

Leveraging Synergy Among Multiple Strategies for Developmental Math Acceleration

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Overview

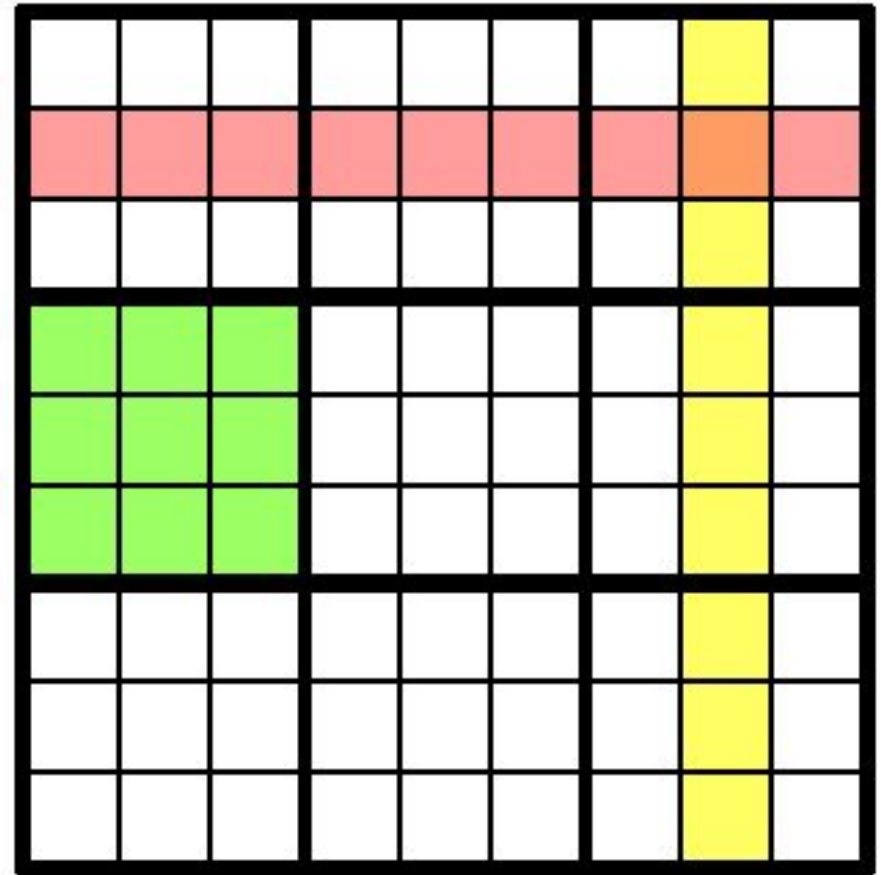
- Introductory Activity: Sudoku
- Math Pathways
- Co-Requisite Learning Communities (Just-In-Time Remediation)
- Pathways for Less-Prepared Students
- The Emporium Model
- Implementation Synergy
- First-Semester (Fall 2016) Results
- Replicating the Model
- Additional Resources

A sudoku puzzle is a grid of nine by nine squares or cells, that has been subdivided into nine subgrids or "regions" of three by three cells.

The objective of sudoku is to enter a digit from 1 through 9 in each cell, in such a way that:

- Each horizontal **row** (shown in pink) contains each digit exactly **once**
- Each vertical **column** (shown in yellow) contains each digit exactly **once**
- Each subgrid or **region** (shown in green) contains each digit exactly **once**

<https://www.sudoku.ws/rules.htm>



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UHCC Strategic Directions Challenge

75% of students testing at one level below college-ready standards will complete their college-level English and/or math course within one semester.

70% of students testing at two or more levels below college-ready standards will complete their college-level English or math course within one year.

http://uhcc.hawaii.edu/OVPCC/strategic_directions/hawaii_grad.php

Creating Math Pathways

Provide rigorous Math Pathways that align with the skills and knowledge necessary for success in students' chosen programs of study.

<http://completecollege.org/the-game-changers/>



What was the problem?

Traditional Legacy Sequence with 4 levels (2 years!) of developmental math

	Developmental Courses				Transfer level courses	
Placement	4 levels below	3 levels below	2 levels below	1 level below		
College Algebra Track	Basic College Math	Pre-algebra	Elementary Algebra I	Elementary Algebra II	College Algebra	Pre-calculus and Calculus
College Math Track					Survey of Mathematics OR Math for Elementary Teachers I OR Introduction to Statistics with Probability	
Quantitative Methods Track			Quantitative Methods for Automotive Technology			

What are co-requisite learning communities?

Research has shown that many more students can succeed in college-level gateway courses with additional support than are currently placed into them

<http://completecollege.org/the-game-changers/#clickBoxTan>

	Co-requisite Learning Communities (placement 1 level below)
College Algebra Track	College Algebra (3 credits) paired with College Algebra Companion (2 credits)
College Math Track	Survey of Mathematics (3 credits) OR Introduction to Statistics With Probability (3 credits), paired with College Math Companion (1 credit)
Quantitative Reasoning Track	Quantitative Methods for Automotive Technology (3 credits) paired with Quantitative Methods Companion (1 credit)

Leeward CC's Pathways for Less-Prepared Students

	Developmental Course (placement 2 levels below)	Transfer-level Courses	
College Algebra Track (to calculus)	Algebraic Foundations	College Algebra	Pre-calculus and Calculus
College Math Track (terminal)	Introduction to College Math	Survey of Mathematics OR Math for Elementary Teachers I OR Introduction to Statistics with Probability	
Quantitative Methods Track (terminal)	Introduction to Quantitative Methods	Quantitative Methods for Automotive Technology	

What is the big deal for the College Algebra Track?

Students placing 1 traditional level below the transfer level can register for designated College Algebra classes that are paired with a co-requisite support course. An Algebraic Foundations class accepts students who place 2 traditional levels below the transfer level. Other prospective College Algebra Track students are referred to a local Community School for Adults.

Placement	Fall Semester	Spring Semester
1 traditional level below	College Algebra with companion support class	No need; passed College Algebra in the first semester
2 traditional levels below	Algebraic Foundations	Take and pass College Algebra in the second semester

What is the big deal for the College Math Track?

College Math courses are also offered with companion support courses for those placing 1 traditional level below the transfer level. Students with lower placements, even 4 traditional levels below, can become college ready in a single semester in the streamlined sequence. This is made possible by tailoring course content to the intended pathway.

Placement	Fall Semester	Spring Semester
1 traditional level below the transfer level	Survey of Mathematics or Introduction to Statistics with Probability, either with its own companion support class	No need; satisfied their AA degree requirement in the first semester
2 or more traditional levels below the transfer level	Introduction to College Math	Take and pass Survey of Mathematics or Statistics in the second semester

What is the big deal for the Quantitative Methods Track?

The Quantitative Methods Track is for students in the automotive mechanics technology program. As with the College Math Track, there are both co-requisite and no-prerequisite compressed sequence offerings.

Student Placement	Fall Semester	Spring Semester
1 traditional level below the transfer level	Quantitative Methods for Automotive Technology, with companion support class	No need; satisfied their AAS degree requirement in the first semester
2 or more traditional levels below the transfer level	Introduction to Quantitative Methods	Take and pass Quantitative Methods for Automotive Technology

Initial counseling is important!

Students who start down the wrong pathway might find that they need to backtrack to meet their actual program requirements.

- Students who start in the College Algebra track can seamlessly move into the College Math Track or Quantitative Methods Track
- Introduction to College Math and Introduction to Quantitative Reasoning interchange seamlessly
- Students who pass courses in the College Math or Quantitative Methods tracks generally must take and pass Algebraic Foundations to qualify to take College Algebra



The Importance of Content Coordination

Ensuring Rigor While Accelerating

Given the level of acceleration in both the pathway sequence compression and co-requisite interventions, how did we ensure that the courses are appropriately rigorous?

- Careful planning of content
 - Companion classes provide just-in-time remediation
 - Prerequisite classes provide appropriate (and not excessive) preparation
- Emporium model implementation
- Use of instructional software that facilitates both acceleration and just-in-time remediation

Emporium Model

- No lectures!
 - Learning resource center model
 - Computerized instruction
 - On-demand personalized assistance
- Depends heavily on instructional software
 - Interactive tutorials
 - Online exercises and testing with immediate feedback
- Pacing is student-determined within broad parameters
- Emporium staffing is flexible
 - Faculty and/or tutors are on duty to provide immediate assistance
- Requires a significant commitment of space and equipment



http://www.thencat.org/PlanRes/R2R_Model_Emp.htm

How the Pieces Fit Together

- The Emporium Model allows students to spend more time on the content they are unsure of and less (or no) time on already-familiar topics
 - Important both for pathway sequence compression and for co-requisite learning communities
 - Flexible student pacing facilitates inclusion of all required topics in fewer credit hours than in fixed-pace lecture classes



How the Pieces Fit Together

- The Emporium Model allows capable and under-placed students the opportunity to complete 2 classes in a single semester
 - Students who complete Introduction to College Math by the mid-point of the semester are able to complete Survey of Mathematics, in the same semester because of dovetailed content
 - An agreement with admissions and records allows students to have their registration changed from MATH 75 to MATH 100 with no tuition or fee charges AFTER they complete the MATH 100 material so there is a potential reward but NO RISK to the student to try
 - Combined efforts of instruction, counseling, admission and records, and administration were the key to providing students with this opportunity

#noexcuses

#justdoit



Does it REALLY work?

Legacy baseline data:

Starting 2+ levels below the transfer level in the fall	Starting 1 level below the transfer level in the fall
27% completed the 2+ developmental sequence to become college-ready by the end of the academic year	56% passed their class and became college-ready by the end of the semester
9.7% earned a C or better in a transfer-level math class by the end of the NEXT academic YEAR	29% earned a C or better in a transfer-level math class in the spring.

Initial-semester Fall 2016 results

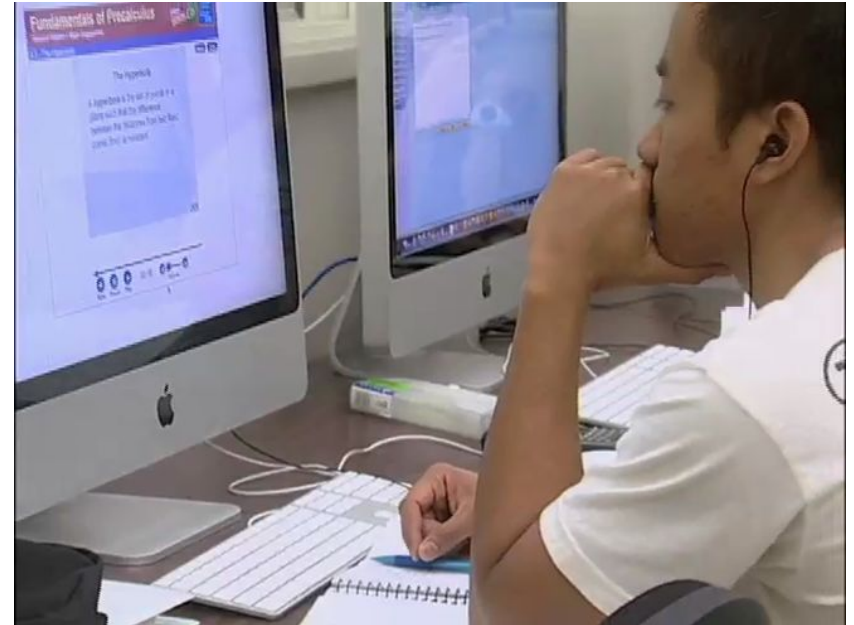
	Traditional placement 2 or more levels below the transfer level	Traditional placement 1 level below the transfer level
College Math track	82% become college-ready by the end of the semester (legacy comparison 27% for the academic YEAR)	70% passed the Survey of Mathematics co-requisite learning community (legacy comparison 29% for the academic YEAR)
	26% (included in the above 82%) completed Survey of Mathematics (legacy comparison 9.7% by the NEXT academic year)	
College Algebra track	56% became college-ready (legacy comparison 27% for the academic YEAR)	75% passed the College Algebra co-requisite learning community (legacy comparison 29% for the academic YEAR)

Replicating the Model, Part 1

Commit to the Emporium Model

1. Hold informational discussions about the model with faculty, staff, student groups, and administrators
2. Secure appropriate funding and classroom commitments from administrators
3. Take advantage of resources available from The National Center for Academic Transformation:

<http://www.thencat.org/>



Replicating the Model, Part 2

Discuss math sequence compression through pathways

1. Decide how much algebra is needed for success in a liberal arts math course? In an introductory statistics course? In a math course for prospective elementary teachers? In a vocational technology math course?
2. Are there reasons to require more algebra than is “needed”?
3. Would a non-algebra-intensive developmental math course suit your college’s and your students’ needs? If so, could the content be dovetailed with one or more of your transfer-level math courses to allow students to complete both the developmental and the transfer-level course in the same semester?

IMPORTANT: Understanding, agreement, and commitment among all stakeholders (student, instructors, counselors, financial aid staff, registrar, administrators, etc.) is needed for effective implementation.

Replicating the Model, Part 3

Discuss the development and implementation of co-requisite learning communities

1. What prerequisite developmental math topics are “needed” for students who are partially prepared to succeed in each unit of the transfer-level course?
2. The Emporium Model allows seamless integration of remedial topics into the transfer-level course syllabus. This allows students with varying backgrounds to customize and streamline their learning path.



Additional Resources

The Google Drive folder linked below includes a number of materials that can help with replicating the model presented.

<https://goo.gl/98ISi5>



Mahalo!