



HEALTH PROFESSIONS EDUCATION RESEARCH SCHOLARS (HERS)

Research question and Type 1 & 2 error
November 7, 2019



welcome

Check in

- Intro (welcome Dr Baffoe-Bonnie!)
- Something not work related you did that was fun since last month
- Homework from last time
- Updated Research Question as of this morning!

Developing a Research Question

Agenda/Session Objectives

By the end of this session, participants will:

- Compare and contrast health professions education scholarship with clinical research.
- Identify what is QI and what is health professions education scholarship
- Define the area of interest, topic, problem and research question
- Develop a first draft of research question and brainstorm associated hypotheses.
- Develop visual representation of proposed study

What is Educational Scholarship?

- What do educational scholarship and medical research have in common?
- Write down
- Discuss with partner
- Share

Similarities

Clinical Research

-
-
-
-
-

Educational Scholarship

-
-
-
-

What is Educational Scholarship?

- What do educational scholarship and medical research have in common?
- How is educational scholarship different from traditional medical (clinical) research?
- Write down
- Discuss with partner
- share

Differences

Clinical Research

-
-
-
-
-

Educational Scholarship

-
-
-
-

What is Quality Improvement?

- What do quality improvement and research have in common?
- Write down
- Discuss with partner
- Share

Similarities

QI

-
-
-
-
-

Research

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-
-
-

What is Educational Scholarship?

- What do QI and research have in common?
- How is QI different from traditional research?

- Write down
- Discuss with partner
- share

Differences

QI

-
-
-
-
-

Research

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-
-
-

Quality Improvement and Research

QI

- Question
- Gather current state data
- Implement logical intervention
- Analysis of data
- Refine, slight change
- Implementation based on plans
- Address a local problem

Research

- Question
- Read read read
- Refine question
- Hypotheses
- Gather data
- Implement intervention
- Analysis of data
- Next steps
- Address a question, large scale problem

Shared Elements: Scholarship of Clinical Teaching, Quality Assurance, and Practice-based Learning & Improvement (PBLI)



1. Identify a problem
2. Collect baseline data
3. Intervene to reduce the problem
4. Collect follow-up data

Similarities – Goals in Scholarly Work

- Clear goals
- Adequate preparation
- Appropriate methods
- Significant results *(Doesn't mean results have to be statistically significant in order to be an important contribution to the field.)*
- Effective presentation
- Reflective critique

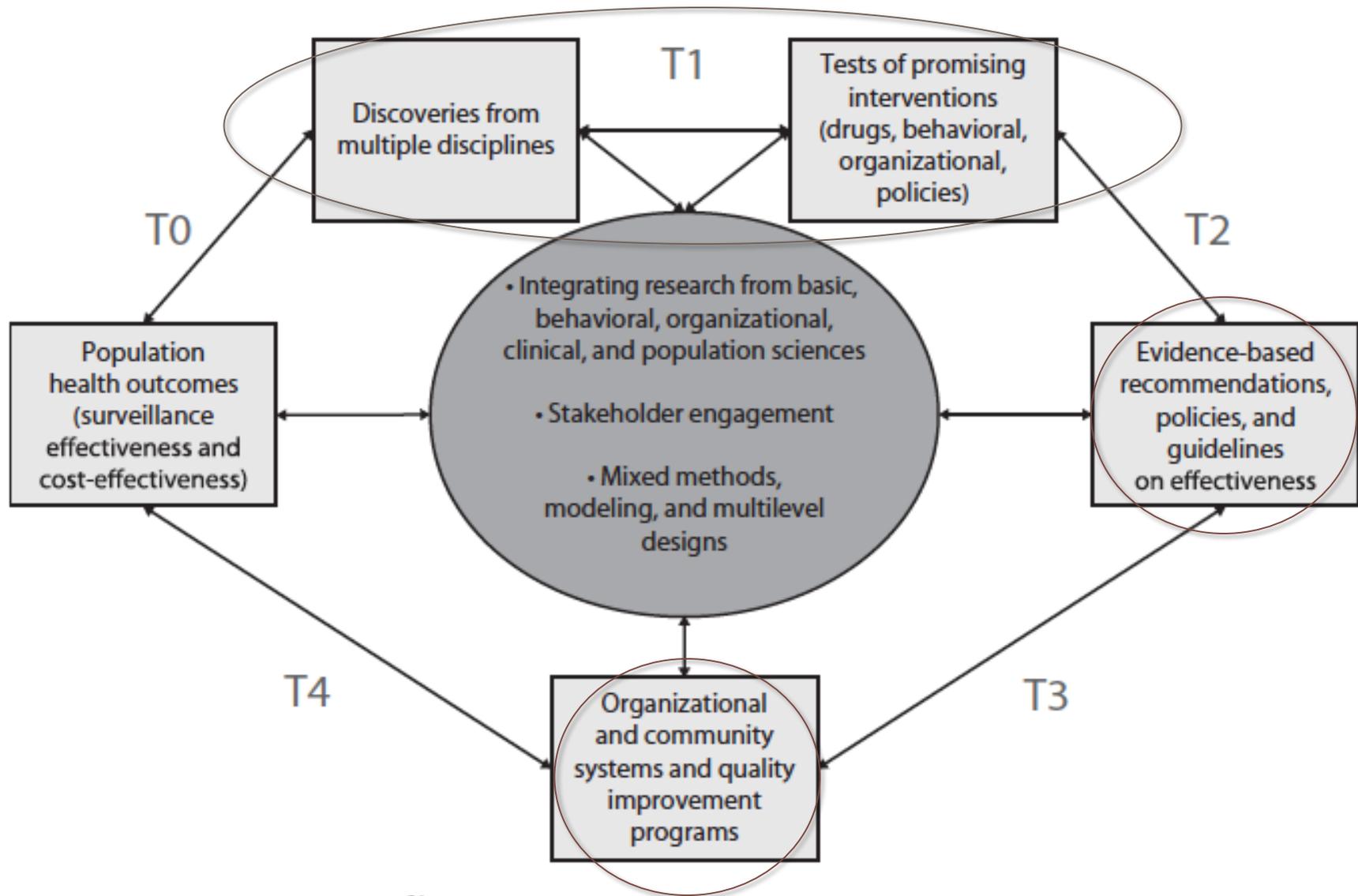
Glassick, Huber, & Meroff (1997) *Scholarship Assessed*.

What are the differences

- research- *generating new knowledge*, not obvious what the outcome is going to be, gap in knowledge or controversy in science; replication is good if there is a controversy in the field,
 - Health professions education
 - Clinical research
- quality- *implementing best practices*, obvious outcome, replication is the goal, not generating new knowledge

How to determine the difference?

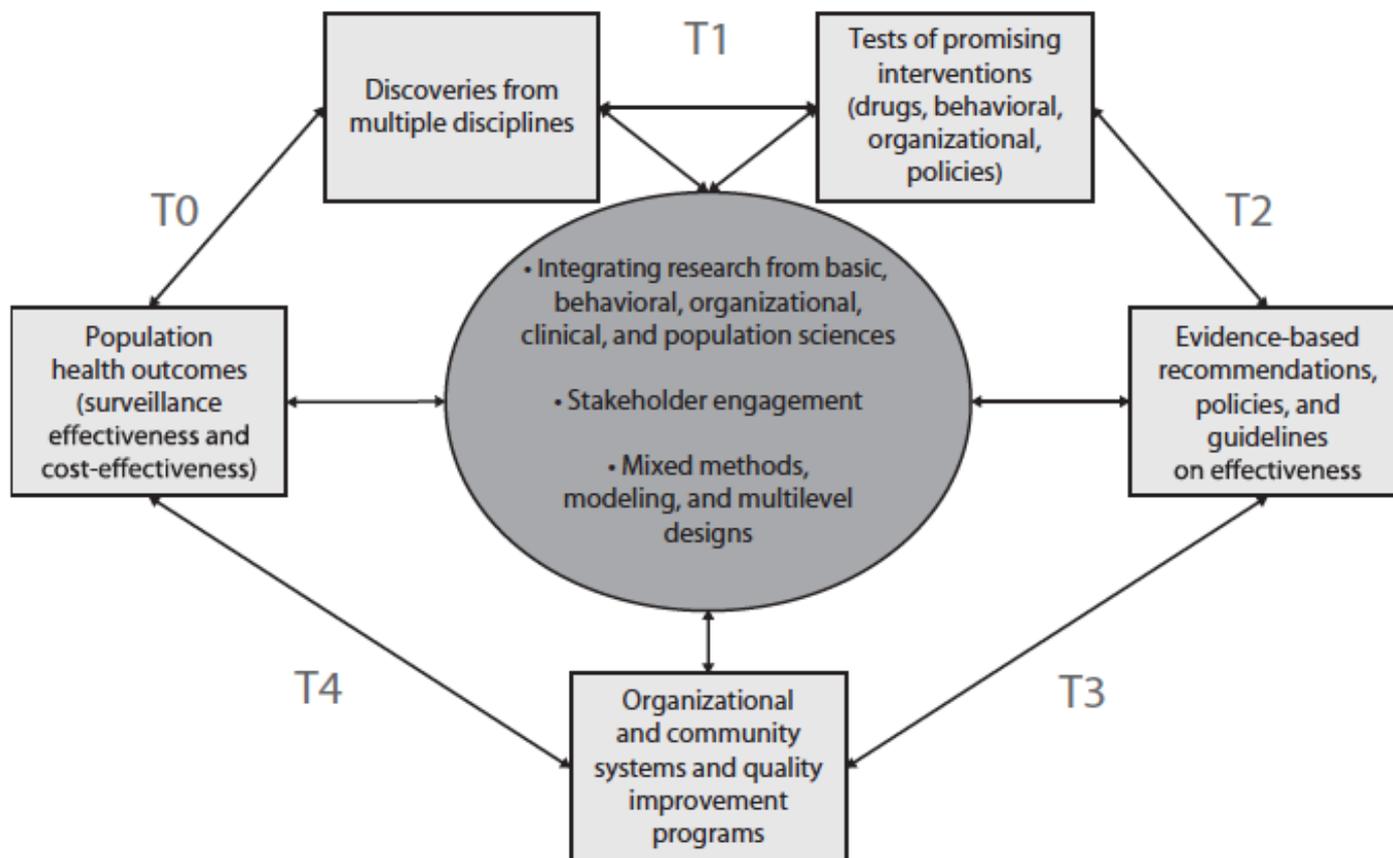
- IRB distinction
- Applied research
- Health professions education research
- How do you evaluate a good QI project/result vs. an appropriately powered research project?



Source. Modified from Khoury et al.³¹

FIGURE 1—Knowledge integration process.

Redraw this for health professions education research



Source. Modified from Khoury et al.³¹

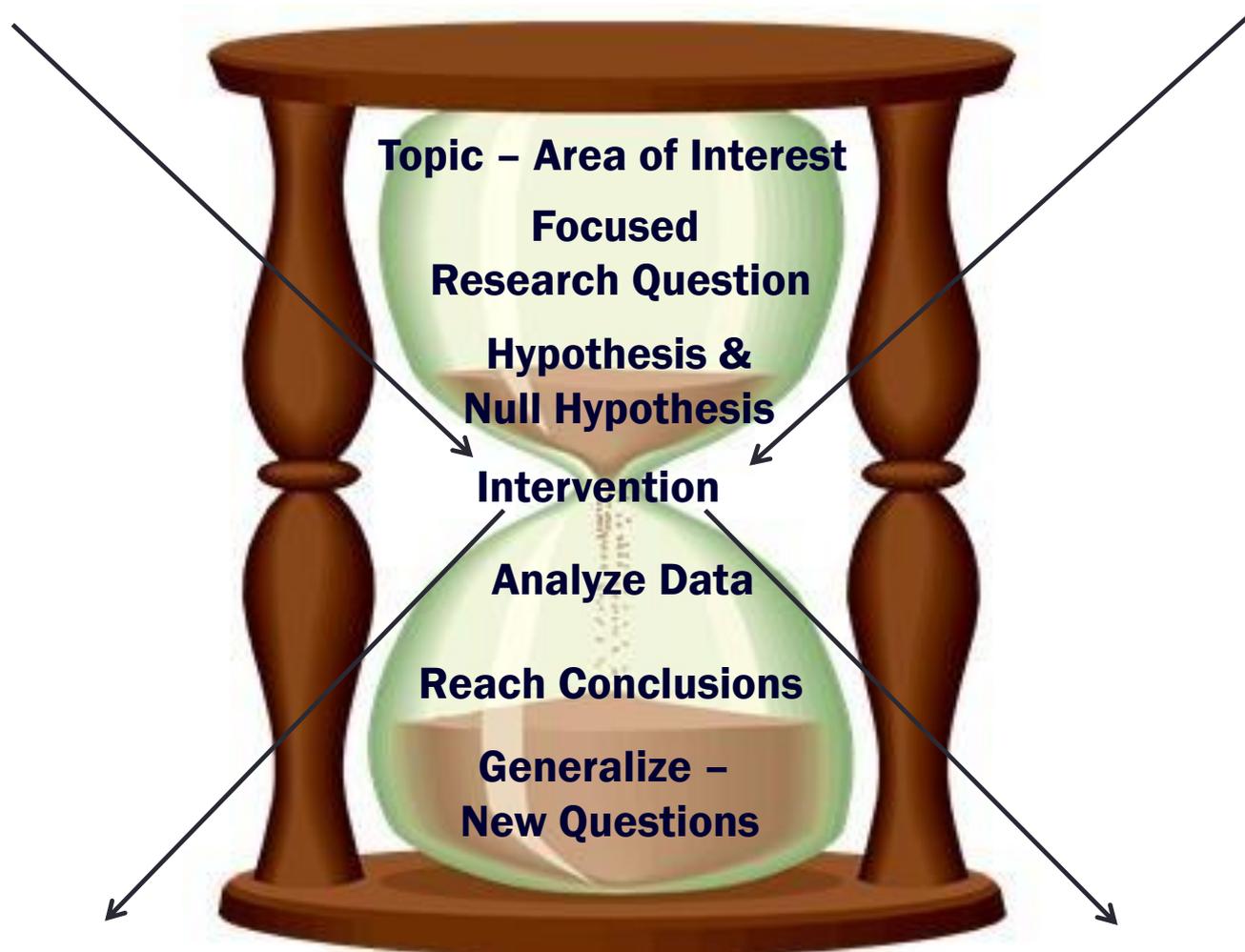
FIGURE 1—Knowledge integration process.



Reference: <http://en.wikipedia.org/wiki/Glacier>

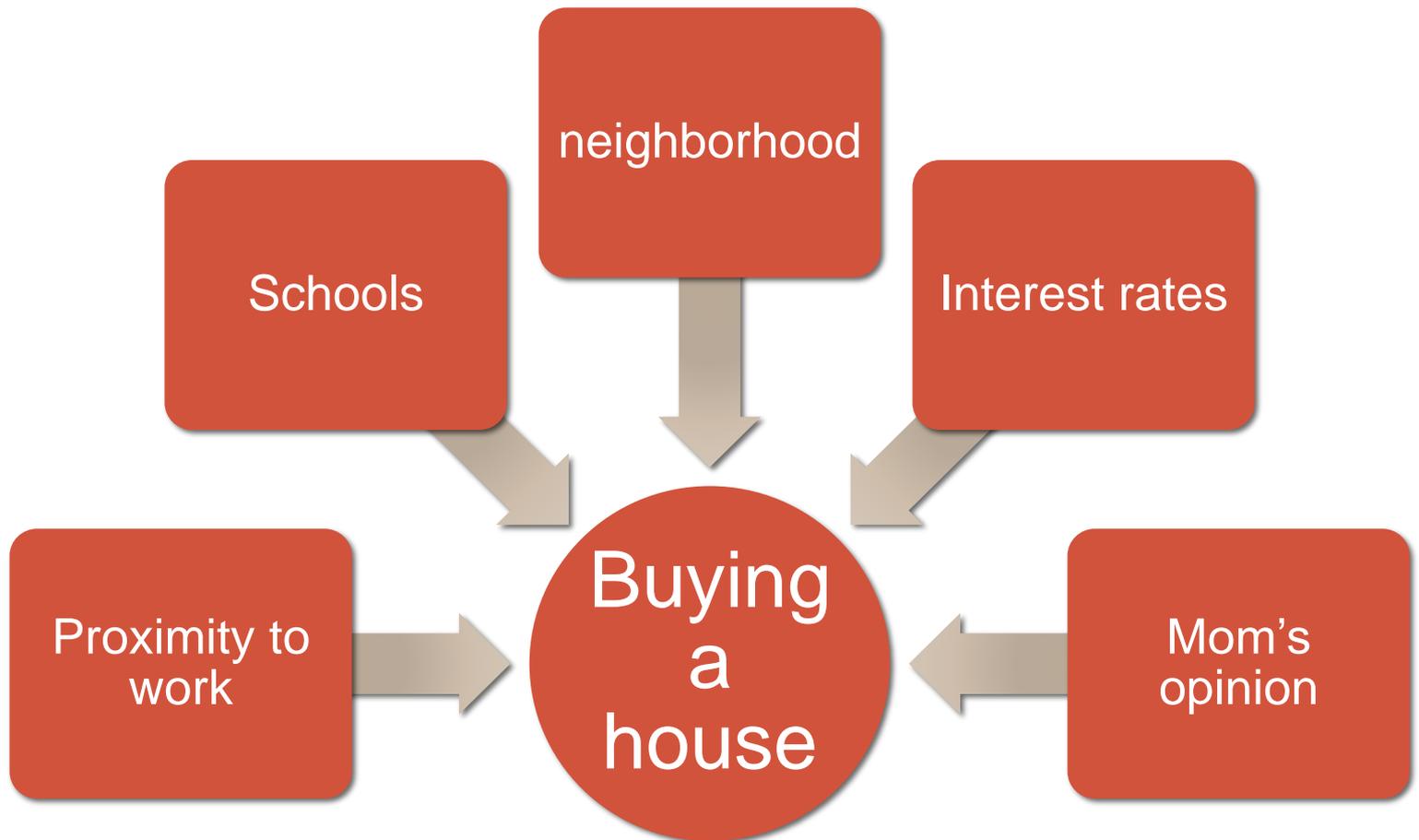
BREAK

Structure of Research



Lets apply...

- You are thinking of buying a house.



Thinking through it like a social scientist....

- What is the area of interest (broad)
- What is the topic you are interested in (narrower)
- What is the area of interest within the topic that matters to you (narrower)
- What is the question you want to answer (narrower)
- What are the things that are going to influence your findings (variables)
- What do you consider?
 - Map out for yourself
 - Share as a group
 - Write on stickies
 - Group

Thinking through it like a social scientist....

- What is the area of interest (broad)- *Real estate*
- What is the topic you are interested in (narrower)- *House purchasing*
- What is the area of interest within the topic that matters to you (narrower)- *social influences on house purchasing decision*
- What is the question you want to answer (narrower)- *What social factors influence the purchase of a house*
- What are the things that are going to influence your findings (variables)- *salaries, budget, mom influence, emotional, parental influence, schools neighborhood*

So... what is your broad area?

Recognizing and Choosing Research Topics

- What situations or problems tend to puzzle, fascinate, challenge, or interest you?
- List as many of these as you can as quickly as possible.
- 5 mins
- Think, Pair, Share

Rate your ideas

FINER

Feasible (Timing, cost,
needed cooperation)

Interesting

Novel

Ethical

Relevant

In alignment with
unit's goals

(G)

Fundable

(\$)

Best overall

(*)

Most interesting, feasible, best overall

- Pick 2
- Share

- We have now defined a couple areas of interest!

What question do you want to answer?

Literature says...

- Go to your articles you pulled for homework and the ideas you generated and rated.
- What are the gaps articulated in the literature? Or gaps you noticed?
 - 5 mins- take notes
- Pair and share

Draft 1 of your research question(s)

- Based on the gaps you wrote, what would an appropriate research question be?
- Write as many as you want.

This is an annoying problem → Research
idea

What is the purpose of your study?

- Purpose statement
 - Research topic
 - Intent of the study
 - Why do you want to do the study and what do you intend to accomplish

This study will...

Purpose statement

- Back to your list of research questions or ideas
- Choose one or two that intrigue you (even if not the most highly rated)
- Finish this statement
 - *The purpose of this study is to...*

Research idea → Research Question

The Research Question

- Central direction of the study
- Specific question(s) you intend to answer
- Does not happen in isolation
 - Literature is critical

Rewrite your Research Question

- Back to your purpose statement(s).
- Rewrite/expand one into a research question.
- What specifically do you want to know?
- *Share*

Variables

- **Independent Variable** – The **presumed cause** of an event/intervention; the variable one manipulates. (e.g. treatment)
- **Dependent Variable** – The **variable affected** by the independent variable; the presumed effect of an event/intervention (e.g. outcome)

The Research Question

Do **first-year medical students** who complete **a student-run anatomy review course** **score** higher on the **anatomy final exam** than students who do not complete the review course?

- ✓ What is the *independent variable*?
- ✓ What is the *dependent variable*?
- ✓ What is the *sample*?

The Research Question – Residency participation

- Does the length of a medical residency training program affect a resident's participation in quality or safety initiatives?
 - ✓ What is the *independent variable*?
 - ✓ What is the *dependent variable*?
 - ✓ What is the *sample*?

The Research Question – Critical Thinking

- Is there growth in **critical thinking skills** of **first-year professional students** as a result of **participation in the PBL curriculum**? And if so, what learning-related and curricular factors or personal characteristics are associated with gain in post-test scores?
 - ✓ *What is the **independent variable**?*
 - ✓ *What is the **dependent variable**?*
 - ✓ *What is the **sample**?*

Identifying Variables

Back to your research question. Make two lists.

- Identify your **Independent (IV)** and **Dependent Variables (DV)**.

IVs	DVs

- Think ahead - *How might you define and measure those terms?*
- *Share with group*

What to Assess

- Achievement
- Program
- Habits of mind and behavior
- Acquisition and application of knowledge and skills
- Communication
- Professionalism
- Participation
- Clinical reasoning and judgment
- Teamwork
- Practice- based Learning and Improvement
- Systems Based Practice
- Satisfaction
- Success

Common Pitfalls in Medical Education Research

Common Pitfalls

- Lack of a control group
- Lack of randomization
- Sample not representative of the population
- Small sample sizes
- Rigorous statistical methods
- Lack of validated instruments

Common Pitfalls

- Not looking outside of the medical literature
- Not building on existing knowledge

- For this course...
 - Education must be the primary focus of the study, not an add-on.

Popular Topics

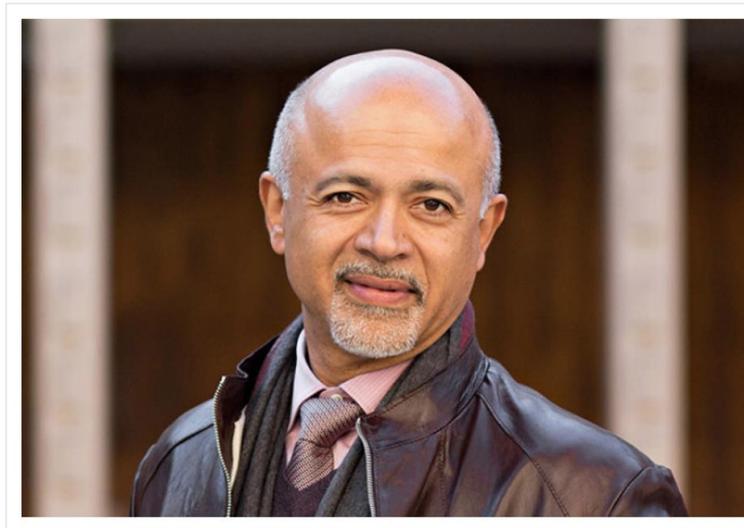
- Specialty Choice
 - Does “X” influence medical students to select a career in....
Surgery, medicine, etc.
- Mentoring
 - Does mentoring improve satisfaction?
- Simulation
 - Does attendance at a [suturing lab] improve suturing skills?

It's a great time to be in Med Ed Research

imperial.ac.uk/news/193571/interview-abraham-verghese-transforming-medical-education/

Interview: Abraham Verghese on transforming medical education

by [Stephen Johns](#)
04 November 2019



One of the world's leading physicians says drastic changes are needed in medical education to keep up with transformation in other areas of medicine.

[Professor Abraham Verghese](#) will give one of the key-note talks at the upcoming [Transform MedEd conference](#), held at Imperial next year in partnership with LKCMedicine.



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Homework

- Reflect on the session today
- Think about variables that are influencing
- Think about what fields outside of medicine may provide knowledge on your topic
- Be prepared to discuss your area of interest, topic, *purpose, and RQ*
- Literature review template
- **Due in December: lit review 1, purpose, research question**

Remember...

- Be open to critique
- Use your mentor as needed
- Your topic may change several times
- Your initial project is a PILOT study
 - F.I.N.E.R.
- Alignment is important for resources. Is your chairman invested in what you are doing? How will your topic help/improve/advance something that is important to your department/hospital?

Go/No Go

- Status checks

Wrap-up and Q&A