SOCQ 121

Foundations of Critical Enquiry

Session 6
Understanding Empirical Research

Social Sciences Department
Opening discussion question:

According to the Australian Bureau of statistics over 40% of the Australian population have an adequate (or above) level of health literacy.

How might your ability to conduct a well designed literature search increase your own level of health literacy?
Session overview

Understanding Empirical Research

1. Types of empirical research
2. An introduction to the research process
3. The stages in the research process
4. Scenario exercise
Types of Empirical Research
Empiricism

We discussed empiricism in week 2

In your own words - what is empiricism?
Empiricism

- the idea that all knowledge comes from experience
- we believe in what we can see or experience
- Remember also that empiricism is foundational in scientific and traditional knowledge
Empirical research methods

- Empirical methods are research methods in which data collection is undertaken in order to answer particular research questions.

- Researcher develops a theory to try to explain or predict real world events.

- The purpose of the research is to test the theory and possibly refine it.

- May be quantitative, qualitative or mixed.
Types of empirical research

There are many different types of empirical research e.g.
Experiments, surveys, case studies, historical data, discourse analysis, action research, clinical observation, observational research, longitudinal studies, cohort studies….

Research terminologies differ over time, in different settings and in different locations
Empirical Research: Experiments

- apply a treatment, measure results (before and/or after):
  - the only method that can demonstrate causal relationships between variables

- Experimental research is associated with the traditional scientific method
Empirical Research: Clinical Observation

• Used in a variety of methods e.g.
  • Cohort Studies
    • Incidence
    • Longitudinal
  • Case-Control Study
  • Cross-Sectional (Prevalence Study) Study
  • Case Series:
  • Case Report

• Provides empirical evidence but not as robust as RCT’s
Empirical Research

- Surveys
  - ask questions
    (face to face, via phone, mail, internet)

- Historical data
  - look for patterns in historical data
    (e.g. IT investment patterns)

- Discourse analysis
  - look for patterns in written material
    (e.g. media analysis)
Empirical Research

- **Case studies**
  - observations carried out in a real world setting
  - The researcher becomes immersed in the situation in order to gain a holistic understanding of the phenomena in its natural setting

- **Action Research**
  - Involves the application of a research idea or principle, or a particular practice and evaluates the results.
  - Research may be continually modified on the basis of ongoing results. (This is known as reflexivity.)
  - The aim is to achieve a particular outcome
Types of Non-Empirical Research

- Literature reviews
  - Secondary source

- Policy research
  - Researching policy documents including Acts of Parliament

- Traditional academic scholarship
  - Pulls together information from a wide range of sources
Types of Non-Empirical Research

• Conceptual or contemplative research
  • Arm chair research, deductive, what if?

• Futures methods
  • Forecasting, scanning

• Scenario Planning
  • Creating alternative likely futures. Can be used for policy writing, crisis planning…
Meta-Analysis

• A meta-analysis is a method combining empirical research studies to provide a more robust picture of the research results

• A meta-analysis is not empirical research, it is an analysis of existing research data or secondary sources

• Secondary or tertiary source
An Introduction to the Research Process
The Engaged Researcher

- Researchers start with an area of interest and research their topic in order to narrow down the focus until they come up with a specific research question.
- Researching is a creative process.
- A stereotype of the rational and disengaged scientist exists.
- However, scientists and researchers bring a variety of passions to their research practice.
- In practice research is limited by ethical issues and by funding and time constraints.
The Research Process

- Choose a research area

- Conduct a preliminary literature review

- Decide on a qualitative, quantitative or mixed method approach

- Design and plan the study
Writing Up the Research

The basic structure of research papers

- Abstract
- Introduction
- Results / analysis
- Conclusions

Note: not all papers comply to this basic format
Activity: Reading a Literature Review

Read your handout for this week:
“The Influence of Diet and Nutrients on Platelet Function”
by Bradley McEwen

1. What type of research is this?
2. What method has been used?
3. What are the key findings in the research?
4. Where does this kind of research sit on the evidence hierarchy?
5. Do you believe in the findings? – why/why not?
The Stages in the Research Process
Hypothesis
Research Papers: The Introduction

- Sets the scene for why the research is being done and the importance of the research.

- Should
  - Introduce the problem
  - Briefly review the literature and describe the current state of evidence, may include some historical information about the problem under investigation.
  - Lead through a rationale of why the research is important.
  - Conclude with a clear aim of this research.
Research Questions

Developed from:

• Existing theories
• Review and critical evaluation of existing research
• Clinical observation
• Seeking solutions for specific problems
• Original
  • something that has not been conceived previously or a modification to a previous study
A “Good” Research Question

1. **Simple** – easy to test
2. **Important** – useful to humanity
3. **Answerable**
4. **Original** - can be a subtle change

Is the question too broad or too narrow?

Questions should be →
- Specific enough to maintain focus
- Not so specific that there is limited information
Types of Research Questions

- Exploratory – asks “what is potentially happening”
- Descriptive - when have set factors measuring to see “what is actually happening”
- Explanatory – asks “why/how is it happening”
- Predictive – predicts an outcome
- Evaluative – asks “how effective is …”
Developing Research Questions

- Developing a research question is a process of narrowing down the field of study.

- Topic – broad area of interest
- Problem – concern within area of interest
- Question - specifics
- Hypothesis - prediction

An hypothesis is a research question converted into a statement regarding the expected/desired outcome.
Hypothesis

- A particular kind of formalised research question
- **Statement** developed by researcher which is then evaluated using the data collected

For example:
Research question: *Is the orange annoying?*
Hypothesis: *The orange is annoying.*
Hypothesis Testing

- The hypothesis \([H_1]\) is:
  The orange is annoying.

- The null hypothesis \([H_0]\) is:
  The orange is not annoying.

The null hypothesis \((H_0)\) is a hypothesis which the researcher tries to disprove (so clearly this researcher believes that the orange is annoying)
Exercise

Watch the following video:

2 min., https://www.youtube.com/watch?v=kpOqrKsXO1k

How many people in the class think the annoying orange is annoying?
(Our hypothesis)

How many people think it is not annoying?
(The null hypothesis)
Hypothesis testing example

- The hypothesis \([H_1]\) is that the annoying orange is annoying
- The null hypothesis \([H_0]\) is that the annoying orange is not annoying
- The null hypothesis \((H_0)\) is a hypothesis which the researcher tries to disprove

If more people think the annoying orange is annoying then we have disproved our null hypothesis. We have results that support the hypothesis.

If more people think it is funny then we have not disproved our null hypothesis. We do not have results that support the hypothesis.
Variables

Measureable ‘things” that change

- Independent variable
  - Is the variable that is *manipulated* or changed by the researchers
e.g. patients are given fish oil

- Dependent variable
  - Is the variable that is observed and *measured* for changes
e.g. fish oil measurably improves health outcomes

The hypothesis is a statement of the relationship between these two variables.
A Good Hypothesis

- **Explains** or accounts for a set of observations.

- Can be **tested** by further investigation
  - Measurable statement of a relationship between variables
  - The dependent variable is the variable that is being measured in an experiment
The Basic Research Process

Hypothesis predicts the result when a test is performed.

- State hypothesis (orange is annoying)
- Test hypothesis (is it annoying?)
- Collect and analyse data for evidence
- Results support or disprove the hypothesis
- Results are fed into a theory
Hypothesis: Supportive Evidence

If results support the hypothesis does that mean it is true?

- Remember: Many different hypotheses can predict the same outcome of a particular test.
  - We always need to consider other possible explanations.

- This is why we say that an hypothesis can only be supported or not supported, **never proven**.
Scenario: Developing Research Question

Imagine that you’ve received $1 million research grant...

You have been asked to plan a research on the effectiveness of one of the complementary medicine treatments.
Scenario Questions

1. In class brainstorm a number of topics or ideas that you might research.

2. Did you come up with any topics that you think would be particularly difficult to research?

3. Each student should decide on one topic. Justify your choice.

4. Develop a research question based on your chosen topics.

5. Develop $H_0$ and $H_1$ for your research.

6. Thinking about the research question you have chosen, what type of research strategy would you choose: qualitative, quantitative, or mixed methods?
You should now:

- Have a good general overview of different kinds of empirical research

- Understand the stages in the research process

- Understand what a hypothesis is and how to test it
Next Session

**Topic**: how to write a literature review

Next week discussion forum will relate directly to assessments three and four.

**Preparation for next session**: Now it is the time to ask questions!

- Ensure you know how to research, paraphrase, and reference and when it is appropriate to quote.
- Check if you are sure of your research topic, can you find enough information and sources, or is there too much of them?

**Don’t’ leave things to the last minute** and remember your lecturers, online tutors, library and student administration staff are all here to help!
Discussion Forum question
session 7

Please post your answers in discussions forum for session 7 on LMS. Due date for this post is 11.55 pm on Sunday following session 7.

- Post on the Discussion Forum:
  - Brief explanation on the research topic you have chosen in a scenario exercise (1-2 sentences),
  - A research question based on your chosen topics (1 sentence),
  - $H_0$ and $H_1$ for your research (2 sentences).
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