Mathematics - Teaching Program Assessment
Spring 2013

For Spring 2013, one learning outcome was assessed in the course M329: Modern Geometry. As stated in the assessment plan, by completing the Mathematics Major - Teaching option, students were assessed on their ability to

4. [CCSSGeometry] Create, critique, and revise proofs in Euclidean and non-Euclidean geometries.

This outcome was assessed using a cluster of representative items from the final exam for M329. For each cluster, a student's responses to all items in that cluster was given a score, according the following rubric from the assessment plan.

Unacceptable	Acceptable	Proficient
1	2	3
Displays limited range of appropriate reasoning, problem solving, or modeling strategies in the mathematical content focus that would enable success in the teaching profession.	Displays an adequate range of appropriate reasoning, problem solving, or modeling strategies in the mathematical content focus that would enable success in the teaching profession.	Displays a substantial range of appropriate reasoning, problem solving, or modeling strategies in the mathematical content focus that would enable success in the teaching profession.

Assessment Items
Item 1a on the final exam assessed students' ability to create a Euclidean proof: Write a complete proof of the ASA criterion for congruent triangles theorem using a transformational approach.
Item 1c on the final exam assessed students' ability to critique Euclidean proofs: Compare two different approaches for proving the ASA criterion for congruent triangles theorem.
Item 2 on the final exam assessed students' ability to create a non-Euclidean proof: In hyperbolic geometry, state and prove a property of a quadrilateral with four congruent angles and a pair of adjacent sides congruent.
Students' ability to revise proofs was assessed in the Redo portion of midterm 2: Redo any problem from the midterm on which your proof had a critical error.

Assessment Results

	Unacceptable Level	Acceptable Level	Proficient Level
Number (percentage) of students achieving this level	0	9	8

100% of the students in the course demonstrated an acceptable level in this learning outcome. Further, 47% demonstrated a proficient level for the outcome.

Formative Assessment

Students’ performance overall was strongest in critiquing and revising both Euclidean and non-Euclidean proofs. Six students struggled with constructing a viable proof for the given Euclidean task; one struggled for the given non-Euclidean task. But, because all students are able to successfully revise their own written proofs, all have demonstrated the ability to meet this learning outcome given enough time; some are unable to within the confines of a testing situation. Because an important aspect of teaching geometry is responding in the moment to classroom questions, instruction in the future can focus on providing students opportunities to practice creating proofs in a specified time frame.

Conclusion

The Mathematics-Teaching major at Montana State has successfully met the criteria set forth in the program assessment plan.