

Optimizing Developmental Math Through Divergent Curriculum Paths



FVCC Demographics



FALL 2016
FTE = 1,396
Head Count = 2,262
Developmental Math Students Enrolled \approx 320

Course Offerings 2016/2017

- | | |
|---------------------------------|---------------------------------|
| • M065 (Pre-algebra) x 6 | • M132 (Math for K-8 I) x 1 |
| • M090 (Intro Algebra) x 3 | • M145 (Liberal Arts Math) x 1 |
| • M094 (Quant Reasoning) x 10 | • M152 (Pre-calculus Alg) x 2 |
| • M095 (Intm Algebra) x 3 | • M153 (Pre-calculus Trig) x 1 |
| • M114 (Tech Math) x 2 | • M162 (Applied Calc) x 1 |
| • M120 (Health Care Math) x 3 | • M171 (Calculus I) x 2 |
| • M123 (Surveying Math) x 1 | • M172 (Calculus II) x 2 |
| • M115 (Prob & Linear Math) x 4 | • M234 (Math for K-8 III) x 1 |
| • STAT216 (Intro to Stats) x 2 | • M273 (Multivariable Calc) x 1 |

Developmental Math Re-design – Why?

- Approximately 75% of our students place at the dev math level (543 out of 725 tested for Fall 2016)
- Improve student success and retention rates
- Standardize the curriculum
- Provide opportunities to shorten the dev math sequence
- Create a dev math community for both students & faculty – provide support & encouragement!

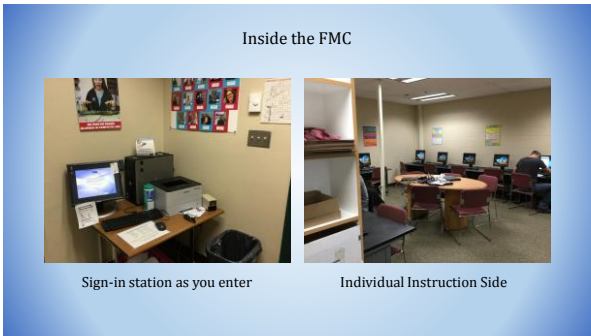
The Foundational Math Program was born!

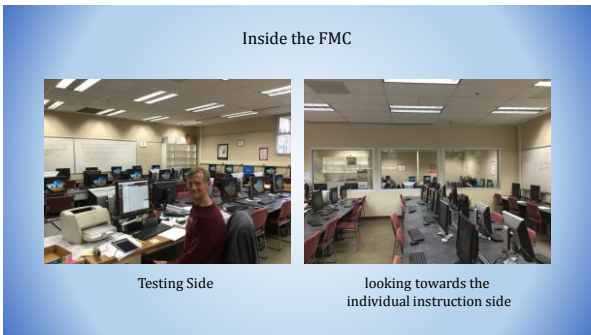
- Implemented full-scale Fall 2013
- Physical structure:
 - 2 classrooms for all sections of Foundational Math (\approx 20 sections per semester)
 - Classrooms contain computers and interactive boards
 - Foundational Math Center (FMC) – provides testing and individualized instruction

The Math hallway – FMC on the left, both classrooms down the hall on the right (and yes, that's Pi wallpaper!)







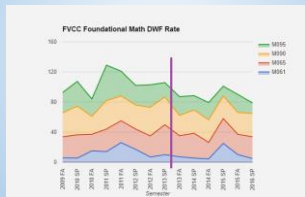


The Foundation Math Program – con't

- Curriculum/Scheduling structure:
 - 1 credit of every course is spent in the FMC
 - 50 min/week required
 - Flexible schedule
 - Standardized curriculum & schedule for all sections
 - Same HW/Quiz/Test assignments
 - Same policies (grading, late assignments, etc)
 - Material presented by faculty in their own teaching style
 - Faculty spends 1 hr/week in the FMC for each course taught
 - Proctoring quizzes/tests & providing individualized instruction
 - Full-time coordinator for the FMC
 - Designated FT faculty (Erin) coordinating all of the Foundational courses

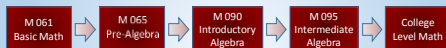
Results, so far...

DFW rates (prior to implementation of the new Foundational Math Program is left of the purple line):

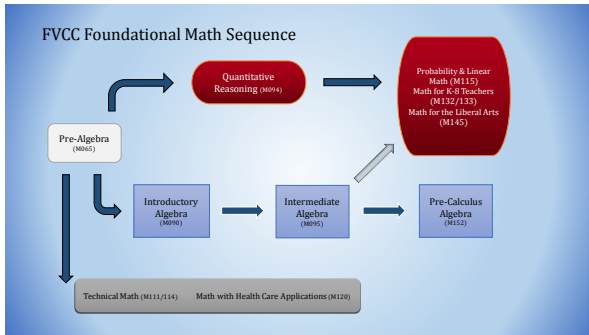


Why change to a Divergent Path format?

- FVCC initial/traditional Foundational Math sequence:



- Non-STEM : STEM (starting class)
 - 112 : 31 ($\approx 7 : 2$) Spring 2016 184 : 48 ($\approx 7.5 : 2$) Fall 2016
- STEM students struggling in Pre-calculus
- Non-STEM students getting more Algebra than necessary for their Math Gen Ed courses



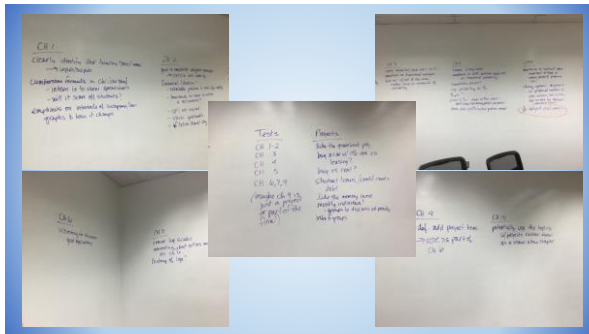
Quantitative Reasoning

A New Course for our Divergent Curriculum Path

- Initial Step:** established a small, core math faculty group
- Identified prerequisite core skills necessary for non-STEM students
 - Reviewed existing courses across the state of Montana
 - Evaluated textbooks within our current online HW platform
 - Developed initial curriculum
 - Formed two Program Improvement Teams (STEM & non-STEM)

Program Improvement Teams

- Each team met twice – Spring 2016 semester
- Participants comprised of FT and adjunct faculty
- First Meeting
 - Preliminary curriculum presented
 - Participants tasked with reviewing & providing feedback
- Second Meeting
 - Participants shared feedback in small groups
 - Feedback compiled by the Core Math Faculty team
 - Participants given access to online HW & Assessments to review & provide feedback through an online form



Quantitative Reasoning – M094

- Course Learning Outcomes – *the student should be able to:*
 - Create, solve, and graph linear equations.
 - Use percents, ratios, and proportions to solve complex problems, including dimensional analysis.
 - Represent, analyze, and interpret data for single and multiple variables.
 - Analyze data through measures of central tendency and variation.
 - Choose appropriate models to represent data, including simple linear regression and exponential & logarithmic equations.
 - Solve linear system of equations graphically and algebraically.
 - Apply basic probability concepts to solve problems.

Quantitative Reasoning – M094 con't

Catalog Description:

This course is designed for students as the alternative to the traditional algebraic math sequence and to prepare them for college-level math courses emphasizing quantitative methods. Emphasis will be placed on using data and appropriate mathematical models to make decisions, while developing logical reasoning and critical thinking skills. Topics include proportional reasoning, utilizing various graphical representations, linear equations (including systems of linear equations), and basic probability & statistics.

Getting Adjuncts Involved

- Typically 60 – 80% of Foundational courses are taught by adjuncts
 - Fall 2016 only 45% taught by adjuncts due to divergent paths & new course curriculum
- Foster buy-in/ownership amongst adjunct instructors
 - Adjuncts served on the Program Improvement Teams
 - Provide Teacher Training Sessions on Friday afternoons
 - Provide opportunities for feedback

Summer Pilot

- 14 students, 13 completed successfully
 - Higher than Intro & Intm Algebra pass rates, which averaged 79% & 70% respectively over the past 7 years
- Curriculum Refinement - Erin
 - Developed 3 initial projects
 - Created additional teaching materials to supplement text
 - Created teacher's edition of the student notebook (answers & teaching tips)
- Prep for fall
 - Erin edited the online & notebook content between Summer & Fall semesters and created the course shells

Fall 2016 Rollout

- 10 sections being taught by 10 different instructors
 - 40% FT Faculty, 60% Adjunct Faculty
- Teacher Training sessions offered most Fridays
 - Google Sheets training
 - Curriculum Specifics (especially projects)
 - Provides a forum for Q & A
- Currently collecting feedback from instructors
 - Via e-mail & Teacher Training sessions
 - Collecting feedback on notebook content and online HW & assessment content

Challenges

- Chosen text does not fit our needs exactly
- Online HW & assessment questions need to be supplemented from other textbooks
- Technology issues
 - Additional training needed for most faculty (mostly Google Sheets)
 - Online HW platform not always functioning properly
- Advising students properly – making sure they're on the right path
- Finding time to review the curriculum analytically

Successes

- Students are really enjoying the material and diverse applications
- Students are being exposed to additional technology applications that are applicable life skills
- Renewed teaching excitement
- Current test scores look good!
 - 144 student's scores analyzed
 - Individual test averages (excluding zeros): Test 1 – 85%, Test 2 – 79%, Test 3 – 88%
 - Overall test average (including zeros) is 83%
