Introduction to Research Method in Master projects

Bendik Bygstad
August 14, 2020

Professor IFI, UiO
Professor II NHH
Program director
Digital Economy and Management
Aims of lecture

1. Understand what is scientific method
2. Get an overview of available research methods in informatics field
3. To be able to identify a research field, and find relevant research articles
Scientific method

Science as **knowledge derived from the facts of experience** (not religion, state authority, classic texts, popular wisdom etc.)

Aristotle  
Descartes  
Newton

Bygstad 2020
Theories and Reality: Induction and deduction
## Scientific models in Informatics

<table>
<thead>
<tr>
<th>Scientific origins</th>
<th>Aim</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural science</td>
<td>Discover laws of nature (and mathematics)</td>
<td>Algorithm testing and verification</td>
</tr>
<tr>
<td>Social science</td>
<td>Discover laws/patterns of human behaviour</td>
<td>Survey</td>
</tr>
<tr>
<td>Design science</td>
<td>Creating and assessing artifacts</td>
<td>Participatory design</td>
</tr>
</tbody>
</table>
# Methods Pluralism in Informatics

<table>
<thead>
<tr>
<th>Mode of inquiry/</th>
<th>1. Investigation</th>
<th>2. Intervention</th>
<th>3. Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
<td></td>
</tr>
</tbody>
</table>
# Methods Pluralism in Informatics

<table>
<thead>
<tr>
<th>Mode of inquiry Scientific model</th>
<th>1. Investigation</th>
<th>2. Intervention</th>
<th>3. Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discover laws of nature (and mathematics)</td>
<td>Hypothesis testing Verification Simulation</td>
<td>Experiment</td>
<td>HW design Software engineering</td>
</tr>
<tr>
<td>Discover laws and patterns of human behaviour</td>
<td>Case study Survey Ethnography</td>
<td>Action research</td>
<td>Socio-technical design, HCI</td>
</tr>
<tr>
<td>Creating and assessing artifacts</td>
<td>IS evaluation</td>
<td>Participatory design/Action design research</td>
<td>Software engineering Design research</td>
</tr>
</tbody>
</table>

Bygstad 2020
## Some recent Master projects

<table>
<thead>
<tr>
<th>Title</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Predicting Stock Markets with Neural Networks”</td>
<td>Hypothesis testing</td>
</tr>
<tr>
<td>“Developing Mobile Health Information Systems for the Global South: Development of an emerging Android platform”</td>
<td>Action Research (Design oriented)</td>
</tr>
<tr>
<td>“Cultivating local champions for mentoring colleagues through integrated e-learning within District Health Information System: A quasi field experiment in Malawi”</td>
<td>Case study (and experiment)</td>
</tr>
<tr>
<td>Design of a wall-climbing robot system</td>
<td>Algorithm testing</td>
</tr>
<tr>
<td>Efficient SOAP messaging for Android</td>
<td>Software engineering</td>
</tr>
</tbody>
</table>
Go to Menti.com
Code: 66 20 36 1
or
https://www.menti.com/2ndsoqppqm6

Question: What kind of researcher are you?
• Fact oriented
• Interpretation oriented
• Design oriented

Results:
https://www.mentimeter.com/s/9a5f1b97a291ae23cac0aa5efcbfa8a9
How do I find relevant research articles?

1. **Identify your research field**
   A research field is a body of knowledge that grows accumulatively in a research community (sometimes defined formally, sometimes not).
   *Examples*: Machine learning, interaction design, platform ecosystems

2. **Identify the key contributions in the research field (peer reviewed)**
   Which contributions are most cited? Use Google Scholar or scientific databases through UiO Library

3. **Identify articles that are particularly relevant for my project**
   Use research field and keywords
   *Example*: platform ecosystems + »boundary resources»
   Use research field and your chosen method
   *Example*: platform ecosystems + case study
Exercise 2

1. Define your research field
2. Find key contributions
   https://scholar.google.com

Go to www.menti.com
Good luck with your Master project!

Start thinking about it now!