Research in Health Professions Education: Asking Good Questions – Using Appropriate Methods

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Overview

• What is research, what is not?
• Asking a good research question
• Choosing an approach: the cycle of research
• Unearthing assumptions
• Making a commitment

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Acknowledgements

• Charlotte Ringsted
• Albert Scherpbier
• Doug Buller
• Vicki LeBlanc

Why do research in medical education?

Discuss in pairs
Write down 3 motivations for research
1.
2.
3.

More Journals

Medical Education Research is rapidly developing as a viable and exciting research field

Medical Education Research is rapidly developing as a viable and exciting research field
More Association and Conferences

Creating Increased Expectations
- To improve the experience, knowledge and competence of students and clinicians
- To improve the care of patients and the health care outcomes generally
- To deepen the field of health professions education research

Why so much poor quality research?
Health professions education research is undertaken:
- In naturalistic / opportunistic settings
- Without a theoretical base
- With little funding
- By isolated researchers
- Published in a dispersed fashion, difficult to find

Bordage 2000

Explanatory Factors
- The conceptualization and research methods used are limited and narrow
- Researchers are often isolated, in units with missions for teaching and administration rather than research
- There is little funding for medical education research
- Researchers unable to connect their work to a larger “conversation” in an academic discipline

Albert 2005

Solutions: According to Bordage
1. Expand research questions and move from local studies to multi-institution and international studies
2. Replicate existing research in varied settings
3. Undertake better controlled studies and support good qualitative research
4. Create stable sources of funding for medical education research
5. Formally train researchers

Solutions: According to Albert
1. Intensify collaboration between PhD researchers and clinicians interested in education research
2. Support the diversification of disciplines which play a role in health professions education research
A masters or fellowship is not enough!

- 108 medical faculty with an interest in medical education: survey and focus groups
- 40% had fellowship or masters training
- Though most involved in a project, few had funding or published their work
- No significant differences between those with and without additional education training

Zibrowski 2008

Solutions according to Zibrowski

Factors for success
- Education research support
- Enhancing colleague interaction
- Ongoing development activities

Barriers
- Protected time
- Access to a context and support staff that sustains research
- Knowledge of research methodology (Does the masters/fellowship actually teach research skills?)

Goals of Education Research

Aims at building on existing knowledge and understanding of learning and education by

- Studying phenomena, interactions, interventions
- Formulating models, theories, and predictions
- Studying what works, why, how and for whom

Related approaches

- Evaluation, assessment, audit
- Study of local, concrete problems and phenomena

Limitations:
  - Do not contribute to advancement of knowledge or theory building
  - Not part of a larger "conversation"

Study of local, concrete problems

Evaluation

"What is the effect of this course in my school regarding satisfaction, usefulness, learning, behaviour?"

Assessment

"What is the learning outcome of this instruction or course assessed by MCQ or OSCE?"

Audit

"How well is our programme working in our department regarding ...?"

Research

- Starts with an idea, problem or case
- Relates the idea to conceptual framework
- Develops specific research questions
- Employs research approach, design, and instruments
- Collects and analyse data
- Interprets results
- Discusses validity and generalisability (or transferability) of results and practice implications
A research program

- Problem
- Research question
- Study design
- Data and analysis
- Understanding refined

Two poles of medical education research

**Theory driven research**
- Provide evidence of effect, justify initiatives, concepts, technology, expenditure
- Deepen the knowledge and understanding of learning, teaching, training, education

**Applied research**
- Getting published, promoted, famous, and socialised

Players in the complex field

Stokes Quadrant Model of Research

Not bird watching...

A single study at Kirkpatrick level 1 (Satisfaction)
- We created a course about #fv*7%d
- 5 people took it
- 3 of them filled out the evaluation form
- They all thought it was great

Sweeping generalization
- We have shown it is feasible and acceptable to implement a course in #fv*7%d
- Medical schools around the world should create courses in #fv*7%d

Quality standards from the primary discipline

Bohr

Quality standards for innovation - eg design based research

Edison
Use-inspired basic research

Advancement of knowledge

Applicability

Quality research = theory + utility

Eg. Learning in a Simulator

Practical Evaluation

Knowledge Building Research

Process

Did the simulation learning program operate well / as intended?

What organizational factors enable the successful development and implementation of simulation learning?

Outcome

Were the learning objectives met? Did students learn?

How does simulation-enhanced education impact learners’ self-efficacy and perceived readiness for practice?

Don’t start with a tool or data

- “I’d like to do a survey”
- “I want to do a study on OSCEs”
- “I want to do something qualitative”
- “We have a lot of teacher evaluation data - I’d like to do some research on it”
- “My chair wants me to do some research on the clerkship”

Ask a Good Research Question

• Think of an idea, problem, issue in education that has been on your mind
• Write it down
• Are you passionate about this problem or issue?
• Explain the problem, and why it interests you, to a neighbour
Perform a systematic review of literature

Find a conceptual framework

- “Conceptual frameworks represent ways of thinking about a problem or a study”
- “Different frameworks will emphasise different variables and outcomes, and their inter-relatedness”
- “Scholars are responsible for making explicit the assumptions and principles contained in the conceptual framework they use in their R&D projects”
  
Bordage 2009

Learn more about the problem

- What, if any, investigation of this problem have you done already?
  - Reading about it
  - Talking with an expert
  - Attend a lecture or workshop

- Has anyone researched this problem before?
- If you are to pursue a study about this problem, what will you need to know more about?

Generate an answerable question

Change your problem into a question

The nurses don’t allow the medical students to participate in deliveries → Why do nurses not involve clinical clerks in the labour and delivery room?

Our international graduates have problems talking to patients → In what ways do international medical graduates have trouble with patient communication?

Students are resistant to feedback about their OSCEs → How do students perceive feedback they receive from their OSCEs?
Ensure your question can be studied

- Too vague:
  What is the meaning of life?

- Too ambitious
  What is the best curriculum to train a professional physician for the 21st century?

- The PhD thesis
  How do methods of assessment of competence used in countries around the world reflect their history and culture?

- Reword, refocus, redefine your question as needed

Ringsted’s cycle of research

- Justifying
- Implementing
- Translational studies
- Predicting
- Modelling
- Explorative studies
- Conceptual/ theoretical framework

What is the nature of the problem?

- Justifying
- Implementing
- Translational studies
- Predicting
- Modelling
- Explorative studies
- Conceptual/ theoretical framework

Descriptive studies

- Description
  - Phenomenon, novel intervention, assessment method, administrative procedure, organisation, population of individuals

- Prevalence
  - High in young research disciplines – Medical Education and Emergency Medicine

- Characteristics
  - Reports with or without outcome data
  - Make no comparisons

What is qualitative research?

The goal of qualitative research is:
- the development of concepts which help us to understand social phenomena
- in natural (rather than experimental) settings
- giving emphasis to the meanings, experiences and views of all participants

Pope and Mays BMJ, 1995

Qualitative methods use language-based rather than numerically-based data
When to use qualitative research?

1. Preliminary to quantitative research
2. Supplemental (triangulation) to quantitative data
3. To explore complex phenomena not amenable to quantitative research

Qualitative and quantitative are not opposites

- Often artificially seen as opposing poles
- Different, but complementary ways of viewing similar phenomena

Eg. Diabetes and insulin compliance
- Quantitative study: What is the relationship between non-compliance (as measured by hemoglobin A1C) and disease progression?
- Qualitative study: Why are patients not compliant? How do they view disease progression? Do they see a relationship with compliance?

Qualitative methodology and method

Methodology
- Historical method
- Ethnography
- Phenomenology
- Discourse Analysis
- Grounded Theory

Method
- Interviews
- Focus Groups
- Case Studies
- Text Analysis
- Observation

Qualitative methodology and method

Method
- Naturalistic / Interpretive
  - Study phenomena in natural settings
  - Meanings participants bring to phenomena
- Specific to context studied
- Individuals’ values involved: participants’ & researchers’

Does it work in a lab?

Challenges with RCTs in education

- Samples
  - Size and representativeness
- Interventions
  - Definition of intervention and control circumstance
  - Standardisation of intervention
- Measurement
  - Identification of valid outcome measure
  - Appropriate measurement points
Measurement points

- Before measurement
  - The test might have an effect on learning in itself
  - The test might be remembered

- After measurement
  - Measurement immediate after intervention
  - Measurement after a pause, retention test
  - Measurement of transfer
    - Another, but similar task
    - A more complex task
    - Another context

Experimental design

- Learning is a sustainable change in capacity to perform
  - Measure retention and/or transfer
- Be aware of the testing-effect

Randomized design

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Other concerns about RCTs

- Ethics, blinding, and feasibility
  - Matched groups, ‘waitlist’ controls

- Validity
  - RCTs are the best design to find out if an intervention works
  - The worst design to find out who it works for and the long-term effects the intervention

Measurement

- Test-enhanced learning
  - Testing has an intrinsic effect on memory

- Effect of stress on learning and performance

Feedback and learning

- Training program: Vascular anastomosis, plastic model
  - Distributed over 1 week
  - Massed in 1 day

- Measurement points
  - Pre-test
  - Post-test
  - Retention 1 month after
  - Transfer, live animal

Does it work in “real” settings?

- Conceptual
  - Theoretical framework
  - Justifying
  - Implementing
  - Modelling
  - Predicting

- RCTs & Quasi-experimental studies
  - Cohort studies
  - Case-control
  - Associational
Observational studies

- Aims at predicting – effect, cause or consequence
  - Cohort studies
  - Case-control studies
  - Associational studies

Examples

- Tamblyn et al. JAMA 2007
  - Prospective cohort study
  - Scores on communication, decision-making predict complaints in later practice
- Draycott et al. BJOG 2006
  - Retrospective cohort study
  - Effect of training on neonatal outcome
  - Retrospective case-control study
  - Effect of ACLS training on performance standards

Case-control studies

- Study the cause or consequence of differences that already exist between or among groups

- Useful for studies where
  - Outcome is categorical
    - Yes/no or present/absent
  - Prevalence of outcome is low
  - Rarely observed phenomenon
  - Time delay until outcome is long
    - Years

Example: Case-control study

Wayman et al. Med Educ 2008

- RQ
  - Does PBL in medical school predict results of doctors’ performance reviews in practice?
- Design
  - Retrospective study of 1166 Canadian doctors’ performance reviews

Result

<table>
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<th>Concern</th>
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<td>+PBL 108</td>
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<tr>
<td>- PBL 857</td>
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Associational studies

- Aims at
  - Describing phenomena by identifying the degree of an existing relationship among variables
  - Clarify understanding and seek to predict a certain outcome

- However ....
  - Conceptual, theoretical framework is crucial to interpretation of cause and effect
Does it work in different settings?

Translational research  Sung JAMA 2003

- Political concern
  - Scientific discoveries fail to be translated efficiently into tangible human benefit
- Three translational blocks (biomedicine)

Effect studies

Practical clinical trials (PCT)  Tunis JAMA 2003

- Approach is based on a need to make decisions
- Select relevant alternative interventions to compare
- Include a diverse population of study participants
- Recruit participants from heterogeneous settings
- Collect data on a broad range of outcomes related to both persons and systems, including finances

Jump on and off wherever you like

- What KIND of approach to you want to use to address your research question?
- Think about the previous slides, and see if you can identify where in the cycle you wish to be
- Chat with your neighbour about your thoughts

Unearthing Assumptions
Where do your ideas come from?

- “It is known that..”
- “Everyone agrees that...”
- “Many studies have shown that...”
- “I believe that...”

Unearth your assumptions

What is the answer(s) to your question?
Write down what you think it might be (even if you are not sure - even if you just ‘suspect’ them to be true)
It’s OK to do this - really!

Bias
Perspective
Reflexivity

Making a commitment

Make a commitment

- You must make a commitment to yourself
- Write down your research question...somewhere
- Put it somewhere you will see everyday

Post it somewhere you can see it!
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References


References


