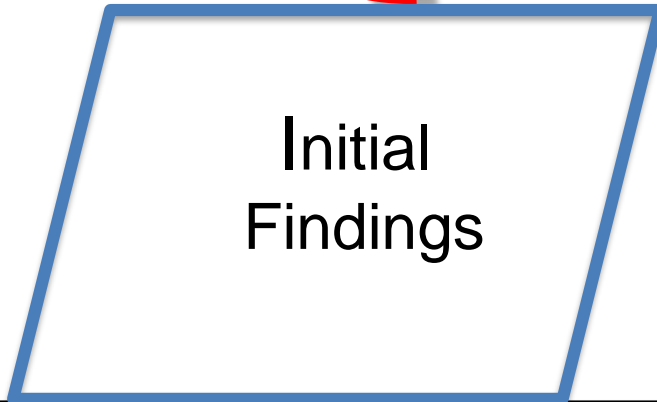
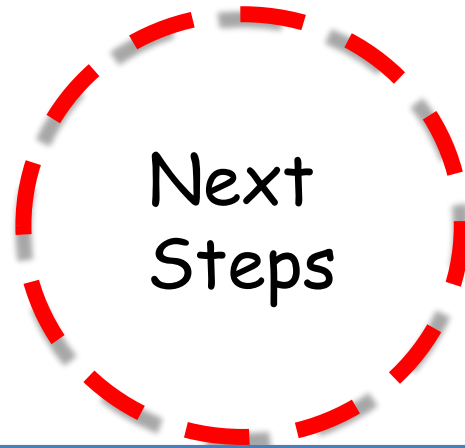


# **Benefits of evidence-based research: Investigation of STEM retention in chemistry**

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Enthusiasm for learning about “evidence-based” practices is common in STEM disciplines. Often, instructors are motivated to research their classroom innovations and share findings with colleagues, and this in turn leads to continued change. Frequently, however, the research projects are not themselves evidence-based. Findings from an evidence-based research collaboration focusing on STEM retention will be shared, along with the process of how the collaboration was designed.



# Seek Professional Help



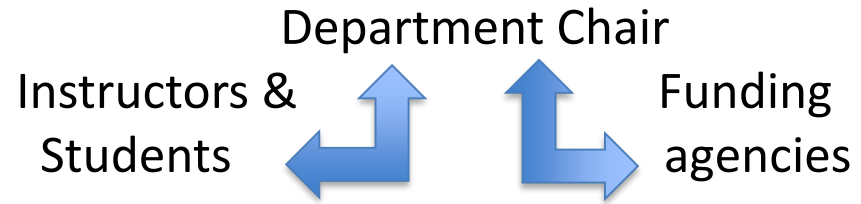
The Department of Chemistry and Biochemistry has sought to “research” and improve instructional practices for more than a decade...

...A recent collaboration with an educational researcher has taken these efforts to a much higher level.

WHO cares about the topic of STEM retention in your department?  
And WHY do these people care about STEM retention?

# Who cares about the topic of STEM retention in your department?

- Identify stakeholders.



What aspect of STEM retention do you want to know more about?

—

Why might some students choose to **change** majors from Chemistry/Biochemistry after their first year?

Why do students choose to **stay** in the Chemistry/Biochemistry major after their first year?

What factors might be affecting these decisions?

# How can I find out what I want to know?

## Activities

## Outputs

## Outcomes

Directly related to your program activity and usually something you can count.

The effect or impact of your outputs on people and systems.

Offer introductory course for majors.

Active learning in labs

Classroom undergraduate research experiences

Peer Led Team Learning (PLTL)

# Students considering a change in major

# Students staying in, or leaving, the major

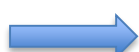
# Students graduating in the major

Students have relevant info. about the major, and related professions.

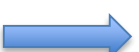
Students support one another in the major.

# Logic model

Resources



Activities



Outputs



Short-term



Outcomes  
Long-term

## Department level

- Research informed Faculty, Staff, Grad Students
- Achievement, demographic, & retention data
- Program Manager for First Year Experience/Mentoring.

## Students

- Passion for subject.
- Goal oriented.
- High achieving.

## Beyond the Department

- Thriving STEM community.
- Mentoring opportunities.

- Offer chemistry courses.
- On-going assessment of courses.
- Develop long-term assessment plan.
- Gather baseline data.
- Expand PLTL program.
- Develop mentorship opportunities.
- Develop resources for students.
- Develop resources for faculty/staff.

## Number of students...

- Enrolled in chemistry classes
- Enrolled in chemistry major
- Graduating with major
- Considering change in major
- Number of mentor/mentee relationships

\*Each output counted in terms of **gender**.

## Students have accurate, relevant info...

- About chemistry major.
- About professions related to chemistry.
- More students have mentors
- More students feel like they belong in chemistry courses

- Students support one another in the chemistry major
- Faculty/Staff better support students considering a change in major
- More students graduate with chemistry major
- More female students graduate with chemistry major

# Data Collection

## Phase one

Develop a survey to measure student dispositions including:

- Motivation toward Chemistry,
- Epistemological beliefs toward Chemistry,
- Personal interest in Chemistry,
- Attitudes toward their chosen major and coursework in that major.

Lengthy “talk throughs” of the survey with current Chemistry students to clarify the survey and expand to additional areas of challenge and opportunity.

Revision of survey, then additional feedback from faculty.





# Data Collection

## Phase two

Interview of current Chemistry students in relationship to ideas that had been presented in the first phase. In particular, gender stereotypes in relationship to STEM were discussed in addition to other student dispositions.

## Phase three

Administering survey, initial data analysis.





# Initial Findings...and Your Recommendations

- Students indicate they want to change majors with stated reasons
- Gender does seem to play a role in students' experiences in these classes
- Many students felt like they didn't know how to "do a Chemistry major"

