



# Two Roads Toward Success in Developmental Math Redesign

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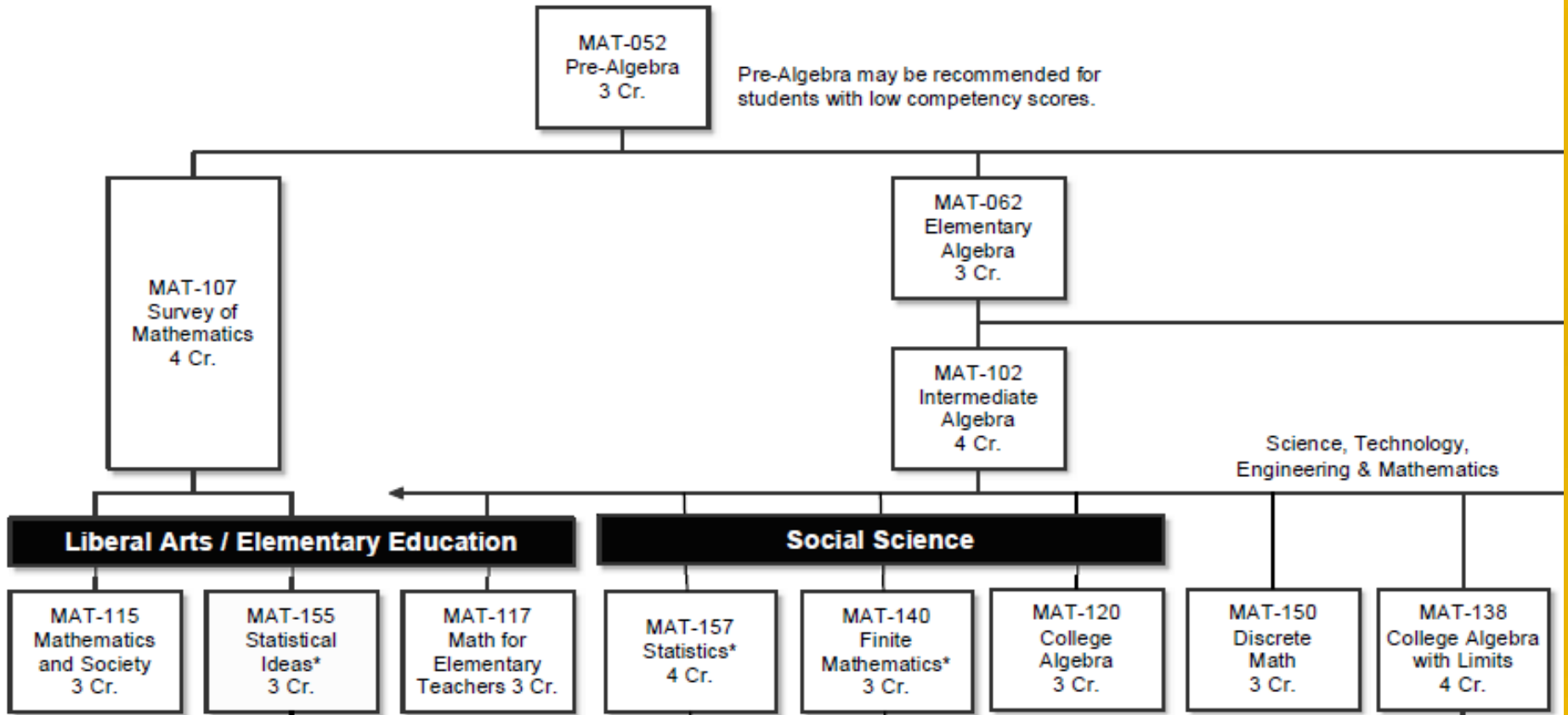


# Cedar Rapids Main Campus

- On the south side of Cedar Rapids
- 27 buildings over 685 acres
- ~ 17,000 students
- 2,303 students enrolled in Elementary and Intermediate Algebra during 2010-11
- Mix of degree programs
- Impending renovation of Linn Hall (home to Math/Science)



# Kirkwood (CR) Developmental Math as of Fall 2009





# Why redesign?

Low success rates in the algebra sequence:

41% for Elementary Algebra

46% for Intermediate Algebra

Incremental changes did not produce significant improvement:

Prerequisite enforcement

Online homework systems

Professional development

Hybrid model

Conversations with faculty and students brought up the following issues:

Pace – too slow or fast

Unrecognized gaps in learning

Life situations interfering



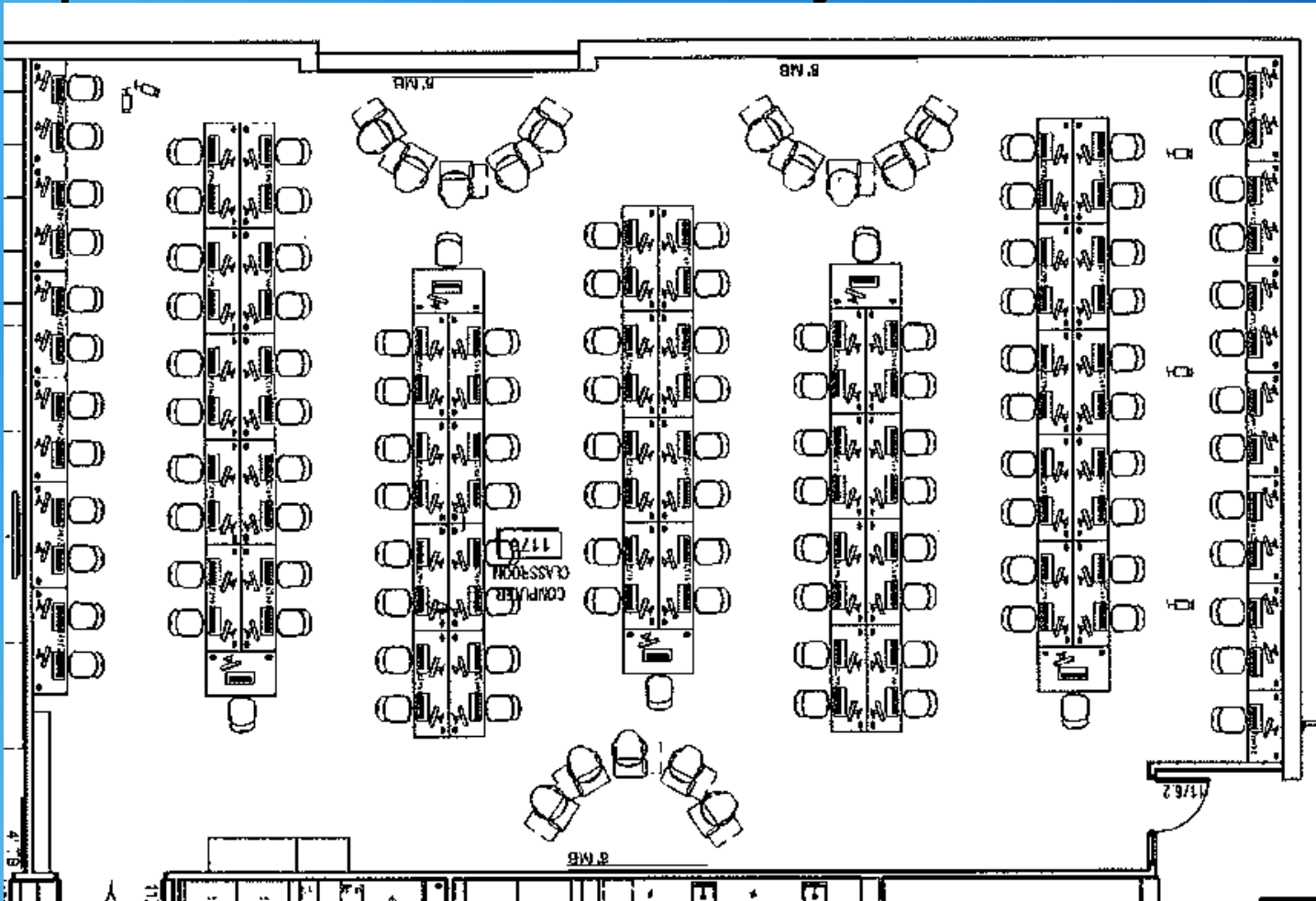
# Modified Emporium Model

- Create a single new course (MAT-076)
  - Combines material from Pre-Algebra, Elementary Algebra, and Intermediate Algebra
  - Students can earn credit for MAT-076 up to 3 times
- Individually-paced and computer-based
- Modularized curriculum based on mastery
- Students attend class at a specified time



# Accommodating the Redesign

- Fall 2013: new 117 student “Emporium” space should be ready





# Accommodating the Redesign

- Pre-remodel, pilot in computer labs
  - 40 students and 2 instructors per lab





# Modularization

- 13 thematic modules
- Based on learning objectives from traditional classes
- Three “Exit Points” based on the student’s intended college-level math course
- All students start in Module 1, but can “pre-test” out of Modules 1-5
- Module completion exported to Colleague as a “placement test score”
- Implemented using software



# Piloting Redesign



<b>Term</b>	<b>Cedar Rapids Enrollment</b>
<b>Spring 2011</b>	<b>130</b>
<b>Summer 2011</b>	<b>47</b>
<b>Fall 2011</b>	<b>219</b>
<b>Spring 2012</b>	<b>241</b>
<b>Summer 2012</b>	<b>55</b>
<b>Fall 2012</b>	<b>289</b>



# Faculty Roles – In Class

- Respond to student questions
- Start and proctor tests
- Provide “just in time” teaching
- Check in with students
- Monitor student progress
- Cover lab for 1 hour outside class hours

# Faculty Roles – Out of Class



- Contact students about their progress
- Grade Concept Questions
- Review student tests and progress reports
- Work with teaching group to plan for the upcoming class period
- Attend all-faculty meetings, participate in professional development, develop course policies and materials



# Assessing the Pilot

**Standard #1:** Compare completion and success rates to traditional Elementary Algebra and Intermediate Algebra classes.

**Standard #2:** Compare student performance on common exam items.

**Standard #3:** Compare the percentage of students who move on to and successively complete a college-level math class.

**Standard #4:** Examine feedback from student evaluations and focus groups.

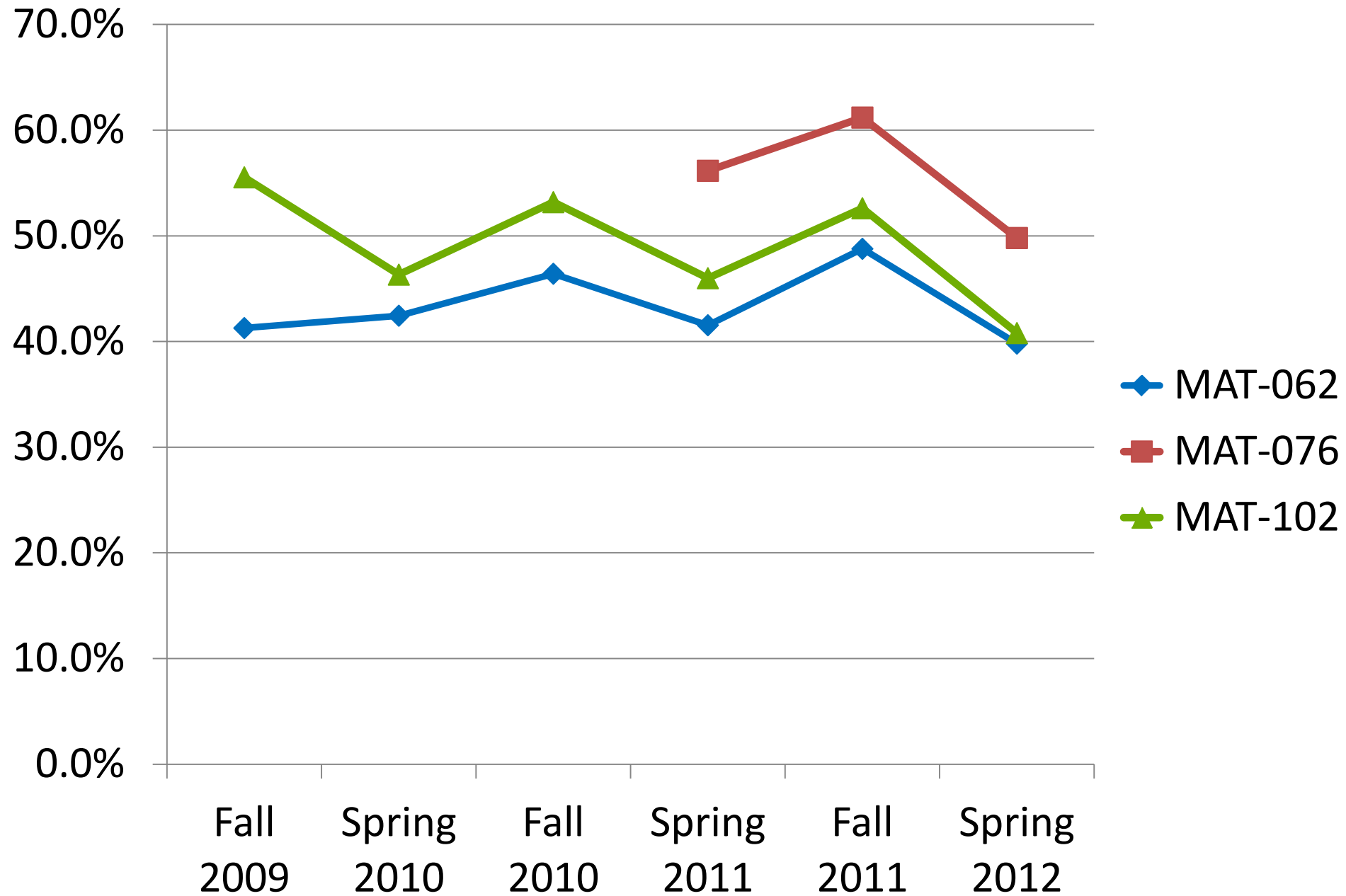


# Success Rates (A-C)

	Spring 2011	Fall 2011	Spring 2012
Prep for College Math	56%	61%	50%
Elementary Algebra	42%	49%	40%
Intermediate Algebra	46%	53%	41%



# Success in CR Face-to-Face Classes





# Common Exam Items

- Department uses common finals for Elementary and Intermediate Algebra
- Comprehensive exams in redesign
  - After Modules 5, 8, and 12
  - Most questions taken from common finals
- Redesign students significantly better on 39 of 46 common questions
- Comp exam averages after Modules 8 and 12 about 15% higher than final exam averages



# Feedback

- Instructors enjoy teaching the course and feel they see more evidence of student learning.
- Most students, especially those who struggled in traditional math classes, greatly preferred the new format.
- Some students (especially early in the pilot) felt they needed more instruction, support, or structure.



# In Their Own Words

- “This class actually helps you learn better. I learned more this semester than I did last semester and my junior year of high school combined!”
- “Professors are easy to talk to and help a lot!! This class is great for anyone who is struggling with math.”
- “I’ve taken five college math classes and this is the first time I felt like I was actually learning the material.”
- “You should keep offering this class forever!”

# Iowa City Outlet Campus



- 30 Miles from our main campus
- Near the University of Iowa
- Two buildings with 25 classrooms
- Average classroom size (32)
- ~ 3000 students
- % taking developmental math
- Minimal careers programs
- 1 computer lab (40)
- 1 math lab (14)







# Our Students

- Seeking 2 year degrees
- Large percentage seeking to transfer to a four-year institution
- Some dual enrolled
- Approx. 50% enrolled in Dev. Math

# Emporium Hurdles



- Facilities
  - Lack of Space
  - Lack of Computers



# Our Facilities



**1 full-time math classroom 30 with computers**



# Our Facilities



**Computer classroom we may reserve**

# Other resources



- 32 laptops ready for classroom use
- Testing center
- Computer lab
- Math lab





# Adjusting for our facilities

- Kept students grouped by level
- Kept normal class sizes (26 to 32)
- Mixed lecture with lab time
- Adopted a mastery level approach
- Created 1 more classroom with (30) computers
- Scheduled as many classes as possible into our computer room
- Utilized our computer lab classroom and laptops more often

# Changes I had to make

- Letting go of “one-size fits all”
- Not keeping the class together
- Less lecturing
- More individualized instruction





# Flexibility and Creativity

- Accepting organized chaos
- Students at different places in the course
- Students testing at different times
- Adjusting the course to fit student's needs
- Offering extensions
- Allowing students to start where they left off
- Changing the traditional approach

# How Students are adjusting





# How Students are adjusting

- More active in class
- Doing more problems
- Asking more questions
- Reviewing tests and quizzes
- Reading more examples
- Not settling for missing problems
- Using the math lab more
- Better understanding of application problems



# Student Perception



4 = more True than False

5 = Definitely True

I put forth my best effort in this class. **3.9**

The computer system helped me learn the content of this course. **4.1**

Having to achieve certain percentages in the course encouraged me to practice more. **4.2**

# Student Perception



4 = more True than False

5 = Definitely True

This course helped me improve my ability to think mathematically. **4.3**

If I had to do this semester over, I would register for this course again. **3.9**

I would recommend this course to someone else. **4.2**



# Success stories

**Kelly: “ Our baby was due mid-October, and I knew I need to finish through module 8 to get into Math for Elementary Teachers, so I worked hard and finished all my work before October. Now I am ready to help with the new baby and also ready to take my next math course in the spring.”**



# Success stories

- Troy: “I didn’t quite finish all of the modules by the end of the term, but with the extension offered I was allowed to complete the work and receive a passing grade for the course before the start of the next semester. Now I am ready for my next course and didn’t have to retake Intermediate Algebra”



# Success stories

- Sam: “Last semester I didn’t complete enough modules to pass, things got too busy in my life to keep up with school. I took the course over this fall and now I am on my way to completing what I started. It was nice to start on the module I left off on in the spring, and not have to start over again.”





# Success stories

- Ashlee: “I am on my way to completing enough modules in one semester to move directly into a college level math course. This saved me a semester of time and over \$400!”

# Moving Forward



- Continual education of student and adjuncts
- Creating a 1 hour completion course
- Running parallel sections
- Continual communication between campus

# The Future: Challenges and Opportunities



- Work with career programs to better align exit points.
- Use reports and data analysis to make improvements and assess success.
- Increase the use of “just in time” teaching and structured learning opportunities.
- Identify best practices for the online version.
- Update the rest of the curriculum (whither Elementary & Intermediate Algebra?).



# The Last Slide

S055

Grand 2

Thursday, 1:40 – 2:30 pm

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“Using Hawkes in a Modular Emporium-Style  
Developmental Math Redesign”

Friday, 4:00 – 4:45 pm; City Terrace 4