Weber State University
Biennial Report on Assessment of Student Learning

Cover Page

Department/Program: Developmental Math
Academic Year of Report: 2018/19 (covering Summer 2017 through Spring 2019)
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A. **Brief Introductory Statement:**

Please review the Introductory Statement and contact information for your department or academic program displayed on the assessment site: **http://www.weber.edu/portfolio/departments.html** - if this information is current, please place an 'X' below. No further information is needed.

___ Information is current; no changes required.

Update if not current:

Developmental mathematics offers pre-college level math courses designed to prepare students for college level mathematics: Pre-algebra (Math 0950), Beginning Algebra (Math 0990), Pathway to Contemporary Mathematics (Math 0970), and Intermediate Algebra (Math 1010). The courses are available face-to-face and online. Face-to-face courses are offered in two different modalities: Flipped courses with a strong technology component and R.E.A.L. courses that focus on learning math conceptually, contextually, and procedurally. It is the goal of the WSU Developmental Mathematics program to assist students in gaining the math skills they need for success in college level mathematics in as short a time as possible.

B. Mission Statement

Please review the Mission Statement for your department or academic program displayed on the assessment site: **http://www.weber.edu/portfolio/departments.html** - if the mission statement is current, please place an 'X' below.; If the information is not current, please provide an update:

__X_ Information is current; no changes required.

Update if not current:

C. Student Learning Outcomes

Please review the Student Learning Outcomes for your academic program displayed on the assessment site: **http://www.weber.edu/portfolio/departments.html**. In particular, review in light of recent strategic reporting and indicate any needed updates. If the outcomes are current, mark below.

___ Information is current; no changes required.

SLO #1: Students will be able to demonstrate procedural knowledge of mathematics by competently performing algebraic operations.

SLO #2 Students will attend to precision by avoiding common errors, using math symbols and mathematical language appropriately, and neatly writing out their work.

SLO#3: Students will demonstrate understanding of foundational concepts such as identity, inverse, and equivalence.

SLO #4: Students will persist through difficulty and work through the entire semester.

SLO #5: Students who complete one or more developmental math course will have the knowledge and skills needed to successfully complete a Quantitative Literacy course.

D-1. Curriculum
"A collection of courses is not a program. A curriculum has coherence, depth, and synthesis."
(Linda Suskie; presentation at NWCCU Assessment Fellowship, June 19, 2019)

Please review the Curriculum Grid for your department or academic program displayed on the assessment site: **http://www.weber.edu/portfolio/departments.html**.

Indicate in the curriculum grid where student performance is assessed for each program outcome. In the 'additional information' section, please provide information about these assessments (e.g., portfolios, presentations, projects, etc.) This information will be summarized at the college and institutional level for inclusion in our NWCCU reporting on student achievement.

Curriculum Map Format

Course #/title (type of course)	Outcome #1 Procedural Knowledge	Outcome #2 Attend to Precision	Outcome #3 Conceptual Knowledge	Outcome #4 Persistence	Outcome #5 Complete QL
Math 0970	3	3	3	3	3
Math 1010	3	3	3	3	3

Note[a]: Define words, letters or symbols used and their interpretation; i.e. 1= introduced, 2 = emphasized, 3 = mastered or I = Introduced, E = Emphasized, U = Utilized, A = Assessed comprehensively; these are examples, departmental choice of letters/numbers may differ
Note[b]*:* Rows and columns should be transposed as required to meet the needs of each individual department

D-2. High Impact Educational Experiences in the Curriculum

In response to the recent USHE requirement that all students have at least 1 HIEE in the first 30 credit hours and 1 HIEE in the major or minor we are asking programs to map HIEEs to curriculum using a traditional curriculum grid. This helps demonstrate how and where these goals are accomplished.

Courses	HIEE 1: Evidence-based pedagogy	HIEE 2: Supplemental Instruction	HIEE 3: Collaborative learning	HIEE 4: Integrate Growth Mindset skills			
Math 0970	X	*	X	X			
Math 0950			X	X			
Math 0990			X	X			
Math 1010			X	X			

HIEEs include capstone courses or experiences, community-engaged learning, evidence-based teaching practices, internships, project-based learning, study abroad/away, supplemental instruction, team-based learning, undergraduate research, pre-professional/career development experiences.

Additional information (HIEE planning, assessment, or other information):

*Supplemental Instruction was piloted in one section of Math 0970 in Spring 2019.

E. Assessment Plan

Please update the Assessment Plan for your department displayed on the assessment site: http://www.weber.edu/portfolio/departments.html. Keep in mind that reporting will be done biennially instead of annually; that should be reflected in your assessment plan. Please ensure that Gen Ed courses are assessed/reported at least twice during a standard program review cycle.

A complete plan will include a list of courses from which data will be gathered and the schedule, as well as an overview of the assessment strategy the department is using (for example, portfolios, or a combination of Chi assessment data and student survey information, or industry certification exams, etc.), and plans for continuous improvement.

Assessment plan:

Learning Outcome	**Assessment Measure**	**Threshold of Evidence**	**When Assessed**
1. Procedural Knowledge	Specified procedural problems on the final exams of Math 970 and 1010 course sections.	70% of the specified questions will be answered correctly.	Every Spring semester
2. Attend to Precision	Rubric-guided analysis of student work on Test 2 Review or Exam in Math 970 and 1010.	80% of participating students will get 80% on the analysis.	Every Spring semester starting Spring 2020
3. Conceptual Knowledge	Specified conceptual problems on the final exams of Math 970 and 1010 course sections	80% of the specified questions will be answered correctly.	Every Fall semester starting Fall 2020
4. Persistence through Semester	W/UW rates for all courses	80% of students enrolled at 3rd week will persist through the end of the semester.	Every year.
5. QL Course Success	a. QL course pass rates of students who took dev math b. Comparison of the dev math cohort's QL pass rate with those students who placed directly into QL.	a. Students who enrolled in one or more dev math classes will pass QL courses at a rate of 70% or better. b. The pass rate of the dev math cohort of students will be statistically similar	a. Every year b. A five-year cohort will be measured every 2 years.

		to or better than the pass rate of students who placed directly into QL.	

F. Report of assessment results for the most previous academic year:

There are varieties of ways in which departments can choose to show evidence of learning. This is one example. The critical pieces to include are 1) learning outcome being assessed, 2) method(s) of measurement used, 3) threshold for 'acceptable – that is, the target performance, 4) actual results of the assessment, 5) interpretation/reflection on findings 6) the course of action to be taken based upon the interpretation, and 7) how that action will be evaluated.

A. <u>Evidence of Learning: Courses within the Major</u>
(**this is a sample page for purpose of illustration only**; a blank template can be found on the next page)

Evidence of Learning: Courses within the Major					
Measurable Learning Outcome Students will…	Method of Measurement Direct and Indirect Measures*	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results
Learning Outcome 1: Students will be able to demonstrate procedural knowledge of mathematics by competently performing algebraic operations.	Measure 1: Specified procedural problems on the final exams of every course.	Measure 1: 80% of the specified questions will be answered correctly.	Measure 1: The % correct ranged from 48% to 68%. Flipped students performed better than REAL. Full summary in Appendix C.	Measure 1: REAL students clearly show room for improvement. Partial credit grading tends to encourage sloppiness. Our assessment method for this outcome (no rubric, simply right or wrong) favors flipped students who do not get partial credit and are better trained to be precise.	Measure 1: Reconsider assessment methods (for this report.) Also consider changes to the REAL course testing process to encourage/require more precision.
Learning Outcome 2: Students will attend to precision by avoiding common errors, using math symbols and mathematical language appropriately, and neatly writing out their work.	Measure 1: Measured with a rubric applied to an in-class assignment (flipped classes) prior to test 2 or a unit test in REAL classes.	Measure 1: 80% of students who are assessed will earn rubric score of 80% or better.	Measure 1: Not specifically measured.	Measure 1: Not specifically measured, but the data for outcome 1 indicates flipped students are attending to precision in order to pass their tests and the REAL students need improvement	Measure 1: Data collection will begin Spring 2020 and we can make adjustments based on the first semester of data.

Learning Outcome 3: Students will demonstrate understanding of foundational concepts such as identity, inverse, and equivalence.	Measure 1: Measured with 3 multiple choice questions on final exams, one for each concept.	Measure 1: 80% of students who take the final exam will get 80% of the specified questions correct.	Measure 1: Not measured	Measure 1: n/a	Measure 1: n/a
Learning Outcome 4: Students will persist through difficulty and work through the entire semester	Measure 1: Course retention rates	Measure 1: 80% of students enrolled at 3rd week will persist through the end of the semester.	Measure 1: Retention Rates: 2017 – 18: 74% 2018-19: 85%	Measure 1: See summary in Appendix C Retention in 18-19 increased dramatically over previous years in all course types, with the greatest change in the online courses. Anecdotally, we are noticing our students are generally less prepared for our courses than they used to be. Placement has not changed, but we think Concurrent Enrollment has had an effect by removing the stronger students from our classes and now we have a stronger concentration of weaker students than we used to have. If a larger percent of students are ill-prepared for a class, a larger percent of students will be dropping the class.	Measure 1: We don't know what caused the dip in 17-18. We would expect a continued increase because of our including lessons on persistence and growth mindset. Anecdotally, we have noticed students persisting even when it would seem to make more sense for them to drop out.

Learning Outcome 5: Students who complete one or more developmental math course will have the knowledge and skills needed to successfully complete a Quantitative Literacy course	Measure 1: QL course pass rates of students who took dev math	Measure 1: Students who enrolled in one or more dev math classes will pass QL courses at a rate of 70% or better.	Measure 1: See summary in Appendix C. Pass Rates: 2017-18: 59% 2018-19: 67% Success Rates: 2017-18: 81% 2018-19: 79%	Measure 1: 2017-18 pass rates took a dip and recovered in 2018-19. The latest pass rate is the highest of my records since 2008. REAL class outcomes have stayed relatively consistent. Flipped/Online outcomes fluctuated greatly. This is likely due to changes in grading policies that have been made in those classes. We have been experimenting to find the best policy for students and to assure learning objectives are being met.	Measure 1: We have been experimenting with flipped/online course format and grading policy. Now we are selecting a single format and policy for all courses.
	Measure 2: Comparison of the dev math cohort's QL pass rate with those students who placed directly into QL.	Measure 2: The pass rate of the dev math cohort of students will be statistically similar to or better than the pass rate of students who placed directly into QL.	Measure 2: See full summary in Appendix C. Of students who took QL in Summer 2016 through Spring 2019 Dev Math cohort: 73% Direct Placed cohort: 77%	Measure 2: Compared to the 2014 – 2017 cohort the dev math cohort increased 4 percentage points and the direct placed cohort increased 2 points. Therefore, the dev math cohort has improved. The Dev Math cohort of Math 1040 continues to be far below the directly placed cohort. Additional research done by Eric Amsel on Math 1010 shows the REAL completion rate (80%) higher than the flipped (73%), but	Measure 2: We need to find a balance between the flipped and REAL methodologies. Clearly flipped students have a higher 1050 pass rate because more of them are screened out in the flipped class. A 71% (REAL 1010) subsequent pass rate seems quite respectable, but by increasing expectations for precision in the REAL classes we may find a

				flipped students pass Math 1050 (78%) higher than REAL students (71%). A significance test has not been conducted.	better balance of all 4 completion rates. We need to work with the math department to identify a better path for Math 1040 students.

Appendix A

Most departments or programs receive a number of recommendations from their Five/Seven-Year Program Review processes. This page provides a means of updating progress towards the recommendations the department/program is acting upon.

Date of Program Review: Feb 2018	Recommendation	Progress Description
Recommendation 1	Continue to keep website updated with current course offerings	This is ongoing with continual updates
Recommendation 2	Make evidence-based decisions by utilizing data prior to making revisions to courses.	We have subsequent course outcomes, and we are doing more specific research for the 1010 courses.
Recommendation 3	All changes to curriculum need to be communicated to full-time and adjunct faculty	Curriculum changes are being discussed in faculty meetings
Recommendation 4	Explore options other than unit tests to assess the mastery of mathematical concepts.	No progress
Recommendation 5	Improve communication between all university departments, programs, and support services regarding enrollment practices and services provided to students.	The director continues to meet regularly with student and academic services leaders and committees. Other faculty are given the opportunity to work on campus-wide committees
Recommendation 6	Implement a mentor program for adjunct faculty.	Course leads act as mentors to adjunct faculty.
Recommendation 7	Build a sense of community within the program.	We have at least 2 social events each year.
Recommendation 8	Determine whether having instructors spend required work hours in the Hub is an efficient use of program funds.	Completed. Faculty no longer work in the Hub
Recommendation 9	Provide hard copy math resources in each tutor center, including syllabi for each course.	We update these resources regularly
Recommendation 10	Provide tutors access to online courses	This has been ongoing for many years

Recommendation 11	Continue to foster relationships with local school districts	We work on Concurrent Enrollment in the local districts
Recommendation 12	Build a working relationship with the Math Department that will support the goals of both the DMP and the Math Department.	We have had multiple cross-departmental conversations and are working together on the Math 1015 course.
Recommendation 13	DMP should have a representative at Faculty Senate since they are their own group of instructors, not housed in any specific department.	We have whoever is representing the College of Science
Recommendation 14	Create student interventions that would require students to utilize tutoring.	No progress
Recommendation 15	Provide instructors an incentive for training tutors.	No progress and incentives may not be necessary. We need to be invited by the tutoring program to do training.
Recommendation 16	Provide students with instructions and/or videos on the website to help with technology issues such as optimal browsers and settings for accessing Pearson programs.	
Recommendation 17	Continue marketing efforts within community and with campus programs such as tutoring.	We do marketing to promote dev math. We don't have a collaboration with tutoring any more to promote.

Additional narrative:

Appendix B

Please provide the following information about the full-time and adjunct faculty contracted by your department during the last academic year (summer through spring). Gathering this information each year will help with the headcount reporting that must be done for the final Five Year Program Review document that is shared with the State Board of Regents.

Faculty Headcount	2017-18	2018-19
With Doctoral Degrees (Including MFA and other terminal degrees, as specified by the institution)		
Full-time Tenured	0	0
Full-time Non-Tenured (includes tenure-track)	0	0
Part-time and adjunct	1	1
With Master's Degrees		
Full-time Tenured	0	0
Full-time Non-Tenured	11	12
Part-time and adjunct	14	13
With Bachelor's Degrees		
Full-time Tenured	0	0
Full-time Non-tenured	1	1
Part-time and adjunct	16	14
Other		
Full-time Tenured	0	0
Full-time Non-tenured	0	0
Part-time	0	0
Total Headcount Faculty		
Full-time Tenured	0	0
Full-time Non-tenured	12	13
Part-time	31	28

Please respond to the following questions.

1) First year student success is critical to WSU's retention and graduation efforts. We are interested in finding out how departments support their first-year students. Do you have mechanisms and processes in place to identify, meet with, and support first-year students? Please provide a brief narrative focusing on your program's support of new students:
   a. Any first-year students taking courses in your program(s).
      Yes. We treat every student as a first year student should be treated because completion of our courses is required for all students whether they are enrolled in their first year or their last semester. We teach growth mindset and try to help students develop better study and learning skills.

   b. Students declared in your program(s), whether or not they are taking courses in your program(s)

      n/a

2) A key component of sound assessment practice is the process of 'closing the loop' – that is, following up on changes implemented as a response to your assessment findings, to determine the impact of those changes/innovations. It is also an aspect of assessment on which we need to improve, as suggested in our NWCCU mid-cycle report. Please describe the processes your program has in place to 'close the loop'.
   We are continually looking at outcomes data and making adjustments to improve outcomes. One example is the Math 0970 course was created to improve student preparation for Math 1030 and 1040. Data showed it was working for Math 1030, but not necessarily for Math 1040, so we will stop using it as a prereq to Math 1040 and will consider other options.

Appendix C: Data Summaries

SLO #1

	Flip	REAL	Total	Flip	REAL	Total	Flip	REAL	Total
Final Exam Skill being assessed	# Tested			#Correct			% Correct		
Add or subtract rational expressions with different denominators	729	408	1137	369	179	548	50.6%	43.9%	48.2%
Solve equations with rational expressions	670	408	1078	447	138	585	66.7%	33.8%	54.3%
Solve linear systems with three equations	608	408	1016	429	229	658	70.6%	56.1%	64.8%
Multiply complex numbers	390	408	798	303	243	546	77.7%	59.6%	68.4%
Solve quadratic equations using the quadratic formula	423	408	831	310	156	466	73.3%	38.2%	56.1%

SLO #3 Students will demonstrate understanding of foundational concepts such as identity, inverse, and equivalence.
SLO #4 Students will persist through difficulty and work through the entire semester.

	3rd Wk N	% of total enrolled	Pass Rate	Success Rate	Retention Rate
16-17 Total	**4984**		**64%**	**84%**	**76%**
16-17 Online	1700	34%	57%	89%	64%
16-17 Flip	1895	38%	64%	79%	81%
16-17 REAL	1367	27%	70%	84%	84%
17-18 Total	**4466**		**59%**	**81%**	**74%**
17-18 Online	1375	31%	54%	91%	59%
17-18 Flip	1264	28%	53%	72%	74%
17-18 REAL	1480	33%	70%	82%	85%
18-19 Total	**3476**		**67%**	**79%**	**85%**
18-19 Online	862	25%	64%	84%	76%
18-19 Flip	957	28%	62%	73%	84%
18-19 REAL	1657	48%	73%	80%	91%

SLO #5 Subsequent Pass Rates
Pass rates for students who completed QL courses Summer 2016 through Spring 2019

Course	Dev Math Cohort		Directly Placed Cohort	
	N (Passed)	% Passed	N (Passed)	% Passed
Math 1030	1610	77%	1078	76%
Math 1040	483	67%	681	78%
Math 1050	3023	72%	2621	77%
Total	5116	73%	4380	77%

Glossary

Student Learning Outcomes/Measurable Learning Outcomes
The terms ‘learning outcome’, ‘learning objective’, ‘learning competency’, and ‘learning goal’ are often used interchangeably. Broadly, these terms reference what we want students to be able to do AFTER they pass a course or graduate from a program. For this document, we will use the word ‘outcomes’. Good learning outcomes are specific (but not too specific), are observable, and are clear. Good learning outcomes focus on skills: knowledge and understanding; transferrable skills; habits of mind; career skills; attitudes and values.

- Should be developed using action words (if you can see it, you can assess it).
- Use compound statements judiciously.
- Use complex statements judiciously.

Curriculum Grid
A chart identifying the key learning outcomes addressed in each of the curriculum’s key elements or learning experiences (Suskie, 2019). A good curriculum:

- Gives students ample, diverse opportunities to achieve core learning outcomes.
- Has appropriate, progressive rigor.
- Concludes with an integrative, synthesizing capstone experience.
- Is focused and simple.
- Uses research-informed strategies to help students learn and succeed.
- Is consistent across venues and modalities.
- Is greater than the sum of its parts.

Target Performance (previously referred to as ‘Threshold’)
The level of performance at which students are doing well enough to succeed in later studies (e.g., next course in sequence or next level of course) or career.

Actual Performance
How students performed on the specific assessment. An average score is less meaningful than a distribution of scores (for example, 72% of students met or exceeded the target performance, 5% of students failed the assessment).

Closing the Loop
The process of following up on changes made to curriculum, pedagogy, materials, etc., to determine if the changes had the desired impact.

Continuous Improvement

An idea with roots in manufacturing, that promotes the ongoing effort to improve. Continuous improvement uses data and evidence to improve student learning and drive student success.

Direct evidence

Evidence based upon actual student work; performance on a test, a presentation, or a research paper, for example. Direct evidence is tangible, visible, and measurable.

Indirect evidence

Evidence that serves as a proxy for student learning. May include student opinion/perception of learning, course grades, measures of satisfaction, participation. Works well as a complement to direct evidence.

HIEE – High Impact Educational Experiences

Promote student learning through curricular and co-curricular activities that are intentionally designed to foster active and integrative student engagement by utilizing multiple impact strategies.