CHICKEN, EGG, OR OMELET?

RELATIONSHIPS BETWEEN TEACHER KNOWLEDGE, ASSESSMENT PRACTICE, AND STUDENT LEARNING

Formative assessment is increasingly popular in educational policy, yet research raises questions about the adequacy of teachers' content-pedagogical knowledge (CPK) to implement quality practice[1 2 3] and reveal non-robust findings for effects on student learning[4 5 6]. This study explores potential connections between teachers' CPK assessment practices and student learning.

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METHODOLOGY

Data come from Cohort 1 of a RCT of the effects of incorporating new, curriculum-based assessments into an existing upper elementary, science curriculum.

1 SAMPLE

20 Treatment and 19 Control teachers (4th grade) from a southwestern state.

20 treatment teachers + *19 control teachers*

2 DATA SOURCES

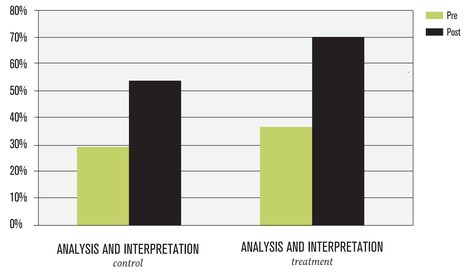
Data include pre- and post- measures of teachers' content-pedagogical knowledge, and weekly logs of assessment practices; and, for students, 3rd grade scores on the state reading test and end of study year performance on a specially designed science test.

pre + post measures + *weekly logs* + *student scores*

RESULTS

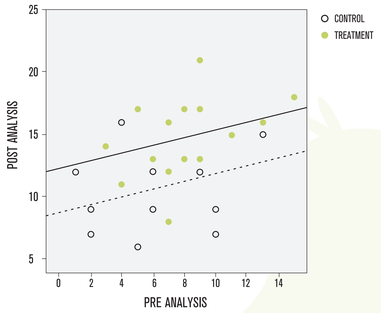
1 WHAT IS THE QUALITY OF TEACHERS' CONTENT-PEDAGOGICAL AND ASSESSMENT KNOWLEDGE?

Mean scores on the CPK pretest ranged from 29% to 37% correct and from 45% to 54% on the posttest for the control group. That the measures actually engaged teachers in analyzing student work and identifying implications for subsequent instruction suggests challenges for teachers' formative assessment capacity.



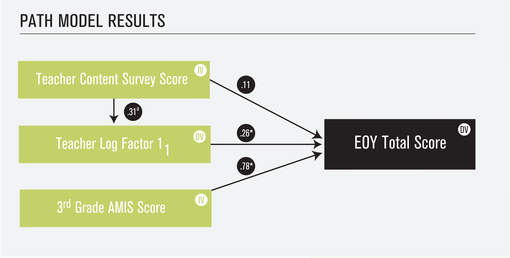
2 WHAT IS THE RELATIONSHIP BETWEEN TEACHER KNOWLEDGE AND ASSESSMENT PRACTICE?

Observed differences end-of-study CPK for treatment relative to control teachers were suggestive of the effects of sound assessment use on teacher knowledge. However, path analyses of relationships between teachers' assessment use and changes in teachers' content knowledge revealed no significant link.



3 WHAT IS THE RELATIONSHIP BETWEEN TEACHER KNOWLEDGE, ASSESSMENT PRACTICE, AND STUDENT LEARNING?

Path analysis results show a positive relationship between teachers' use of assessment and student learning. As expected, teachers' content-pedagogical knowledge showed no direct influence on student learning, but was marginally related to teachers' assessment use. Overall model fit was very high.



DV Dependent variable
IV Interdependent variable
.x Estimated standardized path coefficient among observed variables
* Significant @ $p < 0.5$
* Significant @ $p < 0.1$

CONCLUSIONS

1 THE POWER OF FORMATIVE ASSESSMENT

Teachers' attention to student learning as evidenced in classroom work—whether through observations of students in classroom discussion, analysis of student responses in science notebooks, other written responses, end of investigation assessments—is associated with higher student performance. The strength of the relationship is striking in light of the weaknesses in teachers' initial content pedagogical knowledge.

2 THE INFLUENCE OF SOUND TOOLS?

That the treatment was associated with higher content-pedagogical knowledge at the end of the study opens the possibility that the use of sound assessment tools may contribute to the development of teacher CPK. While the path model examining changes in teachers' knowledge did not show this connection, the small sample size, particularly of the treatment group, may have been an obstacle. The addition of cohort 2 data from our study will broaden the analysis sample and form clear next steps.

3 CHICKEN OR EGG

Teachers' use of formative assessment benefits student learning; yet effective formative assessment places heavy demands on teachers' content-pedagogical knowledge, knowledge which may be spotty based on current and others' research. Can analyzing student responses to sound assessments help teachers strengthen their content-pedagogical knowledge or is some minimal level of knowledge necessary for effective assessment use that benefits learning? What are optimal approaches for developing teachers' capacity in these areas?

The omelet remains on the table, a popular entree in current policy initiatives. Study results underscore both the potential and challenge of bringing these initiatives to fruition.

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