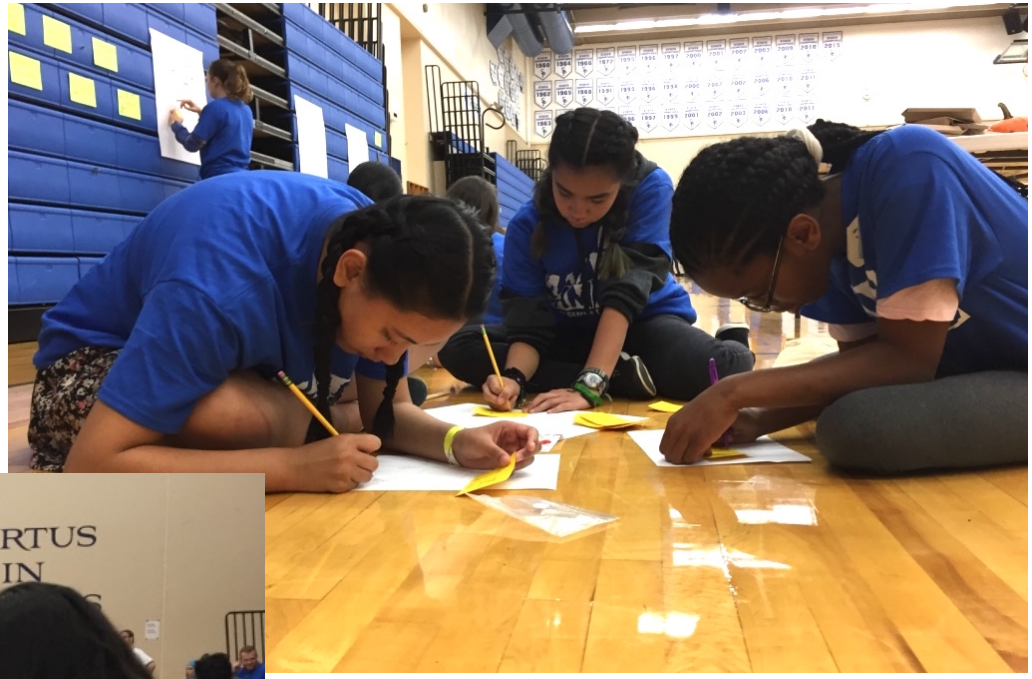
HOW DO I KNOW IF IT'S MAKING A DIFFERENCE?

Action research for the math classroom

NCTM 2019 Annual Meeting and Exposition
Terry Hickey, Ph.D.
Saint Martin's University
thickey@stmartin.edu

Welcome!



What is Action Research?

It is…

- a way of exploring questions in a structured manner
- focused at the classroom/practice level
- “boots on the ground” research by teachers, specialists, para-educators, coaches, administrators…
- involves and is focused on your unique group of learners
- involves questions, gathering information, reflection, and action!

Why consider it?

- It is the ultimate way to explore responsiveness to your learners, to explore connections and ideas that are meaningful for them and for you
- It is centered on learners, involving questions about how they are, think, learn, and interact, and it aims to find the most effective ways to help them learn and grow
- Here are my learners, my learning community. What specifically works with this group of amazing and complicated people?
- The point is to explore your own practice, to think about your learners, and to craft a way forward that meets their needs!

What does it look like?

- wonder
- structure
- run
- reflect

1. Wonder…

This begins with the creation of a list of things you…

- wonder about
- pay attention to,
- want to improve,
- see as problems to lessen,
- see as good things to strengthen,
- see as necessary things,
- have heard about…

- you care about a lot of these in the classroom, let's brainstorm a list – and be specific!

Some helpful categories to consider (these are just a few!)

things students do	
things in the structure of a class	
things involved in the learning	
things you do	

choose one item…

- Choose one of these items, then think about it using the Sentence Frame:

- Is there a relationship between _____ and _____?

- Does _____ depend on _____?

- Is there an association between _____ and _____?

- Is there a relationship between greeting students at the door with a handshake and transition times?
- Does the quality of test corrections depend on if I give feedback using questions?
- Is there an association between using sentence frames and students' willingness to share their reasoning?

wonder … part 2

- What do people already know about these two items and possibly about them together?

- Is there a relationship between using student created comic books to learn math and student participation in math discussions?

- what is known about the use of comic books in learning
- what is known about how students participate in math discussions
- are there any studies that have looked into the idea of comic books and student participation in discussions together?

to do this, check existing research…

- Google Scholar is a great place to start…
- https://scholar.google.com
- You have access to many pdf's for free
- Your library or closest university library often has free online access to the journals that are not available on Google Scholar

Learning and assessing **mathematics** through reading and writing [PDF] pbworks.com

MJ Bossé, J Faulconer - School Science and **Mathematics**, 2008 - Wiley Online Library

… a more favorable climate supporting such a task could have been **created** prior to … diagrams, tables and graphs, creates a dichotomy which **student** readers often … Reading **mathematics** challenges **students** to acquire **mathematical** comprehension through reading simultaneously …

☆ Cited by 57 Related articles All 6 versions

The Learner as Teacher: Using **Student** Authored **Comics** to "Teach" **Mathematics** Concepts [PDF] researchgate.net

LF Pelton, T Pelton - EdMedia+ Innovate Learning, 2009 - learntechlib.org

… We have included three examples of **comics created** with **Comic** Life … Technology enables **students** to focus on the critical and creative aspects associated with constructing a **comic** to … of such in teachers' learning toolkits can have a significant positive impact on **student** learning …

☆ Cited by 4 Related articles All 4 versions

[BOOK] Teaching visual literacy: Using **comic books**, graphic novels, anime, cartoons, and more to develop comprehension and thinking skills

N Frey, D Fisher - 2008 - **books**.google.com

… Millions of young people view and **create** anime, yet they are rarely seen inside classrooms … in which visual literacy tools can be used to extend the understanding of **students** with disabilities … The examples of **student** work included in the chapter broaden our understanding of the …

☆ Cited by 198 Related articles All 2 versions »

New media and research dissemination: The case of performing **mathematics** education research

GG Gadanidis, M BorBa - Journal of Educational Multimedia and …, 2013 - learntechlib.org

… Figure 4 shows a family scene **created** by one of the **students**, depicting herself, her mom, two brothers … couples well with our focus on "storytelling." It also parallels our research focus on **student** per- formance … **Mathematics** for gifted **students** in an arts- and technology-rich setting …

☆ Cited by 10 Related articles All 3 versions

To sum … Wonder =

- determine two things you are wondering about. These are your variables.
- put them in relationship with one another
- search for existing research to see what is already known, what still needs to be explored
    - think about how your ideas fall into the landscape of what is currently understood – what does existing research say?

2. Structure
- how will you measure your variables?

Next, you will want to determine how you will measure your variables and what type of data you will collect.

Let's discuss…

gathering should be as objective as possible, through work/info gathered, counts of behavior, counts of _____?...

- How could you measure
  - transition times
  - participation in discussions?
  - respect for one another?
  - perseverance?

2. Structure
- what types of data will you collect?

As you are planning how to gather data, you should consider how you can get different types of data from a variety of people involved.

Triangulation – collecting information/data from a variety of places and sources so that you are getting the richest, fullest understanding

some different sources of data

- written (surveys, questionnaires, work samples, existing records)
- verbal (interviews, one-on-ones, focus groups, panels)
- observational (you or an associate watching, using checklists/tallies to record)

Structure
- create a plan for what you will do

- This is your strategy, your plan, for finding out if there is an association between your variables.

- What will you do?
- When will you do it?
- Who will be involved?
- How long will it last? How often will you repeat it?
- What resources do you need to prepare (survey, etc.)

one typical process…

- Gather data on your variables BEFORE you do anything differently
    - use the same data gathering methods that you will be using for your Action Research
    - this gives you the baseline data

- Gather data from your Action Research across the same amount of time and under roughly the same conditions (the only thing you want to have different between your BEFORE and now is the new process or variable you are studying

- – make only one change at a time!

- analyze…

3. Act

This is the stage at which you run your research project

Try to run it on days that you have planned for that model what regular days look like

- you know that on days when your class follows an assembly or a fire drill or… things are not the same as usual

4. Reflect

- Now that you have all of your data, what does it all mean?
- Collect your quantitative data (number data, frequency counts, etc.) into one place and look at how they differ
    - you can use simple descriptive statistics such as mean and median to describe the results, also simple graphs
    - Percent change is a useful describer, too. This is the ratio of (how it changed) / (original amount)

qualitative data...

- Collect your qualitative data (short answer responses, notes from a focus group, notes from a panel discussion) into one place

- Read through the answers and look for common ideas to emerge – these can be grouped together into themes.

- for example, maybe respondents mentioned feeling like they belonged, like they felt safe, like they trusted their peers. You could group these into a theme of Belonging or Community.

- Once you get your themes, you can record the frequency of them, how often each appears.

put your findings into ACTION!

- How can you use your results now?
  - improve your classroom practices
  - think about wider school improvements/adjustments

- How can you share them with others?
  - in your department
  - in your building
  - in your PLC?
  - in newsletters
  - in professional conferences (like this one!)

Some final things to consider…

- Action research is meant to be about your unique group of learners.

- Because of the way in which you are choosing your group and involving yourself and running your research, you have to be careful when sharing your work – your results are valid for *YOUR* group, but not for others necessarily.

- Your results should not be generalized beyond your group, but they can inform others of ideas to try within their own practice that might prove helpful for reaching their unique groups of learners.

- You want to always protect the safety, health, and well-being of your students, so this research should not cause harm or embarrassment or disadvantage in learning.

- The point is to focus on what we do as educators specifically and see if changes in approach, technique, or learning strategy can help to improve our learning and/or learning community!

- If you find some interesting results, you can follow your Action Research project with a more formal and larger scale research project to see if the results apply to others!
- Because this research is more formalized, different rules apply and you will want to make sure that you follow the necessary research protocols and protections. It might be a great idea to partner with someone at a university to work and learn together!

questions?