



The Good Shepherd

California's parable for Developmental
Mathematics

MSRI CIME 2015

Katherine F. Stevenson

California State University, Northridge



Goal for today

- The necessary ingredients for guiding change
 - Know, listen, adapt, herd (and pick a good dog)

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- The different and specific forms of change required in Developmental Mathematics (California)
 - Different manifestations within different institutions
 - Different needs of different populations between, as well as within, institutions
 - Different agendas for, and purposes of, change

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 - Know, listen, adapt, herd (and pick a good dog).
- The different and specific forms of change required in Developmental Mathematics (California)
 - Different manifestations within different institutions
 - Different needs of different populations within institutions
 - Different agendas for and purposes of change
- Give example of successful and less successful attempts at change
- Discuss myths surrounding Developmental Mathematics

California's College-Bound Story

- Private 4-year College:
- UC System:
- CSU System:
- CCCS System:
- Total Public:



California's College-Bound Story

- Private 4-year College: 1%
- UC System: 7.2%
- CSU System: 10.5%
- CCCS System: 22.9%
- Total Public: 40.6%



<http://www.cpec.ca.gov/>

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California's Fairy Tale: The Master Plan



- Research 1 Universities (9 campuses, 238,700 students)
 - Top 10%
 -
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- Comprehensive Universities (23 campuses, 437,000 students)
 - Top 30%
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- Community colleges (112 campuses, 2.1 million students)
 - Open access to all HS graduates.
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 - No Developmental Math – Assumed proficient



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 - Developmental Ed – Placement tests in math and English
 - Entry Level Math Test (ELM)
 - One year completion cap



- Community colleges (112 campuses, 2.1 million students)
 - Open access to all HS graduates.
 - Developmental Ed – Placement tests in math and English
 - Assorted tests
 - Traditionally no time cap

California's Reality Program



- Research 1 Universities
 - 7.2% (not 10%)
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2013 Harvard study:
16 % of LAUSD's
Class of 2011 college
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 - Disproportionately African American and Hispanic
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 - 85% in Dev. Math
 - 61% African Americans 52% Latinos into lowest levels
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 - 85% Freshman to Sophomore retention
 - 6 yr. grad rate < 50%

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 - 61% African Americans 52% Latinos into lowest levels
 - 30% of Dev Math students complete transfer math
 - 17.4% African American



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- Community colleges
 - 22.9%
 - 85% in Dev. Math
 - 61% African Americans 52% Latinos into lowest levels
 - 30% of Dev Math students complete transfer math
 - 17.4% Start at bottom and complete transfer math
- <http://scorecard.cccco.edu/scorecardrates.aspx?CollegeID=000#home>



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Dev ED in CC's Bailey & Cho



California's Developmental Approaches



- Research 1 Universities
 - Boot camp
 - Intensive Social Emotional Support Programs
 - Online adaptive intervention



- Comprehensive Universities



- Community colleges

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- Comprehensive Universities
 - Boot camp / Early Start Math
 - Intensive first year experience
 - Continued Social Emotional Support Programs
 - Coordinated Developmental/College Level Programs



- Community colleges

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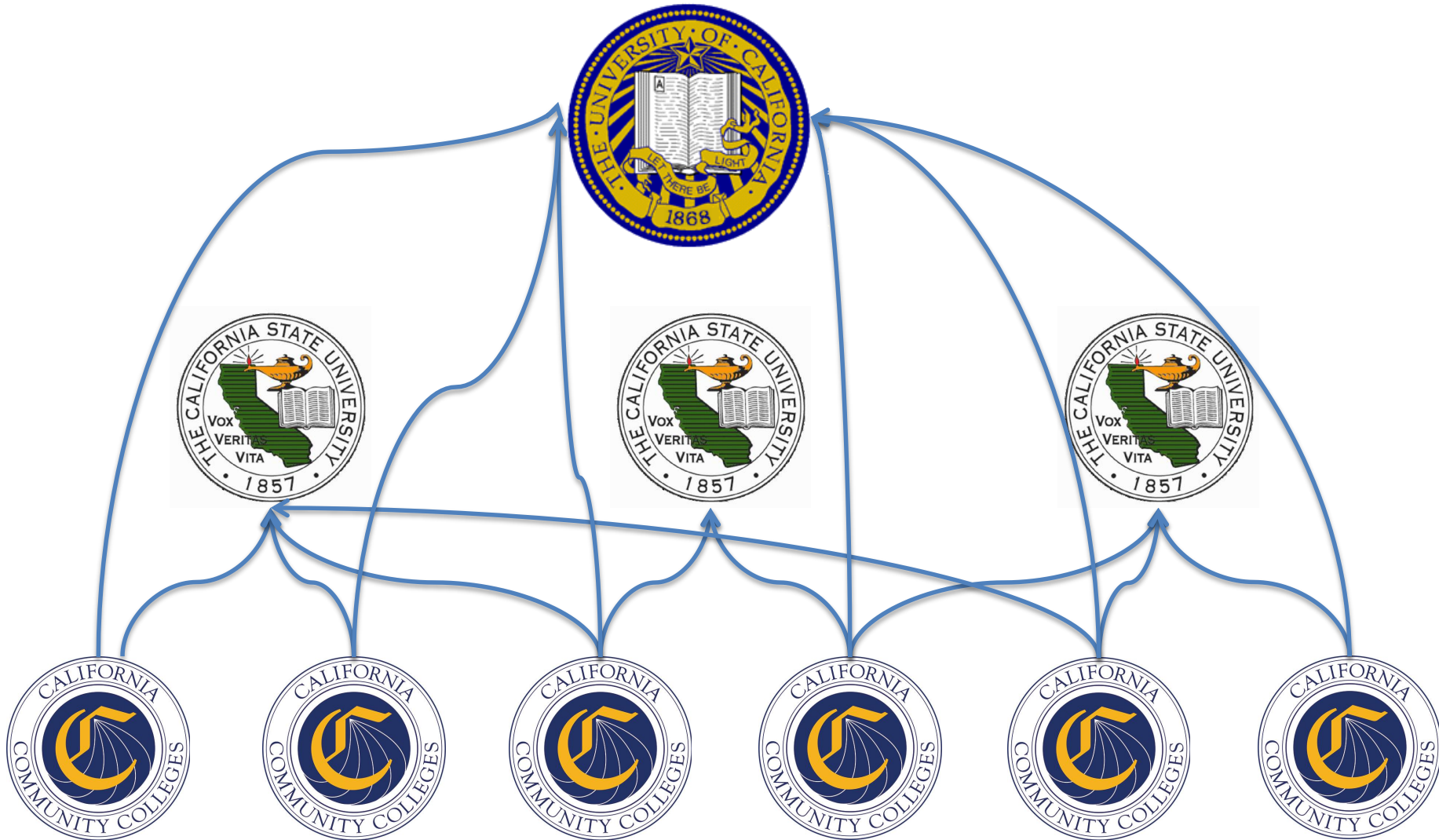


- Community colleges
 - Boot camp
 - Developmental Math Combined with Social Emotional Support programs
 - Coordinated Developmental/College Level Programs

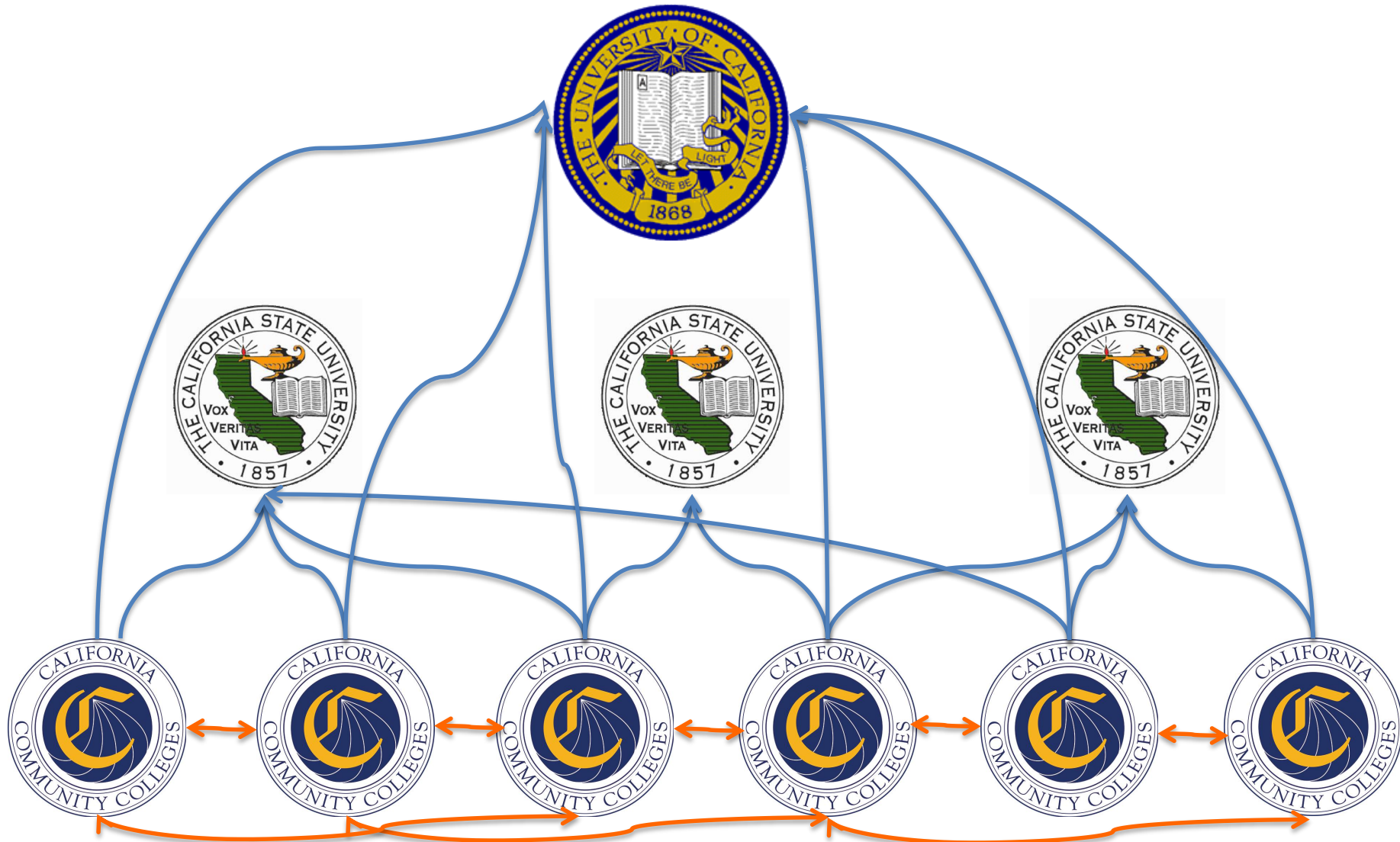
The Integration Challenge



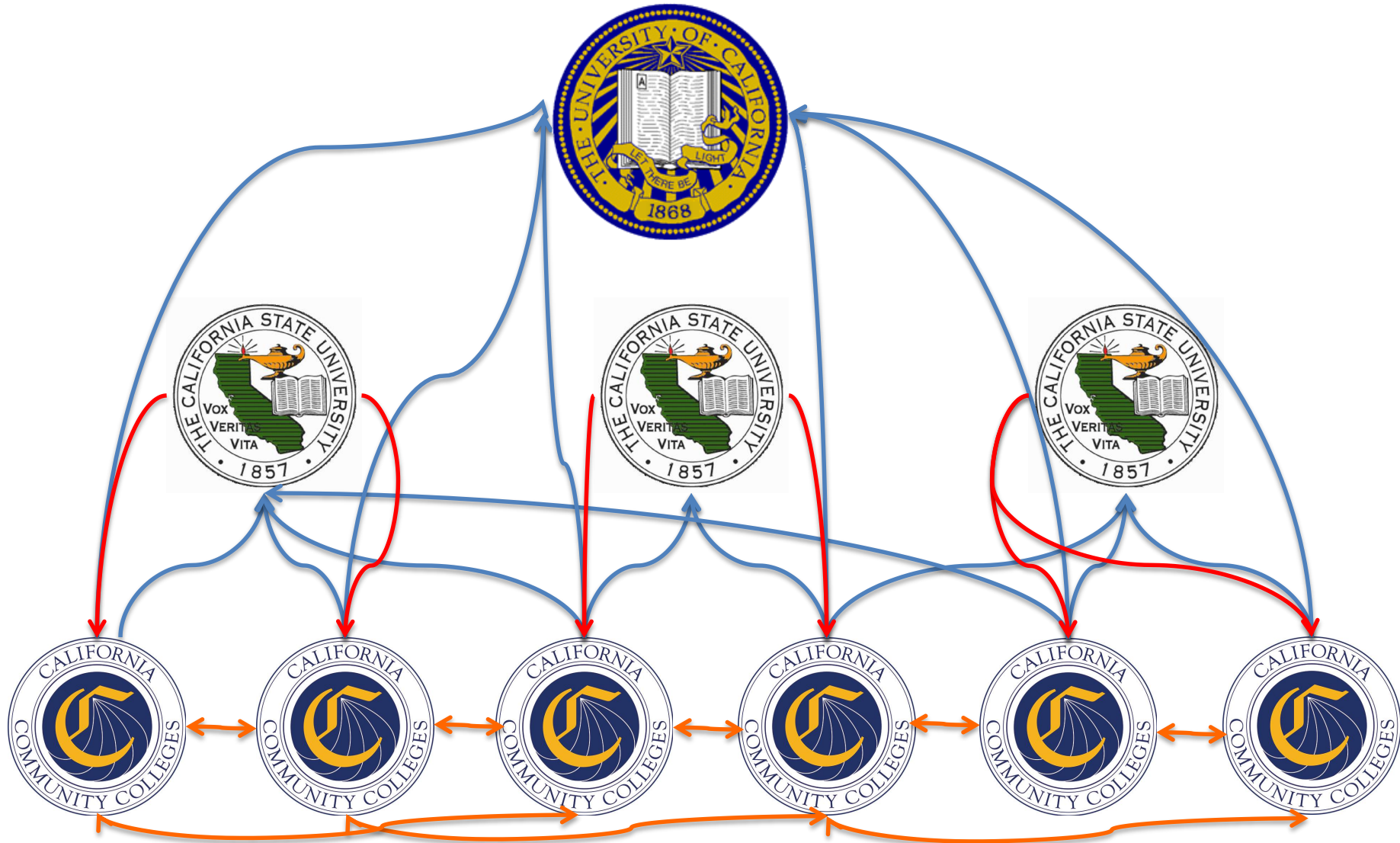
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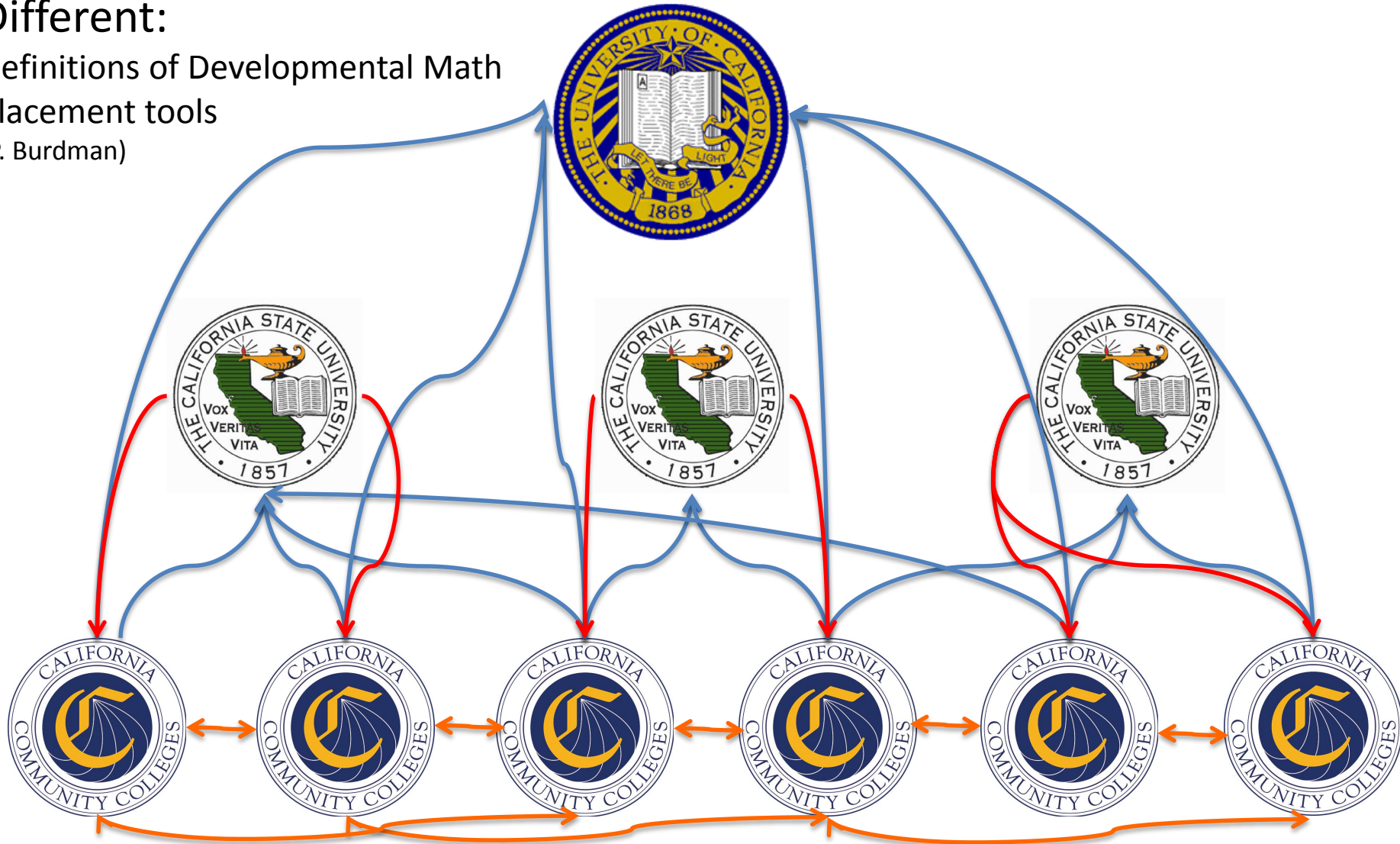
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Different:

Definitions of Developmental Math

Placement tools

(P. Burdman)



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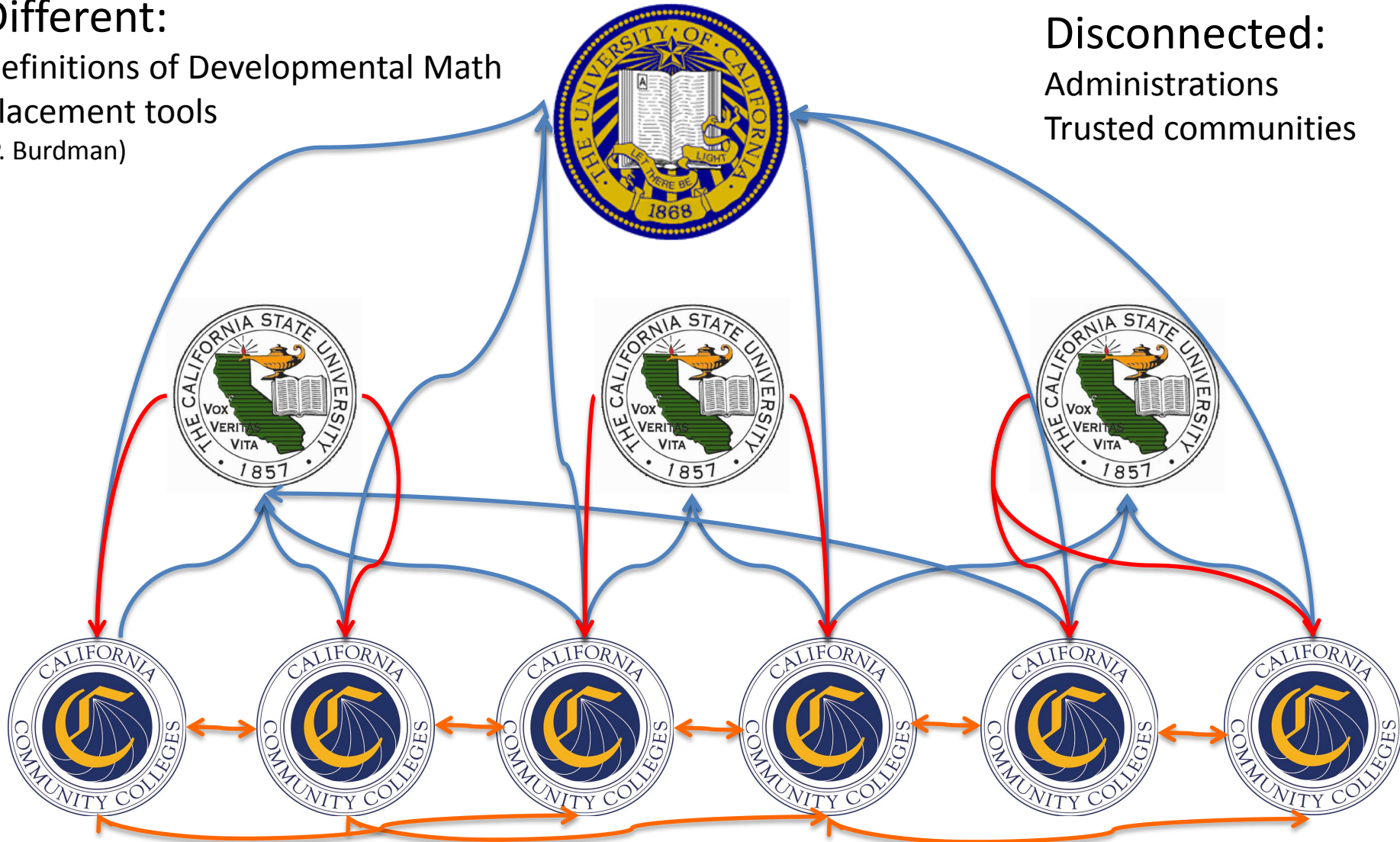
Placement tools

(P. Burdman)

Disconnected:

Administrations

Trusted communities



The Integration Challenge



herding dog

The Integration Challenge

Coordinate:

Definitions of Developmental Math

Placement tools

(P. Burdman)

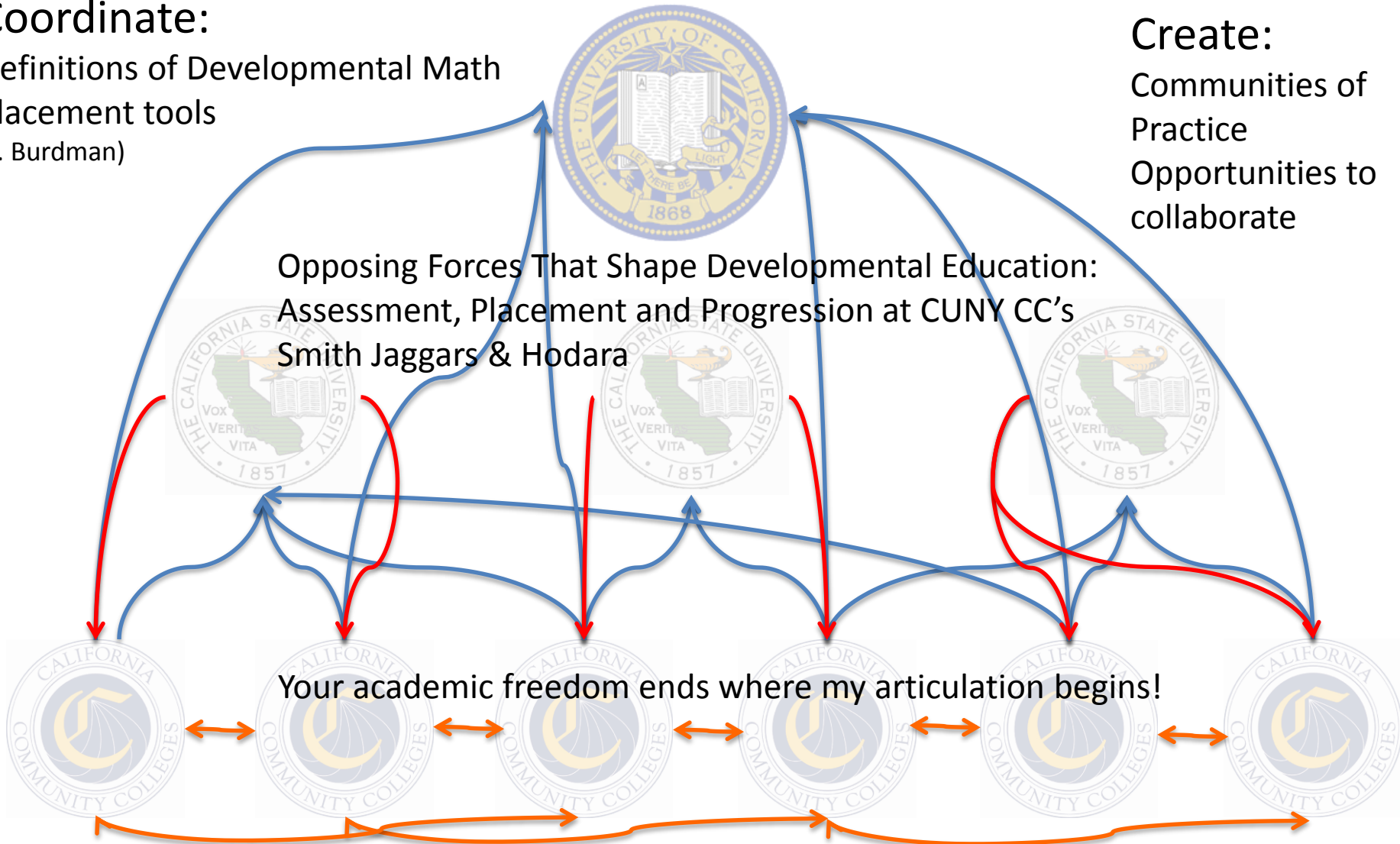
Create:

Communities of Practice

Opportunities to collaborate

Opposing Forces That Shape Developmental Education:
Assessment, Placement and Progression at CUNY CC's
Smith Jaggars & Hodara

Your academic freedom ends where my articulation begins!



Cautionary Tale:

CSU's Administrative push for Statistics Pathways



The plan...

- Several CCC's approached by Carnegie to try *Statway*

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CSU's Administrative push for Statistics Pathways



The plan...

- Several CCC's approached by Carnegie to try *Statway*
- Neighboring CSU's invited
- GEAC consults CSU Mathematicians
- GEAC waives "Intermediate Algebra" Requirement

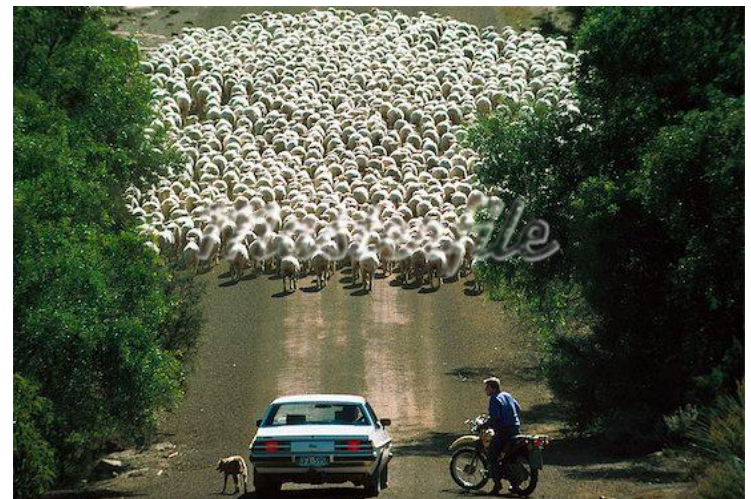
Cautionary Tale:

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The plan...

- Several CCC's approached to try *Statway*
- Neighboring CSU's invited
- **WHICH** CSU Mathematicians consulted
- GEAC waives "Intermediate Algebra" Requirement



Cautionary Tale:

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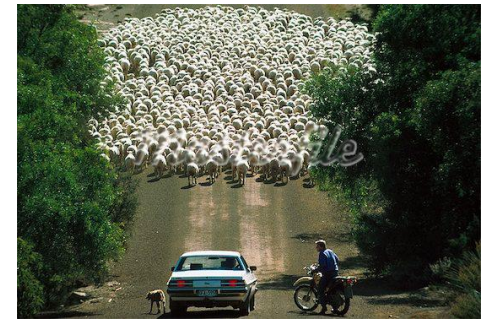


The plan...

- Several CCC's approached to try *Statway*
- Neighboring CSU's invited
- **Not the CSU Council of Math Chairs**
- GEAC waives "Intermediate Algebra" Requirement

What happened.

- CSU Math Council objects
- CSU students complain about unfair dual system
- UC BOARS digs in against *Statway* and all other "locally grown" Stat-path and quantitative reasoning pathways



Happy Ending:



The plan...

- Several CCC's approached to try *Statway*
- Neighboring CSU's invited
- **CSU Math Council Consulted**
- GEAC waives "Intermediate Algebra" Requirement

What is happening, eventually

- UC-BOARS Accepted *Statway*
Left vague the status of other stat-pathways.
- CSU-GEAC Approved extension of waiver
- CSU Math Council – preparing a statement



Success Story: CSU's Early Start Initiative



CSU's Early Start Initiative



The plan...

- All CSU entering freshman must start remediation in the summer before they matriculate
- Students can do ESM at any CSU campus

CSU's Early Start Initiative



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- All CSU entering freshman must start remediation in the summer before they matriculate
- Students can do ESM at any CSU campus
- Entry Level Math Test Equivalent score – Transparency within the system
- Credit (move up), No Credit (non-compliant), Required Progress (tried)
- Local control over what/how/when to do ESM (online, face-to-face, hybrid, boot camp,...)

Used trusted networks

Listened

Compromised

CSU's Early Start Initiative



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What happened.

- Students came!
- Transfers of scores happened
- Ideas were shared
- Standards were coordinated
- CSUN Freshmen retention up (73% to 78%)



Myths we can easily bust:

- There is no solution
- It's one problem
- There is one solution

Listen, know, adapt, herd



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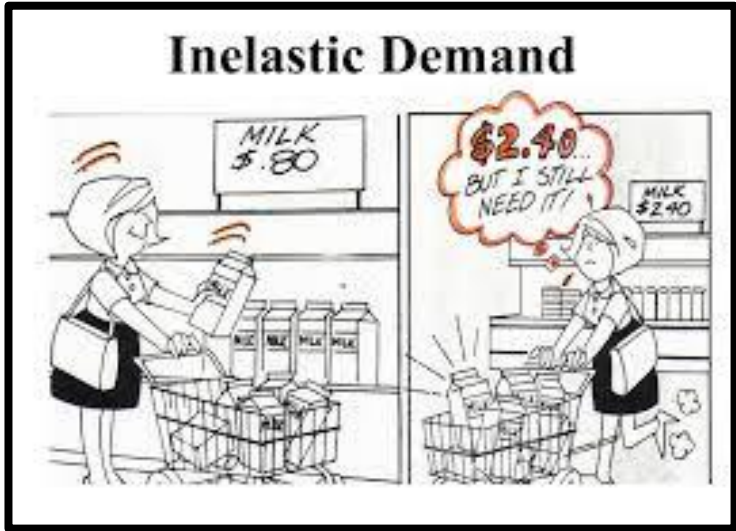
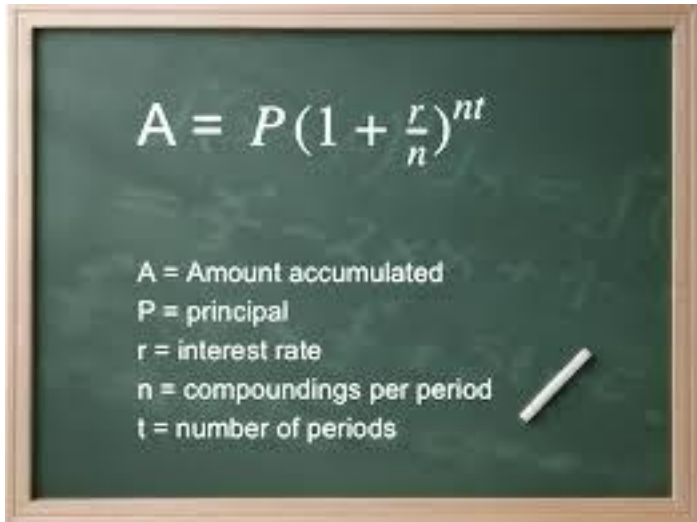


More Myths

- Intermediate Algebra is essential
- Intermediate Algebra is irrelevant

$$\begin{aligned} & \frac{2x^2 + x - 6}{x^2 - 2x - 8} \cdot \frac{2x^2 - x - 3}{x^2 - 3x - 4} = \\ & = \frac{2x^2 + x - 6}{x^2 - 2x - 8} \cdot \frac{x^2 - 3x - 4}{2x^2 - x - 3} = \\ & = \frac{2\left(x - \frac{3}{2}\right)(x + 2)}{(x + 2)(x - 4)} \cdot \frac{(x - 4)(x + 1)}{2\left(x - \frac{3}{2}\right)(x + 1)} = \\ & = \frac{\cancel{(2x - 3)} \cancel{(x + 2)}}{\cancel{(x + 2)} \cancel{(x - 4)}} \cdot \frac{\cancel{(x - 4)} \cancel{(x + 1)}}{\cancel{(2x - 3)} \cancel{(x + 1)}} = 1 \end{aligned}$$

$$S = a(r_1(E_1) + (1 - r_2)(E_2)) / C$$



$$E = (\% \Delta \text{Demand}) / (\% \Delta \text{Price})$$

$$E(p) = -ap / (b - ap)$$

More Myths

- This is a US problem:
 - Nationwide increase in international students placing into Dev Math.



Saudi Arabia

- Test for English as a Foreign Language: Mean 60 vs 81
- TIMS bottom 3
 - <https://www.insidehighered.com/news/2013/05/30/international-educators-discuss-challenges-facing-saudi-students-and-strategies>
- Similarly: Kuwait, Oman, Qatar
 - UK, Open University's Bridge to Success: mathematics and learning-to-learn content so students can close gaps in their abilities and move into college-level courses



Good Shepherding

To Find Answers:

- Know
- Listen
- Adapt
- Herd



Make it easier and more attractive for students, faculty, and administrators to do the right thing than the wrong thing.