WRITING IN THE DISCIPLINE AND REPRODUCIBLE METHODS

A process-oriented approach to teaching empirical undergraduate economics research

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Motivation

- Learning to “think like an economist” means... 
  
  “*doing economics*”  

- Economic research has become increasingly empirical (Angrist et al. 2017; Hamermesh 2013)

- Authors of research involving statistical analysis have an ethical responsibility to
  
  - “promote sharing of data and methods” and “make documentation suitable for replicate analyses” available (ASA, 2016, p. 7)
Quantitative research papers are the best way to enhance student learning of economics (Simpson and Carroll 1999)

Writing assignments improve student learning*

While 70% of economics departments have formal writing requirements, only
- 15% offer courses dedicated to the research process
- 10% offer ‘research methods’ courses**

*Dynan and Cate (2008); Greenlaw (2003)
** McGoldrick (2008)
Learning Objectives

Goal: • Be able to conduct applied empirical research

- Students should be able to demonstrate:
  (1) an understanding of Stata syntax, data management skills, and best coding and documentation practices for reproducibility;
  (2) the ability to place a research question in the context of existing scholarly discourse through an effective literature review; and
  (3) an understanding of the necessary components of a well-written empirical research paper and the economics discipline formatting and style conventions.

- The emphasis here is on “doing”
Project Structure

■ Sequencing and reproducibility facilitate intentionality and reflection
  - Slow students down (in a good way)

■ Detailed prompts at each phase are necessary
  - but yes, time consuming  
  - high fixed cost, but lower marginal cost  
  - that’s why we’re doing this; our materials are open access and adaptable!
Pedagogical Rationale

■ Students tend to focus too much on the “product”
■ By redirecting their focus to the “process” we can improve the “product”
■ Students learn to treat research and writing as a recursive process
  – a tool of discovery

■ We do this in two ways:
  – Sequencing with detailed prompts
  – Requiring replication documentation
Replication Documentation

Adapted from the TIER Protocol, developed by Project TIER: http://www.projecttier.org/tier-protocol/.
# Project Structure

<table>
<thead>
<tr>
<th>Week</th>
<th>Replication Documentation Tasks</th>
<th>Writing Tasks</th>
<th>Hansen (2001) Proficiencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td><strong>Preliminary Data Documentation</strong>&lt;br&gt;establish folder structure</td>
<td><strong>Annotated Bibliography</strong> &amp; Research Question</td>
<td>Access existing knowledge; interpret existing knowledge.</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td><strong>Proposal</strong>&lt;br&gt;2 pages</td>
<td>Access existing knowledge; display command of existing knowledge; interpret existing knowledge.</td>
</tr>
<tr>
<td>8</td>
<td><strong>Metadata Guide &amp; Data Collection</strong>&lt;br&gt;original, importable, and base data; processing do-file</td>
<td><strong>Literature Review</strong>&lt;br&gt;3 – 4 pages</td>
<td>Access existing knowledge; interpret and manipulate economic data.</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td><strong>Data &amp; Methods</strong>&lt;br&gt;3 – 5 pages</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td><strong>Data Construction &amp; Summary</strong>&lt;br&gt;analysis data; construction do-file</td>
<td><strong>Results &amp; Discussion</strong>&lt;br&gt;3 – 6 pages</td>
<td>Interpret existing knowledge; interpret and manipulate economic data.</td>
</tr>
<tr>
<td>14</td>
<td><strong>Data Analysis</strong>&lt;br&gt;analysis do-file</td>
<td></td>
<td>Display command of existing knowledge; interpret existing knowledge; apply existing knowledge.</td>
</tr>
<tr>
<td>16</td>
<td><strong>Final Project Folder</strong>&lt;br&gt;final paper (20 page maximum); ReadMe file; complete replication files</td>
<td></td>
<td>Apply existing knowledge; create new knowledge.</td>
</tr>
</tbody>
</table>
Define/Refine Research Question

- Define Data
- Find Data
- Process Data

Specify/Evolve Thesis Statement

- Specify Empirical Model
- Specify Theoretical Model

Motivate Topic
- Evaluate Sources

- Find Sources
- Write Literature Review

Test Hypotheses
Discuss Results
Interpret Results

- Estimate Final Model

Compile Final Replication Documentation
- Compile Final Paper
## Evaluation and Assessment

### Point Distribution

<table>
<thead>
<tr>
<th>Task</th>
<th>Percentage of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Paper</td>
<td>45% (of course grade)</td>
</tr>
<tr>
<td>Research Question and Annotated Bibliography</td>
<td>10% (of project grade)</td>
</tr>
<tr>
<td>Proposal</td>
<td>10% (of project grade)</td>
</tr>
<tr>
<td>Data Collection and Metadata Guide*</td>
<td>15% (of project grade)</td>
</tr>
<tr>
<td>Literature Review</td>
<td>15% (of project grade)</td>
</tr>
<tr>
<td>Data and Methods*</td>
<td>15% (of project grade)</td>
</tr>
<tr>
<td>Results and Discussion*</td>
<td>15% (of project grade)</td>
</tr>
<tr>
<td>Research Paper Compilation and Replication Documentation*</td>
<td>20% (of project grade)</td>
</tr>
</tbody>
</table>

*denotes that data (.xlsx or .dta) files and/or command (.do) files are due at this stage also.
Evaluation and Assessment

- Align objectives, assessments and instructional strategies (Ambrose et al. 2010)
  - Feedback must be coordinated with the “practice” activities
  - Goals stated in the prompts shape our targeted feedback

- Rubrics guide targeted feedback
Final Thoughts

- Our adaptable prompts and rubrics are available online (but are password protected) so please email me for access...

- A published version (*Journal of Economic Education*) of this paper is available [here](#).

- Questions? email us!
  - marshaem@dickinson.edu
  - underwoa@dickinson.edu
BONUS SLIDES

(MORE ON PEDAGOGY)
Students and instructors are typically at different stages in the development of mastery (Ambrose et al. 2010)

- Students don’t know what they don’t know
- Instructors don’t know what they do know

**Expert Blind Spot**
The Expert Blind Spot

- We often develop expectations of autonomy that:
  - surpass the cognitive load and
  - exceed prior knowledge constraints of students

- The likely results are that students:
  - miss vital information
  - make unnecessary mistakes
  - function inefficiently