

**Embedded Math Pilot: Fall 2008 (Pilot 2) and Spring 2009 (Pilot 3)**

**AWC General Education Outcome: Quantitative Analysis**

<b>AWC General Education Outcome: Quantitative Analysis – Embedded Math Pilot 2 and 3</b> Academic Achievement Report – Academic Year 2008-2009	
Statement of Purpose	Learning-Centered Values: Arizona Western College graduates will demonstrate competency in communication, critical thinking, quantitative analysis, and technology applications.
Intended Student Learning Outcomes	Graduates will: 1) Identify and extract relevant data from given mathematical or contextual situations. 2) Select known models or develop appropriate models that organize data into: tables or spreadsheets (with or without technology); or graphical representations (with or without technology); or symbolic/equation format. 3) Obtain correct mathematical results and state those results with qualifiers. 4) Use the results to: (a) determine whether they are realistic in terms of the original situation; or (b) determine whether the mathematical model/representation of data was appropriate; or (c) describe a trend in a table, graph, or formula and make predictions based on trends; or (d) draw qualitative conclusions in written form.
Tools for Assessment and Criteria for Success	A) 100% of the graduates will correctly answer 6 or more questions. B) Additionally, 75% of participating graduates will correctly answer each multiple-choice question on a locally designed test that addresses all of the target outcomes for quantitative skills.  <i><b>MAT 151 College Algebra: Standard, MAT 187 Pre calculus and MAT 142 College Mathematics with Applications</b></i> were kept as a second pilot (first pilot Spring2008) for 2008-09 assessment period. These courses are a requisite for students pursuing a degree or an AGEC certificate and are required to take one of these three math courses.  Two separate math exams were created. One for MAT 142 and a second one for Mat151 and MAT 187. The purpose for this was to have appropriate math concepts to the level of math in which certain competencies are being taught. The math questions to this pilot were different from the GE Quantitative Analysis exam and met the outcomes stipulated. Questions to the exam were re-designed and linked to the GE Quantitative Analysis as indicated below. For purposes of posting this report on-line, the section that reveals the actual assessment tool (exam) will be 'blacked-out'. The assessment tool (exam) can be located at the Assessment and Program Review office or in the Math Department.  * * * [Redacted] [Redacted] [Redacted] Outcome 1 "Identify and extract relevant data from given mathematical or contextual situations" and Outcome 3 "Obtain correct mathematical results and state those results with the qualifiers." [Redacted] Outcome 1 "Identify and extract relevant data from given mathematical or contextual situations" and Outcome 3 "Obtain correct mathematical results and state those results with the qualifiers." [Redacted] Outcome 2 "Develop appropriate models that organize the data into graphical representations" [Redacted] [Redacted]



Outcome 2b. Select known models or develop appropriate models that organize data into graphical representations


Outcome 2c. Select known models or develop appropriate models that organize the data into symbolic/equation format

Outcome 4a. Use the results to determine whether they are realistic in terms of the original situation

Outcome 4c. Use the results to describe a trend in a table, graph, or formula and make predictions based on trends

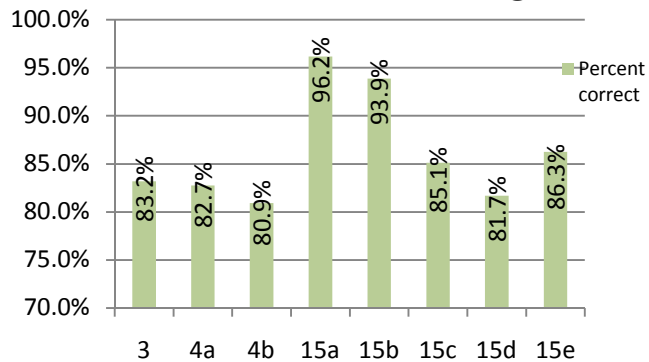
Summary of Data Collected for MAT 142 during Fall 2008

Embedded math was scheduled to occur during Spring 2009; however, faculty was able to complete questions and ready to begin a semester earlier than expected and implemented the assessment tools during Fall 2008.

**MAT142:** A total of 131 students answered the 8 questions in MAT 142 on test one. All sections of live MAT 142 participated and one web course did not participate. Questions 3 and 4 were given on the in-class portion of exam. Question 15 was part of the take-home portion of the exam because of the computer component—students need to use Excel to accomplish #15.

Fall 2008 Embedded Math results met the criteria for success in all 8 questions which states that “75% of participating graduates will correctly answer each multiple-choice question on a locally designed test that addresses all of the target outcomes for quantitative skills.” Results on students answering 6 or more questions were not gathered.

**Fall 2008 Embedded Math  
MAT 142 N=131**



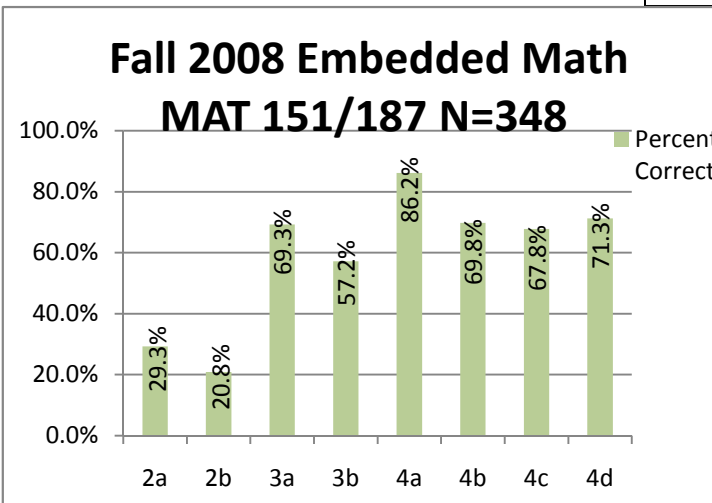
MAT 142			
Outcome	Question #	Total	% correct
1 and 3	3	109	83.2%
1 and 3	4a	108.4	82.7%
2	4b	106	80.9%
2	15a	126	96.2%
2	15b	123	93.9%
4c	15c	111.5	85.1%
4c	15d	107	81.7%
4a	15e	113	86.3%

Summary of Data Collected for **MAT 151 and MAT 187** during Fall 2008

**MAT 151 and MAT 187:** A total of 348 students were administered the embedded questions in math. Thirteen (13) of the fourteen (14) sections of Mat 151 and seven (7) of the eight (8) sections of MAT 187 taught at AWC during Fall 2008 were included in this pilot. The sections not included were web classes with instructors who did not use a written final exam.

Fall 2008 Embedded Math results in MAT 151 and MAT 187 resulted in one question only meeting the criteria for success at 86%. All other seven questions answered did not meet our target of 75%. Results on students answering 6 or more questions were not gathered.

MAT 151/187			
Outcome	Question #	Totals	% correct
2c	2a	102	29.3%
3	2b	73	20.8%
2c	3a	241	69.3%
3	3b	199	57.2%
1 and 2b	4a	300	86.2%
2c	4b	243	69.8%
4a	4c	236	67.8%
4c	4d	248	71.3%



Summary of Data Collected for **Spring 2009**

**Spring 2009:** During Spring 2009, the **ACT/CAAP Mathematics** test was used to replace the embedded questions used in the classroom during Fall 2008. Students were given extra credit to participate and the testing locations were conducted after class hours in the LA and LR building. The reliability of this exam is in question as it is believe that students who feel more comfortable in taking math exams may feel opt to taking the exam than those students with math anxiety. Also, students who may have needed the extra credit to receive a better grade in class may have been a factor in participating. Despite the reliability of the process used, the

	<p>26 students were administered the ACT/CAAP Mathematics exam. During Spring 2009, 25 of the students were enrolled in MAT151 and one student was enrolled in MAT 183 and MAT 130 simultaneously.</p> <p>Nineteen (19) students scored at or above the national mean score for sophomores at two-year colleges. Twenty-two (22) students successfully completed and passed the courses and four students did not.</p> <p>Two students, who received a certificate of achievement in scoring at or above the national mean score from ACT/CAAP, did not successfully complete/pass the course. This may be for many factors such as students not completing assignments, finals, etc. It was determined that a larger number of students are needed to make any further conclusions.</p>
<p>Analysis and Use of Results</p>	<p>The assessment tools initially created and implemented during Fall 2008 will be administered during Fall 2009 and Spring 2010 (2009-10AY). The ACT/CAAP Mathematics was not completely supported by the math faculty as it was considered too long and the ACT/CAAP contained math problems that were not appropriate for MAT 142 but rather more appropriate for MAT 151 and so forth. The math department has agreed to take a closer look at the ACT/CAAP Mathematics test to make a final decision while embedded math used during Fall 208 will continue during 2009-10AY.</p>