



Venturing Toward Better Teaching:

S.T.E.M. Professors' Efforts to Improve their
Introductory Undergraduate Pedagogy at Major
Research Universities

AERA Annual Meeting
Denver, Colorado May 2, 2010

Julie A. Schell, MS, EdD
Division J - Dissertation of the Year

mazur-www.harvard.edu

schell@seas.harvard.edu

Division J Dissertation Award Committee

Benjamin Baez, Florida International University (Chair)
Amy Bergerson, University of Utah
Deborah Carter, University of Michigan
John Cheslock, Penn State University
Jay Dee, University of Massachusetts, Boston
Aaron Kuntz, University of Alabama
Valerie Lundy-Wagner, University of Pennsylvania
Amy Wells, University of Mississippi

Research Context

20 Research-active professors

Introductory STEM Teaching

Majors and Non-Majors

2 Major, Research I, Universities

Typical Message

Many People

So, Julie....what are you doing your dissertation on anyway?

Julie

Academic researchers in science, technology, engineering and mathematics working to improve their intro undergrad teaching at major research universities

Many People

HAHAHAHA!

What is your sample size--one?

Typical Message

STEM Professors
Venturing Toward
Introductory Undergraduate
Teaching Improvement at
Major Research Universities

=



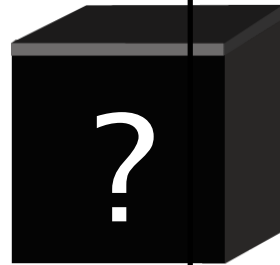
My Message



STEM professors venturing toward better
teaching at major research universities

Black Box Problem

Purpose



What?

How?

Why?

Resources?

Teaching Improvement Efforts

Black Box Problem



Conceptual Framework



Teaching Improvement Efforts

Conceptual Framework

Teaching Improvement Effort			
What	How	Why	Pathways
Key Features	Mechanisms	Influences	Resource Enactment

ms Influences Resources

Conceptual Framework

To Venture

To dare to give, put forth...to brave the risks or changes of a journey, voyage, etc; to dare to go or proceed...to make a trial of; to attempt or undertake (something of a dangerous or difficult nature) without assurance of success. Oxford English Dictionary

Outline

Design and Method

Results

Conclusions

Outline

Design and Method

Research Questions

Sites

Sampling

Data Sources

Data Analysis

Results

Conclusions

Design and Method

Research Questions

Sites

Sampling

Data Sources

Data Analysis

1. What are the **key features** of...
2. What are the **mechanisms** involved in...
3. What **influences** contribute to...
4. What **resources** do research-active STEM professors draw on in their...

Design and Method

Research Questions

Sites

Sampling

Data Sources

Data Analysis

2

Major
Research
Universities



Design and Method

Research Questions

Sites

Sampling

Data Sources

Data Analysis

Adams – Private, Urban

5,000+ undergraduates

Faber State – Public, Suburban

15,000+ undergraduates

Design and Method

Research Questions

Sites

Sampling

Data Sources

Data Analysis

Selection Methods

Size and Disciplines

Gender, Race and
Ethnicity

Design and Method

Research Questions

Sites

Sampling

Data Sources

Data Analysis

Selection Methods

Size and Disciplines

Gender, Race and
Ethnicity

Design and Method – Sampling

Selection Methods

Size and Disciplines

Gender, Race and
Ethnicity

Design and Method – Sampling

Selection Methods

Purposeful Sampling

Size and Disciplines

12 Identified as Engaged in Teaching Improvement

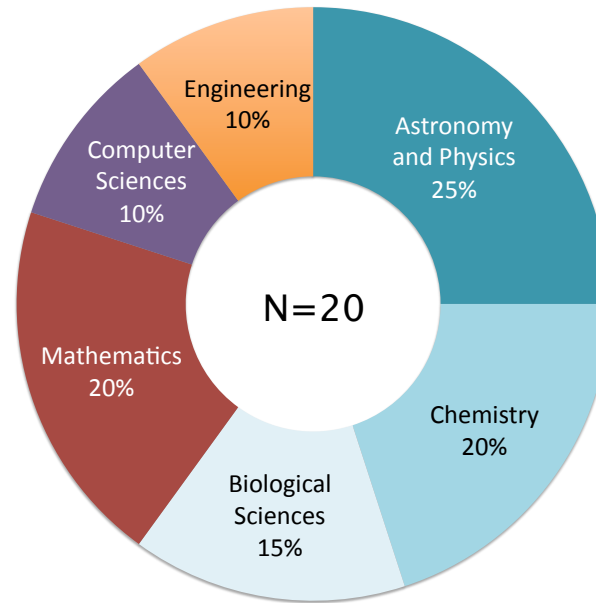
Gender, Race and Ethnicity

8 Unidentified

Design and Method – Sampling

Selection Methods

Size and Disciplines

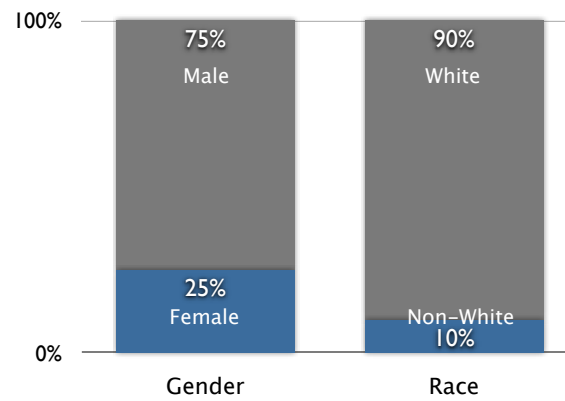


Design and Method – Sampling

Selection Methods

Size and Disciplines

**Gender, Race and
Ethnicity**



N=20

Design and Method – Sampling

Selection Methods

Size and Disciplines

Gender, Race and
Ethnicity

Design and Method

Research Questions

Sites

Sampling

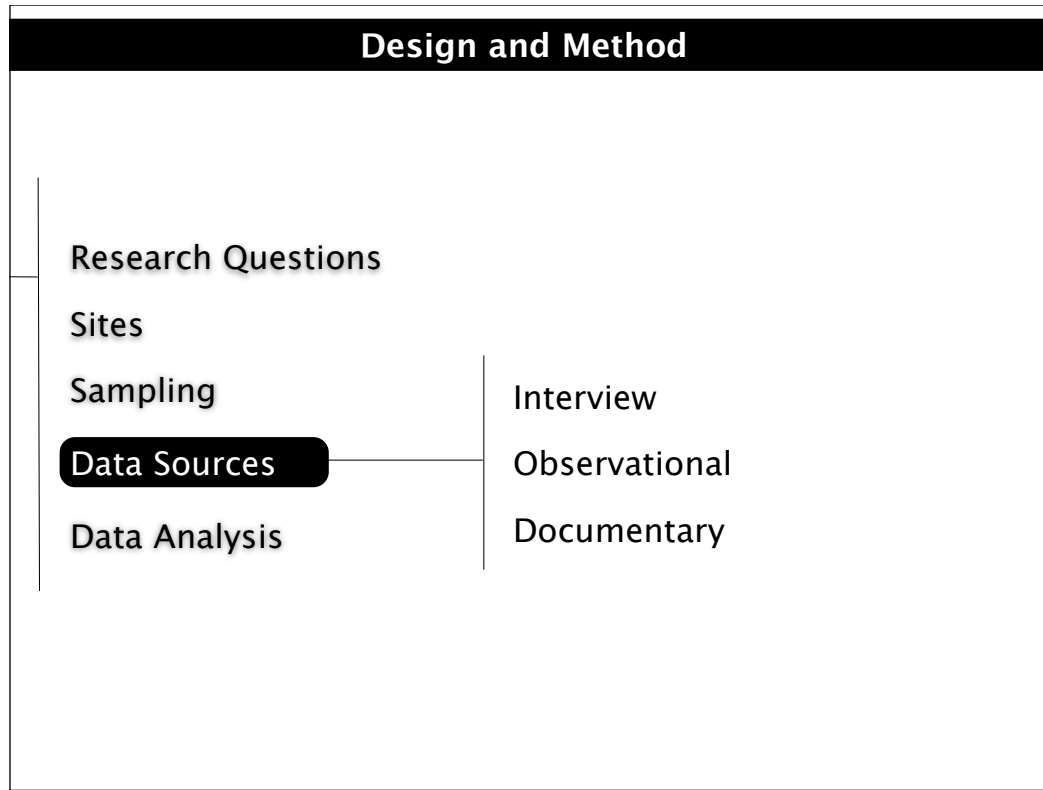
Data Sources

Data Analysis

Interview

Observational

Documentary



Design and Method – Data Sources

Interview	40 Interviews
Observational	36 Classroom Observations
Documentary	200+ Documents

Design and Method

Research Questions

Sites

Sampling

Data Sources

Data Analysis

Research Questions

Analytical Questions

Raw Data

119 Themes

16 Patterns

4 Propositions

GROUNDING THEORY APPROACH

Design and Method

Research Questions

Sites

Sampling

Data Sources

Data Analysis

Outline

Design and Method

Results

Conclusions

Key Features

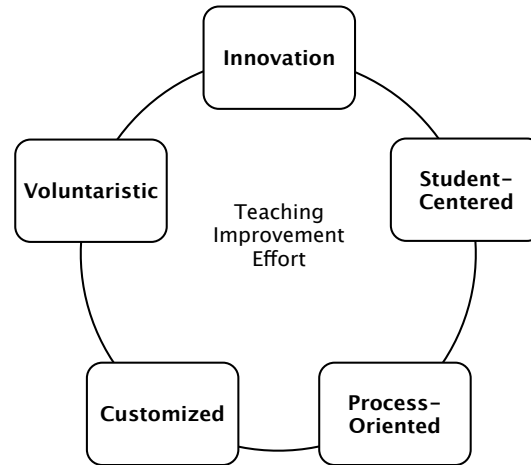
Mechanisms

Influences

Resources

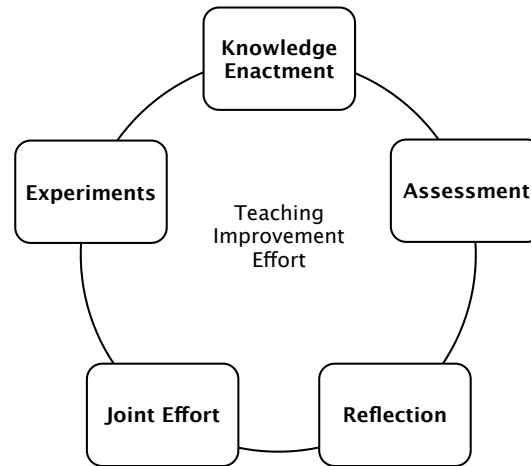
Results

What are the **key features** of STEM professors' teaching improvement efforts at major research universities?



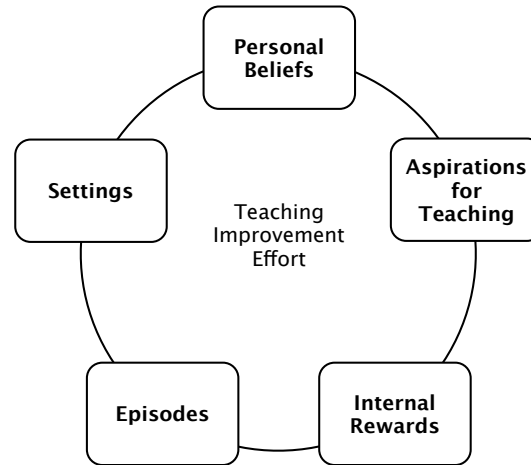
Results

What are the **mechanisms** involved in STEM professors' teaching improvement efforts at major research universities?



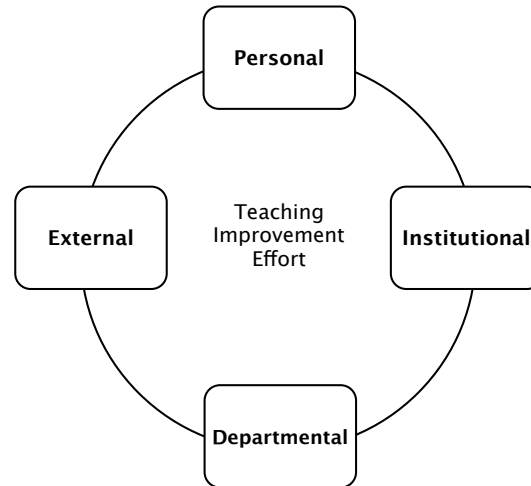
Results

What are the **influences** driving STEM professors' teaching improvement efforts at major research universities?



Results

What **resources** do STEM professors enact in their teaching improvement efforts at major research universities?



Outline

Design and Method

Results

Conclusions

Propositions

Implications

Conclusions – Propositions

Research-active STEM professors' ventures toward better teaching **exist and are possible** at major research universities.

Their ventures toward better teaching proceed through **creative and strategic designs**.

Their ventures are situated by **internal and external forces** that propel them forward.

They are **aware of and enact** a diverse array of resources in their ventures toward better teaching.

Conclusions – Implications

Research Assessment

Practice Joint Work

Policy Personnel

Opened up the Black Box



Research-Active STEM Professors'
Introductory Undergraduate Teaching Improvement Efforts
at Major Research Universities

My Message

Many People

Did you know
there may actually be **many** more
research-active science, technology,
engineering and mathematics
professors working to improve their
introductory undergraduate teaching
at major research universities
than you might expect?

<http://mazor-www.harvard.edu>

MAZUR GROUP

home ▶ people



NEWS — RESEARCH — EDUCATION — PUBLICATIONS — PEOPLE



Julie Schell
schell@seas.harvard.edu