Collecting the Evidence - an Introduction to Research Methods and Methodologies

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Background

HEA-ICS exercise in 2005/6

Providing resources to help colleagues **get started** in doing education research

Deliverable – web resource

- Basic pedagogic guidance
- Survey of conferences and journals

Science vs. Social Science

Science contains formal theory

Science uses “The Scientific Method”

Social Science is supported by theory

Social Science uses many “methodologies”

Education as a Social Science

Wide body of literature

Large spread of theoretical support

see tip.psychology.org

Bloom, Vygotsky, Skinner, Bruner, ...

Behaviourism, Constructivism, ...

Links with psychology, sociology, ...

Role of Theory in Education

Tight (2004) - “Research into Higher Education: an A-theoretical Community of Practice?”

17 HE journals (excl. North America)

406 articles

“Degree of theoretical engagement”

- Explicit / some / none

Theoretical Engagement?

25.6% of all articles *made explicit use of theory*

16.3% of all articles gave *evidence of theory*

58.1% of all articles were *wholly a-theoretical*

So ... there's a strong practical focus

Data

Education research in science is data-centric

We collect and analyse data to support (or refute) hypotheses

Qualitative vs. quantitative data

Methodologies

How we collect and analyse our data in order to answer research question

Lots of different approaches (and fancy names!)

Many research activities contain combinations of different methodologies, to provide a “portfolio” of evidence

I'll tell you about some relevant methodologies

Data Collection

Interviews
Observations
Questionnaires
Surveys
Tests
Focus Groups
Social Artefacts

Validity

Internal - In the specific instance under consideration, and with a given data set, is the conclusion sensible and repeatable? Has an appropriate methodology been correctly followed? This is essential

External - Do the results generalise to other instances and variations of data sets which might be encountered? That is, does the result relate to a wider phenomenon in the “real world”? This is desirable

Reliability

A result is reliable — or replicable — if it can be repeated with a similar data set and yield a similar outcome; the expectation of a good research result is that it would be reliable

This is also desirable, but not always possible

Ethics

You can't easily experiment on people (such as students)

Ethics Committees must give approval

Example – split class into two groups A and B with A as control group, B given novel approach, compare outcomes

Quantitative Methodologies

1. Descriptive
2. Causal Comparative
3. Correlational
4. Experiments
5. Quasi-experiments
6. Ex Post Facto

May use statistics (and tools such as SPSS)

1. Descriptive

Describes phenomena based on data collected by a variety of means (but does not address causes of those phenomena)

Good for large-scale studies

Example - What methods are employed for teaching Newtonian mechanics in UK universities?

2. Causal Comparative

The “independent variable” (for which the researcher wishes to find the cause) has already been set, and is not under the control of the researcher

Example - It is suggested that first year students who have taken a “gap year” perform better in their first year assessments and examinations than students who have not. Is this true, and what are the reasons for it?

3. Correlational Research

This is an *exploratory* technique for finding associations between variables, *in order to formulate hypotheses* (which can then be tested later)

Example - It is conjectured that a student's progress during the first year of the course is associated with the science grades achieved at school. Is this worth investigating further?

4. Experiments

Experiments yield explicit concrete evidence which can be used to support (or refute) an hypothesis, and can be replicated

In an experiment, we seek to establish cause and effect, by identifying and measuring *independent* and *dependent* variables

Example - A new tool for comparing document similarity is used to detect instances of plagiarism; how effective is it?

5. Quasi-Experiments

In a quasi-experiment, we merely find *indicators* of what *might* be cause and effect

Example - testing the efficacy of a new learning tool or method, since the exercise depends on the students and the learning material

6. Ex Post Facto

The “independent variables” have already taken place, and the researcher is performing a “pseudo-experiment”

Like police detective work

Qualitative Approaches

Qualitative approaches are based on a relativist philosophy which holds that reality can only be defined subjectively; observations can never be fully objective but are always interpreted by the observer

Anything except numbers (e.g. words, actions)

Qualitative Methodologies

1. Ethnographic research
2. Phenomenographic research
3. Grounded Theory
4. Narrative research and discourse analysis
5. Case studies
6. Action Research

1. Ethnographic Research

Ethnography (or “cultural anthropology” or “naturalistic enquiry”) relates to the study of sociocultural phenomena, and may be descriptive or analytic.

Data collection typically via interviews.

2. Phenomenographic Research

Phenomenography involves the study and interpretation of other peoples' experiences, perceptions of, and understandings of specific phenomena. The data used are subjective and qualitative.

3. Grounded Theory

Grounded Theory research uses repeated stages of data collection (usually interviews) to obtain views from the study participants; theory is generated from the data, and this is tested and refined through iterations of the data collection process

4. Narrative Research and Discourse Analysis

Narrative research is used to study individuals by asking them to provide stories about their lives

The narrative is then given a structure by the researcher so that the final research provides a blended narrative combining the input of both participant and researcher

5. Case Studies

A case study may be exploratory (piloting further research), descriptive (narrative), or explanatory (testing theories)

Difficult to reproduce, but easy to perform

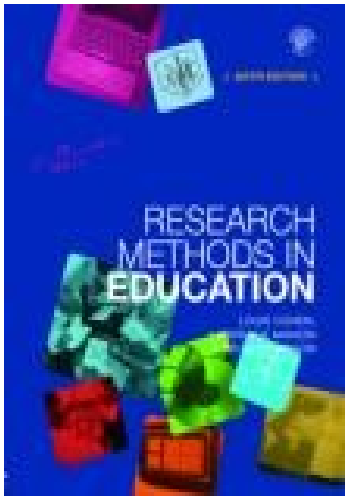
6. Action Research

1. Planning
2. Action
3. Observation
4. Reflection

This is perhaps the “softest” research methodology in use, and one which not all practitioners consider to be valid

Finally ...

Cohen, Manion and Morrison (2007)
Research Methods in Education (6/e)
London: Routledge Falmer



www.ics.heacademy.ac.uk/
resources/pedagogical/cs_research/