

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 2011-12, and please submit it to both your Dean and to Academic Affairs (SHW 220) by Nov. 1, 2012. 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																																			
<p>Demonstrate computational proficiency using various strategies, including a conceptual understanding of numbers, relationships among number and number systems and meanings of operations with all real numbers.</p>	<p>Test questions from Math 411: Discrete Mathematics for K-8 teachers</p> <ol style="list-style-type: none"> <li>1. Is 15.735 a rational number? Justify.</li> <li>2. Is <math>\frac{1}{0}</math> irrational? Justify.</li> <li>3. Is 0 even, odd, or neither? Justify.</li> <li>4. Prove that if <math>r</math> and <math>s</math> are integers, then <math>4r^2 - 6s + 3</math> is an odd integer.</li> </ol>	<p>26 Math elementary majors took this exam. The first three questions were graded on a scale of 0-3 points, where 0 points were assigned if there was no evidence of understanding, and 3 points were assigned if answers and justifications showed excellent understanding and ability to explain. The fourth question was scored on a scale of 0-4. The table below gives the percent of students who scored each number of points.</p> <table border="1" data-bbox="793 483 1234 652"> <thead> <tr> <th rowspan="2">Question</th> <th colspan="5">Percent of students with score</th> </tr> <tr> <th>0</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0</td> <td>0</td> <td>11.5</td> <td>88.5</td> <td>N/A</td> </tr> <tr> <td>2</td> <td>0</td> <td>38.5</td> <td>11.5</td> <td>50.0</td> <td>N/A</td> </tr> <tr> <td>3</td> <td>3.8</td> <td>11.5</td> <td>3.8</td> <td>80.8</td> <td>N/A</td> </tr> <tr> <td>4</td> <td>0</td> <td>0</td> <td>15.4</td> <td>15.4</td> <td>69.2</td> </tr> </tbody> </table> <p>The concepts related to all four questions are introduced in Math 211, encountered in other courses, such as Math 311 and Math 420, and are important ideas for K-8 teachers. By the end of Math 411, students should be able to answer them correctly and justify using definitions and relationships. In general, more than 80% of the students answered #1 and #3 correctly and with conceptual understanding. However, this number should be closer to 100%. Question 4 targets an understanding of closure of the set of integers, but is more abstract than is usually encountered in Math 211. Almost 70% of students earned the highest score of 4 on this problem. Only 50% of students earned full credit on #2. The justifications given by those who did not earn full credit demonstrate misconceptions about the meaning of 'undefined,' the need for and use of definitions in mathematics, and lack of understanding about the number system, irrational numbers in particular.</p>	Question	Percent of students with score					0	1	2	3	4	1	0	0	11.5	88.5	N/A	2	0	38.5	11.5	50.0	N/A	3	3.8	11.5	3.8	80.8	N/A	4	0	0	15.4	15.4	69.2	<p>Instructors of the courses where these ideas are addressed should discuss teaching strategies and connections they can use throughout the program to support students' understanding of this outcome. These particular outcomes should be mastered in Math 211 by all future elementary teachers. Unfortunately, the number of concepts that must be mastered in Math 211 and Math 212 is too great for most students to learn in two quarters, and the courses are most often taught by adjuncts or lecturers who are not included in conversations about the program. Thus, action items can include either having only tenure track math educators who teach the courses, or having meetings with lecturers and adjuncts who teach the courses.</p>	<p>Mathematics education faculty will address this issue with the department chair during the Fall of 2012, so that we can schedule meetings with all those instructors who teach Math 211 and Math 212 to brainstorm ways to support students' mastery of these number concept. Assessment will be conducted again in the Winter and Spring of 2013 for Math 211 courses.</p>	<p>Math elementary majors were not as strong at this outcome as we would hope, so we will continue to monitor and come up with ideas for increasing student understanding.</p>
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