The nature and impact of elementary school teacher partnerships with university scientists

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Background

- On average, elementary school teachers have little training and low confidence in teaching inquiry-based science (Avery, 2012).
- There is little time for science in elementary schools (1-2 hours a week on average; Trygstad et al., 2013).
- Scientist-teacher partnerships can improve inquiry based science instruction in K-12 schools (Gamse et al., 2010).
- However, it is unknown how effective these partnerships are when funding and time are limited.
- Furthermore, the roles taken on by each partner influence the effectiveness of the partnership.

Program description

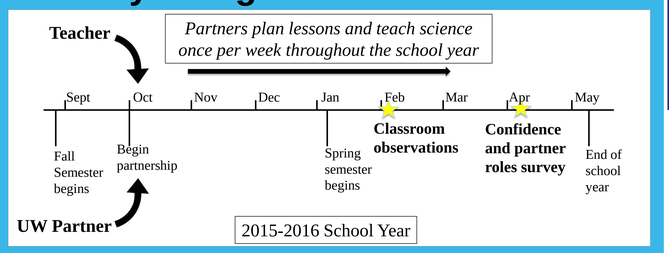
- Young Science Scholars pairs science and engineering students from UW Madison (mostly graduate students) with elementary school teachers in the Madison Metropolitan School District.
- UW partner teaches one science lesson per week in the teacher's classroom.
- Partners were allowed to choose what roles they would take in the partnership.

Questions

1) Do partnerships increase teacher self-confidence in science teaching?

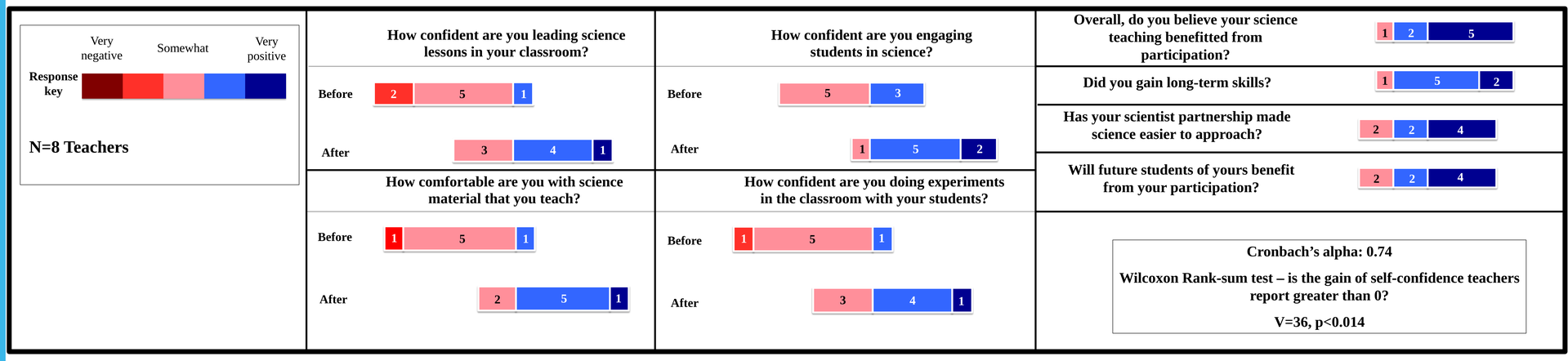
2) What are the roles that teachers and UW partners take in these partnerships?

Study Design



- **Surveys –** asked teachers to self-report confidence; asked teachers and UW partners to describe partnership roles
  - Cronbach's alpha was used to ensure that all survey questions addressed a single construct (acceptable range: 0.7-0.9; Rickards et al., 2012).
  - CATMA online software was used to code responses to open-ended survey questions (Computer Aided Textual Markup & Analysis online tool; http://catma.de/home).
- **Classroom observations –** COPUS style of classroom observations was used to observe partnerships (Smith et al., 2013).

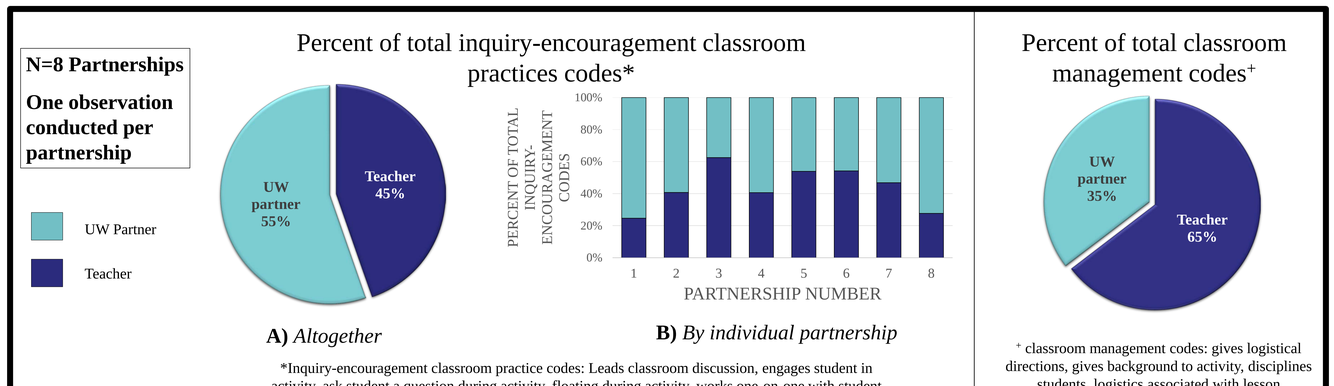
➢ Teachers self-reported significant gains in self-confidence in science teaching.



❑ Without explicit instructions for partnership roles, partners reported that scientific lessons were co-taught, that UW partners acted as scientific role models, and teachers provided classroom expertise.

Self-reported roles	TEACHER EXEMPLAR QUOTE	UW PARTNER EXEMPLAR QUOTE
TEACHERS CO-TAUGHT LESSONS AND PROVIDED CLASSROOM EXPERTISE	"I co-teach the lesson with the science volunteer and circulate assisting the students during investigations and recording of our thinking."	"During the science lesson, [teacher] also brings out additional resources...to help in the discovery... [Teacher] is very good at getting the [students'] attention and anytime I speak to the full group you better believe [teacher] has made sure they are all listening. We make a pretty good team."
UW PARTNERS CO-TAUGHT LESSONS AND WERE SCIENTIFIC ROLE MODELS	"[UW partner] has worked with me collaboratively to develop new and engaging science lessons for students."	"[Teacher] has learned how a 'scientist' walks through the scientific method. It's much easier to emulate a person after watching them in a classroom than from reading about how to do good science."

❑ Partners chose to co-teach lessons but there is large variation between partnerships.



Conclusions

➢ Self-confidence

- Scientist-teacher ***partnerships in elementary schools increase teacher self-confidence in science teaching*** when time and funding are limited.
- Partnerships may have increased teacher confidence ***by giving practice designing and leading inquiry based science alongside a scientist.***

❑ Partnership roles

- Classroom teachers and UW partners co-taught science lessons.
  - However, ***co-teaching occurred to different degrees in different partnerships.***
- UW partners modeled inquiry-based science in the classroom.
- Teachers provided classroom expertise.

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