

EWU Programmatic SLO Assessment

AY 2015-16 and “Closing the Loop” for AY 2014-15

Introduction:

Assessment of student learning is an important and integrated part of faculty and programs. As part of ongoing program assessment at Eastern Washington University, each department is asked to report on assessment results for *each* program and *each* certificate for *at least one* Student Learning Outcome (SLO) this year. To comply with accreditation standards, the programs must also demonstrate efforts to “close the loop” in improving student learning and/or the learning environment. Thus, this template has been revised into two parts.

Resources:

Check this site for sample reports (created with the previous year’s template) by EWU programs and other assessment resources: <http://access.ewu.edu/undergraduate-studies/faculty-support/student-learning-assessment/program-slo-assessment.xml>

Additional resources and support are available to:

- 1) Determine whether students can do, know or value program goals upon graduation and to what extent;
- 2) Determine students’ progress through the program, while locating potential bottlenecks, curricular redundancies, and more; and
- 3) Embed assessments in sequenced and meaningful ways that save time.

Contact Dr. Helen Bergland for assistance with assessment in support of student learning and pedagogical approaches: hberglan@ewu.edu or 359.4305.

Use this template to report on your program assessment. **Reports are due to your Dean and to Dr. Helen Bergland (hberglan@ewu.edu), Office of Academic Planning, by September 15, 2016.**

Degree/Certificate: BAE

Major/Option: Math Secondary

Submitted by: Mathematics Education Committee, with leads Carlos Castillo-Garsow and Jackie Coomes. Mathematics Department Chair Barbara Alvin

Date: 2016-06-20

Part I – Program SLO Assessment Report for 2015-16

Part I – for the 2015-16 academic year: Because Deans have been asked to create College-Level Synthesis Reports annually, the template has been slightly modified for a) clarity for Chairs and Directors, and b) a closer fit with what the Deans and Associate Deans are being asked to report.

1. **Student Learning Outcome:** The student performance or learning objective as published either in the catalog or elsewhere in your department literature.

M1: Demonstrate understanding of foundational content of modern mathematics and its applications.

M2: Reason mathematically and develop proofs with understanding.

M3: Employ the values, dispositions, and habits of mind of a community of mathematicians.

P4: Demonstrate understanding of mathematical learning progressions and connections within secondary mathematics.

P5: Critically read, analyze, evaluate, transform, and implement mathematics education literature.

P6: Display a sensitivity and ability to respond to the mathematical thinking of secondary students.

P7: Apply of pedagogical content knowledge for secondary mathematics in planning and teaching

P8: Employ habits of mind to continue improving teaching practices that support mathematics learning.

2. **Overall evaluation of progress on outcome:** Indicate whether or not the SLO has been met, and if met, to what level.

_____ SLO is met after changes resulting from ongoing assessments, referencing assessment results from the previous year to highlight revisions;

X SLO is met, but with changes forthcoming;

_____ SLO is met without change required

3. **Strategies and methods:** Description of assessment method and choices, why they were used and how they were implemented.

SLOs were assessed in all major methods courses (MTED 392 and 393) in Winter and Spring quarters. Additional detail on proofs (M2) and sensitivity to student thinking (P6) was collected from problem solving (MATH 492) and Practicum (MTED 490B). Tasks collected were: Capstone assignment (take home exams) in 392 and 393, Observations of students in field placement classrooms in 490B, and a proof task in 492. Capstone assignments and field placements touch on multiple SLOs. Assignments were evaluated based on a qualitative coding rubric linking observable behaviors to SLOs. See individual course reports for details.

Additionally, students in 492 wrote a self assessment evaluating their beliefs about their own progress toward the SLOs.

4. **Observations gathered from data:** Include findings and analyses based on the strategies and methods identified in item #3.

- a. Findings:

SLO scores for MTED 392 final capstone. SLOs marked "opt" are "optional" SLOs for this assignment where the appearance of the SLO in the students' assignment depended on choices made by the student.

	Not attempted	not met	met	exceeded
M1	0	4	2	3
M2(opt)	6	2	1	0
M3	0	4	2	3
P4(opt)	5	2	2	0
P5	4	1	4	0
P6(opt)	3	4	2	0
P7	1	3	5	0
P8	0	4	5	0

SLO scores for MTED 393 midterm capstone. SLOs marked "opt" are "optional" SLOs for this assignment where the appearance of the SLO in the students' assignment depended on choices made by the student.

	Not attempted	not met	met	exceeded
M1	1	3	2	2
M2(opt)	8	0	0	0
M3	1	3	3	1
P4(opt)	2	4	1	1
P5	4	0	3	1
P6(opt)	3	1	3	1

P7	1	4	3	0
P8	1	3	4	0

SLO scores for MTED 490B field observation.

	Not met	Met	Mastered
P6	2 (40%)	2 (60%)	1 (0%)

SLO scores for MATH 492 proof task.

SLO	Not met	Met	Mastered
M2	1 (16.7%)	5 (83.3%)	0 (0%)

b. Analysis of findings:

SLOs in the program are scored according to a standardized rubric across all classes, meaning the "not met" "met" and "mastered/exceeded" categories are based on level at the end of the program, not on the level appropriate for the particular course. The large number of students who have not met the end of program standards is therefore not a cause for concern. The improvement in student SLO scores from 392(final) to 393 (midterm) shows that the sequence is working as intended. However, there remain some areas of concern outlined below.

c. Qualitative observations:

M1: Demonstrate understanding of foundational content of modern mathematics and its applications.

- *MTED 393 Capstone:* Consistent with the common literature on this topic (i.e. Tall & Vinner), students form judgments about functions based on similarity to what they have previously seen, rather than on the definition. Many of the students at this level (but not all) were able to adapt when definition conflicted with prototype. This shows adequate, but not optimal understanding of the topic assessed.

M2: Reason mathematically and develop proofs with understanding.

- Student understanding of proof appears to be consistently weak. In both MTED 392 and MATH 492 students struggled to complete a proof, although this SLO should have been met earlier in the program.
- In particular the distinctions between proof, explanation, justification, and example seem to be particularly difficult for students.

M3: Employ the values, dispositions, and habits of mind of a community of mathematicians.

- *MTED 393 Capstone:* Student did not show a disposition to make sense of their result beyond finding an initial answer to the question. This lack of mathematical curiosity impaired their ability to continue with the follow up parts to the capstone questions.

P5: Critically read, analyze, evaluate, transform, and implement mathematics education literature.

- *MTED 392/393 Capstone*: Students struggled with recalling/understanding information that was easily searchable on the web, or contained in textbooks for lower division courses. This seems to be a combination of not thinking to search for the information, and not being sure of where to look.
- *MTED 392/393 Capstone*: When students did use external resources in solving a capstone, they rarely (1 student) looked beyond solving the immediate problem and into the more detailed surrounding topic described in the text. This appears to be connected to the lack of mathematical curiosity described above.

P6: Display a sensitivity and ability to respond to the mathematical thinking of secondary students.

- *MATH 492 Self Assessment*: Some of them indicated that they believed the problems they were solving in 492 were well beyond the capabilities of high school students. Thus, this disposition of low expectations for high school students seems to be an issue with our students.
- *MTED 490B Field observation*: The purpose of much of the questioning by teacher candidates appears to be to lead their students to follow the teacher candidates' thoughts on the mathematics, or to see if students recall a procedure (e.g. "what is the next step?") rather than to find out what students are thinking, to promote mathematical ways of thinking, or to provoke students to think about the key mathematical ideas of the lesson.
- *MTED 490B Field observation*: The students in the Met category asked some probing questions and responded to the mathematical thinking of students, but did not use student ideas to further the understanding of others in the class in this observation.
- *MTED 490B Field observation*: The student who exceeded the SLO facilitated a whole class discussion in which several students shared their own ideas about the mathematics with the whole class, and the teacher candidate briefly used those ideas as she helped students develop the ideas of the lesson. Note that this was brief and not prevalent in the lesson.

P8: Employ habits of mind to continue improving teaching practices that support mathematics learning.

- *MTED 392 Capstone*: The midterm capstone did not initially have the self-reflection component. Adding a required self-reflection component greatly improved scores in P8 over the midterm capstone. More students are now articulating a need to grow in their mathematical understanding.
- *MATH 492 Self Assessment*: Students described adequately where they were with objectives (P4) and (M1) and described why they were important for their teaching. They had plans for improvement (the detail varied), showing adequate self-reflectiveness.

5. What program changes will be made based on the assessment results?

a) Describe plans to improve student learning based on assessment findings (e.g., course content, course sequencing, curriculum revision, learning environment or student advising).

- MATH 492 will be renumbered to be a sophomore level course with a prerequisite of only Math 225 so that students start gaining insights about purposes of proof before they take many upper level courses involving proof. Students will be advised to take it the spring of their sophomore year.
- Moving a renumbered MATH 492 earlier in the program will also help students develop cultural values about mathematical curiosity and what is or is not a satisfying and complete solution.
- The reading content in MTED 392 will be redesigned to include a lesson on finding and making use of literature in the field.
- Teacher candidates arrive into the program with a strong belief that the purpose of teacher questioning and responses is to lead students to their way of thinking. Thus, the program will target this specific belief explicitly by providing vignettes and videos for students to compare and contrast in their methods courses. We will also provide opportunities for teacher candidates to practice demonstrating their understanding of these differences in their methods assignments.
- We will continue to revise and consistently use rubrics for each program SLO throughout the program to help students understand the characteristics of the work we expect them to produce.
- We are currently experimenting with an early practicum course (MTED 290) as a way to further increase teacher candidates exposure to students and provide better preparation for the methods courses.

b) Provide a broad timeline of how and when identified changes will be addressed in the upcoming year.

- We will submit the course and program changes to CPAC in the fall of 2016.
- Methods faculty have discussed the implications and are addressing them in all methods classes in 2016-17. (Fall 2016: MTED 493 & 490B, Winter 2017 MTED 392 & 490B, Spring 2017 MTED 393)

6. Description of revisions to the assessment process the results suggest are needed and an evaluation of the assessment plan/process itself.

- The SLO standard rubric will be revised based on collected data to better serve as a tool for describing that data. In particular:
 - We will revise the rubric for SLO M2 to include students' understanding of the purposes of proof.

- We will revise the rubric to better capture what we expect of students and share the rubric with them.
- SLOs may themselves be revised as revisions to the standard rubric suggest possible new groupings of student behavior.
- Given a choice of capstones, Students tended to choose capstone that was least intimidating, over the capstone that was least difficult. However the distinction is subtle enough that it did not provide useful information on student progress toward any particular SLO. Choice of capstones needs to be adjusted to not only be equal in difficulty, but also to appear equal in difficulty to students (equally intimidating rather than equally difficult).

NEW: PART II – CLOSING THE LOOP
FOLLOW-UP FROM THE 2014-15 PROGRAM ASSESSMENT REPORT

In response to the university's accrediting body, the [Northwest Commission on Colleges and Universities](#), this section has been added. This should be viewed as a follow up to the previous year's findings. In other words, begin with findings from 2014-15, and then describe actions taken during 2014-15 to improve student learning along, provide a brief summary of findings, and describe possible next steps.

PLEASE NOTE: The College-Level Synthesis report includes a section asking Deans to summarize which programs/certificates have demonstrated "closing-the-loop" assessments and findings based on the previous year's assessment report.

Working definition for closing the loop: *Using assessment results to improve student learning as well as pedagogical practices. This is an essential step in the continuous cycle of assessing student learning. It is the collaborative process through which programs use evidence of student learning to gauge the efficacy of collective educational practices, and to identify and implement strategies for improving student learning.* Adapted 8.21.13 from <http://www.hamline.edu/learning-outcomes/closing-loop.html>.

1. Student Learning Outcome(s) assessed for 2014-15

Applications of Pedagogical Content Knowledge for Learning and Teaching

2. Strategies implemented during 2015-16 to improve student learning, based on findings of the 2013-14 assessment activities.

The strategies we identified on the 14-15 report are:

- Students need more specific feedback and clearer instructions on the level of mathematical detail expected in a response.
- Faculty teaching methods need to make student cognition present in all lessons, so that methods students learn how to address the student experience with the task, and not just the task itself.

3. Summary of results (may include comparative data or narrative; description of changes made to curriculum, pedagogy, mode of delivery, etc.): Describe the effect of the changes towards improving student learning and/or the learning environment.

- Improvement shown in capstone assignments scores seem to be attributable at least in part to the extensive feedback provided by both inline comments and rubric responses. The

two students who struggled most with appropriate level of detail in 393 were the two students who had not taken 392 the previous quarter. All other students had two capstones in 392 before being evaluated in 393 and showed improvement.

- Teacher candidates continue to struggle with addressing and imagining student experience in methods classes. We intend to address this by increasing our use of video and classroom artifacts in methods classes. However the core problem seems to be that teacher candidates have very little experience with living students until their final year of the program. We are currently experimenting with an early practicum to increase exposure to both video and live students.

4. What **further changes to curriculum, pedagogy, mode of delivery**, etc. are projected based on closing-the-loop data, findings and analysis?

- We are currently experimenting with an early practicum course (MTED 290) as a way to further increase teacher candidates exposure to students and provide better preparation for the methods courses.

Definitions:

1. **Student Learning Outcome:** The student performance or learning objective as published either in the catalog or elsewhere in your department literature.
2. **Overall evaluation of progress on outcome:** This checklist informs the reader whether or not the SLO has been met, and if met, to what level.
3. **Strategies and methods used to gather student performance data,** including assessment instruments used, and a description of how and when the assessments were conducted. Examples of strategies/methods: embedded test questions in a course or courses, portfolios, in-class activities, standardized test scores, case studies, analysis of written projects, etc. Additional information could describe the use of rubrics, etc. as part of the assessment process.
4. **Observations gathered from data:** This section includes findings and analyses based on the above strategies and methods, and provides data to substantiate the distinction made in #2. For that reason this section has been divided into parts (a) and (b) to provide space for both the findings and the analysis of findings.
5. **Program changes based on the assessment results:** This section is where the program lists plans to improve student learning, based on assessment findings, and provides a broad

timeline of how and when identified changes will be addressed in the upcoming year.
Programs often find assessment is part of an ongoing process of continual improvement.

6. Description of revisions to the assessment process the results suggest are needed.

Evaluation of the assessment plan and process itself: what worked in the assessment planning and process, what did not, and why.

Some elements of this document have been drawn or adapted from the University of Massachusetts' assessment handbook, "Program-Based Review and Assessment: Tools and Techniques for Program Improvement" (2001). Retrieved from http://www.umass.edu/oapa/oapa/publications/online_handbooks/program_based.pdf