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Classroom assignments as measures of teaching quality

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ABSTRACT

We investigate classroom assignments and resulting student work to identify important characteristics of assignments in terms of instructional quality and their validity as measures of teaching quality. We examine assignment quality within a large-scale project exploring multiple measures including classroom observations, teacher knowledge measures, and value-added estimates based on student achievement scores. Analyses included descriptive statistics, multivariate analyses to understand factors contributing to score variance, and correlational analyses exploring the relationship of assignment scores to other measures. Results indicate relatively low demand levels in all teacher assignments, a marked difference in score distributions for mathematics (math) and English language arts (ELA), and a substantial relationship between what was asked of and produced by students. Relationships between assignments scores, classroom characteristics, and other measures of teaching quality are examined for both domains. These findings help us understand the nature of and factors associated with assignment quality in terms of intellectual demand.

1. Introduction

1.1. Rationale

Central to recent educational accountability efforts are teacher evaluation systems that include measures of the quality of classroom interactions, with the underlying claim that what teachers do in the classroom matters (Stodolsky, 1990). Classroom observations have received the greatest amount of attention in evaluating classroom interactions (e.g., Bell et al., 2012; Gitomer et al., 2014; Kane, Kerr, & Pianta, 2014; Taylor & Tyler, 2012). They provide important evidence about classroom interactions and guide interpretation of classroom interactions to make inferences about an array of classroom qualities including the goals that teachers have for students, the depth of content and reasoning that characterizes a given lesson, and classroom discourse. Formal teacher evaluation, predominantly focused on classroom observations, characterizes most OECD countries (Organization for Economic Co-operation and Development, 2013a; Scheerens, Ehren, Sleegers, & de Leeuw, 2012). Across OECD countries, the overarching articulated goal of evaluation is to improve teaching quality (OECD, 2013b).

Within the context of teacher evaluation systems, very little attention has been given to classroom artifacts as a direct source of evidence about the quality of classroom instruction. Yet, students spend a great deal of their instructional time working on and with assignments, whether they are instructional tasks or some type of assessment. Artifacts have been used as part of larger portfolios of teaching (e.g., OECD, 2013b; Stake, Kushner, Ingvarson, & Hattie, 2004) but not as standalone evidence of teaching quality.

The current study examines the quality of assignments in middle school mathematics (math) and English language arts (ELA) classrooms as part of a larger study of measures of teaching quality. We define teaching quality as "the quality of interactions between students and teachers; while teacher quality refers to the quality of those aspects of interactions that can be attributed to the teacher" (Bell et al., 2012, pp. 63–64). We acknowledge that, in many cases, assignments may not simply reflect instructional decisions of the teacher. Assignments may be part of a curriculum that is determined at the school or district level. Thus, assignments can also provide information about what the district holds as its view of quality teaching, with the teacher acting as "a key connection between policy and practice …" (Cohen & Hill, 2000, p. 329).

This study is intended to provide evidence that classroom assignments through collected artifacts can provide complementary interpretations about classroom interaction quality. We investigate how a protocol can be used to assess the quality of teaching practice and student learning by evaluating the quality of assigned quizzes,

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tests, and in-class work. These artifacts are, in certain ways, more straightforward to interpret than are classroom observations. Specifically, assignment artifacts can make clear what is expected of students and how students respond to those expectations in ways that are not always observable within a set of classroom interactions (see Gitomer & Bell, 2013). This study also contributes further validity evidence (see Kane, 2013) for the interpretation of scores from an artifact protocol.

As part of a larger study of a broad set of measures of teaching quality, this study investigates the relationship of artifact scores to measures of classroom observations, teacher knowledge, and value-added measures based on standardized student achievement tests. Acknowledging that "no single measurement can capture the full range of teacher performance in different contexts or conditions" (Looney, 2011, p. 443), this research enables us to consider what artifacts can contribute to an understanding of teaching quality and how scores on artifacts are related to scores on other teaching quality measures.

As with classroom observations, *quality* of classroom assignments is a construct that has no absolute definition. Therefore, a given protocol provides a conceptual lens through which quality is defined (e.g., see Dwyer, 1998). For this work, we adopt the framework of authentic intellectual work (Newmann, Bryk, & Nagaoka, 2001). Originally proposed by Archibald and Newmann (1988), the framework characterizes the work students are typically asked to do as contrived and superficial and contrasts that with the kinds of work skilled adults often do. Authentic intellectual work is viewed as relatively complex and socially or personally meaningful.

Newmann et al. (2001) describe authentic intellectual work as having three distinctive characteristics. First, it involves the *construction of knowledge,* arguing that authentic work requires one to go beyond routine use of information and skills previously learned. Problem solvers must construct knowledge that involves "organizing, interpreting, evaluating, or synthesizing prior knowledge to solve new problems (p. 14)." The second characteristic of authentic intellectual work is *disciplined inquiry,* which involves the use of prior knowledge in a field, in-depth understanding, and elaborated communication. The final characterizing feature is *value beyond school*, the idea that work that people do authentically is intended to impact or influence others.

The principles of authentic work derive from philosophies and studies from constructivist traditions including Bruer (1993), Dewey (1916), Resnick (1987), and Wolf, Bixby, Glenn, & Gardner (1991). Support for these constructivist pedagogies, on which the authentic work framework is based, include Carpenter, Fennema, Peterson, Chiang, and Loef (1989), Cobb et al. (1991), and Silver and Lane (1995). In this constructivist tradition, students engage with real-world problems that have legitimacy within their own experiences and that involve the structuring and restructuring of knowledge rather than simply reporting back information that they have reviewed.

A number of studies have provided empirical support. Newmann, Marks, and Gamoran (1996) studied a set of restructured schools that were designed around authentic intellectual engagement and related constructivist practices. They found that authentic pedagogical practice explained approximately 35% of the variance in student performance. D'Agostino (1996) studied compensatory (low-achieving) education third-grade classrooms and found a strong relationship between authentic instruction and math problem solving. Findings for reading comprehension were more ambiguous. Knapp, Shields, and Turnbull (1992) studied high-poverty schools and found that those classrooms that engaged in authentic practices of meaning making, disciplinary thinking, and connections with the real world produced students who were substantially stronger in their academic attainment.

The framework of authentic intellectual engagement is the foundation of the artifact protocol used in this study, the *Intellectual Demand Assignment Protocol (IDAP)* (Wenzel, Nagaoka, Morris, Billings, & Fendt, 2002). While other assignment protocols build on different frameworks, the assignment protocols cited in the literature all focus on some variation of intellectual demand.

Prior classroom assignment research has provided understanding of the intellectual demands that are placed on students, how students respond, and how these assignments affect student outcomes. Students respond to authentic work that is challenging, constructive, and relevant (American Institutes for Research, 2003; Beane, 2004; Daggett, 2005; Dowden, 2007; Milanowski, Heneman, & Kimbal, 2009; Ng, 2007; Paik, 2015; Prosser, 2006; Woolley, Rose, Orthner, Akos, & Jones-Sanpei, 2013). Intellectual demand has also been measured reliably (Borko, Stecher, Alonzo, Moncure, & McClam, 2005; Clare & Aschbacher, 2001; Matsumura, Garnier, Slater, & Boston, 2008) and is connected to student outcomes (Matsumura & Pascal, 2003; Mitchell et al., 2005; Newmann et al., 2001).

This study is situated within a larger validation effort of measures of teaching quality. Following Messick (1989) and Kane (2013), we investigate evidence of the extent to which scores from an artifact protocol support the appropriateness of inferences about teaching quality in middle school math and ELA classrooms. Adopting a theoretical framework of intellectual demand, this research seeks empirical support for the use of artifacts to make judgments of teaching quality by investigating the following questions:

1. How are scores representing assignment intellectual demand distributed for math and ELA?
2. What is the relationship between the intellectual demand of a given assignment and the student work produced in response?
3. What are the relationships between assignment intellectual demand and other measures of teaching?
4. How are assignment scores related to contextual variables including teacher characteristics, class demographics, schools, or districts?

1.2. Review of research on assignment quality as measures of classroom practice

Initial validation work of IDAP (Wenzel et al., 2002) provided evidence that IDAP scores could support inferences about the quality of classroom assignments in the Chicago Public Schools. Artifacts could be rated reliably, though there was some year-to-year drift. In addition, more challenging artifacts were associated with higher test scores (Newmann et al., 2001). Note, however, these initial validation studies used status scores rather than a value-added measure. They also did not include observation measures as alternative measures. Additional work supporting the validity of using IDAP was done by Mitchell et al. (2005), who also demonstrated that artifacts could be scored reliably and that scores were related to status achievement scores.

Studies using other assignment protocols have also examined the validity and reliability of classroom assignments. Matsumura and colleagues found that a reliable estimate of ELA classroom assignment quality could be attained with three assignments, that there was overlap among the scales, and that there was a relationship between assignment quality and other measures of teaching quality (Clare, 2000; Clare & Aschbacher, 2001; Clare, Valdés, Pascal, & Steinberg, 2001; Matsumura & Pascal, 2003; Matsumura et al., 2008). Similar work looking at middle school

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