

Forty Five Years of Dev Math in 50 Minutes

Jack Rotman
AMATYC 2017
November 11, 2017 San Diego, CA
S137, Sat 11:55-12:45

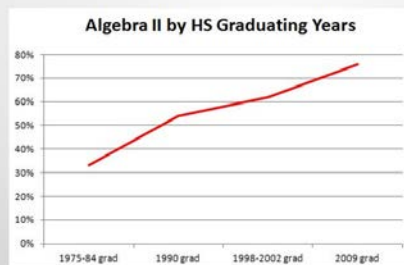
Start with "Now"!

- Minimization: smaller footprint for developmental mathematics
- Trend A: Co-requisite remediation (footprint size=0)
- Trend B: Pathways (smaller footprint for sub-populations)
- Trend C: Replace traditional dev math with modern courses (smaller footprint for all)
- Everybody is an expert (even college presidents and system chancellors)

In the beginning ...

- Developmental mathematics ... kinder, gentler remedial mathematics
- Complete mathematics college-prep kids did in high school, for those who did not
- "High school" mathematics cloned
- Was anti "New Math" (in general)
- Rationale: Get students ready for College Algebra or equivalent

Made some sense then ... (1975)



Bureau of Labor Statistics, "High school math courses and college attendance in two generations" <https://www.bls.gov/publications/tables/2002/20020001.htm>
NCES Fast Facts: Advanced Mathematics & Science <https://nces.ed.gov/fastfacts/display.asp?id=501>

What we tried then (1975)

- Workbooks
- Programmed instruction books and specialized learning machines
- Audio tapes
- Books in 3 colors
- It was all about the **materials**

Decade 2: the 1980's

- Arithmetic skills obsession (reaction to 'handheld calculators')
- Low pass rates meant "let's add another course!"
- Student Learning Problems (aka "blame the student")
- Back to Basics (skills, procedures)

Decade 3: Early 1990s

- NCTM Standards ... small changes for us
- Graphing calculators ... all or nothing [Most of us did 'nothing']
- "Time for a change" (Ed Laughbaum)
- Many of the same messages then ... as in Common Vision & Math Sciences 2025
- We still focused on: old curriculum, getting students ready for College Algebra

Decade 3: Late 1990s

- Pockets of reform and revolution: Focus on writing textbook(s); some grant based
- Supported by AMATYC Standards (1995) and NCTM standards (though not by 'us')
- Presentations at AMATYC and affiliates
- Some were similar to current "Option C" Replace traditional dev math with modern courses

Decade 4: 2000 to 2009

- Publisher's Golden Age: lots happening
- Digital as supplement
- Focus on commonly used content
- Reduction in reform books, and birth of combined algebra texts
- Separate and unequal: graphing calculator within some textbooks; most avoid GC
- Few of us thought of anything besides College Algebra

Decade 4: AMATYC Standards, Act 2

- Beyond Crossroads (2006)
- Process as a Focus ("Improvement Cycle")
- Curriculum addressed more in 1995 document
- Implicit acceptance of status quo (the out-of-date remediation structure)
- Policy influencers ... began to be interested in developmental mathematics

Decade 4 (2000-2009): NCAT

- The Center for Academic Transformation
- Course Redesign as the all-purpose solution: Emporium; Modules
- Skills ... old content
- Efficiency
- Generality: Isolated from the work of the profession

How Many People Does it Take?

- Three people might be enough ... to start (2007)
- Fifteen people can create a new future for dev math (2009)
- Change and reform can grow when continuity exists in the profession
- Appeal to core beliefs of professionals: "Good mathematics" for all students

Decade 5: The Role of 2010

- Carnegie Foundation: Quantway™ and Statway™
- Dana Center: Foundations of Mathematical Reasoning
- AMATYC New Life: Mathematical Literacy, and Algebraic Literacy (the forgotten sibling)
- The "joyful conspiracy" (Uri Treisman)
- We began thinking about other college math courses (besides 'college algebra')

Decade 5: No Longer Hidden

- Prior to 2010, dev math operated under the radar
- Until ... Policy influencers painted a dismal picture of our work
- Policy influencers sought to disrupt the continuity in the profession
- Specific solutions "sold" to college and system leaders (presidents, provosts)
- Focus on non- (or anti-) College Algebra

Minimization Option A: Footprint=0

- Co-requisite remediation as the all-purpose solution
- Focus on Statistics & Liberal Arts Math (or QR)
- "The data is in ... co-requisite remediation works"
- "We can't a group of students for which it does not work." If it sounds too good to be true ... is it?
- College algebra de-valued; get done with math!
- Would it pass the 'employment standard'?

Minimization Option B: Some Gain

- Pathways
- Students needing statistics or quantitative reasoning (aka "non-STEM")
arithmetic courses often still required;
replaces 1 or 2 algebra courses (conditionally)
- "STEM" students generally see the same old curriculum (obsolete stuff) **The "Jekyll-Hyde" approach**
- Get students done with math but in programs which may have low employment rates

Minimization Option C: Replacement

- Mathematical needs relatively same for all students (at the Math Literacy level)
- Eliminate arithmetic (and pre-algebra)
- Algebra II is no longer sufficient for pre-calculus prep: Need Algebraic Literacy
- Supports College Algebra as well as 'other mathematics' (stat, QR, etc)
- Supports upward mobility (mid- and high-skill technical programs)

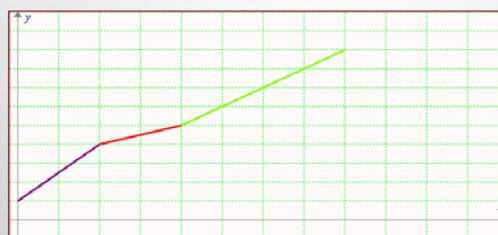
Is there an Option D?

- Not anytime soon
- Traditional Dev Math courses will not survive (perhaps 5 years)
- Policy influencers will not let us 'not change'
- College-Level courses will also shift to modern content ... increasing the forces on dev math

The College Mathematics Curricula

- Minimization also applies to college level math courses
- Obsolete content: will become modern, efficient
- Continuity is critical ... our values, our dreams for 'better'
- "Replacement" (option C) is our first step towards improving ALL of our courses

What WE see



"More developmental courses leads to more students being 'ready!'"

What THEY see

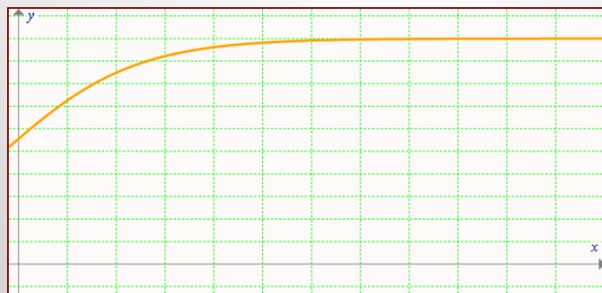


"More developmental courses means most students are blocked from degrees!"

"Remediation" will not survive

- Exponential decay is stronger: we can not WIN this argument
- Stop using the labels "remedial" and "developmental"
- Articulate a positive message about effective & modern preparation courses that we can show lead to success in ALL fields (not just non-STEM)
- Such as: **One (at most) pre-college prep course for 90% of students**

Our Future



"One course gets 90% of students ready for success in college!"

Remaining Challenges

- Do we accept the premise: "changing WHAT we teach is necessary for changing HOW we teach"?
- Can we articulate THE function? (And, is it an increasing or decreasing function?)
- Will we define the constraints? Or someone else?
- Among those constraints: needs of College Algebra, science courses (all of them) ... and even statistics and QR

Where are we headed?

- All traditional developmental math courses will be gone within 5 years; several forces ensure that
- Survival of stand-alone "dev math" (prep) courses depends upon our professional work
- Co-requisite remediation will be an accepted solution; we must help define 'when' to use it
- Intro college math courses (up to Calculus *n*) are the next field of dreams; who wants to play??
- **It's still about the mathematics!!**

Into the sunset ...

- I could not ask for a better experience than I've had within AMATYC for these 30 years
- Any success I've had is based on the collaboration with other AMATYC members
- Each of us has a leadership role
- What will your role be?

This handout AND the entire set of slides available at:

<http://www.devmathrevival.net/?p=2875>