Pathways for Assessing Interdisciplinarity

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Workshop on the Implications of Convergence for How NCSES Measures the Science and Engineering Workforce

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A note on vocabulary

• Interdisciplinarity = “interdisciplinarity”
  (including elements in common with “transdisciplinarity”)

• Convergence = a kind of “inter- or transdisciplinarity”

• Assessment = an empirical summary of important characteristics

• Measure = a unit of empirical observation (qual or quant)
Every assessment design is a series of choices—an assessment pathway.
a. Assessment Pathway Framework

- Context & Goals
- Intended Output
- Criteria
- Standards
  - Units of Observation
    - Phase
    - Scale
  - Units of Analysis
    - Phase
    - Scale
- Measures
- Analysis methods
- Aggregation methods
- Evaluative Judgment Methods
- Evaluative Judgment
These choices determine how one navigates the complex landscape of interdisciplinarity assessment.
We mapped all pathways in the ID assessment landscape published between 2000-2019.
So

What?

!!
1. Decide to Monitor or Evaluate

or

AND DECLARE THIS INTENTION.
Assessment = Monitoring + Evaluating
Assessment = Monitoring + Evaluating

Description
(No Value Judgment)
Assessment = Monitoring + Evaluating

Description (No Value Judgment)

Diagnosis (Value Judgment)
Assessment = Monitoring + Evaluating

Description (No Value Judgment)
"Results are ###ABC."

Diagnosis (Value Judgment)
"Results are high quality."
Assessment = Monitoring + Evaluating

Description
(No Value Judgment)
"Results are ###ABC."

Diagnosis
(Value Judgment)
"Results are high quality."

Action!
2. USE RIGOROUS EVALUATIVE REASONING TO AVOID DEAD ENDS.
Assessment = Monitoring + Evaluating

Description (No Value Judgment)
"Results are ###ABC."

Diagnosis (Value Judgment)
"Results are high quality."

Action!
Assessment = Monitoring + Evaluating

Description (No Value Judgment)
"Results are ###ABC."

Diagnosis (Value Judgment)
"Results are high quality."

Action!
RIGOROUS EVALUATIVE REASONING

*at minimum*

Premise 1: ”Results are ###ABC.”

Conclusion: “Therefore, these results are high quality.”
Rigorous Evaluative Reasoning

at minimum

Premise 1: ”Results are ###ABC.”

missing link

Conclusion: “Therefore, these results are high quality.”
Premise 1: ”Results are ###ABC.”  
Premise 2: “ABC is high quality.”  
Conclusion: “Therefore, these results are high quality.”

- Accurately measured criterion
- Explicit standard for criterion
- Clear evaluative judgment
At least 83% of pathways aiming to evaluate did not include all minimum elements required for rigorous evaluative reasoning.
The vast majority of pathways **ended** before reaching a clear evaluative judgment. It was most common to stop with **analysis**.

<table>
<thead>
<tr>
<th>Progress down Evaluation Pathway</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Setting</td>
<td>0</td>
</tr>
<tr>
<td>Intended Output</td>
<td>0</td>
</tr>
<tr>
<td>Author-stated Criterion</td>
<td>0</td>
</tr>
<tr>
<td>Unit of Observation</td>
<td>0</td>
</tr>
<tr>
<td>Unit of Analysis</td>
<td>0</td>
</tr>
<tr>
<td>Author-stated Standard</td>
<td>2</td>
</tr>
<tr>
<td>Author-stated Measure(s)</td>
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<tr>
<td><strong>Analysis Method</strong></td>
<td>328</td>
</tr>
<tr>
<td>Aggregation Method</td>
<td>260</td>
</tr>
<tr>
<td><strong>Unclear Evaluative Judgment</strong></td>
<td>81</td>
</tr>
<tr>
<td><strong>Evaluative Judgment</strong></td>
<td>281</td>
</tr>
</tbody>
</table>
3. Mix Methods to Keep Both Eyes Open
Over 80% use either quant or qual methods, but quant dominates. Only 10% used mixed methods.
Over a third didn’t describe how they used multiple measures to support their judgment. And 6% based evaluative judgments on a single measure.
Exemplar: Rubrics

<table>
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<tr>
<th>Criteria</th>
<th>Standards (as observable measures)</th>
<th>Performance Levels</th>
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- Rubrics
- Standards
- Performance Levels
- Criteria
- Observation Measures
### Exemplar: Rubrics

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- Exemplar: Rubrics
- Standards
- Performance Levels
- Criteria
- As observable measures
## Exemplar: Rubrics

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4. Use our dataset to find criteria, standards, measures, methods, & entire approaches that are appropriate for convergence.
Systematic review of the literature assessing interdisciplinarity from 2000 to 2019


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1. Decide to monitor or evaluate, and declare this intention.

2. Use rigorous evaluative reasoning to avoid dead ends.

3. Mix methods to keep both eyes open.

4. Use our dataset to find criteria, standards, measures, methods, & entire approaches that are appropriate for convergence.
Evaluation basics are **missing**.
Choose, explain, & follow your assessment pathway clearly and carefully.
Let's talk!

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Watch email for your handout!