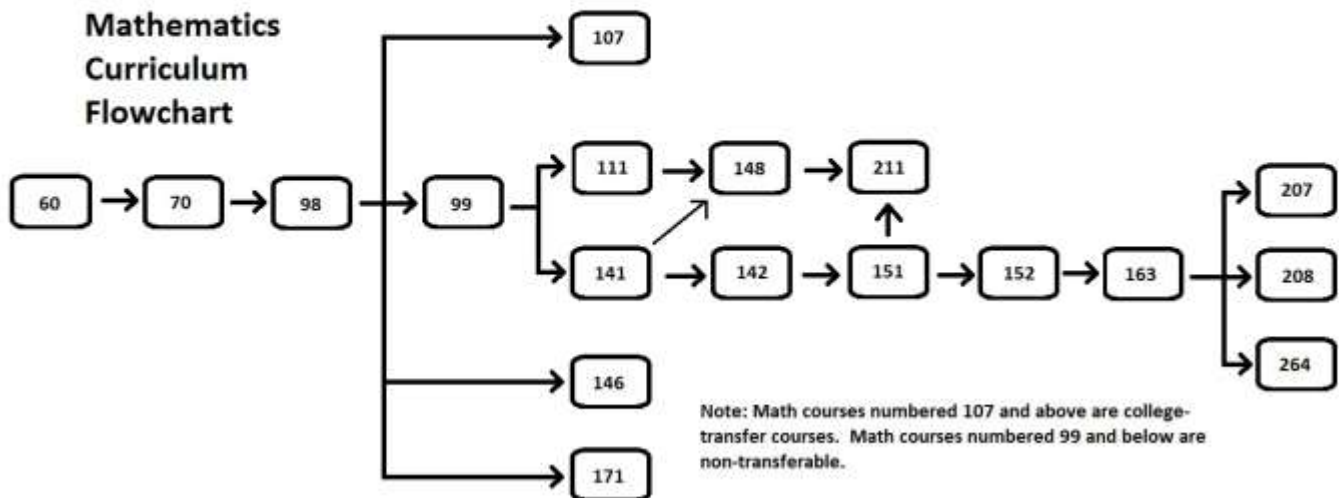## Assessment: Math 098/Math 099

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PROJECT DESCRIPTION: Hundreds of students take Math 098/099 during their time here at Shoreline. Starting in Winter 2014, we launched a major redesign of our 2-quarter algebra sequence. Our changes were prompted by changes to the DTA at the state level; the new sequence allowed at least some students to shorten the path to completing the math requirements for their degree. After more than a full year of teaching the new sequence, we want to learn whether our changes were successful. Are students who take our new 098/099 sequence at least as well-prepared for their next classes as other students? We will examine the organization of the content, how the courses fit together and in our sequence, and whether students are at least as successful as they were in our old sequence. We plan to revise the courses to make them better.

Mathematics Curriculum Flowchart

Note: Math courses numbered 107 and above are college-transfer courses. Math courses numbered 99 and below are non-transferable.

METHODS:

We initially grouped math students taking Math 141 in Winter 2016 into four populations:
   (1) Students who took our 098 (and possibly also 099) and earned a P or 2.0 to 2.9
   (2) Students who took our 098 (and possibly also 099) and earned a 3.0 to 4.0
   (3) Students placed via other coursework here (such as 099 only or 86-96)
   (4) Students who placed directly into college level math

There were two measures of success: course grade and persistence. A passing course grade was a "P" or a GPA of 2.0 or higher. For students who took courses multiple times, the best course outcome was included in the analysis. Persistence compared the rate of success for students who did and did not take the precollege math sequence, Math 098/099. In addition students took a pre- and post- quiz. Gains were calculated by subtracting the pre-test score from the post-test score.

RESULTS:

Student Math Sequences

91 students took both the pre- and post-quiz. Of these students, there were 16 Students who took MATH 098: 2 students earned a P or 2.0 to 2.9, and 14 students earned a 3.0 to 4.0. Due to small counts, students were grouped together regardless of grade.

There were 20 students who placed via other developmental course completion: 13 started with MATH 099, 4 students started with MATH 080 and then took MATH 099, and 3 students started with other courses like MATH 007. These students were grouped as starting their pathway with developmental math.

The remaining 55 students started with college level math: MATH 141 was the first class for 51 students, and 4 students had taken a college level class (like MATH 146 or MATH 142) at SCC. Of these students 49 students took the COMPASS test, and 6 students had no COMPASS records. Due to small counts, these students were grouped as starting their pathway with college level math.

Student Success
Final Grades and Persistence

Average MATH 141 grades did not differ by students' math sequence (see, Figure Average Grades; $F(2,88) = .896$, $p = .412$). Interestingly, students who began their math sequence with other developmental classes may show more variability in achieving their final grades than students who first enrolled in MATH 098 or College Level Math.

Figure Average Grades. Students entering at College Level Math earned an average grade of 3.25 (SD = .92), MATH 098 – 3.23 (SD =.67), and Other Developmental Math – 2.95 (SD = 1.1)
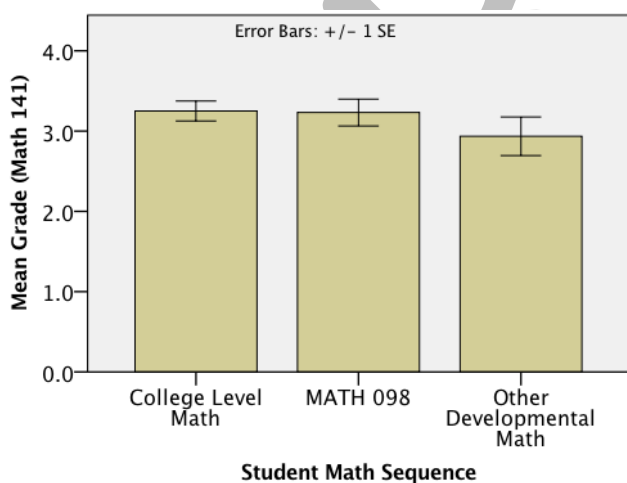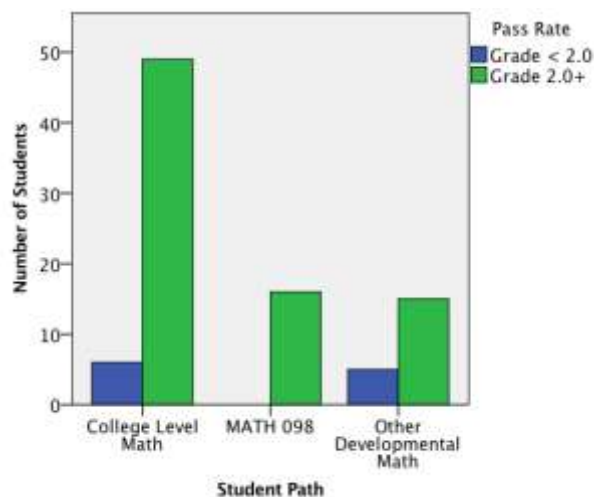
Figure Persistence. Number of students passing Math 141 (with a grade of at least a 2.0) grouped by where in the math sequence they began.


In addition, persistence, or the rate of success for students who did and did not take a precollege math sequence was calculated: students who started with college level math passed 89% of the time, students starting with MATH 098 passed 100% of the time, and students starting in another

developmental math class passed 75% of the time (see, Figure Persistence). The different rates between MATH 098 and the other starting points approached significance, χ^2 (3, N = 91) = 5.4, *p* = .067.

Pre- and Post-Quiz

For students taking the pre- and post-quiz, the pre-quiz total score ranged from 0 to 10. The median score was 3, and the interquartile range was 3. The post-quiz total score ranged from 1 to 16. The median score was 7, and the interquartile range was 4. Gains from pre- to post-test ranged from -3 to 11. The median gain was 3, and the interquartile range was 5. There was no difference in gains among students starting at different levels of math, *F*(2, 88) = 1.45, *p* = .240, see Figure Gains.

Figure Gains. Students entering at College Level Math gained an average 3.25 (SD = 3.2), MATH 098 – 3.75 (SD = 3.2), and Other Developmental Math – 4.75 (SD = 3.8).
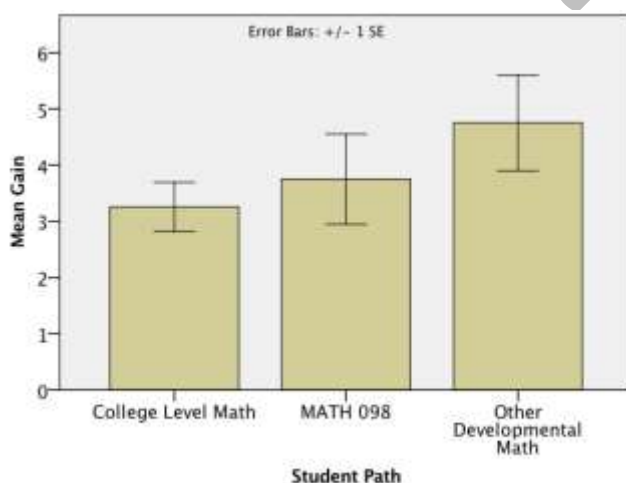
Are these gains relevant to overall course success? Gains related to final grades; students earning higher grades made greater gains from pre- to post-quiz (*r* = .354, *p* = .001). This relationship was still significant after accounting for pre-test scores (*r* = .432, *p* < .001). Overall, gains accounted for 11.5% of the variability in final grades, and pre-test scores accounted for an additional 6.9% of the variability (as measured from Adj. R^2 values from a hierarchical linear regression model).

Figure Gains by Persistence. Number of points gained from pre- to post-quiz among different starting points for students who passed and did not pass the course.
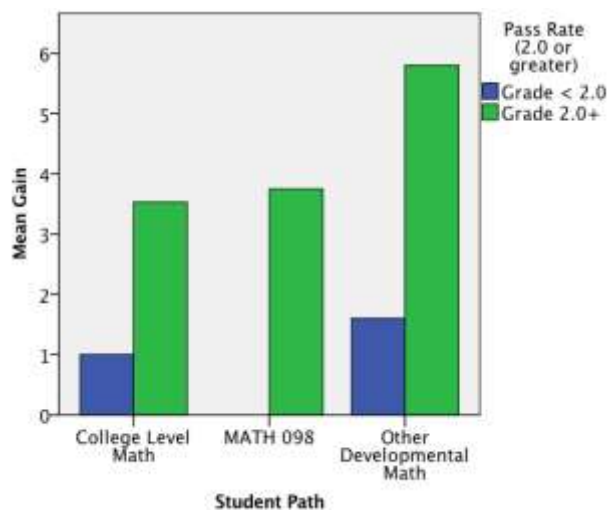
Appendix.

There was not much difference among average pre-quiz scores for students starting with different math classes.