WE RISE

Best Practice and Course Reconceptualization in Online Undergraduate Quantitative Reasoning

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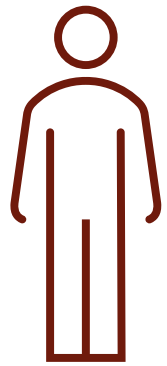
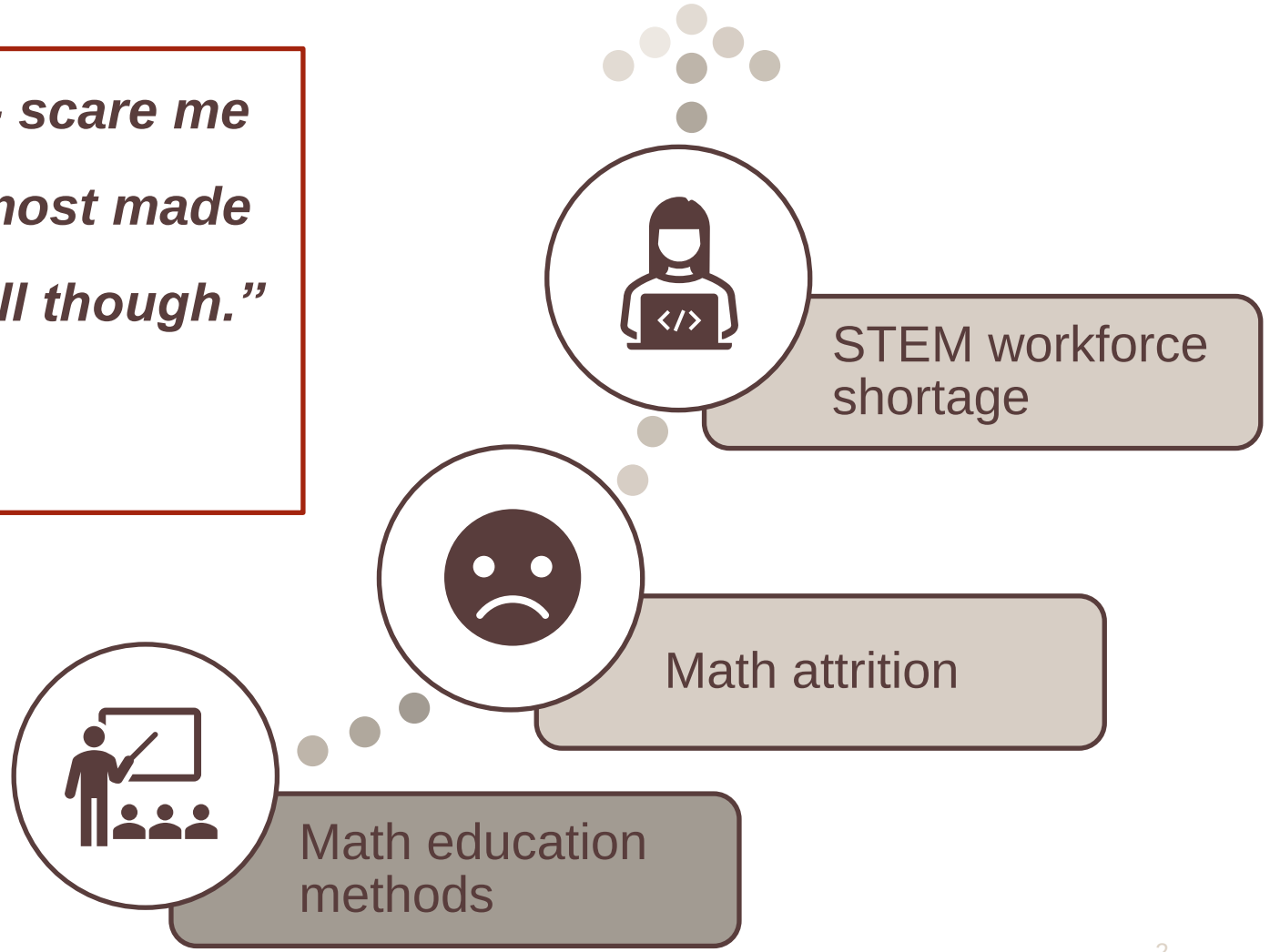
Problem: STEM workforce shortage

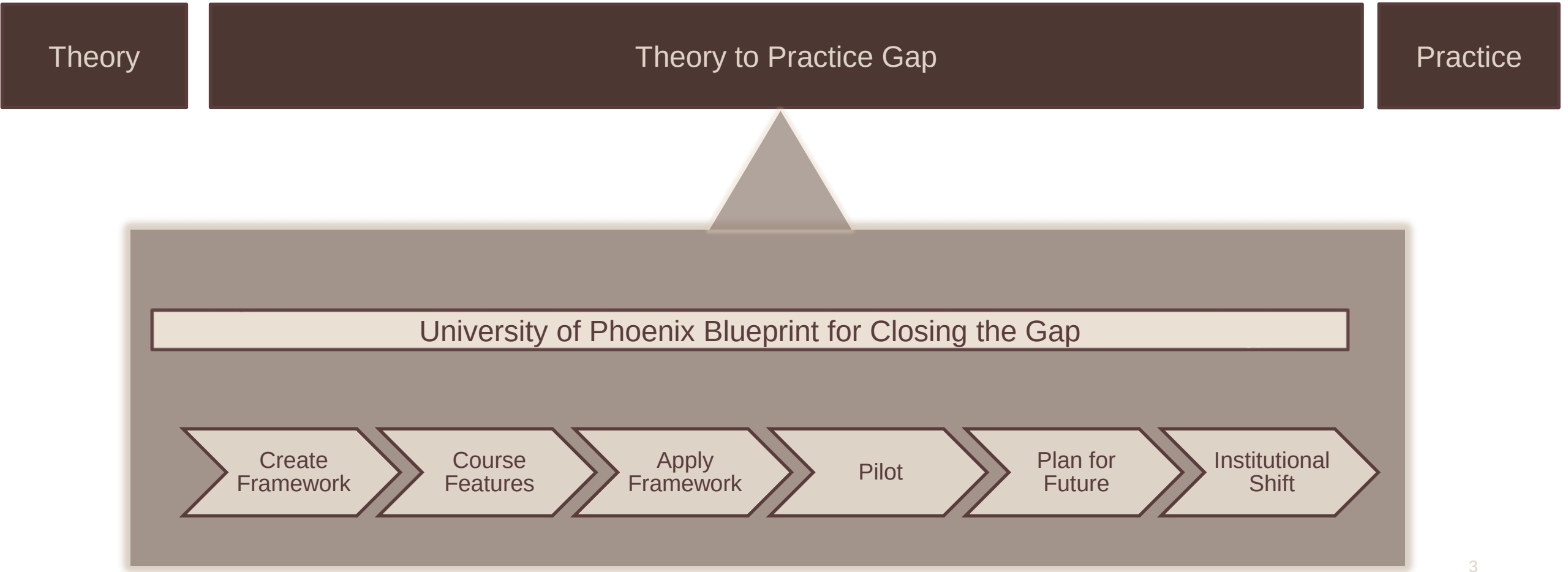
“The next four courses - all math - scare me senseless…. Again - this class almost made me drop out - going to give it my all though.”

-Student





Solution: Translate theory to practice



Step 1: Create philosophical framework

Theory	Seminal works
Metacognition and Affect	[Dole1998][Mayer1998][Moons2007][Sinatra2005][Bandura1986]
Conceptual Change	[Strike1992][Carey1999][Carey2000][Chinn1993][Chi2008]
Social Constructivism	[Vygotsky1986]
Academic Self-concept	[Marsh1985][Bong2003]
Holism	[Dewey1997][Mahmoudi2012]
Systemic Functional Linguistics	[Halliday1992][Holliday1994]
21st Century Knowledge Framework	[Kereluik2013][Mishra2019]

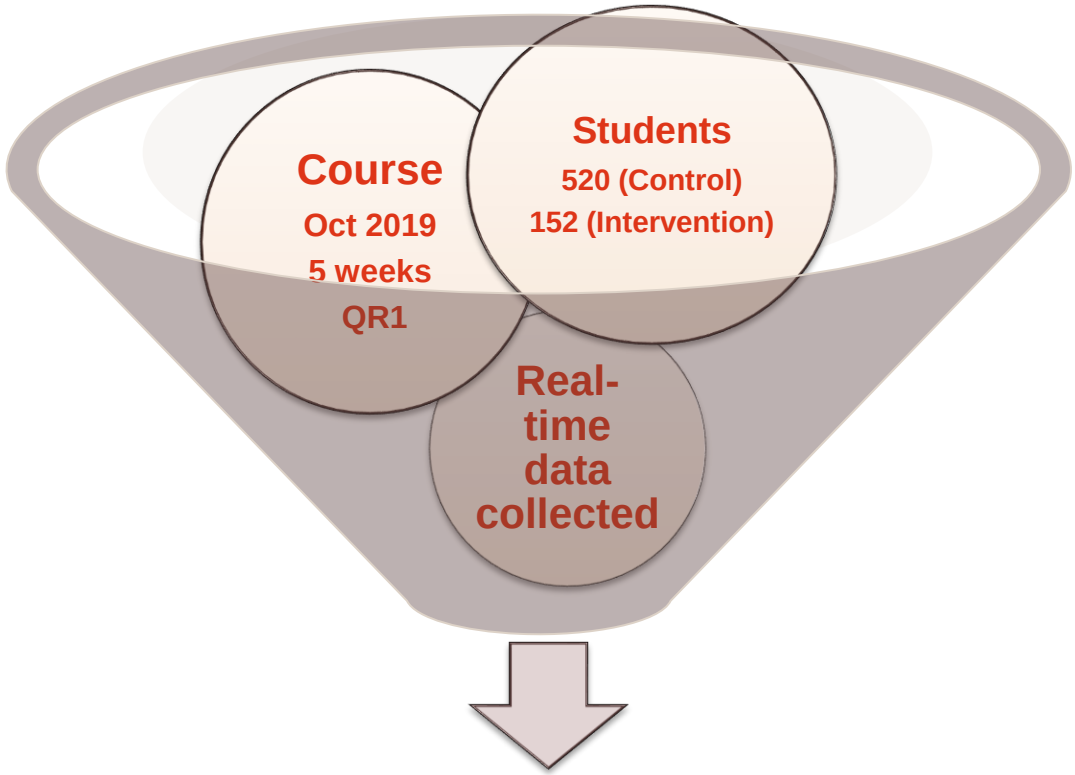
Step 2: Identify course features

Features
Advisory language
Remediation
Discussion questions
Reading assignment
Homework assignment
Grade pass back to student
Late work policy
Exams
Rigor

Step 3: Apply framework to features

Theories per feature	Control	Intervention
Advisory language	0	4
Remediation	0	7
Discussion questions	2	7
Reading assignment	1	7
Homework assignment	1	7
Grade pass back to student	1	3
Late work policy	0	4
Exams	1	4
Rigor	1	5

Step 4: Pilot a proof of concept



Attrition Reduced:

14.6% (Control) vs 5.3% (Intervention)

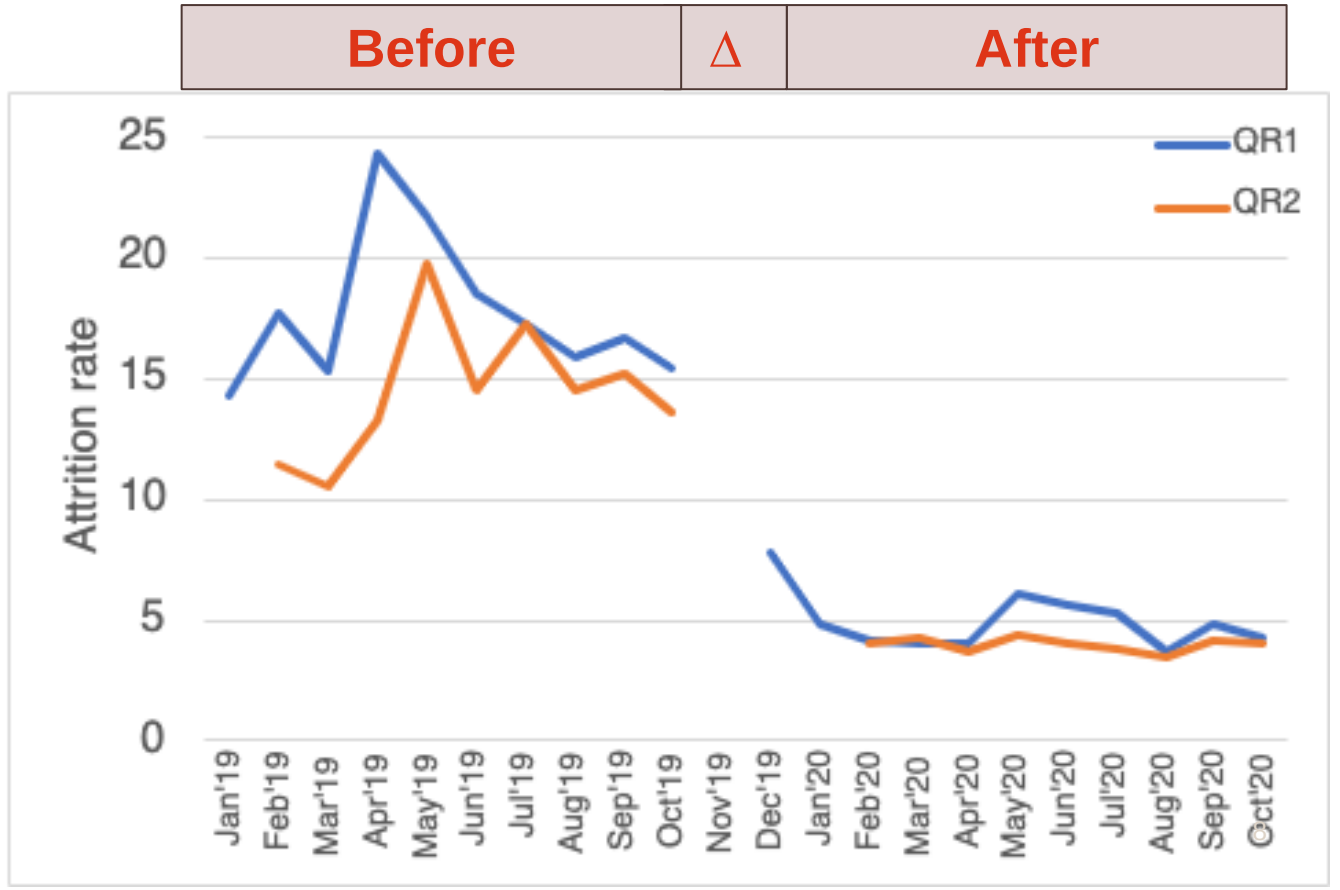
Step 5: Future implementation plans

Determine improvements

Course implementation plan

Communicate changes to stakeholders

Address institutional misconceptions



Step 6: Induce institutional shift

Conduct unique training for different stakeholders

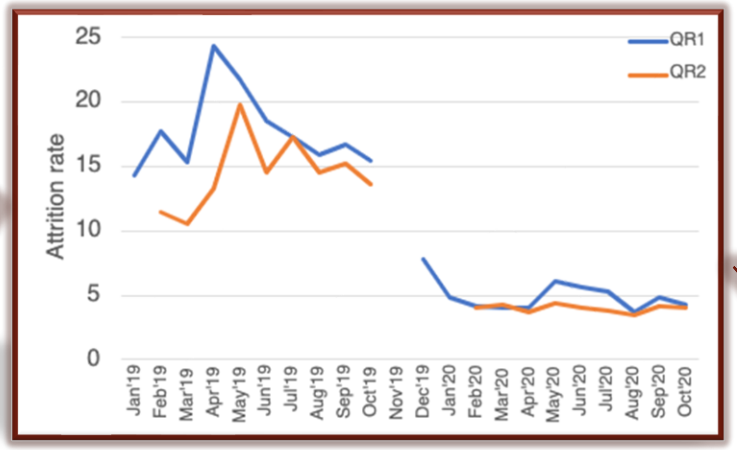
Institutional leadership
Cross-college leadership
Faculty
Assessment teams and instructional designers
Student support services

Establish continuous feedback loops for improvement

Conclusion

Close the Gap

Reduce Attrition



Stay #studentfocused

"I found myself dreading the class too but I take it all back. I have learned a lot and understand that I use quantitative reasoning without even knowing it."

-Student

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