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Student Achievement and CTE

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Bottom Line

1. Important to distinguish between actual student achievement (ASA) and measured student achievement (MSA)

2. There seems to be a tendency to divide students as academically talented or not. Besides being divisive, this may be meaningless because it is tautological

3. How should policymakers and educators evaluate a tradeoff, if it exists, between MSA and economic outcomes?
For purposes of this talk, let’s call student achievement as \textit{level}, and learning as \textit{change}.
Q: Why emphasis on MSA when ASA determines economic outcomes?
Answer Given by Policymakers

1. MSA correlated with learning

2. MSA correlated with ASA
What Explains ASA?

Actual Student Achievement (Productive) Skills/Knowledge at end of 12th grade

Policy “levers”
- Instruction
  -- quality
  -- place
  -- methods
- Curriculum
- Facilities/equipment

Student controls
- Course selection
- Learning style
- Effort
- Incentives
- Resources

Actual Student Achievement (Productive) Skills/Knowledge at end of 8th grade
Legitimate Research/Policy Question

How do CTE curriculum, instruction, and resources affect MSA?
What is known? (NAVE)

NAEP data:

1. \( \text{MSA}_{\text{non-concentrators}} > \text{MSA}_{\text{concentrators}} \)
   -- Math (1990, 2000)
   -- Reading (1994, 1998)

2. \( \text{Learning}_{\text{concentrators}} > \text{Learning}_{\text{non-concentrators}} \)
   -- Math (1990 \to 2000)
   -- Reading (1994 \to 1998)

re: pt. 2 – NAVE suggests CTE “attracting relatively more academically talented students during the 1990s.” (p. 96, fn. 41)

Question: Aren’t “relatively more academically talented students” defined as doing well in MSA?
## What is known (NAVE): Other Outcomes?

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Effect</th>
<th>Research Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic achievement</td>
<td>0</td>
<td>Consistent</td>
</tr>
<tr>
<td>HS completion</td>
<td>0/+</td>
<td>Mixed</td>
</tr>
<tr>
<td>PS enrollment short-run</td>
<td>−/0</td>
<td>Mixed</td>
</tr>
<tr>
<td>PS enrollment medium-run</td>
<td>0</td>
<td>One study</td>
</tr>
<tr>
<td>PS completion 4-year degree</td>
<td>0</td>
<td>One study</td>
</tr>
<tr>
<td>Short- and medium-run earnings</td>
<td>+</td>
<td>Consistent</td>
</tr>
</tbody>
</table>

(Table 1, Table 2.35, Table 6.1 – sources cited there.)
How Should Policymakers/Program Administrators Use Studies/Data?

6 Principles from Upjohn Institute SWP 04-103

**Principle #1** – In making decisions, consider “costs” of Type I and Type II error.

Type I: Rejecting a true null.
Type II: Accepting a false null.
Principle #2 – Insist on multiple answers (including qualitative, impressionistic data); don’t base high stakes decisions on single study.

Principle #3 – (Equivalent to) Attribution is best when you have a good comparison group.

Principle #4 – Apply “smell” test – are results believable?
6 Principles from Upjohn Institute SWP 04-103 (Continued)

**Principle #5** – Insist on measures of statistical uncertainty.

**Principle #6** – When you have multiple answers, stability is probably good, but must be assessed carefully.
Conclusions

1. **Cost of Type II error >> Cost of Type I error**

   $H_0$: CTE students will be better off with more academic rigor in courses

   **Type I:** This is true, but you reject it based on economic outcomes – status quo continues

   **Type II:** This is not true, but you accept it. You invest in new curriculum and professional development.

   Therefore: We need much higher burden of proof for accepting the null.
2. Argument for emphasis on MSA seems to have empirical inconsistency.

But can’t be complacent, because economic outcomes are short-run.
Conclusions (Continued)

3. As much as practicable, need to move standardized assessments toward authentic assessment.

Hypothesis: Current assessments may be biased against learning styles that do well with CTE pedagogy.
Conclusions  (Continued)

4. Need careful statistical analyses of state assessment data and “black box” studies of CTE to determine what are best practices.