

BA Mathematics
Assessment due November 1, 2010

Goal Assessed:

BA, Mathematics - Goal #4. Demonstrate ability to write clear, well-reasoned proofs.

Course:

Math 485: Theoretical Probability and Mathematical Statistics

Assessment Question:

(see attached)

This question appeared on a final exam Spring 2010 and accounted for 25% of the points on the exam.

Rubric Used on Exam:

0-25 pts Based on correctness of method used, completeness and quality of explanations and correctness of proofs.
 (12.5 points per question)

Rubric Used for Assessing Goal:

0-5 0-2 = Not meeting goal
 3-4= Minimally meeting goal
 5= Fully Meeting goal

Results

Student	Exam Score on Question		Total Score on Final Exam (out of 200 points)	Course Grade	Assessment Score	Comments
	a	b				
1	12.5	2.5	129	2.6	1	Only a few definitions provided for question b.
2	0	0	61	0.0	0	No solution attempted
3	6.5	6.5	153	2.3	2	Incomplete solution. Flaw in mathematical reasoning
4	4.5	0	132	2.6	1	Only a few definitions provided for question a.
5	4.5	6.5	106	0.0	2	Incomplete proof. Flaw in mathematical reasoning
6	12.5	6.5	188	4.0	4	In question b. did not prove that the statistic is sufficient (only showed it is unbiased and consistent)

Students fully meeting goal (5): 0.00%
 Students minimally meeting goal (3-4): 16.67%
 Students not meeting goal (0-2): 83.33%

2009-10 Program Assessment Update

Department & Program: Mathematics: BAE Secondary Education

submitted by: Mathematics Education Committee

As one part of ongoing program assessment at Eastern Washington University, each department is asked to report on assessment results for *each* program for *at least one* Student Learning Outcome this year. Use this electronic file to report on your program assessment for AY 2009-10, and please submit it to both your Dean and to Academic Affairs (SHW 220) by Nov. 1, 2010. The following definitions explain the assessment information you'll enter in the table below:

1. **Student Learning Outcome:** The student performance or learning objective as published either in the catalog, the AIEA assessment data portal, or elsewhere in your department literature.
2. **Strategy or method of measurement:** Mode and process through which student performance data was gathered. Examples: embedded test questions in a course or courses, portfolios, in-class activities, standardized test scores, case studies, analysis of written projects, etc. Additional detailed description could describe the use of rubrics, etc. as part of the assessment process.
3. **Observations gathered from data:** The findings and analysis of those findings from the above strategies.
4. **Actions recommended based on observations:** Course (activities or content) or program changes recommended.
5. **Plan and timeline for taking action:** How the recommended actions will be implemented, and in what timeframe.
6. **Overall evaluation of progress on objective:** The extent to which the student learning outcome is still valid and the assessment of it is producing important and meaningful data.

Please fill out a separate assessment table for each program of study (e.g., one table for BA-Art, another for BAE-Visual Arts, etc.). As needed, add additional rows to the table for each student learning outcome for which you gathered assessment results during 2009-10.

1. Student Learning Outcome	2. Strategy or method of measurement	3. Observations gathered from data	4. Actions recommended based on observations	5. Plan and timetable for taking action	6. Overall evaluation of progress on objective
A. Develop the ability to interact with learners (e.g., assess learning, motivate learners) and to promote learners' interaction with others	<ul style="list-style-type: none"> • Practicum observations from AY 2009-10 • Analysis of student work assignment from Practicum 	<ul style="list-style-type: none"> • In general, moderate to substantial growth demonstrated over time by all 8 students • Scores ranging from 3⁻ to 4⁺ on a 4-point scale 	<ul style="list-style-type: none"> • Continue to provide individual feedback to each Practicum student on a weekly basis • Continue to provide feedback on this aspect of 8 lesson plans and analysis of student work assignment 	<p>AY 2010-2011, Fall and Winter quarters</p> <p>Contact supervising teacher at end of quarter to gain his/her input on student's performance.</p>	<p>This is an important learning outcome that we should continue to monitor on a regular basis</p>
B. Develop the ability to translate conceptual knowledge into lessons/tasks that address a conceptual understanding of the topic	<ul style="list-style-type: none"> • Unit Plan -- 2 drafts submitted for feedback and final plan submitted for assessment • Professional Admissions Interviews from AY 2009-2010 	<ul style="list-style-type: none"> • Growth over time demonstrated by all 8 candidates; final scores on unit plans ranged from 3⁻ to 4⁺ on a 4-point scale. • Of 8 students interviewed, 7 passed on 1st attempt; one completed a remediation assignment before final approval. 	<ul style="list-style-type: none"> • Continue providing intermediate feedback to students on how their unit plans address conceptual understanding. • Continue to interview majors as a component of EDUC 420 and provide meaningful remediation as needed. 	<p>AY 2010-2011.</p> <p>Contact supervising teacher at end of quarter to gain his/her input on student's performance.</p>	<p>This is an important learning outcome that we should continue to monitor on a regular basis with the addition of more input from the supervising teacher.</p> <p>Of the 10 secondary math majors who took the WEST-E, 9 scored above the statewide average, and all 10 passed.</p>

Mathematics: Bachelor of Arts:

Student Learning Outcome:

- 1) Write clear well reasoned proofs
- 2) Demonstrate competence in mathematics and school mathematics.

Strategy of method of measurement:

Embedded test questions from randomly selected analysis and algebra courses. The questions were chosen to represent core ideas in each course. We divided the data between freshman and sophomore in one set and senior courses in the other. For the second mission statement, we focused on the first part (competence in mathematics) as it is more applicable to pure mathematics.

Specific Questions Asked for in each class and the motivation for these questions.

Math 162 – Calculate the following integrals

- a) $\int_0^{\pi} (2x + \sin x)\sqrt{x^2 - \cos x} dx$
- b) $\int \tan x dx$
- c) $\int e^{2\theta} \cos \theta d\theta$

Math 231 –

- a) Prove or disprove that the following sets are subspaces of \mathcal{R}^2
- b) Prove or disprove that the following functions are linear transformations.

Math 433 – Find a minimal extension field of Z_2 for which the degree two and degree three irreducible polynomials that you chose factor completely. Describe the elements and the roots of the polynomials in the extension field that you constructed.

Math 461 – Explain what it means to say that a function $f : \mathcal{R}^n \rightarrow \mathcal{R}^n$ is differentiable at x_0

These questions were chosen since they represent a sample of the basic core of each course. All students in the courses should do well on these particular questions.

Observations gathered from the data:

- a) Data were selected from the examinations in Calculus 2, Linear Algebra, Modern Algebra 3, and Advanced Calculus 1 and 2.
- b) Findings from the 91 lower level sampled examinations indicate that 29% scored above 85% on the selected questions, 31% scored between 70% and 85%, 22% scored between 50% and 70% and 17% of students failed the questions.
- c) Findings from the 29 upper level sampled examinations indicate the 52% scored above 85% on the selected questions, 28% scored between 70% and 85%, 10% scored between 50% and 70% and 10% failed the questions.
- d) As anticipated the upper level students over all faired significantly better than lower level students.

Actions recommended based of observations:

- a) Continue focusing and expanding on the core ideas for each course.
- b) Target underperforming students early in an attempt to rectify problems before they become systemic.
- c) Continually emphasize outside resources, such as the algebra lab, which enhance the classroom learning experience.

Plan and timetable for taking action:

- a) Continually emphasize the importance of learning outside the classroom setting. Target poorly performing students early study skill lessons.
- b) This is to be implemented during the 2010/2011 academic year.

Overall evaluation of progress on objective:

- a) These Student Learning Outcomes are still central to the programs mission. The second SLO should be split into to two to represent the dichotomy of the math program. That is math education versus pure math.