Pitfalls and Opportunities in Educational Research

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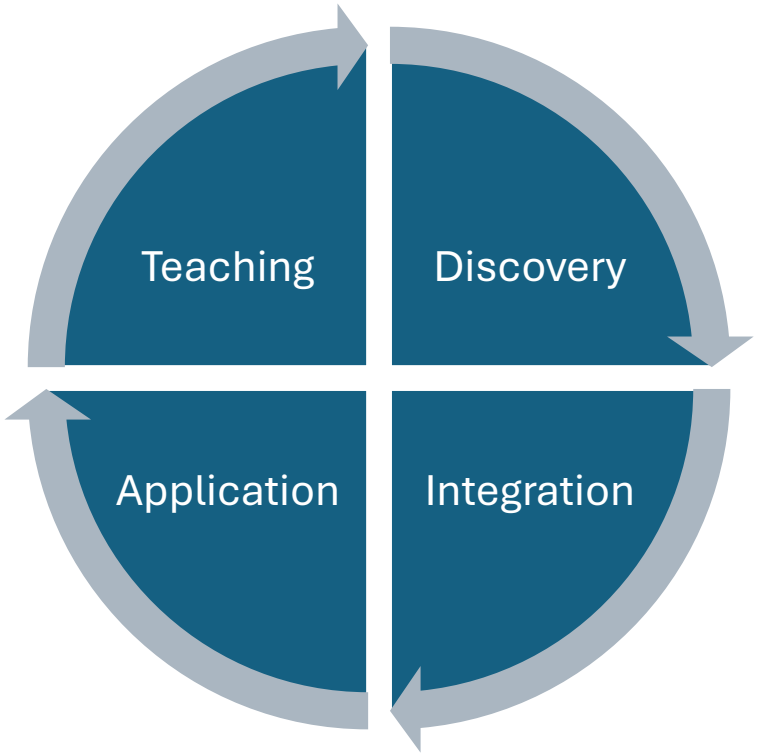
Pitfalls and Opportunities in Educational ~~Research~~ Scholarship

Objectives

- After attending this session, the participants will be able to:
  - Choose a study design that minimizes common biases for their educational research
  - Implement methods for avoiding bias and enhancing applicability in qualitative and quantitative study designs for educational research.
  - Design and develop curriculum in ways that facilitate research and evaluation.

Educational Scholarship – a faculty duty

Boyers Model of Scholarship



Quality Improvement

- Improve how care is delivered
  ~ Improve education

Pitfalls

Pitfalls – The grand idea

- A faculty member is under some pressure to “do some scholarship.”
- They read about a particular gamifying technique for teaching, apply it to their assigned lecture topic, and study:
  - How the residents rate the session
  - Knowledge before and immediately after the session
  - Self-assessed confidence in managing the condition

Pitfalls – Shooting from the hip…

- A faculty member sees a problem with ”inappropriate referrals”. Creates a survey/intervention for referring clinicians.
- Survey assesses “knowledge” about referral guidelines, provides link to PowerPoint “education.”
- Follow up survey is sent in a month assessing knowledge, then assesses change in referrals.

Pitfalls – Great expectations

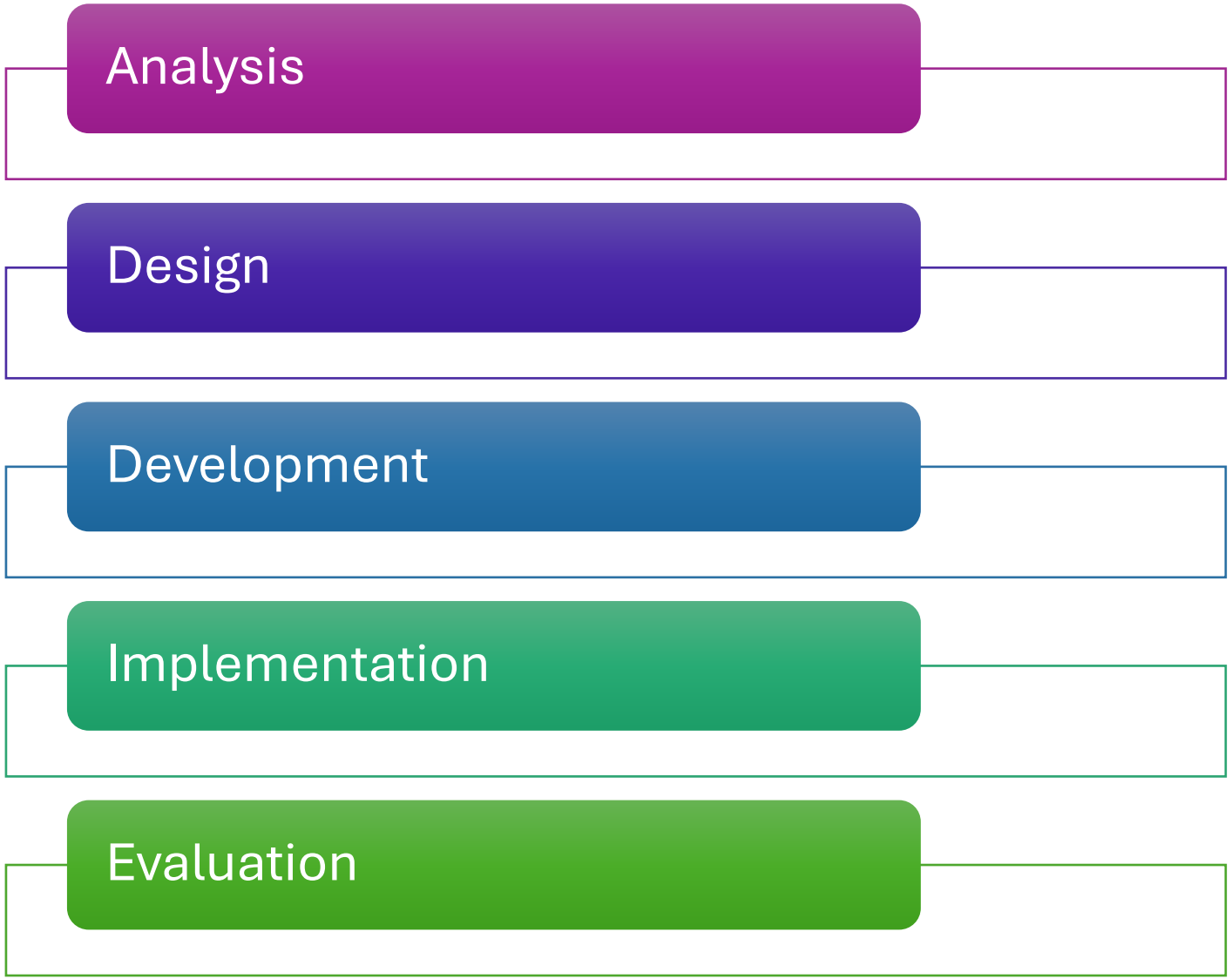
- A researcher described a qualitative study of 13 clinicians across 3 states about their awareness of certain guidelines.
- In their conclusion, they recommended a national call for action to improve knowledge of these guidelines.

Opportunities

Instructional Design (ID) Models

Frameworks for curriculum design AND for research!

ADDIE ID model



Kern's Six Step ID model

PROBLEM IDENTIFICATION AND GENERAL NEEDS ASSESSMENT

TARGETED NEEDS ASSESSMENT

GOALS AND OBJECTIVES

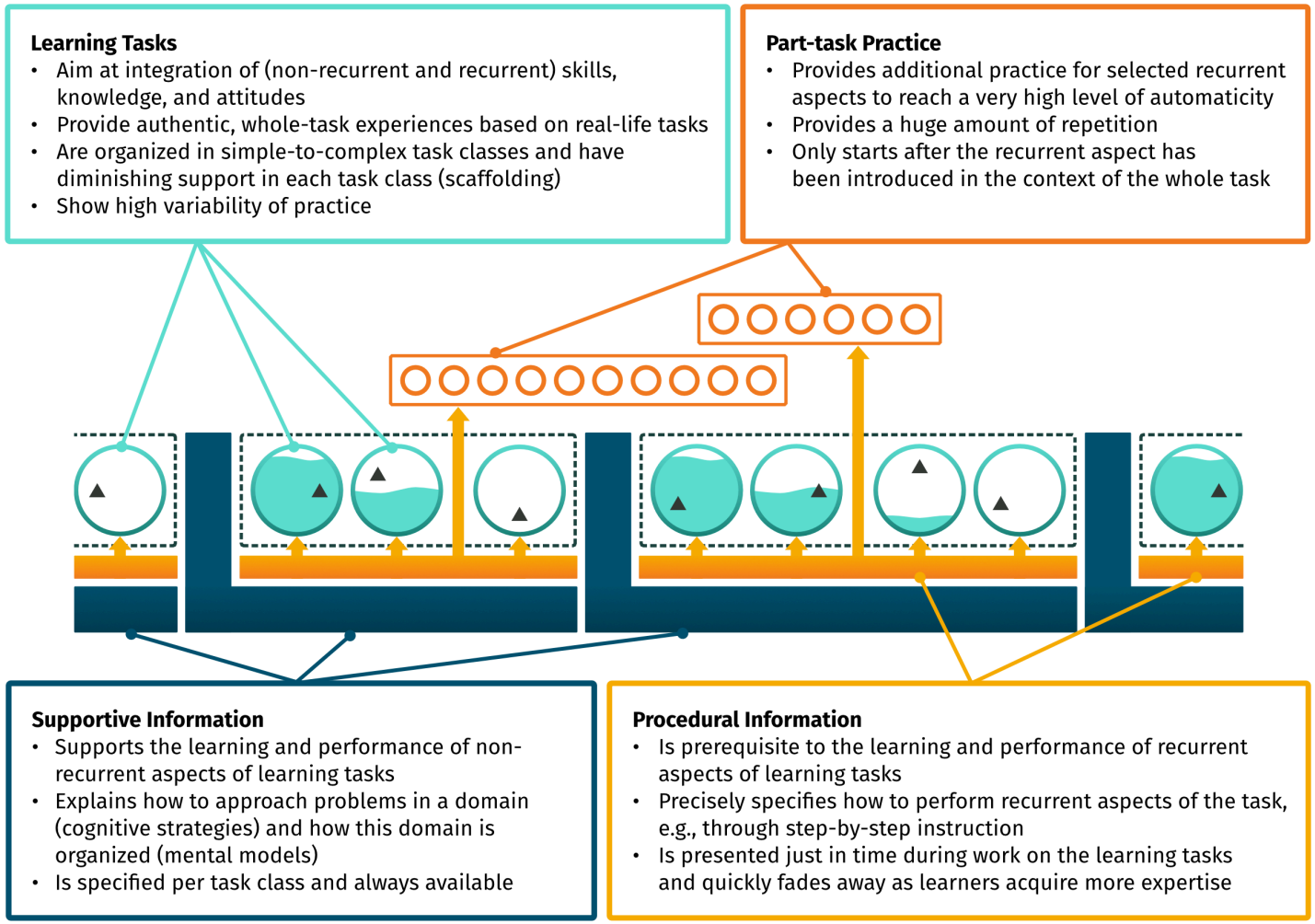
EDUCATIONAL STRATEGIES

IMPLEMENTATION

EVALUATION AND FEEDBACK

4C/ID Model

https://www.4cid.org/



What’s the big whoop with models/frameworks?

- Prove that you know the context of your research question.
- Build on previous educational researchers’ work.
- Helps you design better interventions and study better outcomes
- Don’t waste time/money repeating research.
- Keeps you from biting off more than you can chew
- Research as a multiphase process

Study Designs

Educational research should be good quality research...

Problems with studying our learners

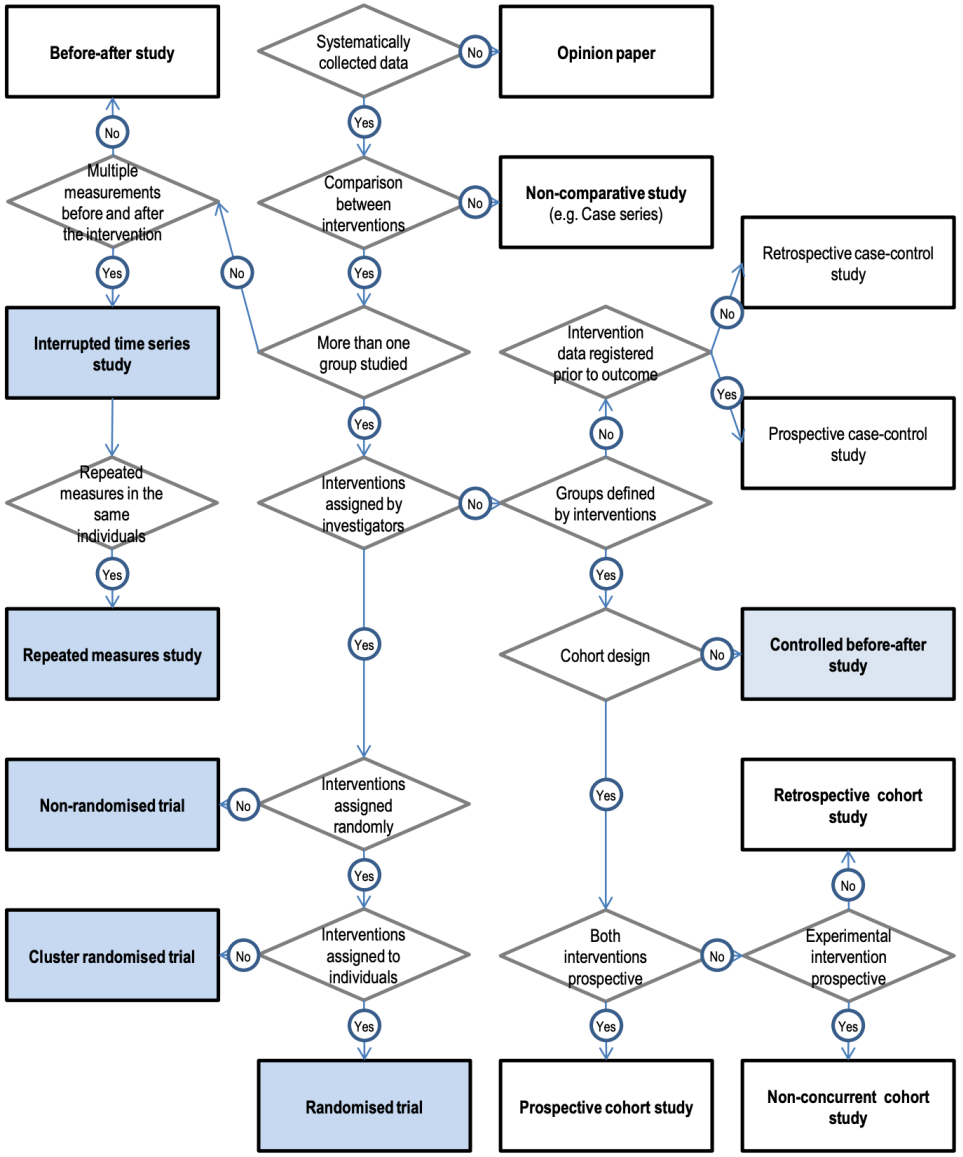
CONSENT

FERPA REGULATIONS

CREATING DIFFERENTIAL EDUCATIONAL OPPORTUNITY

CHOICE OF OUTCOMES DEPENDS ON STAGE OF LEARNING

Study Designs



Study Designs for Educational Interventions

Minimize Bias

- Interrupted Time Series
- Controlled Before and After
- Randomized controlled trial
- Repeated measures study
- Cluster randomized trial
- Non-randomized trial

Subject to Bias

- Case series
- Cohort studies
  - (consider propensity score matching to strengthen)
- Uncontrolled before and after

Qualitative Research

- Method/Framework
- Sampling
- Text for analysis
- Analysis
  - Role of bias, reflexivity
  - Multiple perpectives
  - Member checking
- Generalizability

Why worry about study designs?

- RCTs are not required, and often not feasible/wanted in education.
- Poor quality studies are unethical.
- Good design –> dissemination opportunities
- About the IRB…
  - They’re here to help…really.
  - My hot take: Most useful educational research is not ”QA/QI”

The bottom line…

Unsystematic biased experimentation on learners? Not ok.

Creativity, passion, expertise with good study design? OK!

Outcome Frameworks

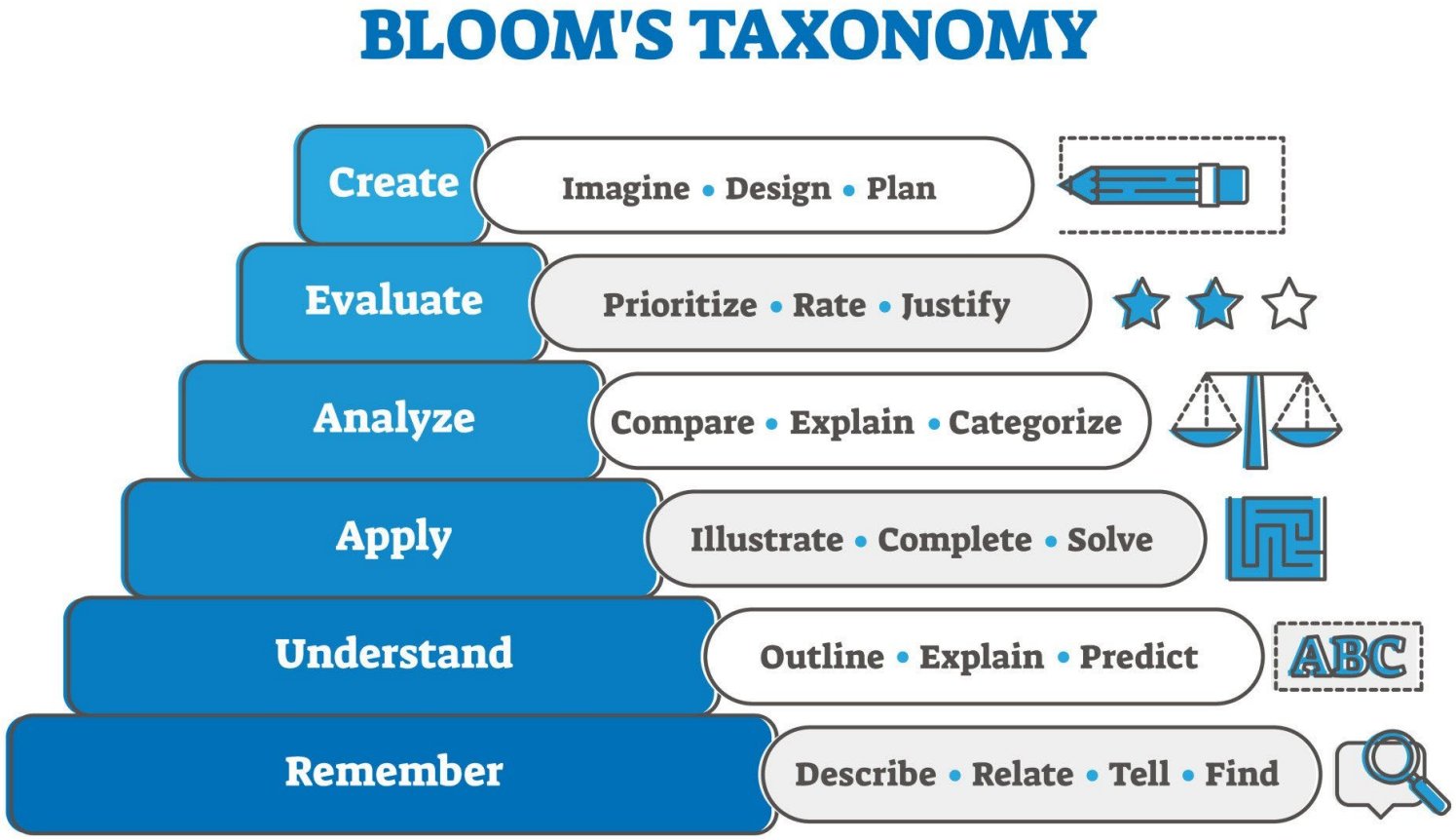
Begin with the end in mind...

What is learning?

How will you know if your learner learned anything?

Bloom Taxonomy

(cognitive-behavioral)



https://www.simplypsychology.org/blooms-taxonomy.html

Bloom's Level	Key Verbs (keywords)	Example Learning Objective
Create	design, formulate, build, invent, create, compose, generate, derive, modify, develop.	*By the end of this lesson, the student will be able to design an original homework problem dealing with the principle of conservation of energy.*
Evaluate	choose, support, relate, determine, defend, judge, grade, compare, contrast, argue, justify, support, convince, select, evaluate.	*By the end of this lesson, the student will be able to determine whether using conservation of energy or conservation of momentum would be more appropriate for solving a dynamics problem.*
Analyze	classify, break down, categorize, analyze, diagram, illustrate, criticize, simplify, associate.	*By the end of this lesson, the student will be able to differentiate between potential and kinetic energy.*
Apply	calculate, predict, apply, solve, illustrate, use, demonstrate, determine, model, perform, present.	*By the end of this lesson, the student will be able to calculate the kinetic energy of a projectile.*
Understand	describe, explain, paraphrase, restate, give original examples of, summarize, contrast, interpret, discuss.	*By the end of this lesson, the student will be able to describe Newton's three laws of motion in her/his own words*
Remember	list, recite, outline, define, name, match, quote, recall, identify, label, recognize.	*By the end of this lesson, the student will be able to recite Newton's three laws of motion.*

https://www.simplypsychology.org/blooms-taxonomy.html

Kirkpatrick's Training Evaluation Scheme

- Reaction
- Knowledge
- Process Change
- Results
- (Return on Investment)

EDITORIAL

Moving on From Self-assessment

Christopher P. Morley, PhD

PRiMER. 2024;8:5.
Published: 1/23/2024 | DOI: 10.22454/PRiMER.2024.624901

Abstract

Self-assessment of knowledge and confidence is common in medical education, and there are both philosophical and practical justifications for it. However, many attempts to establish a correlation between self-assessments of knowledge or confidence and objective measures of knowledge or skill acquisition have failed. While in some circumstances the inclusion or reliance of self-assessment may be warranted, for example when a study is specifically measuring traits or outcomes that rely upon meta-cognition or increases in confidence, it is more often the case that self-assessment is used as a substitute for more objective measures. This is demonstrably flawed, and *PRiMER* as a journal will be moving away from publishing reports that inappropriately rely upon self-assessed knowledge or confidence as the only study outcomes.

Practice

Pitfalls – The grand idea

- A faculty member is under some pressure to “do some scholarship.” They read about a particular gamifying technique for teaching, apply it to their assigned lecture topic, and study:
  - How the residents rate the session
  - Knowledge before and immediately after the session
  - Self-assessed confidence in managing the condition

  - Underlying theory? Novel?
  - Choice of outcomes
  - Choice of intervention based on ratings, outcomes

Pitfalls – Shooting from the hip…

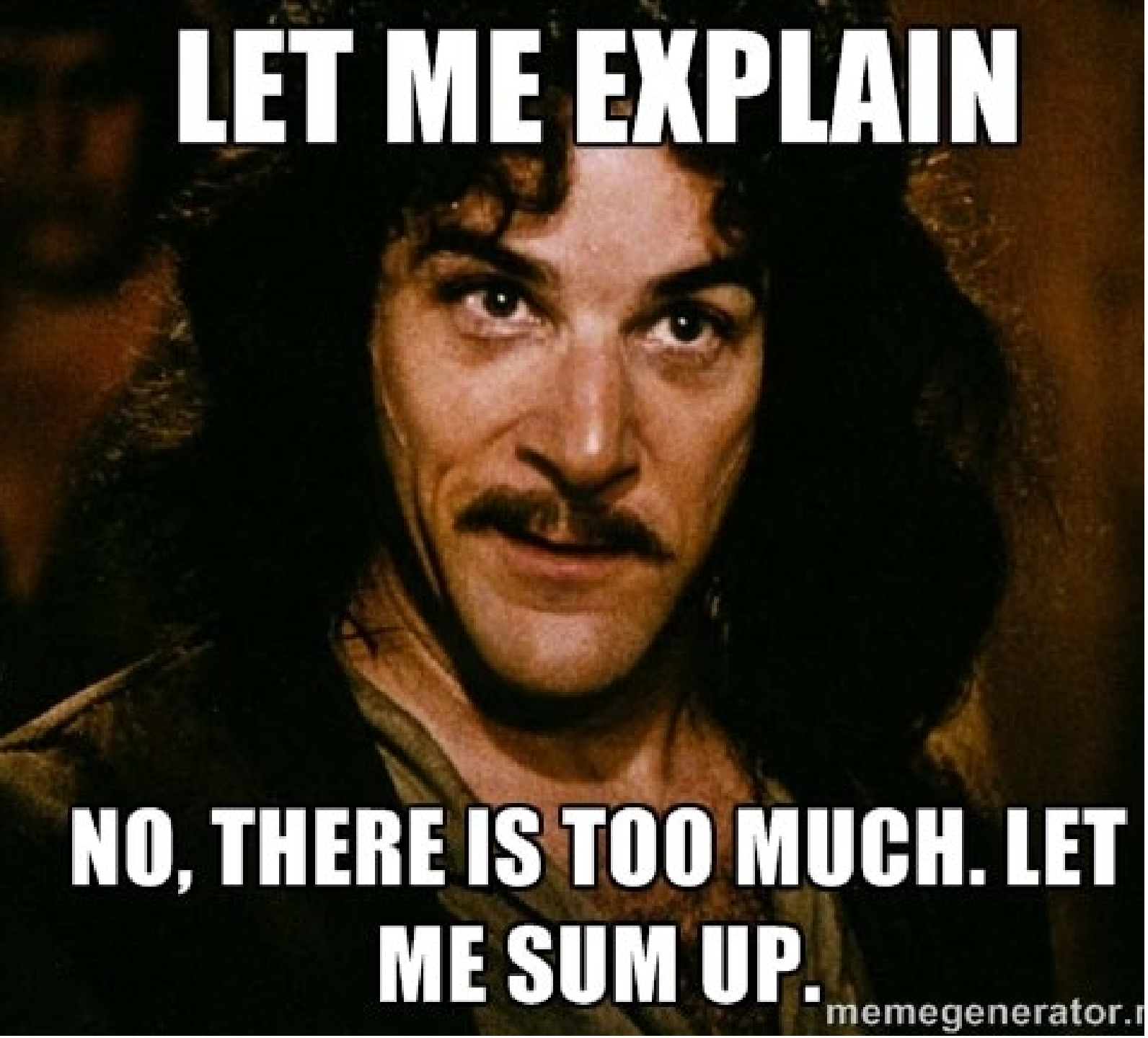
- A faculty member sees a problem with ”inappropriate referrals”. Creates a survey/intervention for referring clinicians. Survey assesses “knowledge” about referral guidelines, provides link to PowerPoint “education.” Follow up survey is sent in a month assessing knowledge, then assesses change in referrals.

- Many assumptions about the problem, lack of guiding framework
- “Education” as intervention to change practice? No.
- No collaboration with referring clinicians.

Pitfalls – Great expectations

A researcher described a qualitative study of 13 clinicians across 3 states about their awareness of certain guidelines. In their conclusion, they recommended a national call for action to improve knowledge of these guidelines.

- Precedent/Background
- Focused research question
- Generalizability – method, sample
- Qualitative Rigor?



- Educational research should be high quality research.
- Pick a passion so you don't have to boil the ocean with one study.
- Use educational frameworks/models to generate research questions.
- RCTs not required, but there are alternatives that minimize bias.
- Consider levels of educational outcome and use the one appropriate to your subject and constraints.

Comments/Questions

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