Classes		84.85%

Summary

The results from our spring 2003 mathematics evaluation of liberal arts and social and behavioral science students seems a satisfactory indication of these student's mastery of the broad educational objectives in mathematics set down by the UT System. The implementation committee is meeting again this fall to generate additional assessment questions, recalibrate the metrics used to grade the responses, and discuss how we might alter the curriculum in specific classes to improve student scores with regard to specific objectives.