Accounting for Co-Teaching

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Using Student Test Scores to Measure Teacher Performance: The State of the Art in Research and Practice

East Lansing, Michigan

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Need Method for Co-Teaching

- **Roster-confirmed data reveals co-teaching**
  - Battelle for Kids (2009, 2013)
  - Value Added Research Center (2011)
  - Mathematica Policy Research (2011, 2012, 2013)

Year (DC Value Added)	Math		Reading	
	Some Students Shared	All Students Shared	Some Students Shared	All Students Shared
2010–2011	28.7%	9.0%	40.3%	12.6%
2011–2012	22.8%	8.1%	34.9%	11.9%
2012–2013	26.2%	14.8%	40.9%	16.3%

Three Basic Methods for Co-Teaching

- Assign each teacher a "dosage" = percent of instructional time spent with student
- Three approaches to using dosage
  - Partial credit method
  - Teacher team method
  - Full roster method/full roster-plus method
- All methods use teacher fixed effects

All Methods Used in DC Value Added

Year	Teacher Model	School Model
2009–2010	Teacher team	Partial credit
2010–2011	Full roster	Partial credit
2011–2012	Full roster	Partial credit
2012–2013	Full roster-plus	n.a.
2013–2014*	Full roster-plus	n.a.

n.a. = not applicable

*Planned

Partial Credit Method

Students
A alone
Shared by A and B
B alone

- Teachers' estimates inform one another
- Teachers receive credit individually
- Some estimates may be statistically unreliable

Teacher Team Method

Students	A's measure	B's measure	AB measure
A alone	1	0	0
Shared by A and B	0	0	1
B alone	0	1	0

- Assume distinct effect of team
- Form team measures when possible
- Combine multiple estimates using student-weighted average

Full Roster and Full Roster-Plus Methods

Students	A's measure	B's measure
A alone	1	0
Shared by A and B	1	0
B alone	0	1
Shared by A and B	0	1

- Equal credit for shared students (team)

Three Basic Methods, but Only One Practical

- **Partial credit: Works for schools, not teachers**
- **Teacher team**
  - **Requires complicated algorithm to determine possible teaming arrangements**
  - **Some students get de-linked from teachers**
- **Full roster/full roster-plus**
  - **Empirically nearly identical to teacher team method**
  - **More practical**
  - **All roster-confirmed students stay with teacher**

Variations of Full Roster Method

- **District policymakers choose (for full-time students)**
  1. **Same dosage, no matter how many courses**
  2. **Same dosage per teacher, no matter how many courses**
  3. **Same dosage per course-teacher combination**
- **Advantages of options 2-3**
  - **More robust to data errors in roster confirmation**
  - **Incentivize teachers to treat students equally**

Full Roster Method Can Lead to Dilemma

- **100 percent dosage for co-taught students with each teacher preserves incentives for each teacher**

  BUT…

- **Students contribute differently to calculation of student coefficients**
  - **Gives co-taught students extra weight in regression**
  - **Gives schools with co-taught students extra weight**

Full Roster-Plus Resolves Dilemma

- **Goal: Preserve relative weights within teacher but obtain equal weight across students**
- **Full roster-plus same as full roster method plus shadow teachers**
  - **Shadow teachers for each teacher**
  - **Estimate model with extra fixed effects (teachers plus shadow-teachers)**
- **Example**
  - **Maximum student dosage (any students) = 400%**
  - **Teacher-student dosage (Ms. Jones & Kareem) = 50%**
  - **Shadow teacher-student dosage (Shadow Ms. Jones & Kareem) = 350%**

Full Roster-Plus Method Empirically Similar to Full Roster Method

- Compare value-added estimates under two methods
- DCPS value-added data, 2010–2011
- Correlation in math: 0.99994
- Correlation in reading: 0.99999

It's a District Decision

- Challenging to attribute co-teaching separately
- Full roster practical solution if district ok with equal credit
- District must choose how to weight students
- Full roster-plus resolves dilemma of full roster but makes little difference empirically
- Best to leave decision to district policymakers

For More Information

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