

From Research to Practice and Back Again: Developing High School Teachers' Action Research Capacity

Session 151 STEM Professional Development

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This presentation is Certified 100% Hobbit free

Agenda for the session

- About the Milwaukee Master Teacher Project
- Year 1 goals and microcredentials
- Analysis of teacher research questions
- Initial reactions related to teacher beliefs and practices
- Discussion

The Milwaukee Master Teacher Project

- Five-Year Noyce Track 3 project
- 24 high school math and science teachers in Milwaukee Public Schools
- Four action research-based microcredentials “badges” per year
- Anticipating change in:
 - Teacher capacity for action research
 - Instructional practices related to focus of microcredentials
 - Quality of instructional practice overall

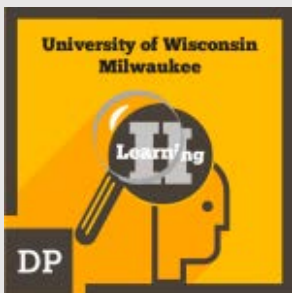
MMTP Theoretical underpinnings

- Practice-based teacher development
 - Action research as a means to develop content and pedagogical knowledge
 - Research-practice-research cycle
- Ensuring teacher voice
 - Choices in areas of inquiry (Years 2-5)
- Development of teacher leaders
 - Position teachers as professional developers within district
 - Develop next-generation district curriculum leaders

Foundations



Action Research I

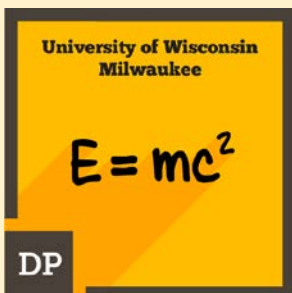


Action Research II

Content Focused



CCSSM & NGSS



Matter & Energy



Evolution



Modeling Part I



Modeling Part II

Pedagogy Focused



Student Engagement & Motivation

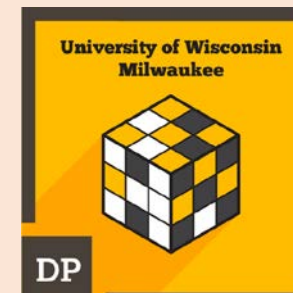


Cognitively Demanding Tasks

Leadership



Designing & Supporting Teacher Learning I

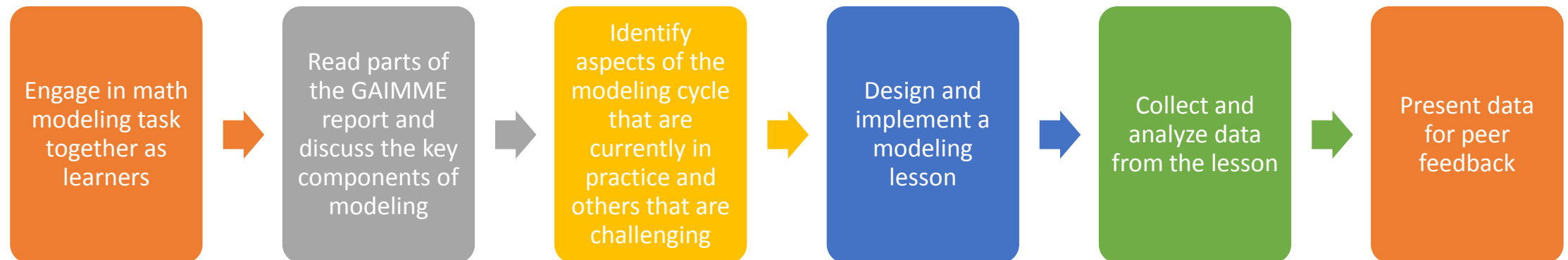


Productive Struggle

Structure of a badge

- Opening activity to orient to the construct under study
 - Do a math/science task, discuss experience with a pedagogical topic
- Engage in selected research-based readings and discussions
- Use research-based ideas to plan a lesson or series of lessons around the topic
- Collect data from implementation
 - Extent to which students met learning goals, with artifacts
 - Teacher reflection
 - Student reflection

Example: Modeling I



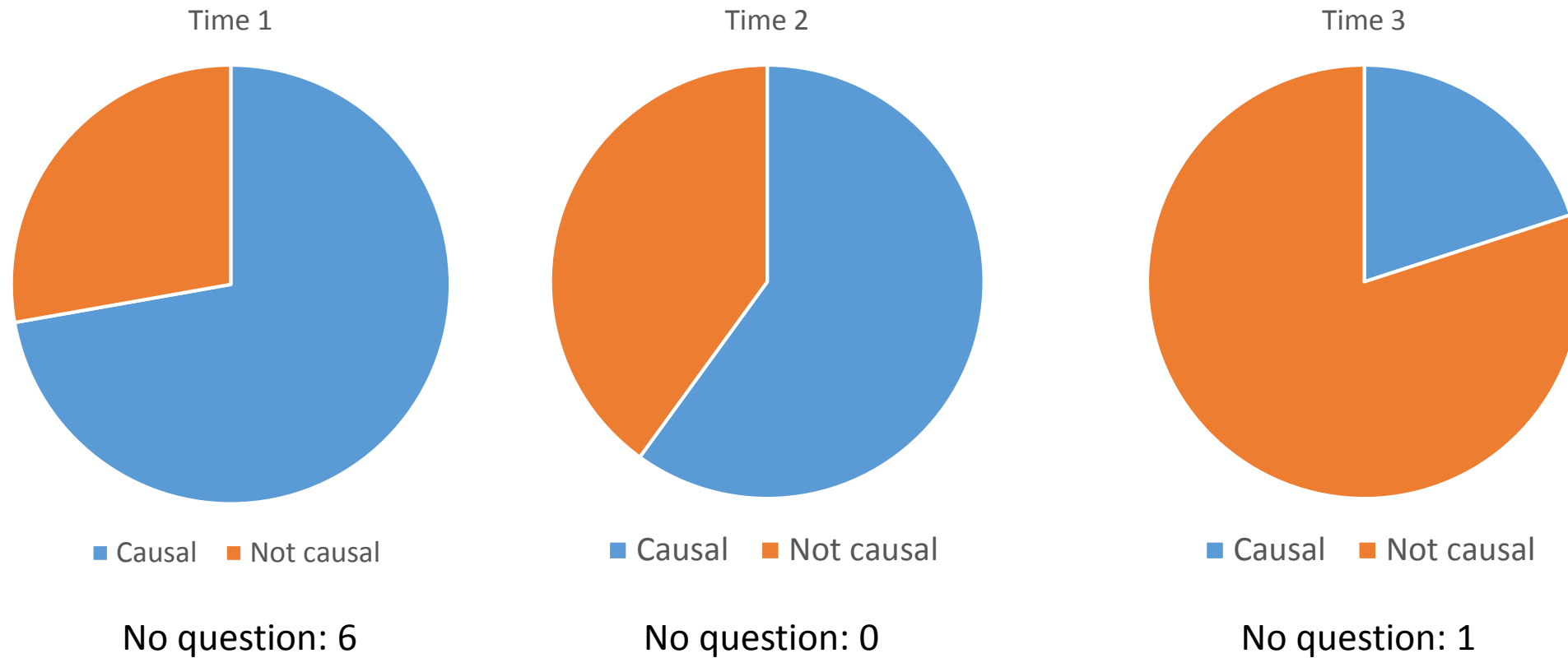
Action research goals

- Build shared conceptions of strong action research design and implementation
- Move beyond naïve, overly broad, and inappropriately causal constructions of research questions
- Empower teachers to see their own classroom as important sources of data that can inform rigorous inquiry

Quality of Action Research Goals

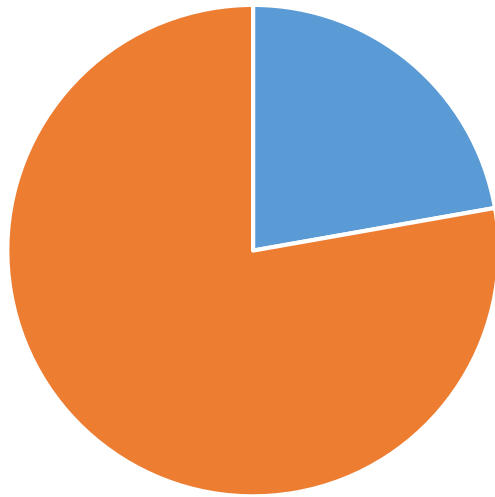
- Categorized teachers' action research goals for Action Research I badge (early Year 1), Action Research II badge (late Year 1), Student Engagement and Motivation badge (early Year 2)
- Analyzed research questions according to:
 - Causal or non-causal
 - Broad question or specific question
 - Constructs to study clearly or unclearly defined

Causal vs. non-causal



Broad vs. Specific

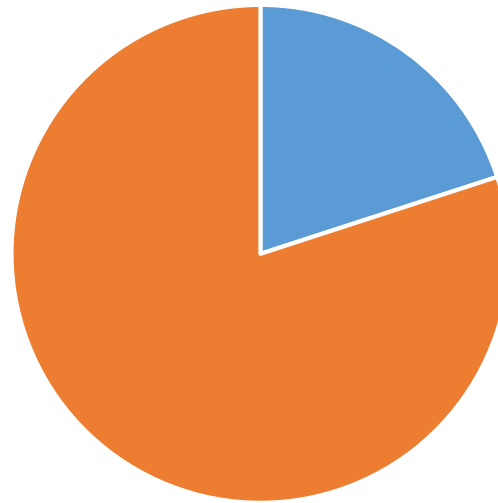
Time 1



■ Broad ■ Specific

No question: 6

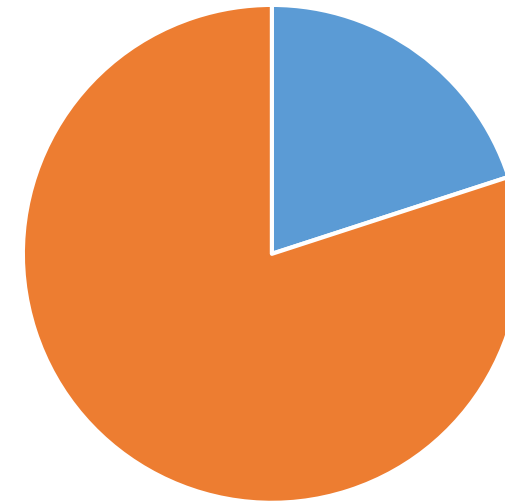
Time 2



■ Broad ■ Specific

No question: 0

Time 3

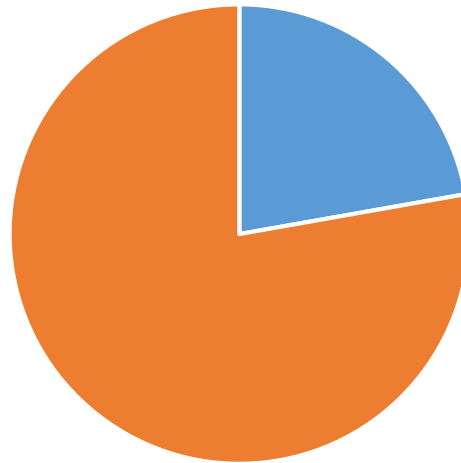


■ Broad ■ Specific

No question: 1

Constructs unclear vs. clear

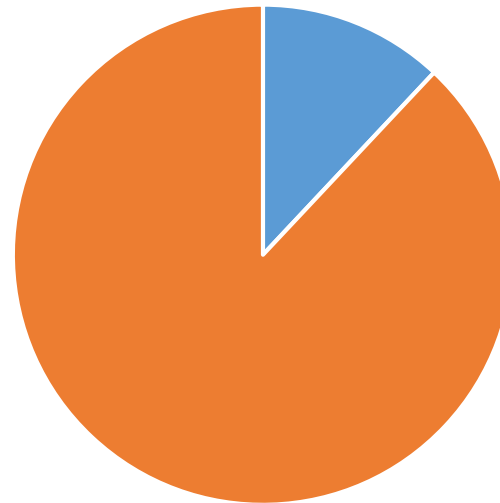
Time 1



■ Unclear ■ Clear

No question: 6

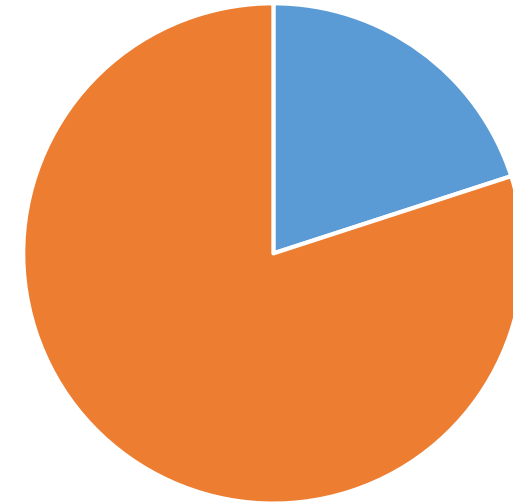
Time 2



■ Unclear ■ Clear

No question: 0

Time 3



■ Unclear ■ Clear

No question: 1

Changes in teacher knowledge and beliefs: early returns

- More confidence in ability to design an action research study and collect data
- Seeing their classrooms as legitimate data sources
- Fostering further inquiry (and healthy researcher uncertainty)

Confidence in Action Research Skills

- Action research is my favorite part of the badges we have done so far. Actively studying my students and my practice is very engaging and easily accessible.
- I feel that the action research component is very useful. I like testing out the effectiveness of different instructional tasks.
- I enjoyed the badges where we had to collect data and reflect on something that we actually workshopped in the classroom.

Classrooms as Legitimate Data Sources

- I have found that it is hard to find a significant result over one lesson or test, but over the whole semester I saw a positive improvement with multiple lessons/tests.
- I actually find little value in district-wide assessment data.
- I'd like to continue to get more student feedback so that I am considering their voices in my reflections of what to keep and what to tweak.
- I would like more data from survey results from my students, pre- and post- survey results on my own perceptions (or department perceptions) of the badge topic, and data related to ACT or other district initiatives/benchmarks.

Further Inquiry and Uncertainty

- I am least excited about the literature reviews when we start a new badge. It is definitely an essential part of the research process and not something that should go away, but I think that I just need to find a better strategy to approach it.
- I often feel that my data is not substantial enough and my analysis is not thorough enough compared to what I see from other participants.
- I still worry that when I put together materials using the provided rubrics that I am somehow putting things together wrong.

Changes in teacher knowledge and beliefs: next steps in progress

- Yearly video records of instruction
 - Effective Mathematics (and Science) Teaching Practices observation rubric
 - Interviews with teachers before and after observed lessons
- Annual survey data from teachers
 - Alignment and use of the effective math (and science) teaching practices
 - Content coverage and confidence in teaching that content
 - Continued needs assessment
- Badge artifacts

Discussion