Weber State University
Biennial Report on Assessment of Student Learning

Cover Page

Department/Program: Developmental Math
Academic Year of Report: 2020/21 (covering Summer 2019 through Spring 2021)
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Report due 11/15/2021

We have updated the Institutional Effectiveness website, which includes an update for each program page. All Biennial Assessment and Program Review reports will now be available on a single page. Please review your page for completeness and accuracy, and indicate on the list below the changes that need to be made. Access your program page from the top-level results page. Select the appropriate college and then your program from the subsequent page.

A. **Mission Statement**

_X__ Information is current; no changes required.

Update if not current:

B. **Student Learning Outcomes**
(please note the addition of certificate and associate credential learning outcomes)
__X_ Information is current; no changes required.

Update if not current:

C. **Curriculum** (please note, we are using Google Sheets for this section so that updates are easier to make)

__X_ Information is current; no changes required.

Update if not current (you may request access to the Google Sheet if that is easiest, or we can make the updates):

(Please review your current curriculum grid and verify that at least one course has been identified for each outcome in which you expect your students to demonstrate the desired competency of a graduating student. This could be shown in a variety of ways: classroom work, clinical or internship work, a field test, an ePortfolio, etc.)

D. **Program and Contact Information**

___ 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, virtual, and online. 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.

E. Assessment Plan

We have traditionally asked programs to report on outcome achievement by students at the course level. We are encouraging programs to consider alternative assessment approaches and plans that are outcome-based as opposed to course-based, though course-based assessment can continue to be used. A complete assessment plan will include a timeline (which courses or which outcomes will be assessed each year), an overall assessment strategy (course-based, outcome-based, reviewed juries, ePortfolio, field tests, etc.), information about how you will collect and review data, and information about how the department/program faculty are engaged in the assessment review.

___ Information is current; no changes required.

Update if not current:

See next page

Assessment Plan

*Please be sure to update this on the website. The plan currently there is from a few reports ago (2015?)

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.	The specified questions will be answered correctly by 70% of the students.	Every Spring semester
2. Attend to Precision	Rubric-guided analysis of student work on Test 2 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 to or better than the pass rate of students who placed directly into QL.	a. Every year b. A five-year cohort will be measured every 2 years.

4. Evidence of Learning, Threshold, Interpretation and Action

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 100% correctly.	Measure 1: Math 1010: The outcomes are encouraging, but hover closer to 70%. The skill to add or subtract rational expressions with different denominators is well below the threshold at 49%. Math 0970: Outcomes are very low ranging from 15 – 52%. Factoring using GCF is the lowest skill. Overall 66.7% of the questions were answered 100% correctly Full summary in Appendix C.	Measure 1: We are questioning the validity of using the final exam data, as students are rarely doing their best work on the final exam. Anecdotally, we see many students figuring out the bare minimum final exam grade needed to pass the class. This data makes the threshold of 80% seem unrealistic. I would expect this outcome to be somewhat in line with course pass rates. COVID-required move to virtual teaching could be a contributing factor.	Measure 1: Exams for Math 1010 will be better standardized across all delivery formats. We may start pulling data from unit tests where students may be more often doing their best work. We need to consider options that provide us with students' best effort.
Learning Outcome 2: Students will attend to precision by avoiding common errors, using math symbols and mathematical language appropriately, and	Measure 1: Measured with a rubric applied to an in-class assignment (flipped classes) prior to test 2 or a unit test in IEL classes.	Measure 1: 80% of students who are assessed will earn rubric score of 80% or better.	Measure 1: Math 1010: Due to COVID this learning outcome was not measured. Math 0970:	Measure 1: Math 1010: No data to interpret. Math 0970: The results are surprisingly good, especially when	Measure 1: We need to reconsider how or if we will retain this as a measured learning outcome. This will be discussed in a future faculty meeting.

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
neatly writing out their work.			We were able to use a different form of data collection to check for this LO. We identified questions on exam 2 that required precision. The percent of questions answered 100% correctly ranged from 68 – 98%. Mostly in the 90s.	compared to the questions measured from the final exam, which causes us to further question the validity of using final exam data.	In Math 0970, instruction and assessment for solving for x using proportions and negative numbers needs to be reconsidered.

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: Students who take the final exam will get 80% of the specified questions correct.	Measure 1: Math 1010: COVID transitions prevented this LO from being measured. Math 970: We were able to identify final exam questions that met this learning outcome. Outcomes range from 35 – 67%	Measure 1: Again, we wonder if the final exam scores are providing an accurate picture of student abilities. COVID-required move to virtual teaching could be a contributing factor.	Measure 1: We need to consider better ways to measure this learning outcome.
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% **2019 – 20: 86%** **2020 – 21: 81%**	Measure 1: We are consistently meeting our established threshold. 2019-20 saw a significant increase in retention for spring semester (87%), which contributed to a higher yearly rate. This is the semester of the COVID shutdown and is a surprising outcome. The decrease in retention for 2020-21 is no surprise as all courses were taught synchronously virtually or asynchronously online and many students didn't have the staying power for this format.	Measure 1: Faculty and students had a learning curve for virtual learning. Moving forward, we will continue to offer some virtual classes, implementing best practices. Faculty are offering virtual office hours by appointment and students are finding faculty more accessible. We need to re-emphasize using growth mindset lessons with faculty to continue to maintain good retention rates.
Learning Outcome 5: Students who complete one or more developmental math course will have the knowledge and skills needed to successfully	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% **2019-20: 71%**	Measure 1: 2019-20 saw a significant increase in pass rate for spring semester (77%), which contributed to the highest overall	Measure 1: 1. We significantly reduced reliance on Proctorio, as we don't have confidence in their ability to

complete a Quantitative Literacy course			**2020-21: 66%** Success Rates: 2017-18: 81% 2018-19: 79% 2019 – 20: 83% 2020-21: 81%	pass rate ever achieved by Dev Math, and meeting our goal. Possible explanation could be that students cheated on exams, which were not proctored due to the COVID shutdown. Or the shutdown may have provided students with more time to focus on schoolwork. Reduced anxiety being outside a testing center could contribute to higher grades, also. The 66% pass rate during the virtually taught year is quite acceptable, considering the challenges of virtual teaching and learning. However, some faculty believe there was a lot of student cheating using Proctorio. See summary in Appendix C	maintain the integrity of the testing environment. We continue to adjust areas of instruction and department policies to provide the best learning opportunities we can for students. For example, faculty have idea sharing sessions, and Intermediate Algebra content has been evaluated and adjusted.
	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.	Measure 2: Overall, pass rates are slightly improved from the last time we report this data, in both cohorts. There is sufficient evidence (statistically-speaking) to conclude	Measure 2: More research is needed to determine the reason for this difference and to determine a plan of action. Anecdotally, we are noticing a difference

				that the pass rates are higher for students who have not had remedial classes.	in the caliber of students in our classes since we started offering Math 1010 through concurrent enrollment. It seems the stronger students are no longer showing up in dev math.

5. Closing the Loop

Overall, excepting for the impact of virtual learning, dev math outcomes continue to hold steady with some slight improvement here and there. We continue to innovate, now offering a corequisite Math 1030 course in cooperation with the math department. Because Math 1035 is a mathematics department course, we will continue to see declines in our enrollment as this course grows. We seek to meet students where they are and will begin offering an ALEKS support class to help students improve their placement by working in the ALEKS software with teacher support. Improving student placement will also decrease dev math enrollments.

Developmental Math is experiencing a culture shift. In the past, extensive measures were taken to try to get every instructor to manage their courses as similarly as possible. We hit an impasse when we tried to get every instructor to adopt a redesigned version of intermediate algebra that was essentially mandated by the math department. While most faculty adopted it, a few did not. The redesign of Math 1010 was challenging. The adoption process was arduous. However, we need to address the fact that Math 0990 is the most failed class at the university. We have a politically charged challenge ahead of us to address that issue. We need to do some in depth research to identify possible reasons for students' failure. This needs to be our next focus moving forward.

Outcomes were affected by virtual learning. The overall pass rate from 2019-20 of 71% is the highest departmental pass rate ever. Several of our faculty would point to the unproctored testing at the end of Spring 2020 as the reason for this, and they may be correct, as the overall pass rate of that semester was 77%, much higher than any other semester since we started tracking data. The fully virtual year of testing with Proctorio tells a different story, however. If students were cheating with Proctorio, I would expect the success rates to improve, even if the pass rates did not. In fact, both rates decreased. The much lower overall pass rate of 66% could be attributed to the decrease in retention. It seems, though, if many students who completed the course were cheating on tests, then the success rate would be higher than usual. It actually dropped 2 percentage points. I suppose significance tests would be valuable here. Perhaps we can get someone to run those tests to learn more.

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.	Ongoing
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.	Exploring options, but there aren't really any useful ones
Recommendation 5	Improve communication between all university departments, programs, and support services regarding enrollment practices and services provided to students.	The director and advisor continue 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.	The dev math director correlates regularly with the math department chair on various matters.
Recommendation 13	DMP should have a representative at Faculty Senate since they are their own group of instructors, not housed in any specific department.	One of the dev math faculty is serving on the faculty senate as on of the COS representatives in the 2021-22 year
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.	Videos are available in their canvas courses.
Recommendation 17	Continue marketing efforts within community and with campus programs such as tutoring.	We do marketing to promote dev math. We no longer have a collaboration with tutoring 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) Review and comment on the trend of minority students enrolling in your classes (particularly lower-division, GEN Ed) and in your programs.

   I don't know where to get data to study this.

2) What support (from enrollment services, advising, first-year transition office, access & diversity, etc.) do you need to help you recruit and retain students?

   We need to do marketing to let students know we have a good math program that they don't need to be afraid of

3) We have invited you to re-think your program assessment. What strategies are you considering? What support or help would you like?

   I honestly don't know. We are doing so many new things, it is difficult to assess everything. We don't have the human resources to do it.

4) Finally, we are supporting our Concurrent Enrollment accreditation process. Does your program offer concurrent enrollment classes? If so, have you been able to submit the information requested from the Concurrent Enrollment office?

   I believe we have.

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	Pass Rate	Success Rate	Retention Rate
19-20 Total	**3341**	**71%**	**83%**	**85%**
20-21 Total	**3111**	**66%**	**81%**	**81%**

SLO #5 Subsequent Pass Rates
Pass rates for students who completed QL courses Summer 2018 through Spring 2021

Course	Dev Math Cohort		Directly Placed Cohort	
	N (Passed)	% Passed	N (Passed)	% Passed
Math 1030	2204	79%	1657	82%
Math 1040	724	72%	845	79%
Math 1050	3641	73%	2491	77%
Total	6569	75%	5000	79%

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.