Getting Starting with Physics Education Research (PER)

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Who am I, and why UW on the slides?

• Quinsigamond Community College
  – Tenured Full Professor of Physics and Astronomy (current)

• University of Wyoming
  – MS Physics (2014), PhD Physics (current)

Outline
• What is Education Research?
• Getting Permission
• Styles of Research
• Group Time
• Wrap-Up

You are already doing education research

• Trying out new ways to teach
• Developing new / tweaking old lesson plans
• Learning how to help students with disabilities
• Fundraising for students with economic hardship to attend class trips
• Encouraging quiet students to participate in class

What is Education Research?

• Answering questions about teaching and learning which have not already been answered by others
• Collecting, analyzing, and interpreting data related to your question
• Doing this in an ethical manner

• Multiple research styles

Ethics

• People are not lab rats.
• Don’t do research to or on your students, do research about and with your students.
• Do research about yourself and your own teaching.
• When in doubt, get permission.
Getting Permission: K-12

- What does your school say about getting permission?
- If you’re doing something with your students that’s outside the scope of normal teaching, talk to your department chair or principal
- Don’t need additional approval to share results about yourself
- Do need additional approval to share about your students – pair with higher ed for an IRB

Institutional Review Board (IRB)

- Higher Ed, hospitals, companies, etc.
- Comprised of members of the organization, plus community members
- Check that your plans are ethical and include informed consent (adult students, guardians) and assent (minors)
- Additional protections for vulnerable populations: minors, seniors, people with disabilities, prisoners

What is Education Research?

In more detail...

Traditional Education Research

**Quantitative**
- Collect data
  - Test scores, MC
  - Number of times takes an action
  - Amount of time
- Analyze data
  - Statistics (average, standard deviation, t-test, ANOVA)
  - Graphs
  - Tables
  - Cross tabs

**Qualitative**
- Collect data
  - Free response Qs
  - Watching student actions
  - Interviews
- Analyze data
  - Look for patterns and trends
  - Code for themes (what ideas come up repeatedly)
  - Relationships between

Action Research (AR)

- A non-traditional qualitative method that focuses on solving problems, becoming part of the solution, and humanizing your subjects.
- A “next step” after reflective practice or journaling.
- Three guiding principles:
  - Social Justice
  - Democratic Participation
  - Community Empowerment
Action Research’s Guiding Principles

- Social Justice – helping the most vulnerable
- Democratic Participation – helping all affected individuals have a voice in the research process and final solution
- Community Empowerment – helping other stakeholders have a voice

Group Work

Let’s put this into practice

Group Work

• Pick a partner/group and discuss an issue that is important to you (Community Engagement)
• How can you draw the students into helping find a solution? (Democratic Participation)
• How can you help your most vulnerable students? (Social Justice)

Share your ideas

Time permitting...

Takeaway

• Research should be driven by and for helping your students
  – Don’t invent a problem just for the sake of doing research
• Don’t work in isolation
  – Talk to colleagues, talk to students, talk to administrators, talk to parents, talk to people outside your school
  – If you’re working alone, maybe you could solve your problem, but it certainly won’t help anyone else!

Additional Resources

My Recent/Upcoming Work

- Schwortz & Burrows. (in prep) *Qualitative analysis of STEM Dataset Use.*

Further questions?

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Slides for this talk, handout, etc.

http://physics.uwyo.edu/~aschwortz