

# Research Possibilities

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# Description

This presentation is in response to questions about theoretical frameworks from an OCMA presentation last year. An overview of research methods used in education will be presented. The presentation will assume very little background in research and is intended to provide an understanding of the scope of options, major features of different approaches, and the connection of findings to theory.

# Starting Point



- What is the motivation?
- Must be a purpose that supports a sustained investigation.
- *Tip* – You do not have to have every detail worked out – at this point you only need to be able to convey there is something that would benefit from gaining insight.

# Gain a few details.

- What do you know about the issue?
- What don't you know?
- What would be useful to know?



- *Tip* – This is a private exercise to begin clarifying your own thinking before you talk to others. Often this helps identify language that can convey the issue.

# Avoid the Rabbit Hole

- One question leads to another or issues are interconnected
- The rabbit hole has many different paths and it is difficult to choose a particular path
- Direction finding and staying focused become important....
  - Talk to your elbow partner and explain your issue in two ways ... (Do the same for them)

# Direction and Focus



- Read your partner's response – which of the two explanations worked better?
- Did you sense that explanation gained from their comments?
- *Tip* – Having someone who can provide an objective voice and be a sounding board can help you maintain focus. Sometimes immediate colleagues are not the best for this.

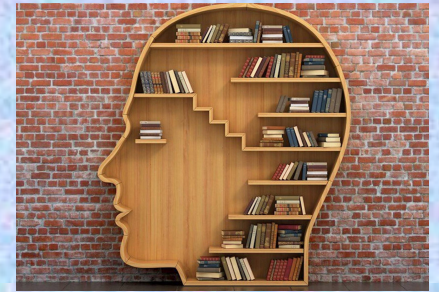
# Fleshing out the Issue

- A good question is worth the time it takes
- Explain it and read your colleagues to see if it is credible (but don't necessarily believe your colleagues).



- *Tip* – Keep tinkering with articulating the issue as you go along. That helps to verbalize your thinking and it has benefits.

# Know / Don't Know



- Consult the literature on what is known or not known about the issue.
- Access to literature can be an issue – Google Scholar, Library access, Third party access (OCT?, Partnership?), books?
- *Tip* – The different attempts at articulating will supply you with keywords to search for.



# Interpreting the Literature

- How does it connect to the issue?
- Does it give you insight for your issue?
- How might the contextual details make your situation different?
- *Tip* – Beware focusing on particular time periods and look for evidence across time and place.

# Develop a Notion



- Place your issue in context.
  - What makes your situation different?
  - What aspects of the issue did you gain insight about? What was not clarified?
  - How did others get at the issue (to the extent that they did)?
- Why isn't your question resolved by the literature? What is the literature missing?

# Construct a Theoretical Model

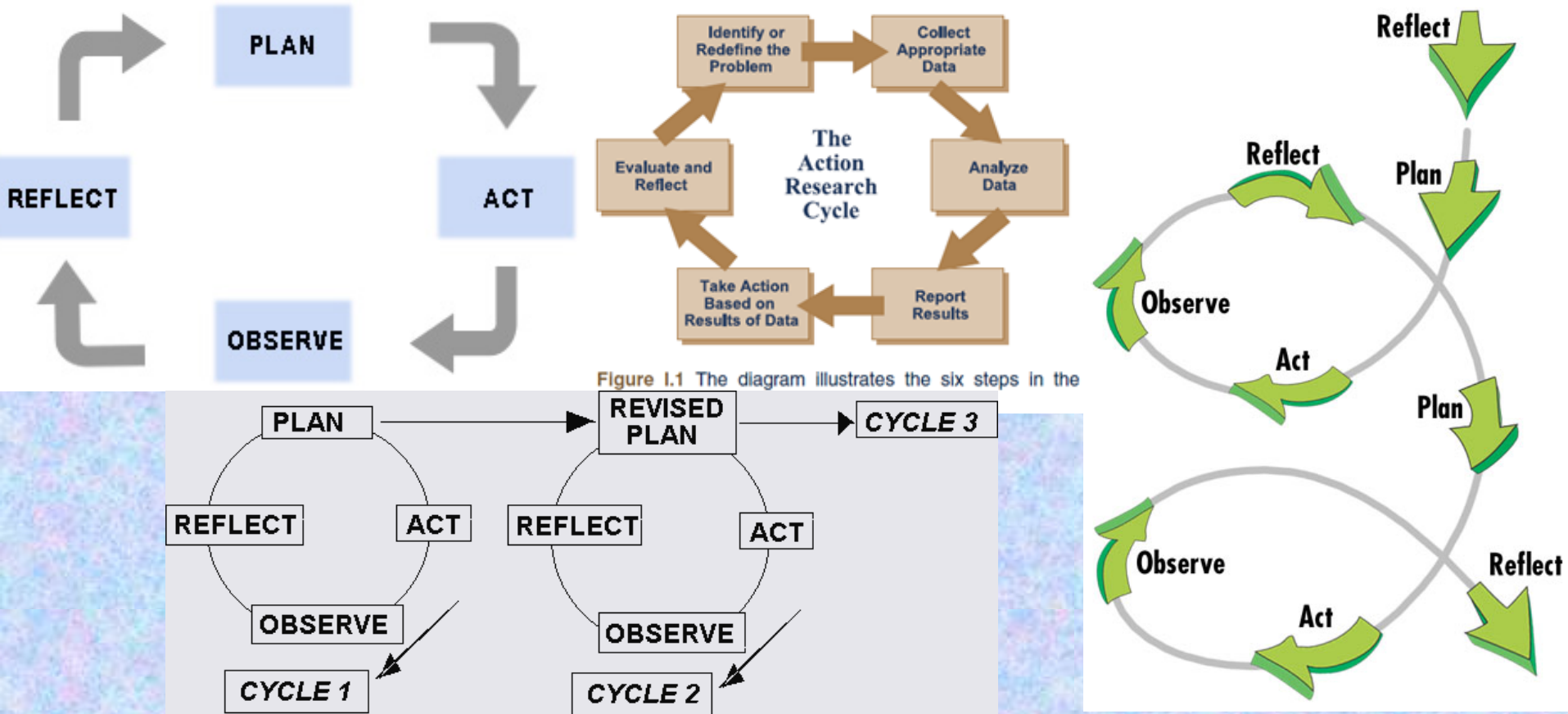
- What do you think is going on with your issue?
- Draw a picture of what elements are involved and show how you think they may be interacting or what processes are relevant.
- Can you connect it to theoretical ideas?
- *Tips* – “Theory” is an established process or understanding. The result is only a guess.

# Example 1: Question Comparison

- Suppose you want to compare how well your students do on wordy problems versus short questions.
- Theory – Wordy problems require language interpretation and math thinking, where short questions do not. Therefore wordy problems should be performed more poorly.

# Example 2 – Action Research Model

- Different illustrations of what happens during action research (to show variety of theories)



# Design a Method

- With the issue established and rooted in what is known
- A theory has been developed to suggest connections
- Understanding those connections allows you to gain insight into the issue
- Simpler methods are often better.
- *Tip* – Method does not have to resolve everything at once.

# Method Choice

- Overall details or what happens in specific instances?
- For the wordy questions – do I want to compare two classes or do I want to see how five or six students address the types of questions?
- Overall  $\approx$  Quantitative
- Specifics  $\approx$  Qualitative



# Quantitative / Qualitative

- Apples and oranges
- They generally provide answers to different questions
- They complement each other
- Qualitative appears to have a wider array of techniques but this is deceptive.
- Quantitative can catch the big picture because it is better for handling large quantities of data



# Many Methods

- Quantitative typically for 15+ people, facilitates use of any statistical methods, highlights trends
- Qualitative typically a small number of people <10, oriented to details, often entails guided interviews, good for seeing specific instances
- Both – Have utility, tools to facilitate, and require a systematic approach that follows a plan.

# Compare the two Methods

- For the issue you identified, do you want specific information or general overall information?
- What are the implications for how you might go about addressing your issue?



# Quantitative (Deductive)

- Measurements allowing comparisons
  - Compare means – is average the same?
  - Compare variances – is variation the same?
  - Are two variables dependent or independent?
- Curve fitting
  - Fit a line or suitable curve to show behavior
  - Allows prediction
- Advanced techniques for modeling

# Qualitative (Inductive)

- Subjects are interviewed (or source material used), themes are extracted from the interviews (in accordance to the theoretical model), and they are consolidated to broader scope themes, these then characterize different sequences of events or relationships between the elements of the issue.
- Level of structure varies but has to be decided in advance (as part of systematic investigation).

# Devil in the Details



- Quantitative – need to use statistics properly for robustness.
- Qualitative – As themes emerge they have to be clarified. Checks, such as inter-rater reliability are necessary. Further development of themes is related to the theoretical framework. Triangulation of data is necessary. I.e. considerable work making it robust.



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