

OHIO NORTHERN UNIVERSITY

2007 ANNUAL REPORT ON THE ASSESSMENT OF STUDENT LEARNING

Academic Program: Mathematics/Statistics

Department: Mathematics

College: Arts and Sciences

Submitted by/Date: December 3, 2007

The Annual Report on the Assessment of Student Learning consists of three parts.

Part I provides the learning objectives and measures as previously identified.

Part II requests information about assessment activities for the previous academic year.

Part III requests information about programmatic or operational changes occurring or being proposed as a result of assessment activities.

Reports must be submitted by department chairs to the Office of Institutional Research by ***December 3, 2007***. Each annual report will be evaluated by the University Assessment Committee and returned to the department chair and the respective Dean by ***March 3, 2008***.

I. ASSESSMENT PROGRAM COMPONENTS

A. Learning Objectives

Mathematics / Statistics Track

1. Acquire core knowledge of mathematics required to provide background in an advanced topic in probability and/or statistics.
2. Demonstrate the ability to place probabilistic or statistical results in the appropriate historical context.
3. Demonstrate the ability to apply probabilistic or statistical knowledge to situations outside of courses.
4. Demonstrate the ability to understand and to create probabilistic or statistical arguments.
5. Demonstrate the ability to independently investigate a probabilistic or statistical topic.
6. Demonstrate the ability to communicate probabilistic or statistical results in written form.
7. Demonstrate the ability to communicate probabilistic or statistical results in oral form.

B. Measurements

- Evaluation of senior capstone presentations
- Evaluation of senior capstone papers
- External examinations
- Senior Exit interview
- Portfolio review
- Sophomore review
- Review of performance in Junior seminar

II. ASSESSMENT ACTIVITIES FOR 2006-07 (ACADEMIC YEAR)

A. Describe the *measures* used to collect the data?

(Which measures did you use during the past year? Which learning objectives does each measure address? How and when did you administer the measures?)

The following measures were used to collect data:

- Evaluation of senior capstone presentations

This measure is used to measure objectives 1, 2, 3, 4, 5, and 7. The presentations are the concluding work required in the Senior Exposition course, Mathematics 493. A panel consisting of three faculty members evaluates the presentations: the capstone advisor, the chair, and a faculty member selected by the capstone advisor.

- Evaluation of senior capstone papers

This measure is used to measure objectives 1, 2, 3, 4, 5, and 6. The papers are collected as part of the course requirements for the Senior Exposition course, Mathematics 493. A panel consisting of three faculty members evaluates the papers: the capstone advisor, the chair, and a faculty member selected by the capstone advisor.

- External examinations

Math/Stat majors are not required to take external examinations. Exams that might be taken include the Advanced Mathematics GRE and one or more of the actuarial exams. Such exams would provide a measure for objective 1.

- Senior Exit interview

This measure is used to measure objectives 1, 2, 3, 4, 5, 6, and 7. At the end of their last quarter at ONU, graduating students are interviewed by a team consisting of the department chair and the department assessment coordinator. After the interview, conclusions are drawn about the relevant learning objectives.

- Portfolio review

This measure is used to measure objectives 1, 2, 3, 4, and 5. At the end of each quarter faculty members complete an Evaluation of Majoring Student form for each of the majors that were enrolled in their courses that quarter. The forms are compiled into a notebook indexed by course and are reviewed annually by the department's assessment committee to draw conclusions about the relevant learning objectives.

- Sophomore review

This measure is used to measure objectives 1, 2, 3, 4, and 5. At the end of a major's sophomore year, the major's advisor reviews the major's progress and writes the student an evaluative letter.

- Review of junior seminar papers

This measure is used to measure objectives 1, 3, 5, and 6. Each Math/Stat major writes a mathematical/statistical autobiography as part of the coursework in Math 370 - Junior Seminar. This paper includes a self-assessment of the student's mathematical/statistical development.

B. Present the *results* of the data collection and analysis for each measure listed above.

(Present the data resulting from 2006-07 assessment activities. What are the standards and expectations for performance? Did the students meet the standards? What gaps were found between the standards for student learning and the actual results? *Please do not include any students' names.*)

Following are the results of the data collection and analysis for each measure:

- Evaluation of senior capstone presentations/papers

No Math/Stat major completed a senior capstone projects during the 2006-07 academic year.

- External examinations

No Math/Stat major took an external exam during this review period.

- Senior Exit interview

No Math/Stat major graduated during the 2006-07 academic year.

- Portfolio review

The Evaluation of Majoring Student forms were reviewed for the time interval starting with Spring 2005-06 and ending with Spring 2006-07. Comments on the review of these forms follow:

Stat 156 (Biostatistics 1) - Three forms were reviewed. [REDACTED]

[REDACTED]
* Information removed for confidentiality.

Stat 256 (Biostatistics 2) - Five forms were reviewed. All of the students performed at a satisfactory level.

Stat 280 (Statistics for Scientists and Engineers) - One form was reviewed. This student met expectations for all of the course outcomes.

Stat 350 (Statistical Computing) - Five forms were reviewed. All of the students performed at a satisfactory level.

Stat 351 (Categorical Data Analysis) - Four forms were reviewed. All of the students mastered the great majority of the material.

Math 480 (Probability Models) - Five forms were reviewed. One of the students exceeded expectations for all of the course outcomes. The other four met or exceeded expectations for all of the course outcomes.

Math 481 (Mathematical Statistics 1) - Five forms were reviewed. All of the students mastered most of the material.

Math 482 (Mathematical Statistics 2) - Five forms were reviewed. All of the students mastered most of the material.

- Sophomore review

The sophomore review of the one sophomore Math/Stat major indicated that he was on track. No problems to report at this point in his program.

- Review of junior seminar paper

Four Math/Stat majors participated in Math 370 - Junior Seminar during the 2006-07 academic year. A review of their junior seminar papers revealed that these students appreciate the small class size and closely knit community of math/stat majors at ONU. They characterized the mathematics department faculty as approachable and extremely helpful. They noted an emerging interest in and passion for the field of statistics. Several commented on the value of tutoring other students. One said that she didn't realize how much she was learning until she began tutoring. Two of the students mentioned how much they enjoyed the MATH 480 - Probability Models course. One student felt that a calculus placement test would be helpful to entering students. Another suggestion was for the department to offer more guidance in the actuarial science area.

III. PROGRAMMATIC /OPERATIONAL ADJUSTMENTS

A. Describe the *adjustments*, if any, to the program or the program's operations (including budgetary) which are either being proposed or have already been made in order to narrow the gaps identified between learning objectives and actual outcomes.

(What changes in curriculum, instructional strategies, course content, personnel, facilities, equipment, resource allocation, etc. are recommended to address the gaps between expected performance and actual results?)

1. No adjustments to the mathematics/statistics major curriculum are recommended based upon the data gathered and reviewed for this assessment.
2. Department faculty should review advising practices with the goal of better serving students interested in actuarial science.

B. Describe the *changes* that need to be made to the assessment plan and practices for the future?

(Have questions been raised about the effectiveness of the assessment plan? If so, what changes are needed? Are different objectives, measures, analysis, etc. needed?)

1. A few of the Evaluation of Majors forms used in the portfolio review have been changed to reflect a more quantitative approach. This needs to be done for the remaining forms.
2. The department should consider developing a process for assessing the calculus knowledge of entering students.
3. The department should consider requiring an external exam for mathematics/statistics majors.