Educational Research:
How to set up experiments in your classroom and write a publication about it

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Agenda
- Scholarship of teaching
- Mixed methods Research design
- Selection and operationalization of variables
- Qualitative Research methods

Time table

<table>
<thead>
<tr>
<th>Approximate Time</th>
<th>Topic</th>
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</thead>
<tbody>
<tr>
<td>9.00</td>
<td>Opening and Introduction:</td>
</tr>
<tr>
<td>10.15</td>
<td>Presentation: Scholarship of Teaching and Classroom Research</td>
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<tr>
<td>11.00</td>
<td>Break</td>
</tr>
<tr>
<td>11.15</td>
<td>Assignment: Formulating research questions</td>
</tr>
<tr>
<td>12.30</td>
<td>Lunch break</td>
</tr>
<tr>
<td>14.00</td>
<td>Assignment: Applied research in higher education</td>
</tr>
<tr>
<td>14.30</td>
<td>Presentations: Design of a classroom experiment</td>
</tr>
<tr>
<td>15.30</td>
<td>Discussion: Publishing educational research</td>
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<tr>
<td>16.00</td>
<td>Conclusion</td>
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The relationship between teaching and research

The first doctor
Thomas Aquinas
Bologna, Italy, thirteenth century

Scholarship of Teaching
Ernest Boyer, 1990

Teaching and Research

- Teachers at a University are researchers in their own discipline
- Their conception of research methodology is determined by their own discipline
- Research on Teaching and Learning is related to social sciences like Psychology and Pedagogy
- In order to do this kind of research the methodological rules from these branches of science must be understood
In Germany
Hochschuldidaktik University of Stuttgart
https://www.uni-stuttgart.de/hd/hochschuldidaktik/scholarship/index.html

Classroom research
• Start with a research question
• Is there other research on this topic?
• What kind of data can you use to answer your question?

Comparatively small numbers, so qualitative or mixed-methods research is usually most appropriate.

Creswell’s frame for research design

Philosophical worldviews

RESEARCH DESIGNS
Qualitative
Quantitative
Mixed methods

Strategies of Inquiry

Research methods

Strategies of inquiry

Quantitative
• Experimental design
• Non-experimental designs
  • Questionnaires
  • Statistics

Qualitative
• Discourse analysis
• Ethnographic or naturalistic research
• Phenomenography
• Narratives
• Case study
• Action research

Mixed methods
• Sequential
• Concurrent
• Transformative

Methods - examples

Quantitative
Questionnaires
Test
Interview
Observation
Document analysis

Qualitative
Interview
Observation
Document analysis

Research Design
Quantitative methods
• Measurements aiming to confirm or reject hypothesis using statistics

Qualitative methods
• Descriptions of unique events or scales reflecting subjective impressions

Mixed methods
• The best of both worlds, but beware of… mixed up methods

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### Phases in a research project

<table>
<thead>
<tr>
<th>Phase</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Problem definition</td>
<td>research question &amp; hypothesis</td>
</tr>
<tr>
<td>2. Research design</td>
<td>definition of the variables</td>
</tr>
<tr>
<td>3. Instrumentalisation</td>
<td>choice of instruments</td>
</tr>
<tr>
<td>4. Data gathering</td>
<td>experiment, fieldwork</td>
</tr>
<tr>
<td>5. Data processing</td>
<td>analysis</td>
</tr>
<tr>
<td>6. Interpretation</td>
<td>evaluation &amp; report</td>
</tr>
</tbody>
</table>

### Qualitative Research methodologies

**Methodology**: Overview composed by Ron Ulseth, based on Case and Light (2011) and Crotty (1988), including all of the methods listed in the Sage Encyclopedia of Social Science Research Methods (Sandelowski, 2004).

#### Qualitative Research methodologies

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Grounded theory</td>
<td>Data from the research study is used to establish new theory through identifying patterns and processes. Can be used to challenge preconceptions and allows for new developments.</td>
</tr>
<tr>
<td>Ethnography</td>
<td>Characterization of people and cultures through close observation, often through immersion in the culture. Data collected through observations, structured interviews, unstructured conversations, etc.</td>
</tr>
<tr>
<td>Action research</td>
<td>Dual focus on doing research while continuously improving the practice being studied. Defined by collaboration and community involvement.</td>
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<td>Phenomenography</td>
<td>Characterization of the different ways in which people experience or think about a phenomenon. Outcomes include the distinct categories of the differing experiences.</td>
</tr>
<tr>
<td>Case study</td>
<td>Analysis of a single case of a phenomenon. Includes connecting that case to the specific, unique circumstances in which the case is set.</td>
</tr>
<tr>
<td>Discourse analysis</td>
<td>Analysis of the language used in the wide variety of communications (verbal, written, graphic, numeric) between people.</td>
</tr>
<tr>
<td>Narrative analysis</td>
<td>Study of how people make sense of a phenomenon by analysing the stories or narratives they use to describe it.</td>
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<tr>
<td>Phenomenological research</td>
<td>Study of how people experience a phenomenon without evaluating the experience or explaining why it happens. Contrasts with phenomenography in that phenomenography seeks differences between individuals.</td>
</tr>
<tr>
<td>Heuristic inquiry</td>
<td>Study in phenomenological approach that looks specifically at the individual experience of the researcher.</td>
</tr>
<tr>
<td>Design-based research</td>
<td>A methodology that integrates the dual purpose of design of new educational methods with research on the implementation. Mixed methods are often used in data collection.</td>
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Any questions left unanswered ????