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# REVIEWING AN EDUCATION PAPER: DIFFERENT AND CRITICAL ELEMENTS

# Educational Literature

- Medical Education a rapidly growing field of research
- Educational research often criticized for poor theoretical frameworks, study designs and meaningful outcomes
- Deficiencies in research methods and reporting quality identified
- People from many fields of interest publish in education

Cook DA .Quality of reporting of experimental studies in medical education: a systematic review. Med Ed 2007;41:737-45

# Education Literature Review

- Peer review lies at the core of academic literature
- Main mechanism journals use to ensure quality
- Guidelines in literature for reporting RCT, prospective studies, diagnostic accuracy and meta analyses but none for medical education research
- Educational research criticized for not informing practice
  - Simulation, web based learning
- Lack of scientific approach
  - Results of one study a foundation for the next

Cook DA. Quality of reporting of experimental studies in medical education: a systematic review. *Med Ed* 2007;41:737-745.

# Medical Education Research Manuscript Review

- Problem Statement
- Relevance
- Research Design
- Sample and sampling
- Instrumentation and data collection
- Results
- Discussion and Conclusion
- Title
- Abstract
- Writing, presentation

Bordage G. Reasons reviewers accept and reject manuscripts. *Academic Medicine* 2001;76(9):889-96

# Top Reasons to Reject Medical Education Research Manuscripts

- Statistics (inappropriate, incomplete, insufficiently described)
- Over-interpretation of results
- Instrument (inappropriate, suboptimal, insufficiently described)
- Sample too small or biased
- Text too difficult to follow or understand
- Insufficient or incomplete problem statement
- Inaccurate or inconsistent data reported
- Review of literature (inadequate, incomplete, inaccurate, outdated)
- Insufficient data presented
- Defective tables or figures

Bordage G. Reasons reviewers accept and reject manuscripts. *Academic Medicine* 2001;76(9):889-96

# Top Reasons to Accept Medical Education Research Manuscripts

- Problem (important, timely, relevant, critical)
- Well written manuscript
- Well designed study
- Review of literature (thoughtful, focused, up to date)
- Sample size sufficiently large
- Practical useful implications
- Interpretation took into account the limitations of the study
- Problem well stated and formulated
- Novel, unique approach to data analysis

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# Types of Medical Education Research Projects

- Descriptive (observational) “what was done?”
  - New educational intervention, assessment
  - No comparisons, no outcomes
- Clarification (Model formation, building theory, prediction) “how does this work and why?”
  - Build on previous work, confirm or refute
- Justification (Testing) “does it work?”
  - Compare PBL to traditional learning

Cook DA . Description, justification and clarification: a framework for classifying the purposes of research in medical education . Med Ed 2008;42:128-33.

# Problem Statement / Research question / Relevance

- Should be clearly stated
- Title clear / matches project
- Abstract concise and accurate
  - Is it an important problem or question?
  - Is it a novel teaching method or approach?
  - Does it advance the field of education?
  - Is the project do-able given the resources?

Eva K. Issues to consider when planning and conducting educational research. *J Dent Ed* 2004;68(3):316-323

# Research Design, Sample and Sampling

- Experimental
  - Randomized allocation
  - Pre test post test control group
  - Post test only control group
  - Solomon four group design
- Quasi-experimental
  - Non equivalent control group design
  - Separate sample pre test post test design
- Time series designs
  - One group only post test design
  - One group pre test post test design
  - Static group comparison design

Lynch DC. A rationale for using synthetic designs in medical education research. *Advances in health sciences education* 2000;5:93-103.

# Study Design

R O<sub>1</sub> X O<sub>2</sub> (pre and post test)

- R= residents
- O<sub>1</sub> = first assessment (dependent variable)
- X = intervention (independent variable)
- O<sub>2</sub> = second assessment (dependent variable)

# Experimental Design

- Pre test post test control group

R O<sub>1</sub> X O<sub>2</sub>

R O<sub>1</sub> O<sub>2</sub>

- Post test control group

R X O<sub>1</sub>

R O<sub>1</sub>

- Solomon four group design

R O<sub>1</sub> X O<sub>2</sub>

R O<sub>1</sub> O<sub>2</sub>

R X O<sub>1</sub>

R O<sub>1</sub>

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# Quasi-Experimental Design

- Non equivalent control group

R	O <sub>1</sub>	X	O <sub>2</sub>
R	O <sub>1</sub>		O <sub>2</sub>

- Separate sample pre test post test design

R	O <sub>1</sub>	X	
R		X	O <sub>1</sub>

- Separate sample pre test post test design

R	O <sub>1</sub>	X	
R		X	O <sub>1</sub>
R	O <sub>1</sub>		
R			O <sub>1</sub>

# Pre-Experimental Design

- One group only pre test post test design

R O<sub>1</sub> X O<sub>2</sub>

- One group only post test design

R X O<sub>1</sub>

R O<sub>1</sub>

- Static group comparison design

R X O<sub>1</sub>

R O<sub>1</sub>

# Outcome Measures, Results

- Use existing proxy measures (such as board exams), or create a new measure
- Affect – student and patient satisfaction
- Behavior – did program improve practical skills, communication skills, competency rates etc
- Cognition – knowledge on GPA or aptitude tests, final exam scores, degree of transfer of theory into clinical practice (OSCE), patient education etc
- Attitudes – life long learning, staying up to date
- Higher order skills – non interpretative skills, clinical decision making etc

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# Qualitative Research

- To investigate complex social processes that are difficult to measure quantitatively
- To capture essential aspects of a phenomenon from the perspective of study participants
- To uncover beliefs, values and motivations that underlie individual health behaviors
- To develop sound quantitative measurement processes or instruments or to study special populations

Curry LA. Qualitative and mixed methods provide unique contributions to outcomes research. *Circ* 2009;119(10):1442-52.

# Qualitative Research: Data Collection

- In depth interviews
  - 1 to 1 interaction between researcher and study participant
  - Explore individual experiences and perceptions in great detail
  - In person, over the phone, or online
  - Respondent directs the course of conversation
  - Discussion guides (data collection instruments) can be broad or deep
- Focus groups
  - Guided discussions, in small groups with a common characteristic
  - Group interaction can generate unique insights into understanding shared experiences
  - Facilitate discussion of sensitive topics among members
  - In person, over the phone, and online
  - Discussion guides with 5 to 10 open ended questions
- Observation
- Document review

Curry LA. Qualitative and mixed methods provide unique contributions to outcomes research. *Circ* 2009;119(10):1442-52.

# Instrumentation and Data Collection

- Educational instrument
  - New teaching method versus traditional - PBL, computer web based training, simulation, interactive teaching files
- Assessment – formative, summative
- Feedback – yes, no
- Quantitative data
  - Satisfaction levels (Likert scale - ordinal)
  - Practical skills attained (yes, no)
  - Competent (passed certifying exam – yes/no)
  - Pre and post test scores (numeric)
- Qualitative data – main themes that emerge

# Statistical Analysis

- Sample sizes  $<30$ ,  $>100$ , parametric or not
- Survey participation rates
- Satisfaction levels (Likert scale - ordinal)
  - Wilcoxon or T-test
- Practical skills attained (yes, no), Competent (passed certifying exam – yes/no)
  - Chi squared test or Fisher exact test
- Pre and post test scores (numeric, grades - ordinal)
  - T-test (paired or non paired)

# Discussion and Conclusion

- Participation rates
- Interpretation of the results
- Compare the current findings to prior work and see if there is agreement or not, and if not, why not?
- Limitations
- Implications for educational practice
- Future directions

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Questions? Comments?



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