“JUST MAKE IT COREQUISITE SUPPORT, THEN!”

How to design sustainable Corequisite Support models

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Goals of this presentation:

Implementing corequisite remediation is a much more complicated endeavor than the usual curricular changes implemented in a department of mathematics.

It potentially involves major changes in:

- The departmental teaching culture
- The department's interaction with the rest of the university

We will highlight the key lessons learned in our implementation.

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A brief introduction to Wright State:

We are a regional, access oriented, 4 year state institution located in Dayton, OH.

Total enrollment F'18 is approximately 15,500

'17-'18 New Students (first time college students): 35% needed mathematics remediation. Overall number is 40-50%.

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Math-emporium style DEV was our structure for several years

In 2013 WSU redesigned its developmental mathematics courses (DEV) in the Mathematics Emporium model, using computer aided instruction.

Platform: ALEKS

Redesign increased DEV completion rates by 13%

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Mathematics Pathways:

We have had well developed, and well implemented, mathematics pathways in place for over a decade:

- *Mathematical and quantitative literacy; general audience.*
- *College Algebra; feeder for three different Calculus tracks: life sciences, business, STEM.*
- *Introductory statistics; feeder for research methods courses in psychology, nursing, and some education and social science majors.*
- *Early and middle childhood mathematics education.*

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Introduced Corequisite Remediation in 2016

In 2016 we were awarded a *Bridges to Success* grant from the Ohio Department of Higher Education to support the creation of corequisite remediation versions of our pathways.

We chose:

- Quantitative literacy
- Statistics
- College Algebra

In 2017 we were awarded a *Bridges to Success Implementation* grant that supported our work to take the first two pathways to scale.

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Going to scale

During the ’18-’19 academic year we will provide seats in corequisite remediation versions of the quantitative reasoning and introductory statistics pathways to accommodate 70% of our incoming first time college students.

With our new model we have given access to college credit bearing classes to

Fall’17-Spring ‘18:

203 students, 60% ABC rate in college credit bearing class

Fall ‘18:

262 students

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How to decide if it's working well?

Three important comparisons:

- ***Success rate compared to direct place students:*** takes a large N since both success rates are changing.
- ***Success rate compared to what came before:*** small N is sufficient to do statistical analysis.
- ***Success in "follower course":*** this takes the longest to measure in any real way since students come from different majors.

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Detailed Success Data for ’16 - ’17

Outcome	*Frequency*	*Percent*	*Cumulative %*
C or Better in Gateway, P in DEV	121	60%	60%
C or Better in Gateway, Did not Pass DEV	0	0%	60%
Less Than C in Gateway, P in DEV	43	21%	81%
Less Than C in Gateway, Did not Pass DEV	39	19%	100%

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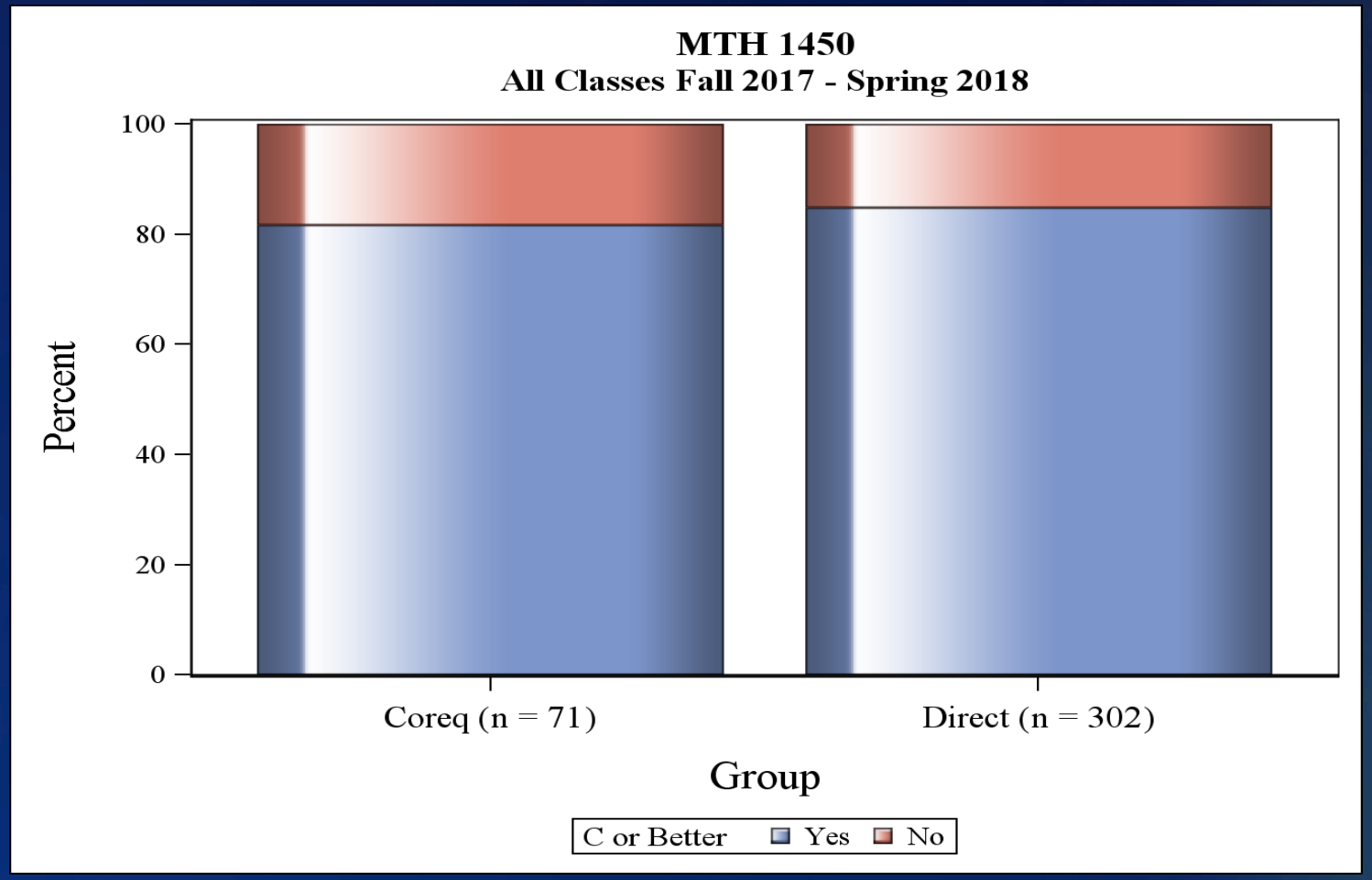
Quantitative Reasoning



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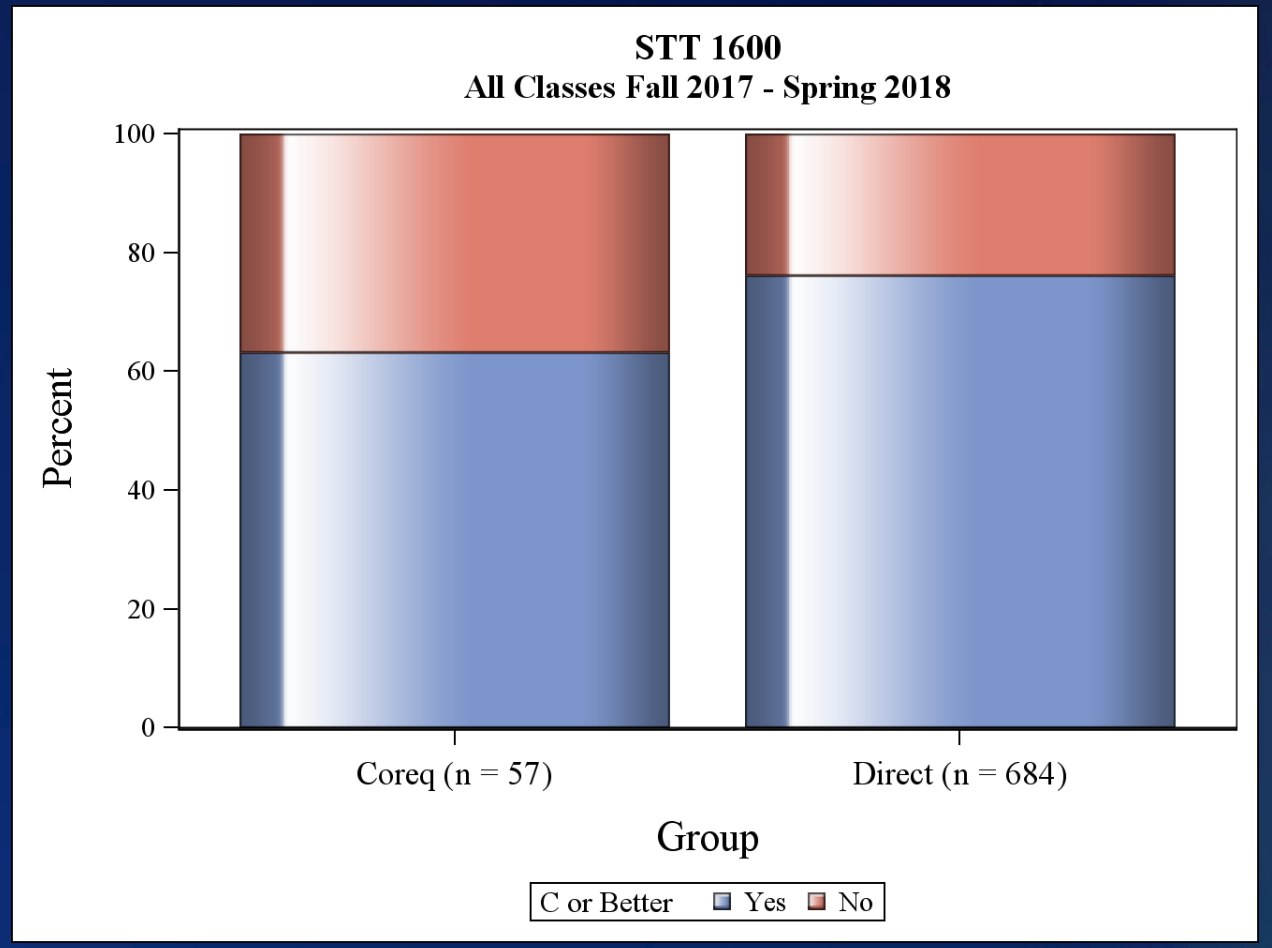
Introductory Statistics



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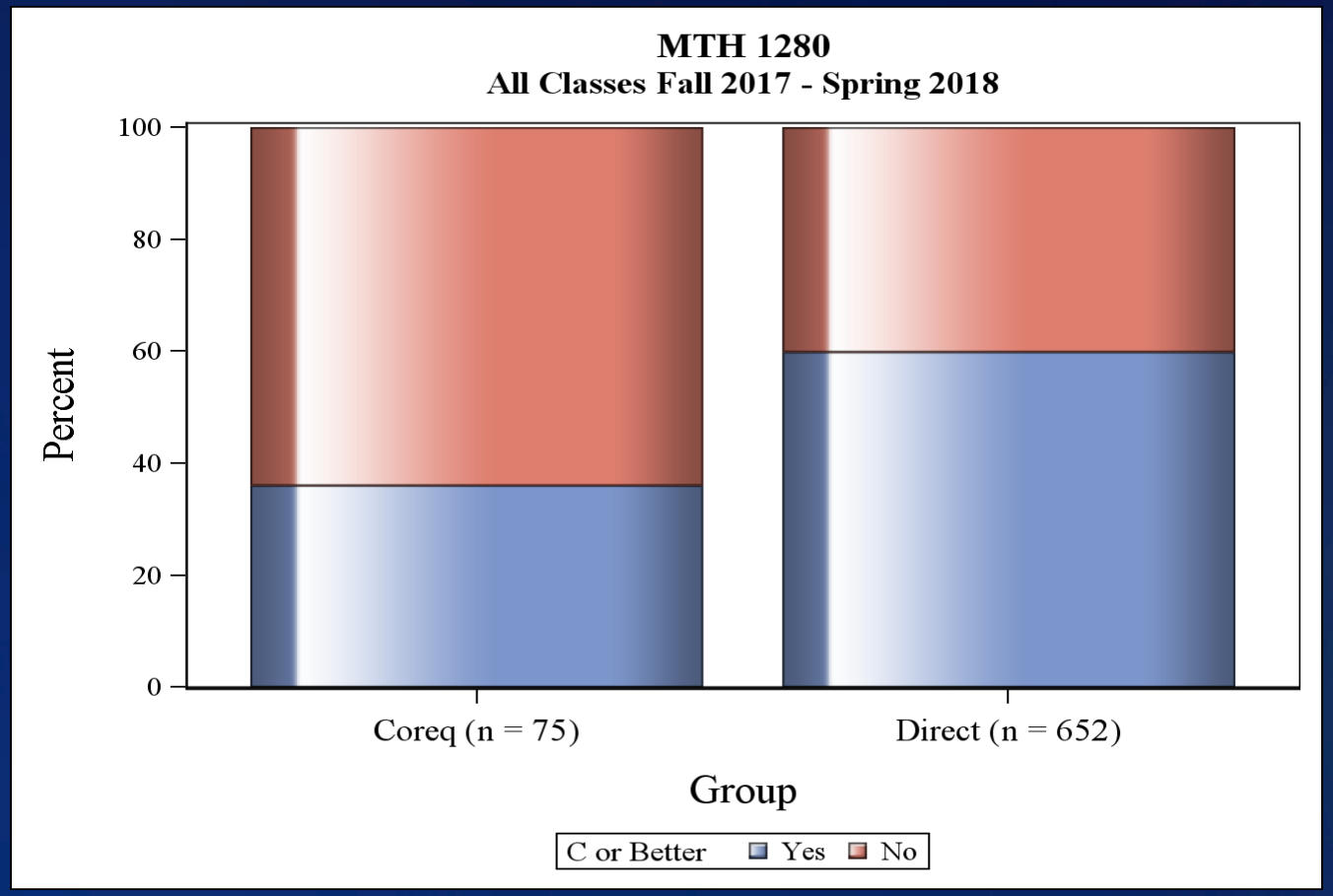
College Algebra



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What came before

This baseline data uses students that took their first developmental mathematics course at WSU F ’13-S’15 who were placed in developmental mathematics, and were in the QR or Intro Stat pathway.

Less than 20% of those students completed their gateway mathematics course in one year. There were two sources of ”leaks”:

- Some students didn’t pass DEV math
- Most students who passed DEV did not take the college credit bearing course the following semester.

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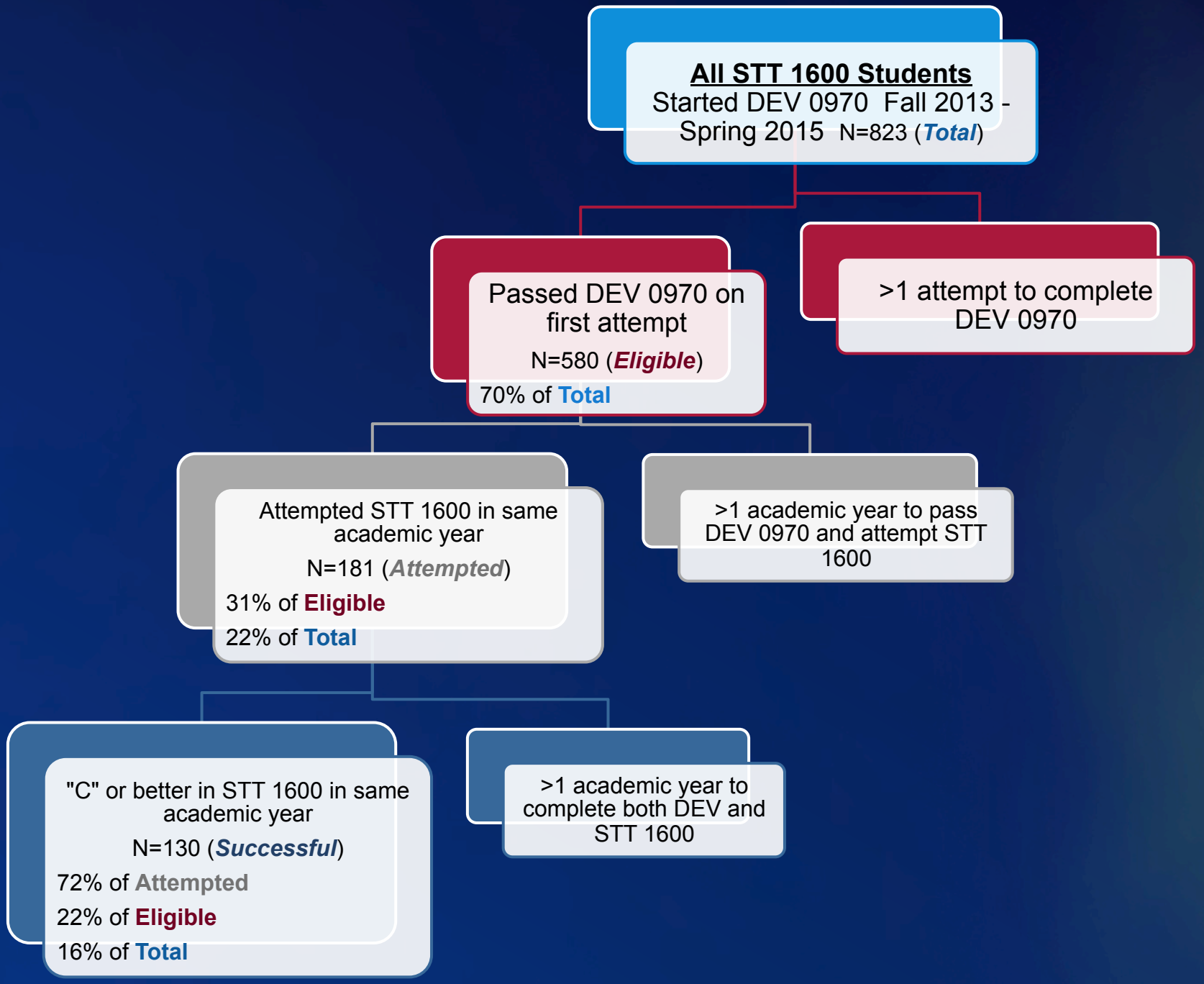

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Increased likelihood of success in Intro Stats

Students taking the Corequisite course are approximately two times as likely to experience a successful result as DEV students. ($p < 0.0001$)

Compared to that flow chart we have lowered the number of modules necessary to enter Intro Stats

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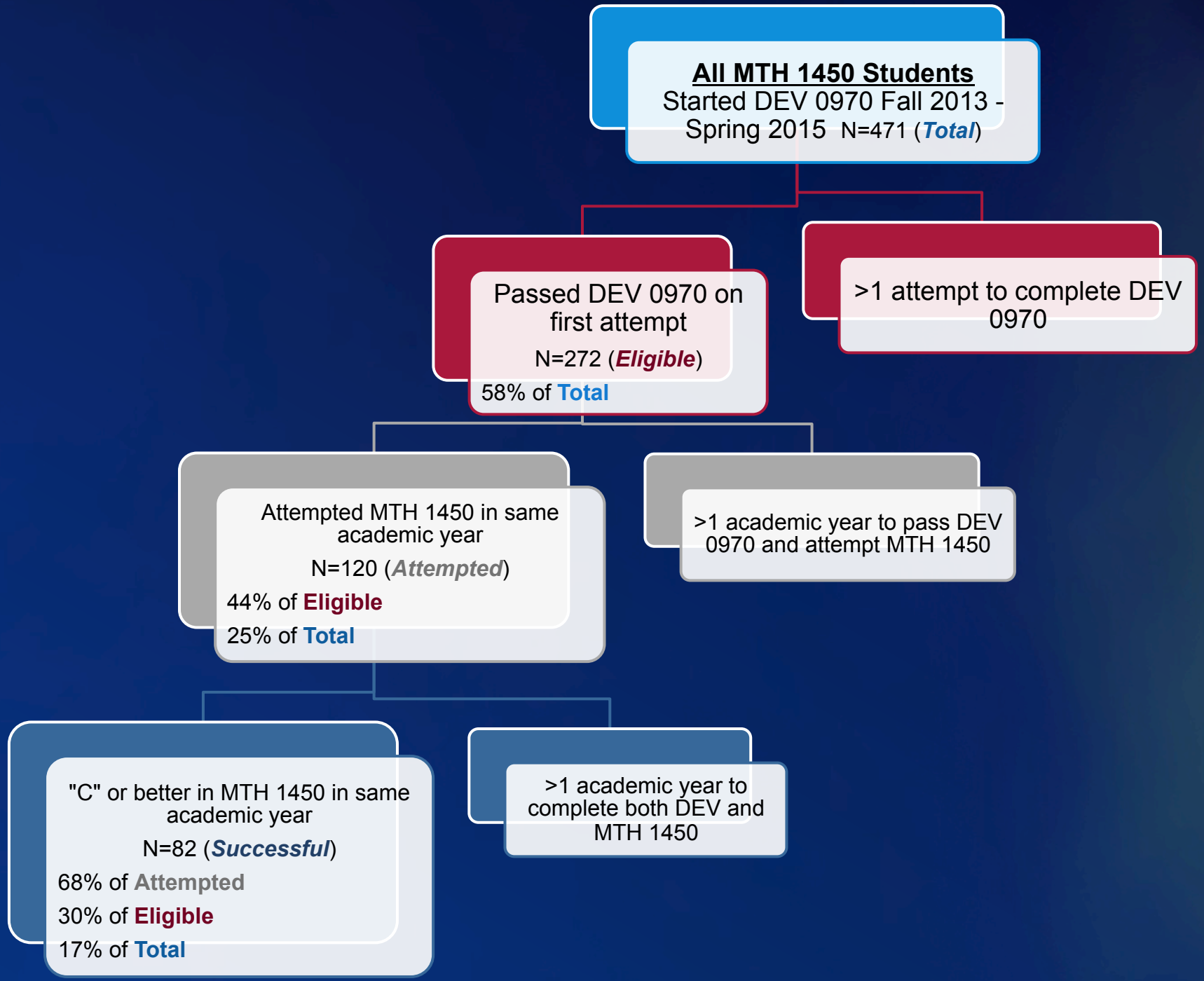

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Increased likelihood of success in QR

Students taking the Corequisite course are approximately 3.54 times as likely to experience a successful result as DEV students. ($p < 0.0001$)

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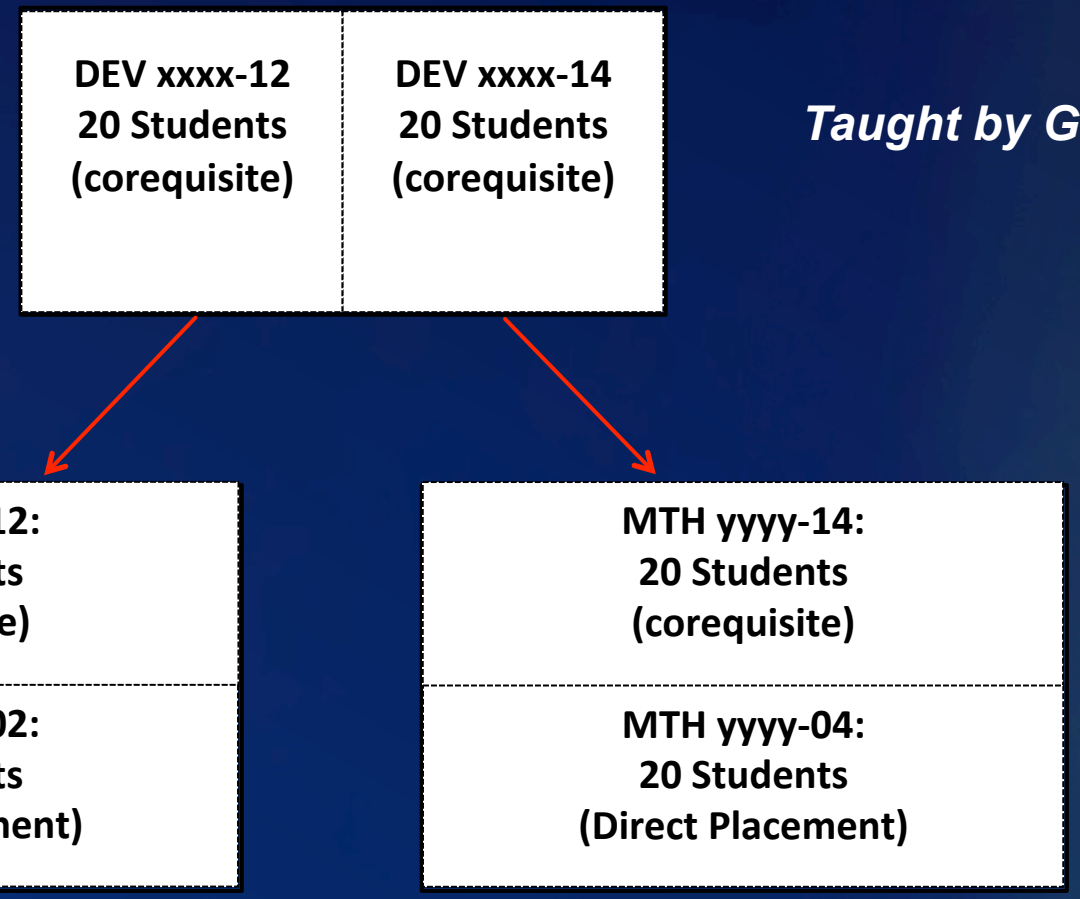
Details of our model:



Taught by Graduate Teaching Assistant

Possibly taught by different instructors

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Pros and Cons of our model

Pros:

- Easy to scale for varying enrollment
- Heterogeneous student body supports soft skill improvement.

Cons:

- Requires increased communication within a teaching team.
- Significantly more expensive than Emporium.

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Changing the perspective on DEV mathematics courses

- Traditional standalone DEV courses focus on:

"What part of high school math did you not learn?"

- Corequisite DEV courses focus on:

"What must students know in order to succeed in college-level math?

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What must students know to succeed in college-level math?

This new perspective led to increased discussion on the learning objectives of our courses and:

- Improved teaching in both DEV and college-level math
- Improved our curriculum in both DEV and college-level math

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Back-mapping from the college-level course is time consuming, difficult work

- Challenging to find or create useful materials to complement the college-level course on our own timeline
  - Faculty support (time, money, and professional development)

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Curricular and Pedagogical Challenge of our structure:

Since two different college level classes feed into one corequisite DEV course the pacing and coverage in the two college level classes has to be coordinated.

If your department doesn't already have a model of teaching communities this presents a challenge.

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It was very useful to change the text at the beginning of the venture

- Faculty reset for new curriculum
- Include all faculty in this change

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Corequisite Course – Curriculum Philosophy

- How are the corequisite courses intended to assist the corequisite students?
  - Only cover prerequisite topics?
  - Also lay the groundwork for new topic coverage in the credit-bearing course?
  - Also support students *after* new topics are introduced in the credit-bearing course?

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Teaching Communities must be formed to resolve these questions.

Agreement needed concerning what topics are covered in credit-bearing courses

- Teaching teams
  - – corequisite and credit-bearing class teachers of shared students must be in communication
  - – Collaboration will include *how* topics are presented (formulas, vocabulary, etc.)

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Early conversations about corequisite changes can lead to support moving forward

- Faculty may need time to mourn loss of past curriculum
- Develop a culture of change for department
- Support transition to teaching communities in the presence of “lone wolf” teaching traditions.

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Our recommendations:

Identify "Heavy Lifters":
A small group of faculty creating the "straw man" for first attempt.

Engaging all faculty:
Creating an environment with early conversations and information for all to take ownership and to start adapting for scale implementation.

Leverage the Coalition of the Willing:
They are ambassadors for the work, and are valuable team members as we build capacity.

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Communicate with Constituents:

- Meet with Deans
- Attend college meetings to explain the project.
- Present before and after data specific to the college to explain positive impact of your work.
- Be honest with your data: present good and bad outcomes.

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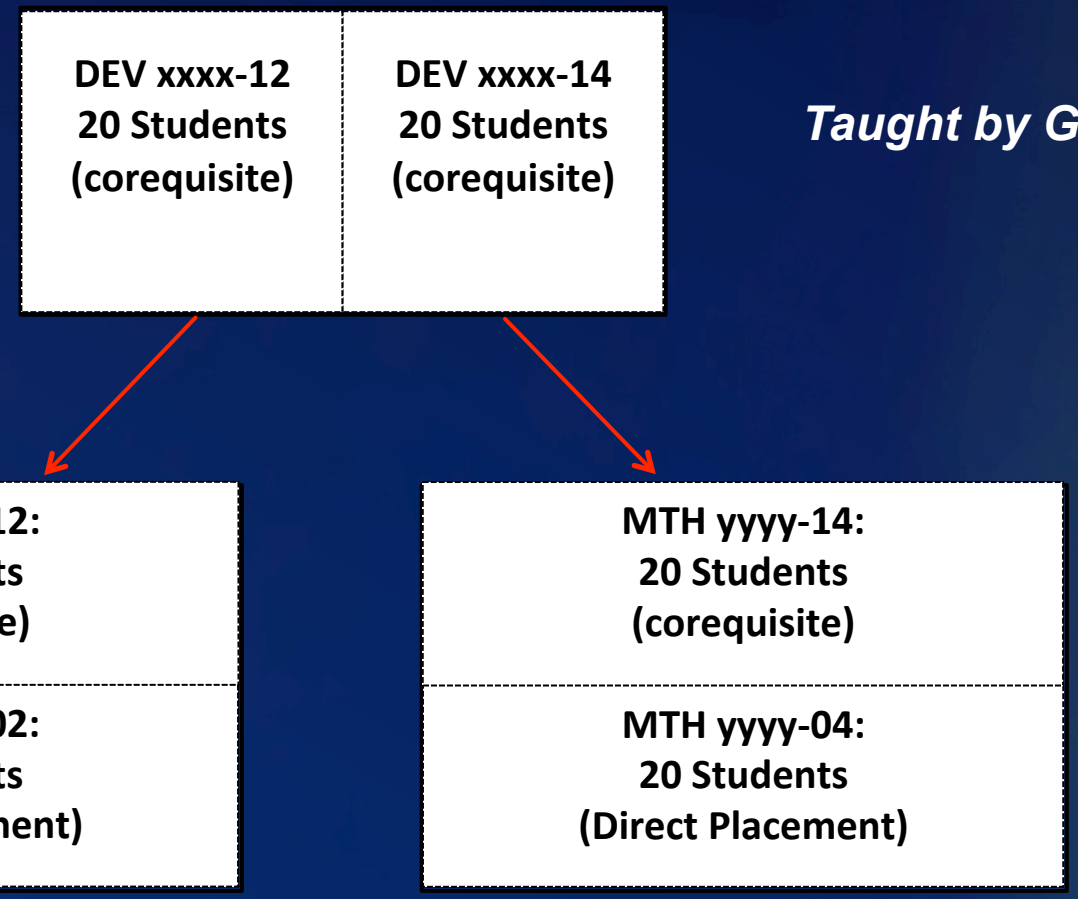
Build Capacity: build teams to induct faculty new to the model.



Taught by Graduate Teaching Assistant

One of the designers/early testers paired with a new instructor

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Departmental Infrastructure

What is needed to aid in the implementation of the corequisite model?

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Communication Plan – for Teaching Teams

- Outlines policies, expectations, and timelines
- Provided to teaching teams before semester begins
- Teaching teams need to be in communication periodically

Anticipate and plan for buy-in issues among disengaged faculty.

CRUCIALLY IMPORTANT: early and frequent communication as you go to scale.

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Corequisite Courses – Scheduling Plan

- Corequisite classes should be scheduled only on days when credit-bearing the class meets: otherwise there are attendance issues.
- Change: faculty now need to work with the chair to coordinate optimal scheduling: which sections should combine for one DEV, etc.

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Points to consider regardless of your model

This is not a project you can complete in isolation!!!

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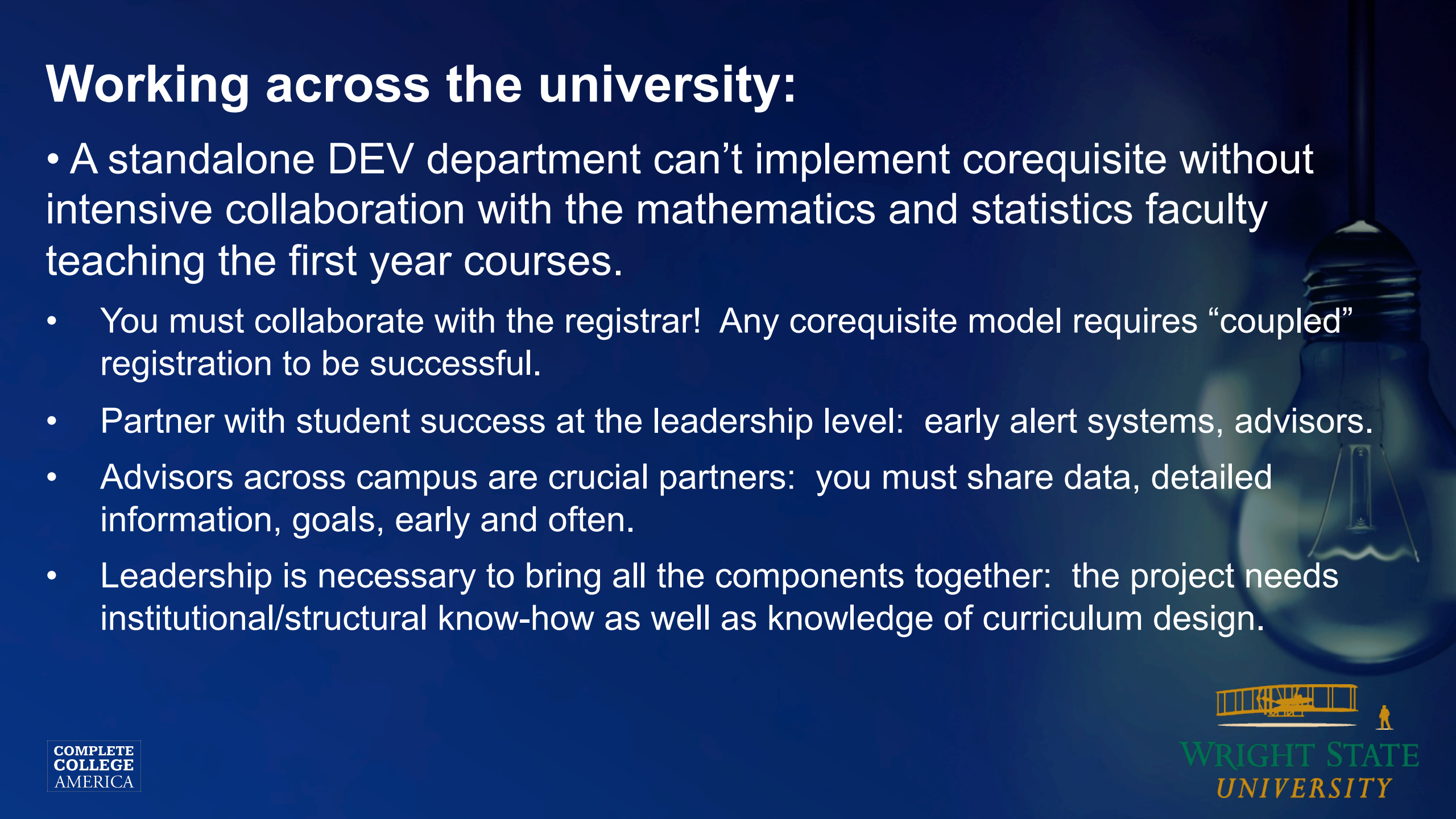
Working across the university:

• A standalone DEV department can't implement corequisite without intensive collaboration with the mathematics and statistics faculty teaching the first year courses.

- You must collaborate with the registrar! Any corequisite model requires "coupled" registration to be successful.
- Partner with student success at the leadership level: early alert systems, advisors.
- Advisors across campus are crucial partners: you must share data, detailed information, goals, early and often.
- Leadership is necessary to bring all the components together: the project needs institutional/structural know-how as well as knowledge of curriculum design.



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Leadership:

The project needs leadership support at all levels:

University and College Level:

Validating the resources and energy spent and justifying the discomfort some faculty will feel.

Department Level:

Leadership to oversee the project's components: collaboration of the department across the university, manage faculty issues, lead the necessary conversations and professional development to build the right infrastructure, support the curricular design, provide data analysis.

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Going to Scale

Current faculty conversations are focused on:

Soft skill issues: We see students in our classroom at least a year before we normally would. Classroom management looks different now.

Literacy issues: many students in the co-req are also in co-req English

Teaching/learning community vs independent teaching

What assumptions have we built into our courses that form barriers to equity?

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