

Parkland College's Developmental Mathematics Redesign

By Erin Wilding-Martin

In the fall of 2013, Parkland College will roll out a redesigned developmental mathematics program. The new design will include two tracks, one for students headed to a college-level general education mathematics course, and another track for students who will need college algebra and calculus. Our plan was inspired by the New Life Project's Mathematical Literacy for College Students (MLCS) course, but is different in key respects due to the way this type of course has been approached in Illinois by community college faculty and by our state organization, the Illinois Mathematics Association of Community Colleges (IMACC). Overall, our hope is that by offering more specialized tracks, we can provide a more appropriate developmental mathematics experience for all of our students.

Investigating the Issues

The project began as an exploration of low success rates in our College Algebra and Precalculus courses. A committee was formed, and we identified our main concerns pertaining to student success in these courses: weak prerequisite skills, difficulty adapting to the pace, and a failure to engage in quality study activities outside of class. While some of these issues can be addressed in the courses themselves, we also wanted to look at ways to better prepare students through our developmental prerequisite courses.

Parkland currently has a fairly traditional sequence of developmental algebra courses: Pre-Algebra, Beginning Algebra, and Intermediate Algebra. Successful completion of Intermediate Algebra makes a student eligible for their first transferable college-level mathematics course, whether it be a general education course (Introductory Statistics or General Education Mathematics) or College Algebra/Precalculus (our Precalculus course covers College Algebra and Trigonometry in one semester). We brainstormed about changes we could make to Intermediate Algebra that would better prepare students for College Algebra: the addition of a unit on exponentials and logarithms, a faster pace, increased rigor in terms of by-hand algebraic skills, more attention to mathematical concept development, etc. But with these ideas came concerns that we would be tailoring Intermediate Algebra to the needs of calculus-bound students, which would make it an inappropriate requirement for students headed to general education mathematics courses.

Around this same time, the idea of a two-track developmental curriculum was getting more attention in our state organization, IMACC. Kathy Almy, who has also been heavily involved in the AMATYC DMC New Life project, presented at Parkland on her new Mathematical Literacy for College Students (MLCS) course at Rock Valley College. This seemed like a promising solution: adjust Intermediate Algebra to prepare students for College Algebra and Calculus, while providing a separate track to prepare students for general education mathematics courses. And so a plan was born, and we split into two committees, one to focus on each track.

College Algebra Track

One committee focused on redesigning the existing developmental algebra sequence to better prepare students for College Algebra. Sometimes referred to as the STEM track, our department instead used the phrase College Algebra Bound (CAB) to include non-STEM majors, such as Business, that require courses beyond College Algebra. The CAB track has been redesigned in two ways. First, Intermediate Algebra was changed in many of the ways we had brainstormed. A unit was added on exponentials and logarithms, which will increase the algebraic rigor and also increase the pace of the course. With a more targeted audience, it is also hoped that we will be able to cover all topics in a more in-depth way, specifically tailored toward the needs of these students. Second, we changed the way in which we will offer both Beginning and Intermediate Algebra. Inspired by Rock Valley and several other institutions, we have split both into half-courses, each with their own course numbers. Each half-course will be offered every half-semester, allowing a student who is failing in the first half to start over at midterm. Or, if a student only fails the second half, they only need to repeat that half. The hope is that letting students repeat only the half they need will ultimately reduce the time it takes for them to complete the developmental algebra sequence.

General Education Track

The other committee designed a new track from the ground up for students headed to general education mathematics courses. We looked at Rock Valley's MLCS course very closely, and Kathy Almy was more than happy to provide helpful resources. There is also a movement within IMACC to standardize such a course within Illinois, calling it General Education Preparatory Mathematics (GEPM). The proposed content outline from IMACC, which gives GEPM a Beginning Algebra prerequisite and takes topics from algebra, geometry, and statistics, guided our efforts. Following the Rock Valley model, we created a combined 6-credit course called Mathematical Literacy that begins at the level of Beginning Algebra (with a Pre-Algebra prerequisite) and includes the content outlined for GEPM. Similar to the CAB track, this will be offered as two 3-credit half-courses. This class is meant to look very different from an algebra course, and it will prepare students for a college-level general education course in one semester. This replaces the traditional sequence of Beginning Algebra, Intermediate Algebra, and Geometry. For students who would have needed all three courses, Mathematical Literacy saves them two semesters, plus it exposes them to content and ways of thinking about math that are more relevant to their educational goals.

The material in Mathematical Literacy is presented in a very different way from traditional courses. The focus is on numeracy, proportional and algebraic reasoning, functions, and modeling. This means that the algebra, geometry, and statistics are intertwined as students are asked to look at real-life data and situations, describe patterns, create models, and solve problems. Instead of a traditional lecture format, students work both in small groups and as a class to explore patterns, make conjectures, and discuss why their ideas will or won't work. My colleague, Brian Mercer, is teaching a pilot section and developing course materials this semester. He reports that student conjectures and observations have generated some of the best mathematical conversations he has ever had with his classes. Our hope is that this course

will provide an alternate, equally rigorous, and more relevant route for students who do not need the emphasis on algebraic by-hand skills in the traditional algebra sequence. Instead, they will engage in activities that prepare them for general education mathematics courses, and to be informed, thoughtful citizens.

Now What?

This semester, Brian Mercer is teaching a pilot section of Mathematical Literacy and developing materials for the course. Next semester, he and I will each teach a section and continue to revise lesson plans and materials. We go full-scale for Fall 2013, offering several sections of Mathematical Literacy and implementing the 8-week half-courses for that and the traditional algebra sequence.

Expanding the new Mathematical Literacy course offers some challenges. The non-traditional approach to the content and the group-oriented pedagogy will make it necessary to train instructors and offer ongoing support. This should be a fun process, but it will require some adjustment. We hope to have a course coordinator who can help with these efforts. There are also scheduling issues to sort out. The main format for the course will be 2-hour classes, 3 days a week. However, that may not be the most convenient format for night students. This may also be a difficult course to offer online, so we will need to explore ways in which technology can help us implement the group-oriented pedagogy.

We will be assessing our redesign in many ways, measuring student success in both these and their college-level courses later, and looking at qualitative outcomes such as student attitudes and reasoning skills. We will also work with other units on campus, such as Advising and Financial Aid, to address any unanticipated issues that may arise. The Mathematics Department will continue to assess and revise, and will try to stay flexible so we can address the challenges of implementing such an ambitious redesign.

Flow Chart for the Redesigned Developmental Curriculum

Bold line = most likely routes

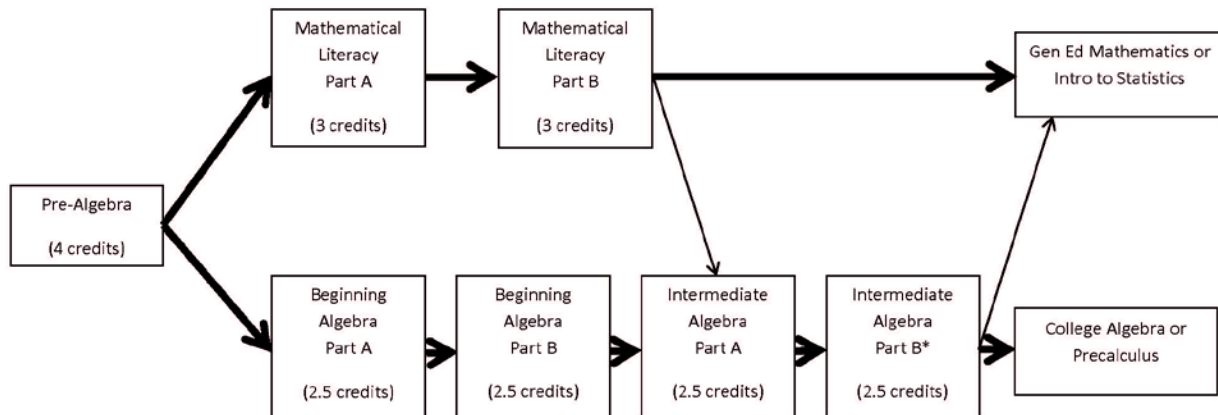


Figure 1. New developmental mathematics flow chart for Parkland College.