American Educational Research Journal
April 2014, Vol. 51, No. 2, pp. 363–402
DOI: 10.3102/0002831213507973

Eliciting Engagement in the High School Classroom: A Mixed-Methods Examination of Teaching Practices

Kristy S. Cooper
Michigan State University

This case study analyzes how and why student engagement differs across 581 classes in one diverse high school. Factor analyses of surveys with 1,132 students suggest three types of engaging teaching practices—connective instruction, academic rigor, and lively teaching. Multilevel regression analyses reveal that connective instruction predicts engagement more than seven times as strongly as academic rigor or lively teaching. Embedded case studies of five classes use interviews and observations to examine how various classes combine connective instruction, academic rigor, and lively teaching and how these practices individually and collectively engage students. Across these analyses, this study introduces a typology for thinking systematically about teaching for engagement.

KEYWORDS: engagement, high school, instruction, identity

Among the more than 275,000 U.S. students who completed the High School Survey of Student Engagement from 2006 to 2009, 65% reported that they were bored in school at least once a day, with 16% reporting that they were bored in every class (Yazzie-Mintz, 2009). In addition, only 36% of students reported that they went to school each day because they enjoyed it. Researchers from the Programme for International Student Assessment (PISA) have also collected survey data on student engagement, noting that "meeting the needs of youths who have become disaffected from school is perhaps the biggest challenge facing teachers and school administrators" (Willms, 2003). PISA researchers found that 25% of 15-year-old students in the United States have a low sense of belonging at school and 20% have low levels of participation (PISA, 2000). Disengagement with school has also long been cited as a critical precursor to the decision to drop out

KRISTY S. COOPER is an assistant professor of K–12 educational administration at Michigan State University; e-mail: *kcooper@msu.edu*. Her research examines instructional leadership, school improvement for increased student engagement, and the qualities of effective schools.

(Bridgeland, Dilulio, & Morison, 2006; Rumberger, 2011), while high levels of engagement have consistently been linked to academic success (Caraway, Tucker, Reinke, & Hall, 2003; Wang & Holcombe, 2010). Among adolescents, engagement with school is critically important because the academic habits and orientations toward schooling experienced during the high school years are foundational to educational opportunity and attainment later in life (Davidson & Phelan, 1999; Rumberger, 2011).

Despite the low levels and high importance of engagement, our understanding of why students do or do not engage in high school is underdeveloped, and our toolkit for increasing engagement is limited. At present, practitioners looking to increase student engagement rely on a collection of volumes offering hundreds of pages of suggested practices (e.g., Easton, 2008; Marzano, 2007; Marzano, Pickering, & Heflebower, 2011; Schlechty, 2011; Vermette, 2009) with no systematic way to conceptualize different strategies, weigh potential approaches against one another, and think strategically about comprehensive approaches to engaging students throughout a building. Thus, an individual student's likelihood of engagement might rest on chance as class schedules are made and students are distributed across available options—with some teachers and classes engendering high levels of engagement while others do not. This state of affairs calls for a more systematic understanding of teaching practices that elicit engagement and the mechanisms by which those practices engage high school students so that schools can more purposefully create learning environments that capture and retain all students' interest, enjoyment, and commitment to learning.

This mixed-methods case study of student engagement at one diverse comprehensive high school lays a foundation for such a systematic approach by analyzing how and why engagement differs across 581 classes. Surveys with 80% of the student body reveal variations in engagement across and within both classes and students. Factor analyses detect three types of teaching practices by which teachers engage students, and multilevel regression analyses link these practices with their associated levels of engagement. Subsequent embedded case studies of five classes with differing survey results utilize interviews and observations to examine how students experience and make sense of the teaching practices they encounter across their school day. Combined, this body of data illustrates the mechanisms by which teachers engage students to varying degrees and suggests a central role for identity development in the adolescent engagement experience. Although the findings are not generalizable, this in-depth portrait of student engagement at one high school can inform further research and influence the development of strategies for increasing engagement.

Classroom Engagement and Identity Development

Classroom engagement is an active state of responding to a class through focused behavior, emotion, and cognition (Connell, 1990). Because engagement has these three dimensions, theorists often consider behavioral engagement, cognitive engagement, and emotional engagement as separate constructs, each occurring along a continuum from low to high (Fredricks, Blumenfeld, & Paris, 2004). *Behavioral engagement* is the extent to which a student exhibits the behaviors expected in a classroom—listening, doing assignments, following directions, participating, and so on. *Cognitive engagement* is the extent to which a student applies mental energy, such as by thinking about content, trying to figure out new material, and grappling with mental challenges. On an affective level, *emotional engagement* denotes the extent to which a student feels positively about a class, such as by enjoying it, feeling comfortable and interested, and wanting to do well (Blumenfeld, Kempler, & Krajcik, 2006; Fredricks et al., 2004). Although engagement occurs along these three dimensions, these elements are also highly synergistic, such that they feed off and into one another, blurring the boundaries between them and collectively constituting a holistic experience of classroom engagement (Blumenfeld et al., 2006; Yonezawa, Jones, & Joselowsky, 2009).

Nakkula (2003) asserts that adolescents experience the highest levels of investment and gratification—facets of emotional engagement—in activities and relationships that positively influence their identity development, which he defines as "the process of integrating successes, failures, routines, habits, rituals, novelties, thrills, threats, violations, gratifications, and frustrations into a coherent and evolving interpretation of who we are" (p. 11). More simply, he states, "Identity is the embodiment of self-understanding" (p. 11). Other research asserts that self-knowing, self-definition, and evaluation of self-worth are also critical tasks in adolescence as youth work to understand and assert the ways in which they are similar to or different from others (Erikson, 1968; Harter, 2006; Kroger, 2000; Marcia, 1966; Shahar, Henrich, Blatt, Ryan, & Little, 2003). In schools, psychologists find that identity development is shaped by interactions and relationships with teachers and peers and by experiences of success or failure in academic, extracurricular, and social endeavors (Kroger, 2000; Nakkula, 2003; Nakkula & Toshalis, 2006). Accordingly, recent qualitative research has begun to emphasize the link between identity development and engagement for adolescents (Lannegrand-Willems & Bosma, 2006; Yonezawa et al., 2009). Nasir and Hand (2008), for example, compared engagement among eight African American males in basketball practice and in math class and argued that these students experienced greater engagement playing basketball in part because of its more salient link to their identity. Cooper (2012) found that Latina high school students were most engaged in classes that

affirmed positive aspects of their identities, countered negative aspects, and promoted their development toward their ideal identities. Davidson (1996) and Yonezawa et al. (2009) have argued that understanding of the self is central to how students experience school and should be the subject of much research on adolescent engagement. Although identity development involves primarily unconscious reflection, observation, and judgment of the self in comparison to others (Erikson, 1968; Kroger, 2000), this emerging body of research suggests that identity development could be an underlying mechanism by which adolescents subconsciously make meaning of classroom experiences and then engage or disengage accordingly.

Teaching for Engagement

If identity development is a primary mechanism for engaging high school students, then teaching practices that positively contribute to identity development should more significantly engage students and engage them in different ways than practices that are less relevant to identity. To test this proposition, this study examines three groups of teaching practices that emerge from the literature and that represent different approaches to engaging students—*connective instruction* practices (Martin & Dowson, 2009) that emphasize individual students and are therefore most likely to relate to identity development, *academic rigor* practices (Wolf, Crosson, & Resnick, 2005) that promote the academic dimension of classrooms, and *lively teaching* practices, which are conceptualized here as those that emphasize active learning opportunities. The theorized relationship among these practices, identity development, and student engagement is presented in Figure 1, which illustrates that the relational connections foundational to connective instruction are theorized to be particularly engaging because they cut most directly to the core of a student's sense of self. By contrast, academic rigor and lively teaching are less individualized and thus target students within classes more collectively. Importantly, the three categories of teaching practices are not mutually exclusive, and strong teachers likely use all three in highly effective ways. This study thus examines how teachers do and do not use these practices in various combinations in pursuit of engagement. Greater understanding of these mechanisms should provide high school teachers with insight to inform critical decisions about how to construct and facilitate classrooms for high levels of engagement.

Connective Instruction

Connective instruction is a category of teaching practices in which teachers help students to make personal connections to a class. Martin and Dowson (2009) proposed this concept through a theoretical argument that engagement, motivation, and achievement are enhanced when students experience meaningful relationships that enable them to emotionally

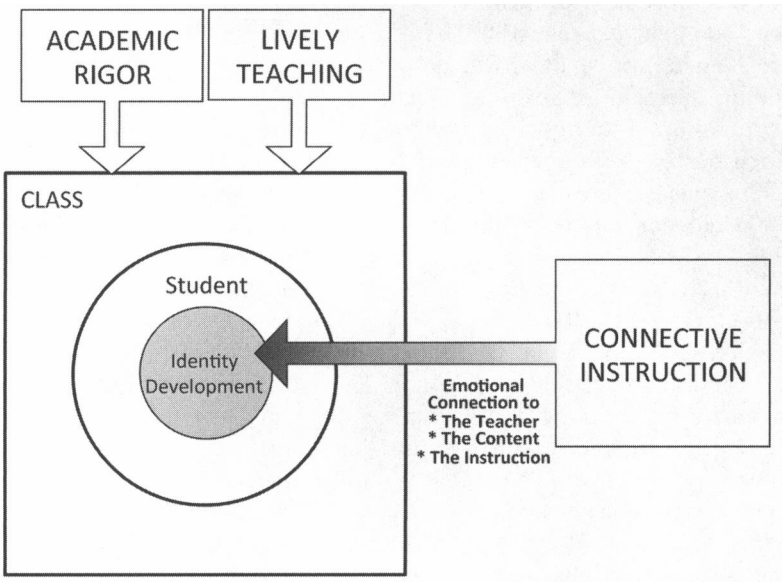

Figure 1. **Theorized relationships among student identity development and the three types of teaching practices for eliciting engagement.**

connect with the content, the teacher, and the instruction of a class. They theorized various teaching practices that operate at each level of connection, such that connections to the content occur through meaningful work that students perceive as relevant, connections to the teacher develop through teachers getting to know and affirming students, and connections to instruction emerge via opportunities for students to develop competence and learn from mistakes. In focusing exclusively on adolescents, the present study builds on Martin and Dowson's conceptualization to theorize that because identity formation is central to how high school students experience school, the relational facets of connective instruction are particularly salient in high school. Compared with academic rigor and lively teaching, which center on teachers' decisions about how to set an academic tone or present content, this work theorizes that connective instruction acknowledges who students are as people and is thus likely to be particularly critical for engaging adolescents (Davidson, 1996; Nakkula, 2003; Nasir & Hand, 2008; Yonezawa et al., 2009). The engaging element of connective instruction under this conceptualization is that such instruction honors *who* the students are—acknowledging that they are particular people with particular interests, points of views, personalities, and experiences.

In the present study, connective instruction is operationalized through six teaching practices related to Martin and Dowson's (2009) theory: promoting relevance, conveying care, demonstrating understanding of students, providing affirmation, relating to students through humor, and enabling self-expression. Although they have not been grouped together in empirical research before, each of these practices has been individually promoted as a tool for engagement. The first, relevance, refers to whether students experience content as relating to their lives, cultures, or futures and is theorized to engage students because it creates personal meaning for academic work (Conchas, 2001; Ladson-Billings, 1995; Nasir & Hand, 2008; National Research Council, 2004; Schussler, 2006; Shernoff, Csikszentmihalyi, Schneider, & Shernoff, 2003). In regards to care, Schussler and Collins (2006) found that academic, personal, and social forms of care all facilitate engagement. They note that prominent researchers on care—Mayeroff (1971) and Noddings (2005)—argue that caring requires understanding another's perspective. The present study measures both constructs—defining *care* as the teacher's concern for a student's well-being and *understanding* as how well the teacher knows a student. The fourth practice, affirmation, occurs when teachers convey that students are doing well or are capable of doing well through praise, written feedback, or opportunities for success (Brophy, 1981; National Research Council, 2004). In addition, teachers who relate to students using humor can engage students through both personal connection and entertainment (Pogrow, 2008). Finally, self-expression involves students sharing ideas and opinions in class. Oldfather (1995) argues that such opportunities engage students by connecting learning and identity—particularly students' values, thoughts, and conceptions of self.

Academic Rigor

The second group of engaging practices is *academic rigor*, in which teachers emphasize the academic dimensions of a class. Academic rigor refers to providing tasks and learning environments that demand high levels of cognition and focus (Wolf et al., 2005). In this study, academic rigor is operationalized through three practices—providing challenging work, pushing students through academic press, and conveying passion for content. Academic press is defined as a teacher's emphasis on hard work and academic success in their interactions with students (Lee & Smith, 1999) and is considered a facet of rigor because it reinforces the academic focus of a class. Researchers have argued that challenge and academic press engage students because they demand concentration and attention that help students to invest in academic tasks (Dockter, Haug, & Lewis, 2010; Lee & Smith, 1999). This is particularly true when tasks are one step beyond students' current skill levels and are accompanied by adequate support

(Shernoff et al., 2003). The Measures of Effective Teaching Project (2010) assessed students' perceptions of seven teaching practices and found perceptions of challenge to be one of the two strongest predictors of achievement gains. Additionally, when teachers demonstrate personal interest in content, students are more likely to perceive value and develop interest that supports engagement (Good & Brophy, 2003; Marzano, 2007). Unlike the individual focus of connective instruction, academic rigor is related to a teacher's class-wide orientation toward the work and is thus likely to be less personal for individual students.

Lively Teaching

Lively teaching, the final category of practice, occurs when teachers emphasize active delivery of instruction. Like rigor, lively teaching represents the teacher's approach to class-wide instructional delivery. It is represented here by three practices—using games and fun activities, having students work in groups, and assigning projects—that are touted in the engagement literature. Marzano (2007), for example, advocates games modeled off the television shows *Jeopardy* and *Family Feud* to review academic content. Vermette (2009) advocates collaborative grouping for engagement because working with peers enables students to test new ideas in a safe space and develop deeper understanding of curriculum. Many teachers also use projects as an engagement strategy, although experts on project-based learning warn that projects are most meaningful when they are student-driven, stem from students' interests, and involve genuine inquiry (Larmer & Mergendoller, 2010). Indeed, on the 2009 High School Survey of Student Engagement, 60% of students reported that they found group projects to be engaging, while 75% reported that they did not find teacher lectures to be engaging (Yazzie-Mintz, 2009). Shernoff et al. (2003) argue that low levels of engagement during passive activities such as listening to lectures or watching videos result from anonymity and inactivity. This suggests that students are more engaged by lively teaching in which the central point of activity is the student, rather than the teacher.

Examining Engaging Practices

In assessing the roles of connective instruction, academic rigor, and lively teaching in eliciting engagement, we can reasonably expect all three categories of practice to positively influence engagement, as prior research has found. However, given the centrality of identity development during adolescence (Erickson, 1968), we might also expect that the connective instruction practices, which are the most individual in nature, will collectively play a relatively strong role in engaging adolescents. To examine this possibility, this case study uses mixed-methods to address two research questions:

Research Question 1: Quantitatively: If the hypothesized three-factor structure of connective instruction, academic rigor, and lively teaching is consistent with survey data from high school students, what are the main and interactive effects of these types of practices on engagement?

Research Question 2: Qualitatively: How and why do these types of classroom practices individually and collectively engage students?

Data

Sample

Participants were 1,132 students in Grades 9 through 12 at Riley High School in Riley, Texas,[1] a predominantly blue-collar, one high school town located about 30 minutes outside a major city. Riley's student body represents the changing demographics of Texas—integrating the town's historic White community with a growing influx of immigrants from Mexico and families who have relocated from the city. An administrator described Riley as "pretty much a middle of the road high school," containing a socioeconomically and racially diverse population (44% Latino, 44% White, and 12% Black), doing moderately well on standardized tests, graduating a percentage of students just above the national average, and offering the broad array of courses customary in comprehensive high schools. The 1,132 survey respondents constituted 80% of the school's full enrollment of 1,420 and represented the racial demographics of the student body fairly well (36% Latino, 42% White, 10% mixed race, and 9% Black[2]). The respondents were 53% female and 46% male, which was close to the enrollment of 51% female and 49% male. The 20% of students who did not respond to the survey included two classes whose teachers forgot to administer it, special education students for whom teachers felt the survey was too difficult, and students who opted not to complete the survey.

The survey asked students to complete a separate report for each class in which they were enrolled at that time, so each student reported on an average of six different classes with a maximum of eight classes, leading to a total of 6,842 reports on individual classes. In total, students reported on 581 classes taught by 106 different teachers. Across the 6,842 cases, responses represented 11 academic and elective subjects, with the greatest representation covering English classes (in 15% of the cases), social studies (14%), math (13%), science (13%), and visual and performing arts (12%).

Procedures and Measures

During one 30-minute advisory in December 2009, teachers administered a previously piloted, paper-and-pencil survey to the students in their advisory. The survey included demographic items (grade level, gender,

race, and levels of parents' education) and asked for a separate report on each class in which students were enrolled. Although some research has identified potential threats to validity when students report on their perceptions of one class while sitting in another class (Green, Martin, & Marsh, 2007; Marsh, Martin, & Debus, 2001), these threats were weighed against those that would be introduced if teachers were to administer surveys about their own class to their own students and those that would be introduced if researchers were to administer surveys in all 581 classes, which would require an extended period of time. Given these concerns, having all students complete the survey during one sitting in the presence of their advisory teacher (on whom they were not reporting unless they happened to have their advisor for another class) was deemed preferable.

The survey sought to address the first research question regarding the main and interactive effects of the three types of practice in predicting engagement. For each class, students reported on the prevalence of 12 teaching practices—6 constituting connective instruction (e.g., "How much do the things you learn in this class relate to your life goals?" "How much do you feel like this teacher cares about you?" "How much do you feel like this teacher knows who you really are?"), 3 for academic rigor (e.g., "How often does this teacher give you challenging work?" "How often does this teacher push you to work hard?"), and 3 for lively teaching (e.g., "How often do you work on projects in this class?" "How often do you work in groups with other students during this class?"). For each class, students also answered five engagement items from a survey of the National Center for School Engagement (2006) (e.g., "How often do you do all of your work in this class?" "How happy are you when you are in this class?" "If you don't understand something in this class, how often do you try to figure it out?"). The mean of a student's responses on these five items formed the classroom engagement composite ($\alpha = .76$), which was the outcome in the regression models. For each class, students also answered one control item on how well they fit in with their classmates to remove the effect of peer belonging on engagement (Furrer & Skinner, 2003). All items included five Likert-style response anchors resulting in scores ranging from 1 to 5. In completing these reports, students also provided their course schedule (period, class, and teacher), which was then matched against school records to provide control variables for class period, subject, and the academic level of a course (e.g., general education, Advanced Placement, etc.).[3]

Factor Analysis

Given the a priori theory, confirmatory factor analyses tested the hypothesized three-factor structure for the 12 teaching items and possible, theory-driven variations for how the items might group empirically. For example, there was some uncertainty as to whether students would

experience a humorous teacher as more connective or lively. Thus, confirmatory factor analyses using Mplus software tested multiple variations to identify the most accurate specification. Given the nesting of responses within students, the data set was divided into 11 subsets by subject area. Thus, no student appeared in any sub–data set more than once, which increased the independence of the data points. The modeling also accounted for the clustering by class (teacher and class period) to account for this additional form of nesting. Because the data set for English classes was the largest (at 1,001 cases), this sample was randomly divided into two halves, with one half used as an exploratory sample to test four factor structures and the second half used to confirm the final model from the exploratory sample. The first four lines in Table 1 illustrate that although the model chi-square test rejected the exact-fit hypothesis in every model, as is common in large data sets (Kline, 2011), the Comparative Fit Index (CFI) was above the threshold of .95 in every model (Kline, 2011), and the Tucker-Lewis Index (TLI) was above the threshold of .90 (Marsh, 2001) in every model. However, the final model was the only one in which the root mean square error of approximation (RMSEA) was below the recommended threshold of .08 (Kline, 2011), which supported the inference that the three-factor structure—representing connective instruction, academic rigor, and lively teaching as described previously—was well represented by the survey data.

Given this good fit, this final model was tested through confirmatory factor analyses with the other half of the English data, the full sample of English classes, and the data for the 10 other subjects. Table 1 shows that this structure held fairly well across all subjects, although the RMSEA for science and shop showed that this structure fit least well in these areas. Table 2 presents the factor loadings for the individual items in the full sample of English classes and shows the alpha coefficients for each factor along with the alpha that would result if each item were omitted from the composite. These findings further supported the existence of the three theorized categories of teaching practices, which were then formulated as composites by averaging a student's responses to the items within each construct.

Embedded Case Studies

To develop a deeper understanding of teaching and engagement at Riley High School, five embedded case studies (Yin, 2003) of individual classes were conducted. Mean survey scores for engagement, connective instruction, academic rigor, and lively teaching were calculated for each class in the sample and standardized across all 581 classes. The 581 classes were then divided into eight varieties denoting each possible combination of "high" (above the mean) or "low" (below the mean) values for connective instruction, academic rigor, and lively teaching, as follows:

Table 1

Fit Indices for Confirmatory Factor Analyses of Teaching Practices in Various Subject Areas

	Sample Size[a]	Degrees of Freedom	Chi-Square	*p* Value	RMSEA	CFI	TLI
Exploratory sample—English classes							
Model as theorized—final model	501	49	197.665	.000	.078	.971	.962
Model with only two factors (Connective Instruction and Academic Rigor)	501	51	244.523	.000	.087	.963	.952
Model with humorous teacher as Lively Teaching	501	49	229.059	.000	.086	.965	.953
Model with projects as Academic Rigor	501	49	243.336	.000	.089	.963	.950
Confirmatory sample—English classes	500	49	202.879	.000	.079	.968	.957
Full sample—English classes	1001	49	317.818	.000	.074	.967	.955
Social studies classes	939	49	272.567	.000	.070	.967	.956
Math classes	838	49	219.073	.000	.064	.971	.961
Science classes	838	49	408.889	.000	.094	.951	.934
Arts classes	828	49	188.547	.000	.059	.977	.969
Foreign language classes	495	49	165.581	.000	.069	.968	.957
Athletics classes	460	49	143.683	.000	.065	.966	.954
Career classes	336	49	100.562	.000	.056	.977	.969
Life skills classes	309	49	111.154	.000	.064	.969	.958
Business and computers classes	276	49	95.619	.000	.059	.978	.970
Shop and agriculture classes	279	49	146.793	.000	.085	.962	.949

Note. RMSEA = root mean square error of approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index.
[a]Includes only those cases for which students completed all 12 items pertaining to teaching practices.

Table 2

Standardized Factor Loadings and Alpha Coefficients From the Confirmatory Factor Analysis for the Full Sample of English Classes (*n* = 1,001)

Factor and Survey Items	Factor Loading	Alpha if Omitted
Connective instruction (α = .8698)		
Relevance	.730	.8671
Care	.856	.8299
Understanding	.831	.8331
Affirmation	.761	.8455
Humorous teacher	.803	.8505
Self-expression	.762	.8586
Academic rigor (α = .6726)		
Challenging work	.596	.6200
Academic press	.852	.5226
Teacher passion	.847	.5836
Lively teaching (α = .6161)		
Projects	.666	.6264
Games and fun activities	.797	.4009
Group work	.536	.5027

- Variety 1: High connective, high rigor, high lively (24% of the classes in the school);
- Variety 2: Low connective, low rigor, low lively (24%);
- Variety 3: High connective, high rigor, low lively (12%);
- Variety 4: Low connective, low rigor, high lively (10%);
- Variety 5: Low connective, high rigor, low lively (10%);
- Variety 6: High connective, low rigor, high lively (9%);
- Variety 7: Low connective, high rigor, high lively (6%);
- Variety 8: High connective, low rigor, low lively (5%).

The class-level results were used for purposeful theoretical sampling (Patton, 2002) to identify five instrumental cases (Stake, 1995) that would provide insight into how the various types of teaching practices related to engagement in different varieties of classes. The five case study classes were:

- Mr. Knowles's fourth-period physics class (11th and 12th grades), Variety 1;
- Mr. Lifksy's fifth-period world history class (10th and 11th grades), Variety 3;
- Ms. Warner's second-period physics class (11th and 12th grades), Variety 4;
- Ms. Ingels's fifth-period pre-Advanced Placement biology class (9th grade), Variety 7;
- Coach Connor's first-period English class (11th grade), Variety 8.

Although Variety 2 occurred in 24% of the classes, a case study was not selected from this group because the low levels of all three teaching practices made such classes inappropriate for exploring how these practices

engaged students. In addition, cases were not selected to represent Varieties 5 and 6 because the quantitative results (described in the following) found that variations in lively teaching were not highly predictive of variations in engagement. Given limited resources, Variety 5 and 7 classes (which differ only by lively teaching) were thus considered collectively, and Variety 6 and 8 classes (which also differ only by lively teaching) were also considered collectively.

Each case study class was observed for five or six 90-minute periods during spring 2010; field notes recorded academic activities, teacher-student interactions, and behavioral engagement. For each class, six to eight student interviewees were identified using maximum variation sampling (Patton, 2002) along dimensions of gender, race, observed engagement, peer group, and personality. Recruitment occurred after at least two observations so that the researcher would be familiar to the students and have a sense of each student's role in the class. Interviews were conducted with 33 students—14 male and 19 female—who spanned Grades 9 through 12 and represented Riley's racial diversity (12 White, 11 Latino, 5 Black, 4 mixed race, and 1 Asian).[4] Interviews were also conducted with the five case study teachers and three school administrators. All interviews followed a semi-structured protocol,[5] lasted 40 to 60 minutes, and were recorded and transcribed. Student interviews were conducted in a small conference room in the school's main office and focused on students' perceptions of themselves and of connective instruction, academic rigor, and lively teaching in the case study class and one additional class for comparison (totaling 19 different comparison classes across 33 interviewees). Teachers were interviewed in their classrooms before or after school and discussed their instructional practice, teaching philosophy, and thoughts on engagement. Administrators were interviewed in their offices and provided background on the school, community, and case study teachers.

Methods

Regression Analysis

Regression analyses of the survey data assessed the main and interaction effects of the three types of teaching practice in predicting engagement. The data were structured hierarchically such that each Level 1 student by class case was nested within a cross-classified Level 2 that consisted of both students (each of whom reported on multiple classes) and classes (each of which was reported on by multiple students). Fielding (2002) used a similar data structure in his analysis of advanced level exam results nested within students and classes (in the UK educational system) and utilized a multilevel model with cross-classified random effects. Other researchers (Rabash & Goldstein, 1994; Raudenbush, 1993; Raudenbush & Bryk, 2002) also advise

cross-classified random effects models for data structured in this way. Thus, the main effects model in the present study was:

$$\text{Engagement}_{ijk} = \beta_0 + \beta_1 \text{Connective}_{ijk} + \beta_2 \text{Rigor}_{ijk} + \beta_3 \text{Lively}_{ijk} + \eta \text{Peers}_{ijk} + \gamma X_j + \delta Z_k + \upsilon_j + \omega_k + \varepsilon_{ijk},$$

where Engagement_{ijk} represented Level 1 classroom engagement in observation i for student j in class k. Peers_{ijk} was also a Level 1 variable and controlled for student j's feeling of belonging among peers in class k as noted in observation i. X_j represented the Level 2 student controls, including grade level, gender, race, and parent education. Z_k represented the Level 2 class controls, including period, subject, and academic level. The error terms captured the random effects of students (υ_j) and classes (ω_k), with ϵ_{ijk} denoting residual within-cell variation. The parameters of interest were β_1, β_2, and β_3, which revealed the relative standardized[6] effect sizes of connective instruction, academic rigor, and lively teaching on engagement at Level 1, controlling for students' perceptions of peer belonging in the class and student and class characteristics. To examine the relationships among the three types of practice in predicting engagement, each of three possible two-way interactions were included in a final model. All regression analyses were conducted using R software, which had the capacity to account for the complex structure of the data.

Embedded Case Study Analysis

Student interview transcripts were coded in three iterations—first for descriptive codes, then for interpretive codes representing emergent themes, and finally for pattern codes denoting key findings—while memos and annotations were used to develop themes and trends (Lofland & Lofland, 1995; Miles & Huberman, 1994; Patton, 2002). Each case study class was then considered in isolation to examine whether the broad interview findings held or whether connective instruction, academic rigor, and lively teaching functioned differently across classes. Conceptually clustered matrices (Miles & Huberman, 1994) were created to compare perspectives of students within each class and to note trends across classes. Twenty-four concept maps (Maxwell, 2005; Miles & Huberman, 1994) were created to graphically display the theorized links between teaching practices and engagement for the five case study classes and 19 comparison classes. Analysis focused on each of the 12 teaching practices in the survey—such as demonstrating care, using projects, providing challenging work—with an emphasis on understanding how each teacher enacted each practice, how students experienced it, and how the various practices worked separately and together to impact engagement. Survey data were integrated into each concept map to situate individual classrooms within school-wide student perceptions, shedding greater light on classroom practice than

would have been possible through only quantitative or qualitative data alone (Creswell & Plano Clark, 2011). For further triangulation, data from observations and teacher and administrator interviews were used to confirm or challenge the findings from student interviews. Finally, findings presented in the 24 classroom concept maps were consolidated to construct two concept maps addressing "how different practices engage students" and "why different practices engage students." Key concepts from the literature were pulled in to buttress links evident in the data.

Survey Results

Correlations

As anticipated, all 12 teaching practices were significantly correlated with engagement and one another. As shown in Table 3, perceptions of teacher care had the strongest correlation with engagement (r = .59), and challenging work had the weakest (r = .19). The strongest correlation among teaching practices was for care and understanding (r = .76), which were also highly correlated with affirmation (r = .62 for care, r = .60 for understanding). The lowest correlations were between challenging work and two lively teaching practices—games and fun activities (r = .05) and group work (r = .11). The composites for connective instruction, academic rigor, and lively teaching were all significantly correlated with engagement, at .70, .46, and .38, respectively, and with one another. To confirm that the three practices were not measuring one construct, such as "good teaching," the variance inflation factor was used to check for multicollinearity (Afifi, Clark, & May, 2004). This test revealed that the three types of practice retained high levels of variance that were independent of the others. Specifically, 59% of connective instruction, 71% of academic rigor, and 75% of lively teaching were independent of the other two practices, revealing that when students perceived a high level of one practice, they did not necessarily perceive high levels of the others.

Variations in Classroom Engagement and Perceptions of Teaching

The premise of this research is that differences in engagement across student by class cases are related to differences in teaching. However, variations in engagement might also be due to other factors, such as differences across students or other class characteristics. As shown in Table 4, there were numerous significant differences in engagement by student and class subgroups. First, Riley students in the 11th and 12th grades were significantly more engaged and perceived higher levels of all three teaching practices than 9th- and 10th-grade students on average. Seniors also perceived higher levels of connective instruction than students in all other grade levels. Females were significantly more engaged and perceived more rigor than males but were less likely to perceive lively teaching. Across racial groups,

Table 3

Correlations Among Categories of Teaching Practice, Individual Teaching Practices, and Classroom Engagement (n = 6,842)

Teaching Practice	Engagement	Constructive Instruction	1	2	3	4	5	6	Academic Rigor	7	8	9	Lively Teaching	10	11
Classroom engagement	—														
Connective instruction composite	.70*	—													
1.Relevance	.57*	.69*	—												
2. Care	.59*	.85*	.51*	—											
3. Understanding	.54*	.84*	.54*	.76*	—										
4. Affirmation	.57*	.79*	.43*	.62*	.60*	—									
5. Humorous teacher	.55*	.78*	.42*	.59*	.54*	.52*	—								
6. Self-expression	.47*	.74*	.35*	.52*	.51*	.53*	.53*	—							
Academic rigor composite	.46*	.53*	.40*	.49*	.42*	.40*	.43*	.35*	—						
7. Challenging work	.19*	.24*	.21*	.21*	.20*	.16*	.19*	.16*	.77*	—					
8. Academic press	.44*	.54*	.37*	.49*	.42*	.44*	.44*	.37*	.82*	.42*	—				
9. Teacher passion	.47*	.47*	.36*	.45*	.37*	.34*	.38*	.30*	.77*	.36*	.46*	—			
Lively teaching composite	.38*	.49*	.31*	.39*	.39*	.40*	.41*	.40*	.30*	.16*	.30*	.26*	—		
10. Projects	.23*	.28*	.17*	.23*	.23*	.24*	.21*	.24*	.25*	.19*	.18*	.21*	.70*	—	
11. Games and fun activities	.38*	.49*	.30*	.37*	.38*	.40*	.43*	.38*	.22*	.05*	.26*	.20*	.80*	.33*	—
12. Group work	.25*	.34*	.24*	.27*	.28*	.26*	.28*	.28*	.22*	.11*	.23*	.16*	.76*	.25*	.46*

*$p < .05$.

scores for Latino students on connective instruction and rigor were significantly lower than those for students in all other racial groups, and Latinos reported being less engaged than White and Black students. However, mixed race, Black, and White students did not differ significantly from one another in any category. Although not shown in Table 4, students whose parents had more education also reported significantly higher engagement, connective instruction, rigor, and lively teaching—although the correlations were small, ranging from .09 (for father's education and lively teaching) to .15 (for father's education and connective instruction).

Table 4 also shows that engagement and perceptions of teaching differed somewhat by subject. Compared with English, which had similar results to other academic subjects, students were more engaged on average in electives—particularly in the arts (e.g., theater, ceramics, band), athletics (e.g., soccer, dance, PE), career (e.g., health science technology, criminal law), life skills (e.g., parent education, personal and family development), and shop and agriculture (e.g., welding, horticulture). Students also experienced more connective instruction in athletics, career, life skills, and shop and agriculture than in other classes. Among the academic subjects of English, social studies, math, science, and foreign language, there were some significant differences in experiences of lively teaching and rigor. Although not shown in Table 4, academic level was not significantly correlated with engagement, connective instruction, or lively teaching. However, students rated more advanced classes as significantly more rigorous ($r = .13$). There were no significant differences in engagement or connective instruction by class period, although classes later in the day were deemed marginally more lively ($r = .06$) and rigorous ($r = .04$). Finally, students who felt a stronger sense of belonging with peers were significantly more engaged ($r = .41$) and perceived significantly more connective instruction ($r = .42$), academic rigor ($r = .28$), and lively teaching ($r = .28$).

Teaching Practices as Predictors of Engagement

An unconditional multilevel regression model (Table 5, Model A) found residual variance attributable to students, classes, and student by class cases. Intraclass correlations reveal that 18.1% of the variance in engagement occurred at the class level, 28.8% of the variance occurred at the student level, and the remaining 53.1% represented unexplained variance across the student by class cases. Including students' perceptions of teaching practices (Model B) accounted for variance at all three levels. A comparison of Models A and B reveals that adding teaching practices as predictors of engagement decreased the student residuals by 44%, the class residuals by 74%, and the student by class residuals by 41%, indicating that the teaching practices examined here explained large portions of the variance in engagement at all three levels but particularly across classes.

Table 4

Mean Values of Classroom Engagement, Connective Instruction, Academic Rigor, and Lively Teaching, by Student Demographics and Class Subject Areas (*SD* in parentheses)

Student or Class Subgroup	*N* Cases	Classroom Engagement	Connective Instruction	Academic Rigor	Lively Teaching
Student grade level					
9th grade	2,335	3.61[a,b] (0.92)	2.85[a,b] (1.09)	3.49[a,b] (1.03)	2.54[a,b] (1.01)
10th grade	1,789	3.60[c,d] (0.90)	2.85[c,d] (1.12)	3.47[c,d] (1.02)	2.54[c,d] (1.01)
11th grade	1,667	3.81[a,c] (0.87)	3.15[a,c,e] (1.09)	3.73[a,c] (0.95)	2.75[a,c] (1.08)
12th grade	1,049	3.81[b,d] (0.86)	3.31[b,d,e] (1.11)	3.74[b,d] (1.05)	2.69[b,d] (1.11)
Student gender					
Female	3,811	3.73[a] (0.89)	2.99 (1.12)	3.61[a] (1.01)	2.59[a] (1.04)
Male	2,987	3.63[a] (0.91)	3.00 (1.11)	3.55[a] (1.03)	2.64[a] (1.05)
Student race/ethnicity					
White	2,938	3.78[a] (0.86)	3.12[a] (1.10)	3.73[a] (0.98)	2.68[a] (1.05)
Latino	2,498	3.58[a,b] (0.91)	2.81[a,b,c] (1.11)	3.38[a,b,c] (1.04)	2.52[a] (1.03)
Mixed race	664	3.68 (0.94)	3.02[b] (1.12)	3.68[b] (1.01)	2.66 (1.05)
Black	535	3.78[b] (0.91)	3.18[c] (1.10)	3.61[c] (1.02)	2.65 (1.06)
Class subject					
English (reference group)	1,039	3.57 (0.88)	2.94 (1.13)	3.59 (1.11)	2.26 (0.86)
Social studies	973	3.55 (0.83)	2.85 (1.05)	3.48 (0.98)	2.02* (0.87)
Math	869	3.52 (0.90)	2.75 (1.03)	3.77* (0.98)	2.14 (0.86)
Science	863	3.51 (0.87)	2.85 (1.06)	3.63 (0.91)	3.00* (0.98)
Arts	833	3.85* (0.93)	2.97 (1.18)	3.55 (1.03)	3.04* (1.13)
Foreign language	516	3.60 (0.88)	2.98 (1.02)	3.47 (0.93)	2.53* (0.84)
Athletics	495	3.95* (0.97)	3.17* (1.22)	3.70* (1.28)	3.22* (0.93)
Career	371	4.21* (0.72)	3.73* (0.97)	3.54 (0.91)	2.88* (0.97)
Life skills	312	3.94* (0.81)	3.38* (1.04)	3.59 (0.89)	3.29* (0.97)
Business and computers	289	3.63 (0.83)	2.72 (1.10)	3.19* (0.97)	2.22 (0.91)
Shop and agriculture	282	3.96* (0.87)	3.48* (1.03)	3.71 (0.96)	3.37* (0.96)
All cases	6,842	3.69 (0.90)	2.99 (1.12)	3.58 (1.02)	2.61 (1.04)

Note. Mean values within each set of comparisons by student subgroups (e.g., classroom engagement by grade level) that share the same letter are significantly different from one another, as determined by a one-way analysis of variance using a Scheffé test to account for multiple comparisons ($p < .05$).

*Mean values within each set of comparisons by class subject (e.g., classroom engagement by subject) that are different from the reference group (English classes), as determined by a one-way analysis of variance using a Scheffé test to account for multiple comparisons ($p < .05$).

Model B shows that students were significantly more engaged in classes where they reported more connective instruction, academic rigor, and lively teaching. Model C includes control variables and reveals that differences in engagement by race, parent education, class academic level, and period were not significant when accounting for teaching practices. General linear hypothesis tests confirmed that the two sets of categorical covariates for race and parent education could be removed from the model ($p = .239$ and $p = .717$, respectively), whereas those for class subject could not ($p = .000$). Thus, Model D presents the most parsimonious main effects model and

Table 5

Taxonomy of Fitted Multilevel Regression Models Describing the Relationship Between Standardized Classroom Engagement and the Three Types of Teaching Practices (standardized), Controlling for Student and Class Characteristics and the Student's Perception of Peer Belonging in the Class

	Model A	Model B	Model C	Model D	Model E
Intercept	0.00	–0.01	–0.08	–0.15	–0.13
Student-level controls					
Grade			–0.03*	–0.03*	–0.03
Male			–0.12*	–0.12*	–0.12*
White			(omitted)		
Latino			–0.01		
Mixed race			–0.06		
Black			–0.05		
Mother's education			–0.01		
Father's education			0.01		
Class-level controls					
English			(omitted)	(omitted)	(omitted)
Social studies			0.04	0.04	0.04
Math			0.04	0.03	0.04
Science			–0.07	–0.07	–0.09*
Arts			0.21*	0.21*	0.21*
Foreign language			0.00	0.00	–0.01
Athletics			0.16*	0.16*	0.15*
Career			0.23*	0.23*	0.23*
Life skills			0.08	0.09	0.10
Business/computers			0.30*	0.30*	0.30*
Shop/agriculture			0.18*	0.18*	0.18*
Academic level			0.00		
Period			0.00		
Case-level control					
Peer belonging			0.11*	0.11*	0.11*
Question predictors					
Connective instruction		0.64*	0.59*	0.59*	0.59*
Academic rigor		0.09*	0.09*	0.08*	0.09*
Lively teaching		0.05*	0.03*	0.03*	0.04*
Interactions					
Connective Instruction × Academic Rigor					–0.01
Connective Instruction × Lively Teaching					–0.06*
Academic Rigor × Lively Teaching					0.04*

(continued)

Table 5 **(continued)**

	Model A	Model B	Model C	Model D	Model E
Random effects					
Student	.28	.15	.14	.14	.14
Class	.18	.04	.03	.03	.03
Case	.53	.30	.29	.29	.29
–2 log likelihood	16,846	12,688	11,738	12,202	12,152
N					
Students	1,123	1,123	1,067	1,111	1,111
Classes	581	581	578	580	580
Cases	6,599	6,594	6,273	6,503	6,503

*$p < .05$.

shows that, controlling for grade, gender, subject, and peer belonging, all three teaching practices were positively related to engagement. The effect sizes in Model D reveal the relative strengths of the relationships between each practice and engagement, controlling for the others. On average, when two classes differed by a standard deviation on connective instruction, students found the class with more connective instruction to be .59 standard deviations higher on engagement ($p < .05$). By contrast, when two classes differed by a standard deviation on other teaching practices, students reported the more rigorous class to be only .08 standard deviations higher on engagement ($p < .05$) and the livelier class to be only .03 standard deviations higher on engagement ($p < .05$). These differences in effect sizes reveal that the relationship between connective instruction and engagement was more than seven times stronger than the relationships for rigor or lively teaching.[7] Panel I of Figure 2 illustrates these relationships and draws attention to the much steeper slope for connective instruction.

Model E presents the tests for statistical interactions among the three types of practice in predicting engagement and indicates two significant interactions—both of which include lively teaching. First, there was a negative interaction between connective instruction and lively teaching (β = –.06). Panel II of Figure 2 shows the slopes for prototypical values of lively teaching a standard deviation above and below the mean, which illustrates that the strength of the relationship between connective instruction and engagement was strongest in classrooms that were low on lively teaching. This suggests that in the absence of practices such as games and projects, the extent to which students experienced connection to the teacher, the content, and the instruction was even more strongly linked to engagement than when lively practices existed to a higher degree. Model E also shows a positive interaction between academic rigor and lively teaching (β = .04). As

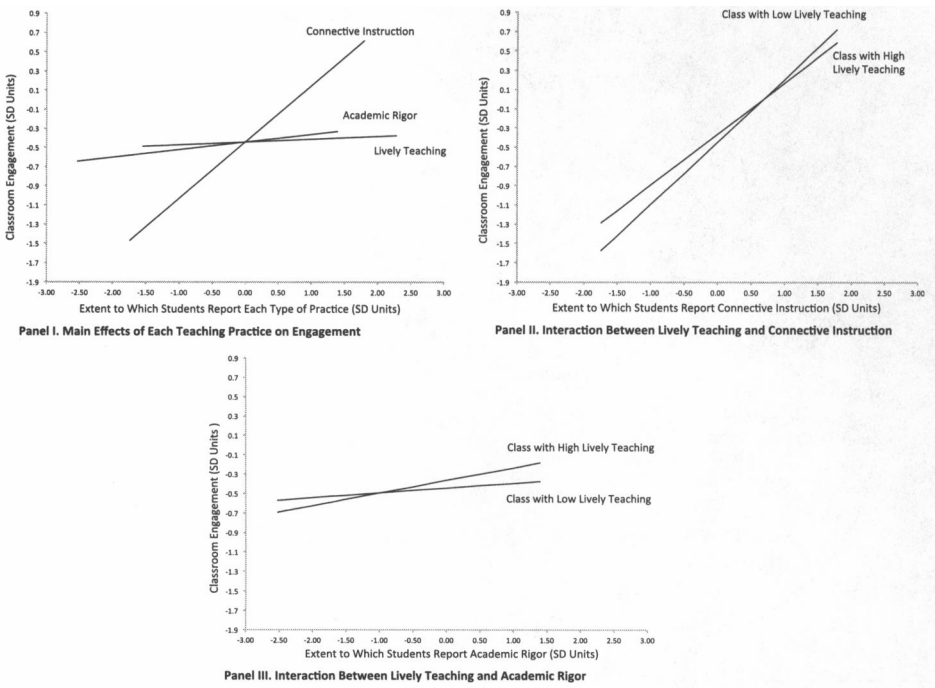

Figure 2. **Fitted plots of the relationships among standardized classroom engagement and the three types of teaching practices, including the main effects for each practice (Panel I) and the two significant statistical interactions shown using prototypical classrooms that were high (1 *SD*) and low (–1 *SD*) on lively teaching (Panels II and III), controlling for student and class characteristics and the student's perception of peer belonging (*n* = 6,503).**

illustrated in Panel III, this interaction indicated that the strength of the relationship between rigor and engagement was stronger in classes that were high on lively teaching. This suggests that in the presence of higher levels of practices such as games and projects, rigor was more strongly linked to engagement than when such activities existed to a lesser degree. Finally, as shown in Model E, there was not a significant interaction between connective instruction and academic rigor.

Embedded Case Study Findings

The five embedded case studies used interviews and observations to qualitatively explore how and why connective instruction, academic rigor, and lively

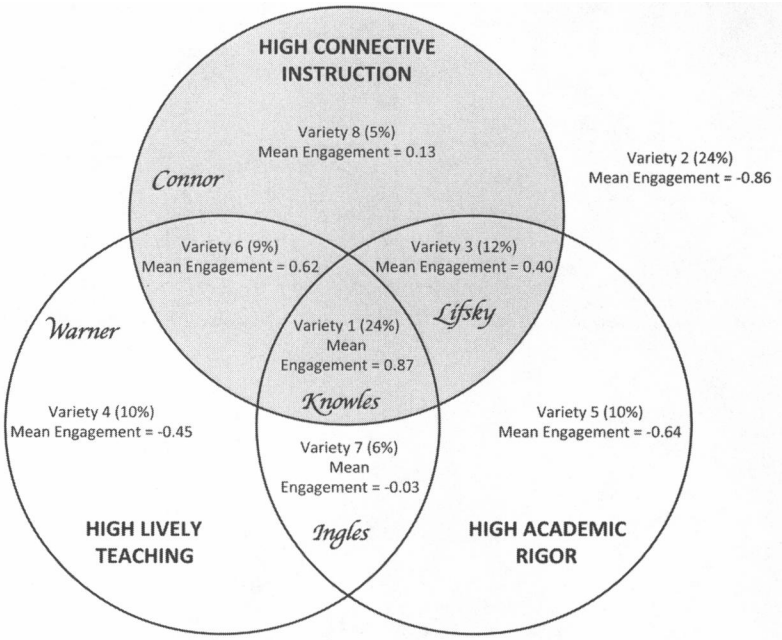

Figure 3. **Venn diagram depicting the eight varieties of classes, the percentage of classes within the school that fall into each variety, the mean levels of engagement for classes within each variety, and the location of the five case study classes within this typology.**

teaching individually and collectively related to engagement. As described previously, the case studies represented different "varieties" of classes that combined high or low levels of each practice. The Venn diagram in Figure 3 illustrates the eight possible combinations of high scores that define the eight varieties and provides the mean level of engagement in each variety. Not surprisingly given the quantitative results, the four varieties with high levels of connective instruction (appearing inside the shaded circle) all have average levels of engagement above the school mean, while the four varieties with low connective instruction (outside the shaded circle) have average engagement below the mean. Figure 3 also indicates the location of each case study class within this typology. As examples from five varieties, these cases help us begin to understand how and why the three types of teaching practices elicit engagement.

Mr. Knowles's Physics Class

As an exemplary Variety 1 class, Mr. Knowles's fourth-period physics class had extremely high levels of connective instruction (1.48 standard

deviations above the mean), academic rigor (1.34) and lively teaching (1.84). Accordingly, the survey results for engagement among the 18 11th- and 12th-grade students in this general education physics class were among the school's highest (1.16). Thus, Knowles's class provided an opportunity to explore how all three types of teaching practices worked together. Analyses of Knowles's class revealed a personable, entertaining, and knowledgeable teacher who integrated frequent labs and group tasks into an easy-going class atmosphere in which students participated regularly and saw physics as being highly relevant to their lives. Student interviews revealed that the most engaging of Knowles's practices were his use of humor, his ability to make physics relevant, and his respectful treatment of students. Although students reported high levels of all three types of practices, they spoke most enthusiastically about connective instruction and suggested an additive effect of having all three types of practices.

Even before the survey administration, it was clear that Mr. Knowles's classes were likely to be perceived as highly engaging. His students were often out in the main corridor conducting experiments, such as dropping items from the second floor and recording their results on clipboards. Amid these lively teaching activities, however, students did not describe Knowles's class as challenging—seemingly due to what Shulman (1986) terms *pedagogical content knowledge*—knowing how to teach content so that students can understand it easily. When students commented on the level of challenge in Knowles's class, they referenced his ability to teach well: "Mr. Knowles is real good at explaining stuff. So, when he explains it, it's pretty easy." "It's easy because he explains it well." "There's something about the way he teaches that I actually get it—it makes sense—that I didn't have with any of my other science teachers, especially in high school." Seemingly as a result, when asked what they learned in Knowles's class, interviewees responded, "Everything." "We learn everything." "We learn everything. I've learned a lot this year, more than I ever have in science."

At the time of the study, Knowles had been teaching science and calculus at Riley for 39 years. He had studied physics in college, switching later to education, and his vast scientific knowledge was evident in his teaching. One student explained, "He knows *everything!* . . . I don't think we've ever asked him something that he didn't know the answer to." Knowles was particularly effective at connecting physics to students' lives. In one lesson, students estimated the cost of providing electricity to the school for a day. Carmen reflected, "We were learning about electricity and he related it to outside—like how much you would pay for so many hours of light. And you're going to use that your whole entire life—use light and everything. Our whole world is electronic."

Students also expressed an appreciation for Knowles's humor: "He jokes around a lot and he's funny. That's what most people like about him. . . . He can crack a joke, teach a little bit, crack a joke, teach a little bit. It's just fun to

learn when he's teaching." For example, during one lesson comparing series and parallel circuits, Knowles created an illustration to demonstrate the problem that could arise if "your house" had series circuits that connected "the television, the refrigerator, and grandma's heart machine." Noting on the illustration that if one circuit blew out, the power supply would be cut to the others, Knowles commented, "So, if your TV goes out, all of your food is going to go bad." After a beat to realize that grandma's heart machine would also fail (and that Knowles had not bothered to point this out), the class erupted with laughter. As Pete explained, "It's fun. Even if it's hard, it's fun. If it's easy, it's fun. . . . I guess it's Mr. Knowles's personality. He's always cracking jokes and laughing." Students also perceived a high level of respect from Knowles and found him relatable. Christine described, "He doesn't talk down to us. He doesn't act like we are stupid people." Ray noted, "He doesn't put up a front like a bunch of teachers. . . . He acts like you're real people. He talks to you." Accordingly, Knowles's classroom was a psychologically safe climate in which students perceived their ideas and inquiries were welcome, and self-expression was the norm as students continually asked questions and offered their own theories on physics.

On the whole, Knowles's ability to help students connect with the content, with him, and with learning experiences led to exceedingly high levels of perceived learning and engagement. In this case, it appeared that rigor and lively instruction—although certainly present and contributing to engagement—were less central to students' perceptions of the classroom dynamic. In discussing Knowles and his class, students privileged the connective elements of his instruction.

Mr. Lifsky's History Class

Mr. Lifksy's fifth-period world history class is an example of a Variety 3 class in which his 25 10th- and 11th-grade students reported high connective instruction (1.14) and academic rigor (0.54) but low lively teaching (–0.74). With the highest engagement among the school's history classes (0.57), Lifsky's general education world history class enabled an exploration of how connective instruction and academic rigor elicited engagement in the absence of lively teaching. Interviews and observations confirmed the infrequency of lively teaching in Lifsky's class, where instruction centered on historical lectures and individual written assignments. Amid this traditional model of delivery, the fundamental dynamic of Lifsky's class was a tight pairing of care and academic press.

A former high school dropout who was "asked to leave" college due to low grades, Lifsky initially enlisted in the military. After breaking his back, he left the military and (honoring influential teachers in his own life) returned to college to study teaching. Lifsky saw his job as going well beyond academics, explaining, "These kids need role models that they can respect,

and I work very hard to do that." To this end, Lifsky shared his life story to inspire students. In a representative comment, Chris explained, "I look up to him in a way for being that type of person that has failed before, but then has achieved after he failed—like learned from his failures . . . it told me to push forward with whatever because you could be in a worse situation." Trying to motivate students was indicative of Lifsky's caring. Students noted, "He's there for us." "He's outstanding when it comes to caring about your work and all that and caring about you, and he's always motivating students to do better." Lifsky echoed this sentiment and referenced the old adage that people do not care how much you know until they know how much you care. He noted, "I truly believe that kids will not put out for you unless they know that you care. . . . One thing that I learned when I was in the military, you can take an East L.A. gang-banger, a kid who's had issues in the military, and turn them into one hell of a soldier if they know that you care. Well I bring that same attitude here."

Lifsky's emphasis on academic rigor—particularly academic press—was also evident, as students routinely spent the entire 90-minute class period working independently or listening to lectures. During silent work, Lifsky frequently urged students to "focus down" or "focus up" and emphasized his expectations for productivity: "I need you focused. I need you serious." "You need to be getting your job done." "You need to push as hard as you can." "I need your A-game." "Make it happen now." Lifsky also encouraged specific students: "Arielle, get to work, sweetie." "Marcus, I'm gonna need you to crack the book, man." And he asked after students: "Jenny, you doing okay?" "Lisa, you okay, honey?" Interviewees' comments reflected the industriousness of Lifsky's class: "You work the whole time and the class goes by super fast." "It's hard in a good way. I mean if it was easy, then I'd be bored." Tina explained how this care and press created a reciprocal dynamic:

> Just the whole "if you need anything from me," "if you need a recommendation from me," "will you check on this for me," to "Mr. Lifsky, I need a band-aid," he's always willing to do it. It tells a lot. If he's willing to do that for me, then the reason goes back and forth. The students are also willing to put up the work for him, and he knows that.

As a Variety 3 class centered on relationships and press, Lifsky's history class illustrated how connective instruction's relational emphasis can elicit emotional engagement in rigorous classes.

Ms. Warner's Physics Class

As a Variety 4 case, Ms. Warner's second-period physics class had lively teaching more than a standard deviation above the school mean (1.07) but connective instruction (–0.04) and academic rigor (–0.02) just below the mean. Notably, Warner's 19 11th- and 12th-grade students reported low

engagement (–0.56), making this general education physics class ideal for examining how lively teaching on its own was insufficient for engagement. Analyses revealed that most students felt a general affinity for Warner personally but little connection to content. They also described relatively little learning, as evident in comments like: "Ms. Warner's class—yeah, uhm, she like makes it all fun, but I don't learn anything from her class." "We don't do a whole lot of learning in there. It's pretty much busy work. . . . Like puzzles, things in our workbooks, crossword puzzles, a lot of crossword puzzles." The instructional model in Warner's class suggested that rigorous learning objectives and connections to content were necessary for lively teaching to engage students.

Despite a connective instruction score just below the mean, Warner was known for being caring. Students reflected: "She's just always nice. . . . She cares about everybody." "I really like Ms. Warner. She's real nice." "She's a really caring person. I mean she runs the food drives and all that stuff." Warner described: "I probably mother them somewhat. . . . There are certain ones of them, especially the ones that are young moms, that I'll migrate towards mentoring." However, Warner did not connect with all of her students. Jack, for instance, compared his relationship with Warner to that with another teacher: "Ms. Andrews treats you like an adult, which I respect. Ms. Warner treats you more like a child. She doesn't give you a chance. You're a student, a child right off the bat." Thus, Warner's mothering style enabled her to connect with some students but alienated others.

Despite most students' fondness for Warner, the missing engagement ingredient seemed to be rigorous, developmentally appropriate instruction that enabled students to connect with physics. During one lesson, for example, students used playing cards and marshmallows to build houses. They were to begin by drawing a house and writing an essay. The observation notes captured:

> The students ask a few questions. Jack wants to know how he's supposed to write an essay about this. . . . [Later,] Rubi is coloring a yellow sun in the corner of her house picture. . . . A number are using rulers to draw straight lines. . . . [Later,] each group must build two houses—one made out of cards and one made out of marshmallows and popsicle sticks. Warner sends the students to their lab stations: "Go get busy." . . . They will have a contest for the best house, "the prettiest." . . . [Later,] the students seem to be mostly on task. The card houses keep falling, and the students seem to be getting frustrated. . . . Jack tells his group that school is a waste of time.

Numerous students expressed frustration with such instruction. Isabel, for example, complained, "She tells us to write stories about stuff that I don't think is important, and I'll be like, 'I thought this was a physics class, not an English class.'" On whether physics was generally important, Isabel

noted, "I don't think it's really important because I don't care how far a pencil goes."

Amid the frustrations of some students, others fondly recounted experiences with lively teaching: "We were talking about gears and stuff, like simple machines. And we had to make a robot and describe what the simple machines were and what their functions were with the robot." "We did the roller coaster. We tried to figure out the gravitational force of letting a marble slide down a roller coaster." "We play basketball and golf with all the classroom. . . . She turns it into a game so you have to answer the question correct and then you get to shoot." Despite some bouts of enthusiasm for some activities, many of Warner's students revealed an eagerness to learn more substantively in her class in addition to enjoying lively teaching. These findings suggest that in the absence of connective instruction and rigor, lively teaching is ultimately limited in its engagement potential.

Ms. Ingels's Biology Class

Ms. Ingels's fifth-period, pre-Advanced Placement biology class is a Variety 7 class: high in lively teaching (1.03) and academic rigor (0.80) but low in connective instruction (−0.38). Figure 3 shows that average engagement for Variety 7 classes is just below the school mean at –0.03. However, Ingels's 20 ninth-grade students experienced her class as relatively engaging (0.31) and so this case served as an example of how rigor and lively teaching could be paired for engagement in the absence of connective instruction. Observations revealed that Ingels's instruction was well planned, fast paced, and included a lot of variety. Across six observations, only once did the class stay in their seats for an entire 90-minute period. On two occasions, they went to computer labs; other times they worked at lab tables in the back of the classroom manipulating codes to build DNA or dropping and catching meter sticks to measure reaction time. The analyses suggested that Ingels's use of detailed, hands-on activities, group assignments, and challenging work seemed to compensate for students' lack of connection with her and the biology content.

In only her second year of teaching, Ingels had been lured out of a career as a biologist and chemist in the nearby city so that she could work closer to home. Similar to Knowles, she was a trained scientist who had turned to teaching after receiving solid grounding in her scientific discipline. As such, she shared Knowles's pedagogical content knowledge and keen ability for explaining scientific concepts to students in ways that they understood. Claire explained, "I think she's a good teacher, and I think the whole class kind of agrees. . . . A good teacher is able to explain new information in a way we can start to understand." In regards to challenge, Marianne explained, "She's not like most teachers. She doesn't give us multiple-choice tests. She gives us actually like, open-ended questions for our test, and I

think that helps a lot because, you know, with all the labs and everything that we do in there, we are actually able to understand it—not just learn it, but we're actually able to understand it." In this comment, Marianne described how frequent lively teaching activities facilitated understanding that tempered the potential difficulty of open-ended tests. Marianne further noted, "She definitely makes us think. When we're doing labs or we're doing notes, she always asks us questions and really makes us think about the curriculum."

Numerous students aligned Ingels's ability to teach well with their perception of her as a "cool" teacher. In a representative comment, Carter explained, "We all like her. She's a really cool teacher, and she actually teaches. . . . There's a few teachers in high school that people talk about like, 'Yeah, they're cool, but they don't actually teach anything. We don't understand anything that they teach.' But she's like really cool *and* we understand all the things that she teaches." Carter's description of Ingels as cool is illustrative of another key theme for this class: Ingels's general likeability. Students noted: "She's so young and fun. . . . She laughs at our jokes and she makes other jokes." "She treats me kindly. She treats everyone kindly." "She's nice, and she actually helps us." Although such sentiments initially seemed puzzling given Ingels's low scores for connective instruction, close examination of students' comments revealed a fondness for Ingels yet a simultaneous distance. Roxana noted, "She's not the kind of teacher that will talk to you about your personal life if you don't bring the subject up." Ingels commented on this herself:

> I like to know what they're doing as far as what takes their time, as far as work, or what their parents are expecting of them. But some of them are involved in extracurricular activities that are not legal, and I don't want to know. That's something that makes me judge them in here and when they walk through that door I want them to be all level, I guess. I don't want to know who's popular, I don't want to know who's that kind of thing, 'cause that doesn't matter to me in here, 'cause everyone in here is equal.

Because Ingels intentionally made an effort to keep her distance to deter her own bias, it was not surprising that students did not feel a strong personal connection with her. Just the same, they did pick up on Ingels wanting to do right by students, which manifested in an even temperament. Claire noted, "The thing I like about her is that some days she'll come in and she'll be like, 'This has been a really bad day.' But she doesn't let her bad day affect how she teaches the class, which is good."

Overall, Ingels seemed to have a professional orientation toward her work, which was evident in her well-planned instruction centered on lively teaching and academic rigor. From a connective standpoint, although she had positive interactions with students, she purposefully kept an emotional

distance. Ingels's case thus builds on the lessons learned from Warner's class to suggest that academic rigor is an important complement to lively teaching if it is to engage students. This case also illustrates that while generally engaging, connective instruction is not *required* for engagement.

Coach Connor's English Class

As the Variety 8 case, Coach Connor's first-period English class had relatively high levels of connective instruction (0.44) but was low on rigor (–0.38) and lively teaching (–1.00). Yet, Connor's 23 11th-grade students reported high engagement (0.57). As such, Connor's general education–level American literature class was the direct opposite of Ingels's class and thus enabled consideration of how connective instruction engaged students in the absence of academic rigor and lively teaching. Analyses revealed that Connor shared one key characteristic with Knowles—a well-loved sense of humor—and that he conveyed his humor to students in a laidback classroom climate that engendered high levels of self-expression from much of the class. A key facet of this dynamic was Connor's status as a young, popular teacher and football coach. Indeed, interviewees overwhelmingly described Connor as laidback and likeable and many reported enjoying his class. Laura noted, "He's one of my favorite teachers because right from the beginning he's one of the nicest teachers I have. . . . He's just such an easygoing guy that you can totally get along with." Others concurred: "He's cool. He's a teacher that teaches, but then too he's a teacher that understands, and he's a laidback teacher too. He's like all of them combined together." "Everybody likes Coach Connor 'cause he's so funny and just easy, really." "He's fun. He's a cool teacher."

Observations suggested that much of the fun in Connor's first period appeared to be due to Connor's personality and strong sense of youth culture, a handful of jokesters in the class, and the openness of class discussions. Connor often started class, particularly on Monday mornings, with a comical story about his family. Pete explained why he thought Connor did this: "Probably just to wake us up 'cause it's first period and to give us a good laugh before class starts." Along with this functional purpose, Connor's stories also enabled students to get to know him. Connor also seemed tuned in to his students and who they were socially. For example, during one discussion comparing slang from the era of *The Great Gatsby* with contemporary slang, some students asserted that *cupcaking* was a slang term. Connor asked Mia—a particularly stylish and popular student—if she had heard of cupcaking. When Mia said she had not, Connor replied, "It's not real if Mia hasn't heard of it." Students also commented on the 1920s term *big cheese*. Connor quipped to one student, "That's a different kind of cheese than where your nickname comes from." Such easygoing methods for relating to students seemed to give many students the perception that

Connor understood them. Shameeka explained, "He understands us. Like, he gets where we're coming from. . . . When we have our discussion in class, he can relate to what we're talking about."

In regards to rigor, all of the interviewees reported that Connor's class was easy. This seemed to be in large part because Connor taught English, a subject students reported finding easy across the board. They noted: "English is easy. It's an easy class. . . . I always pass English." "I think it's easy just 'cause like—I don't know—like we get the answers out of the book and stuff. . . . Yeah, it's English so . . . English is like the easiest subject." Students described the content: "Pretty much the same English stuff we've been learning since our freshman year—nothing really that new. We pretty much repeated each year the same thing." "I'm pretty good with answering questions about stories. It's not that hard." Although the lack of rigor was a dominant theme for Connor's class, students did not suggest that they were engaged *because* of this lack of rigor. Rather, given his relaxed sense of humor and the accessibility of his content, Connor's singular focus on connective instruction appeared to be sufficient for engagement in this particular instance.

Discussion

Fundamentally, this mixed-methods study addresses the questions of whether, why, and how teaching relates to engagement. Using quantitative and qualitative lenses to examine student engagement across 581 classes in one high school, this case study enhances our understanding of the nuanced relationship between teaching practice and student engagement. Unlike prior research on teaching for engagement, this study seeks not only to understand why and how particular practices engage students but also begins to develop a typology for classifying different instructional approaches by their mechanisms for eliciting engagement. Although the findings are not generalizable, they provide initial support for the theorized groupings of connective instruction, academic rigor, and lively teaching and illuminate the statistical and lived interactions among them.

As one critical contribution of this research, the structure of the survey data (with multiple reports from each student) enabled examination of variations in engagement both within and across students and classes. Intraclass correlations revealed that only 29% of the variance in engagement resided at the student level, while the remaining 71% occurred at either the class level or the student by class level. This finding implies that educators seeking to increase engagement must look beyond the traits of individual students to also consider the nature of the teaching practices in a given class as well as the relationship between an individual student and a particular class. With this broader view of the factors contributing to student engagement, the objective then becomes determining how to create learning spaces

that elicit high engagement for the individuals in a given class. The survey findings and embedded case studies presented here begin to uncover how three particular sets of teaching practices could play a role in enhancing student engagement.

The first category of practice, connective instruction, is comprised of teaching practices that emphasize the uniqueness of individual students by integrating connective elements of student-teacher relationships (care, understanding, affirmation, and humor) with connective elements of instruction (relevance and self-expression) (Martin & Dowson, 2009). The relative magnitude of the relationship between connective instruction and engagement—at over seven times that of the other practices—supports the notion that these practices are particularly salient for adolescents, potentially because of their individualized nature. Although the role of identity formation in engagement was not tested empirically in this study, developmental theory's assertion that identity formation is critical during adolescence (Erikson, 1968) provides a persuasive theoretical rationale for connective instruction's relatively strong relationship with engagement among these high school students. Through emphasizing relational connections between students and their teachers, content, and learning experiences, connective instruction practices appear to draw on students' sense of self as a mechanism for engagement. The findings here suggest that this engagement strategy holds promise for teachers seeking to enhance student engagement in their classes. The statistical interaction with lively teaching further suggests that connective instruction plays an even stronger role in teacher-centered classrooms where teachers rarely use games, projects, and group work. This finding suggests that teachers who run teacher-centered classes might see substantial payoff in increased student engagement by integrating more connective instruction into their practice.

The qualitative findings further illuminate the potential role of connective instruction in classes that differed in other ways. Lifsky's class, for example, suggested that students' feelings of interpersonal connection facilitated their willingness to engage in rigorous work. As such, it seems that Connor's exclusive utilization of connective instruction represented a missed opportunity to engage students in rigorous tasks that could have led to students learning more than just "the same English stuff we've been learning since our freshman year." While researchers have argued that engagement and positive affect are important for learning (Blumenfeld et al., 2006; Krathwohl, Bloom, & Masia, 1999; National Research Council, 2004), the comments from Connor's students support the logical notion that emotional engagement does not *necessarily* lead to learning in the absence of high-quality instruction. This point is clearly evident in the contrast between students' comments on learning in Connor's and Knowles's classes. While Connor's students described repeating "easy" lessons, Knowles's students reported learning "everything" and "more than I ever have in science."

For this reason, while Connor's class is instructive for illustrating how teachers can create connective instruction, it is by no means a model for student engagement and learning.

The second and third factors—academic rigor and lively teaching—both had relationships with engagement that were only a fraction of that of connective instruction. The commonality between rigor and lively teaching is that they represent teachers' decisions about how to structure and run their classes. The academic rigor practices—providing challenging work, pushing students through academic press, and demonstrating passion for content—represent a teacher's sense that what he or she has to teach is important and students must work hard to learn it. Lively teaching—using games and fun activities, group work, and projects—represents a teacher's efforts to put students in active learning roles. The focus on planning in these two types of practice is in stark contrast to connective instruction's more humanizing attention to who students are as individuals. The weaker relationships between these practices and engagement supports the theoretical proposition that teaching practices that are more relevant to student identity are more engaging for adolescents. The interaction effects further suggest that the engagement potential of lively teaching depends considerably on the other facets of a class. The findings illustrated in Figure 2 suggest that lively teaching could play a compensatory role in engagement when students feel a low level of connection with a class (Panel II) or when students experience a class as relatively rigorous (Panel III). It might be that lively teaching fills an emotional void in nonconnective classes or relieves stress in challenging classes and thereby fosters some engagement. On the whole, however, the engagement potential of lively teaching appeared to be very small, with a standardized main effect size of only .03. The qualitative findings for Warner's and Ingels's classes suggested that even when connective instruction was low, lively teaching was fairly unengaging in the absence of rigor. Figure 3 further supports the limited engagement potential of lively teaching on its own by showing that the mean level of engagement in classes that offered only lively teaching was –.45 standard deviations.

The potential utility of this three-factor structure of teaching practices is that teachers and those who support them—instructional leaders, coaches, or teacher educators—could use these constructs to think about, discuss, and strategize around teaching for engagement by identifying areas of strength and weakness. As is increasingly being advocated in efforts to improve classroom instruction (Burniske & Meibaum, 2012; Ferguson, 2007; Measures of Effective Teaching Project, 2010), school leaders and policymakers could use surveys to measure how students experience different classes and then use those results to identify target areas for individualized professional development for teachers. Such data could facilitate a systematic approach to teaching for engagement within particular classrooms and throughout a school or system. Without a typology for interpreting and

responding to survey data, however, efforts at engagement could remain isolated and rooted in trial and error. Further, understanding the mechanisms by which practices engage students could help teachers to more purposefully apply those practices. For example, knowing that demonstrating care can help students to feel valued in ways that might foster emotional connection could motivate teachers to more conscientiously make gestures of care to students who appear alienated or uninvested. In other words, this typology could inform teachers' theories of action for instructional improvement and strategically guide their engagement efforts.

One particular finding that highlights the importance of teaching to engagement emerges from the survey results among Latinos. On average, Latino students at Riley were significantly less engaged and reported significantly lower levels of connective instruction, academic rigor, and lively teaching than their peers (Table 4). However, when controlling for other factors, including perceptions of teaching (Table 5, Model C), Latinos were not significantly less engaged. Thus, the lower average engagement among Latinos was primarily explained by their different perceptions of teaching. There are two possible explanations—either Latino students at Riley experienced different teaching than others or they perceived the same practices differently. Enrollment patterns in the survey data provide some support for the first explanation. On average, Latino students were enrolled in classes that were 49% Latino, whereas non-Latinos were in classes that were 30% Latino—revealing some segregation of Latinos at Riley. Latino students also had significantly lower enrollment in advanced courses than other students. For example, only 15% of Latino students were taking advanced math, compared with 39% of White students. The second explanation rests on Latinos having different perceptions of particular practices, which could result from culturally different interpretations of survey items. For example, when reporting their perceptions of teacher care, Latinos might have particular cultural expectations for teacher care. Or, when assessing the frequency of group work, Latinos' notions of what constitutes "quite often" could be different. Given culturally different notions of constructs such as teacher care or group learning across Latino and other cultures (Gándara & Contreras, 2009; Valenzuela, 1999; Vigil, 2004), there is a strong possibility that Latino students perceive their classroom experiences differently from other students. Such differences are foundational to culturally relevant pedagogy, which honors the ways of being and learning across cultures (Ladson-Billings, 1995), and which could suggest that Riley is not serving Latinos well. Future research using the Riley data will more fully examine these differences for Latinos. Regardless, the finding that lower levels of Latino engagement were primarily explained by different perceptions of teaching underscores the role of teaching in engagement.

Future research must replicate this study in new contexts with different student populations and different instructional emphases. Importantly,

before we dismiss the engagement potential of academic rigor and lively teaching, we must note that these findings represent students' experiences with these practices at Riley High School—not how students *could* experience them. Indeed, research has shown that some of the assessed practices—collaborative groups and project-based learning, in particular—can be engaging and promote learning when implemented well (Johnson & Johnson, 2009; Larmer & Mengendoller, 2010; Ravitz, 2010; Vermette, 2009). At Riley, it might be that these practices are underutilized or poorly implemented. To this end, the low correlation between group work and challenging work ($r = .11$) suggests that teachers might assign low-level tasks to groups, as Warner did in the house-building activity. Similarly, the low correlation between projects and self-expression ($r = .24$) implies that teachers might not assign projects that facilitate creativity. However, schools that emphasize project-based learning might implement projects and group work differently, and so further attention to these variations is warranted. In addition, this study does not assess all potentially engaging practices that teachers might use, and future studies could assess more or different practices than those included here. If other practices are considered, more than three mechanisms for engaging students might emerge. It might also be the case that various teaching practices function differently across subjects. Certainly, the comments from Connor's students regarding their perceptions of English classes suggested that students held strong conceptions of the expectations in particular subjects. The survey results similarly revealed different perceptions of teaching across 11 academic and elective subjects. Thus, future research should examine whether and how teaching for engagement varies by content area.

If these findings do hold across multiple sites and subjects, then future research can examine whether and how increased emphasis on connective instruction could support schools and teachers working toward increased engagement. Specifically, future research should consider how teachers and instructional leaders can change teaching to emphasize the emotional connections of connective instruction, whether doing so supports teachers' effectiveness and self-efficacy in regards to engagement, and whether such efforts lead to higher levels of engagement. Future research could also more closely examine the relationship between lively teaching and rigor. In this study, the only two case study classes that were high on both lively teaching and academic rigor were those taught by Knowles and Ingels. Interestingly, these were also the only two teachers who demonstrated considerable mastery of their content and high levels of pedagogical content knowledge. Given the importance of such knowledge to effective teaching (Parris & Block, 2007; Shulman, 1986), teachers with sophisticated understanding of content in these ways might be particularly well equipped to design instruction that effectively integrates lively teaching with academic rigor. Future research could explore this possibility and examine how

teacher collaboration might enable teachers with such knowledge to help other teachers increase the engagement potential of their lessons.

Additionally, the role of identity as a mechanism for classroom engagement needs to be further explored. The present study drew on identity as a rationale for theorizing how and why connective instruction might be particularly critical during adolescence. Despite being motivated by this possibility, the present study did not examine this premise empirically. Future research can more closely examine the role of identity formation in students' classroom experiences with connective instruction and explore whether and how connective instruction practices influence students' identity formation. As a separate issue, the fact that identity formation is the primary developmental task of adolescence (Erickson, 1968) raises unaddressed questions regarding developmentally appropriate instruction for adolescents. Literature on "developmentally appropriate instruction" often examines early childhood education (e.g., Elliott & Olliff, 2008; Van Horn & Ramey, 2003) or programming for at-risk youth (e.g., Meschke, Peter, & Bartholomae, 2012; Pedlow & Carey, 2004). Yet, the notion of making everyday classroom instruction across content areas developmentally appropriate for adolescents through a focus on identity is largely overlooked in research and practice. Even among studies that examine identity in high school, the focus is on how schools and schooling experiences inadvertently shape or are shaped by students' identities (e.g., Davidson, 1996; Lannegrand-Willems & Bosma, 2006; Nasir & Hand, 2008; Roeser, Peck, & Nasir, 2006; Yonezawa et al., 2009). The literature does not address how high schools can intentionally capitalize on identity formation as a mechanism for engagement. In this way, while the present study is small and nongeneralizable, it does suggest a new arena for research on teaching for engagement.

Conclusion

Given the importance of engagement to academic success, increasing engagement can no longer rely on teachers' idiosyncratic teaching styles. With a stronger, more systematic understanding of how various teaching practices link to engagement, educators can begin to more uniformly modify classes for increased engagement. This study takes a step toward such a systematic approach by classifying teaching practices according to their mechanisms for engagement and assessing the engagement potential of various practices. Collectively, these findings support Martin and Dowson's (2009) notion of connective instruction as a valid and promising strategy for increasing engagement. Given the centrality of identity development in how adolescents experience and understand school, it is not surprising that the personal, relational facets of connective instruction were so strongly linked to engagement. Indeed, more attention to practices that enable

students to make personally meaningful connections to classes would be a critical step toward increasing student engagement.

Notes

This research was funded by a Dissertation Fellowship from the Harvard Graduate School of Education. The author would like to thank John Diamond, Richard Elmore, Hunter Gehlbach, John Willett, Barbara Schneider, and Sola Takahashi for their thoughtful feedback on the research design and written drafts of this work.

[1]Riley is a pseudonym, as are the names of all individuals included in this study.

[2]The school and sample racial breakdowns differ because the school-level data (enrollment data from the Texas Education Agency, as of October 31, 2009) did not allow students to designate multiple races. Thus, the 10% of students who self-reported multiple races on the survey were classified as only one race in the school-level data.

[3]Some students did not complete the entire survey, either because they ran out of time or they gave up partway through. During data entry, if students completed the items for at least one class, those responses were used.

[4]For details on student interviewees, see: https://sites.google.com/site/elicitingengagement2013/.

[5]For the student interview protocol, see: https://sites.google.com/site/elicitingengagement2013/.

[6]The standardized composites for engagement, connective instruction, academic rigor, and lively teaching were all z scores computed by STATA software ($M = 0$, $SD = 1$).

[7]To test whether the relative effect sizes were due to the greater number of items and higher alpha coefficient for connective instruction, Model D regression analyses were rerun using three-item composites for connective instruction, as follows: Using care, understanding, and a humorous teacher (the three items with the largest factor loadings; $\alpha = .83$), the standardized effect sizes were .47 for connective instruction, .07 for lively teaching, and .13 for academic rigor. Using relevance, affirmation, and self-expression (the three items with the smallest factor loadings; $\alpha = .70$), the standardized effect sizes were .52 for connective instruction, .07 for lively teaching, and .13 for academic rigor. These tests confirm that although the effect sizes were closer in magnitude when using fewer items, the ranking of effect sizes held and the effect of connective instruction remained at least 3.6 times as strong as that of academic rigor or lively teaching.

References

Afifi, A., Clark, V. A., & May, S. (2004). *Computer-aided multivariate analysis* (4th ed.). Boca Raton, FL: Chapman & Hall/CRC.

Blumenfeld, P. C., Kempler, T. M., & Krajcik, J. S. (2006). Motivation and cognitive engagement in learning environments. In R. K. Sawyer (Ed.), *The Cambridge handbook of the learning sciences* (pp. 475–488). Cambridge, UK: Cambridge University Press.

Bridgeland, J. M., Dilulio, J. J., & Morison, K. B. (2006). *The silent epidemic: Perspectives of high school dropouts.* Seattle, WA: Bill and Melinda Gates Foundation.

Brophy, J. (1981). Teacher praise: A functional analysis. *Review of Educational Research*, *51*(1), 5–32.

Burniske, J., & Meibaum, D. (2012). *The use of student perceptual data as a measure of teaching effectiveness* (Briefing paper from the Texas Comprehensive Center). Austin, TX: SEDL.

Caraway, K., Tucker, C. M., Reinke, W. M., & Hall, C. (2003). Self-efficacy, goal orientation, and fear of failure as predictors of school engagement in high school students. *Psychology in the Schools, 40*, 417–427.

Conchas, G. Q. (2001). Structuring failure and success: Understanding the variability in Latino student engagement. *Harvard Educational Review, 71*(3), 475–504.

Connell, J. P. (1990). Context, self, and action: A motivational analysis of self-system processes across the life-span. In D. Cicchetti (Ed.), *The self in transition: Infancy to childhood* (Pp. 61–97). Chicago, IL: University of Chicago.

Cooper, K. S. (2012). Safe, affirming, and productive spaces: Classroom engagement among Latino high school students. *Urban Education, 48*(4), 490–528.

Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks, CA: Sage.

Davidson, A. L. (1996). *Making and molding identity in schools: Student narratives on race, gender, and academic engagement.* Albany, NY: State University of New York.

Davidson, A. L., & Phelan, P. (1999). Students multiple worlds: An anthropological approach to understanding students' engagement with school. *Advances in Motivation and Achievement, 11*, 233–273.

Dockter, J., Haug, D., & Lewis, C. (2010). Digital literacies: Redefining rigor: Critical engagement, digital media, and the new English/language arts. *Journal of Adolescent & Adult Literacy, 53*(5), 418–420.

Easton, L. B. (2008). *Engaging the disengaged: How schools can help struggling students succeed.* Thousand Oaks, CA: Corwin.

Elliott, E. M., & Olliff, C. B. (2008). Developmentally appropriate emergent literacy activities for young children: Adapting the early literacy and learning model. *Early Childhood Education, 35*, 551–556.

Erikson, E. H. (1968). *Identity: Youth and crisis.* New York, NY: W. W. Norton & Company.

Ferguson, R. (2007). *Toward excellence with equity: An emerging vision for closing the achievement gap.* Cambridge, MA: Harvard Education Press.

Fielding, A. (2002). Teaching groups as foci for evaluating performance in cost-effectiveness of GCE advanced level provision: Some practical methodological innovations. *School Effectiveness and School Improvement, 13*(2), 225–246.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*(1), 59–109.

Furrer, C., & Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology, 95*, 148–162.

Gándara, P., & Contreras, F. (2009). *The Latino education crisis: The consequences of failed social policies.* Cambridge, MA: Harvard University.

Good, T. L., & Brophy, J. E. (2003). *Looking in classrooms* (9th ed.). Boston, MA: Allyn & Bacon.

Green, J., Martin, A. J., & Marsh, H. W. (2007). Motivation and engagement in English, mathematics and science high school subjects: Towards an understanding of multidimensional domain specificity. *Learning and Individual Differences, 17*(3), 269–279.

Harter, S. (2006). The development of self-esteem. In M. H. Kernis (Ed.), *Self-esteem issues and answers: A sourcebook of current perspectives* (pp. 144–150). New York, NY: Psychology Press.

Johnson, D. W., & Johnson, R. T. (2009). An educational psychology success story: Social interdependence theory and cooperative learning. *Educational Researcher, 38*(5), 365–379.

Kline, R. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York, NY: Guilford.

Krathwolh, D. R., Bloom, B. S., & Masia, B. B. (1999). *Taxonomy of educational objectives: Book 2 affective domain* (2nd ed.). London: Longman.

Kroger, J. (2000) *Identity development: Adolescence through adulthood.* Thousand Oaks, CA: Sage.

Ladson-Billings, G. (1995). Toward a theory of culturally relevant pedagogy. *American Educational Research Journal, 32*(3), 465–491.

Lannegrand-Willems, L., & Bosma, H. A. (2006). Identity development-in-context: The school as an important context for identity development. *Identity, 6*(1), 85–113.

Larmer, J., & Mergendoller, J. R. (2010). 7 essentials for project-based learning. *Educational Leadership, 68*(1), 34–37.

Lee, V. E., & Smith, J. B. (1999). Social support and achievement for young adolescents in Chicago: The role of school academic press. *American Educational Research Journal, 36*(4), 907–945.

Lofland, J., & Lofland, L. H. (1995). *Analyzing social settings: A Guide to qualitative observation and analysis* (3rd ed). Belmont, CA: Wadsworth.

Marcia, J. E. (1966). Development and validation of ego-identity status. *Journal of Personality and Social Psychology, 3*(5), 551–558.

Marsh, H. W. (2001). Distinguishing between good (useful) and bad workloads on students' evaluations of teaching. *American Educational Research Journal, 38*(1), 183–212.

Marsh, H. W., Martin, A. J., & Debus, R. (2001). Individual differences in verbal and math self-perceptions: One factor, two factors, or does it depend on the construct? In R. Riding & S. Rayner (Eds.), *International perspectives on individual differences* (pp. 149–170). London: Greenwood Publishing.

Martin, A. J., & Dowson, M. (2009). Interpersonal relationships, motivation, engagement, and achievement: Yields for theory, current issues, and educational practice. *Review of Educational Research, 79*(1), 327–365.

Marzano, R. J. (2007). *The art and science of teaching: A comprehensive framework for effective instruction.* Alexandria, VA: Association for Supervision and Curriculum Development.

Marzano, R. J., Pickering, D. J., & Heflebower, T. (2011). *The highly engaged classroom.* Bloomington, IN: Marzano Research Laboratory.

Maxwell, J. A. (2005). *Qualitative research design: An interactive approach.* Thousand Oaks, CA: Sage.

Mayeroff, M. (1971). *On caring* (*Vol. 43*). New York, NY: Harper & Row.

Measures of Effective Teaching Project. (2010). *Learning about teaching: Initial findings from the measures of effective teaching project.* Seattle, WA: Bill & Melinda Gates Foundation.

Meschke, L. L., Peter, C. R., & Bartholomae, S. (2012). Developmentally appropriate practice to promote healthy adolescent development: Integrating research and practice. *Child Youth Care Forum, 41*, 89–108.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook.* Thousand Oaks, CA: Sage.

Nakkula, M. (2003). Identity and possibility: Adolescent development and the potential of schools. In M. Sadowski (Ed.) *Adolescents at school: Perspectives on youth, identity, and education* (pp. 7–18). Cambridge, MA: Harvard Education Press.

Nakkula, M. J., & Toshalis, E. (2006). *Understanding youth: Adolescent development for educators.* Cambridge, MA: Harvard Education Press.

Nasir, N. S., & Hand, V. (2008). From the court to the classroom: Opportunities for engagement, learning, and identity in basketball and classroom mathematics. *The Journal of the Learning Sciences, 17*, 143–179.

National Center for School Engagement. (2006). *Quantifying school engagement: Research report*. Denver, CO: National Center for School Engagement.

National Research Council. (2004). *Engaging schools: Fostering high school students' motivation to learn*. Washington, DC: The National Academies.

Noddings, N. (2005). *The challenge to care in schools: An alternative approach to education* (2nd ed.). New York, NY: Teachers College Press.

Oldfather, P. (1995). What's needed to maintain and extend motivation for literacy in the middle grades. *Journal of Reading, 38*(6), 420–422.

Parris, S. R., & Block, C. C. (2007). The expertise of adolescent literacy teachers. *Journal of Adolescent and Adult Literacy, 50*(7), 582–596.

Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage.

Pedlow, C. T., & Carey, M. P. (2004). Developmentally appropriate sexual risk reduction interventions for adolescents: Rationale, review of interventions, and recommendations for research and practice. *Annals of Behavioral Medicine, 27*(3), 172–184.

Pogrow, S. (2008). *Teaching content outrageously: How to captivate all students and accelerate learning, grades 4–12*. San Francisco, CA: Jossey-Bass.

Programme for International Student Assessment. (2000). *Student engagement at school: A sense of belonging and participation, executive summary* (Report Code: 96 2003 13 1 P). Paris: Organization for Economic Cooperation and Development.

Rabash, J., & Goldstein, H. (1994). Efficient analysis of mixed hierarchical and cross-classified random structures using a multi-level model. *Journal of Educational and Behavioral Statistics, 19*(4), 337–350.

Raudenbush, S. W. (1993). A crossed random effects model for unbalanced data with applications in cross-sectional and longitudinal research. *Journal of Educational Statistics, 18*(4), 321–349.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Application and data analysis methods*. Thousand Oaks, CA: Sage.

Ravitz, J. (2010). Beyond changing culture in small high schools: Reform models and changing instruction with project-based learning. *Peabody Journal of Education, 83*(3), 290–312.

Roeser, R. W., Peck, S. C., & Nasir, N. S. (2006). Self and identity processes in school motivation, learning, and achievement. In P. A. Alexander & P. H. Winne (Eds.), *Handbook of educational psychology* (2nd ed., 391–426). Mahwah, NJ: Lawrence Erlbaum.

Rumberger, R. W. (2011). *Dropping out: Why students drop out of high school and what can be done about it*. Cambridge, MA: Harvard University.

Schlechty, P. C. (2011). *Engaging students: The next level of working on the work*. San Francisco, CA: Jossey-Bass.

Schussler, D. L. (2006). Beyond content: How teachers manage classrooms to facilitate intellectual engagement for disengaged students. *Theory Into Practice, 48*(2), 114–121.

Schussler, D. L., & Collins, A. (2006). An empirical exploration of the who, what, and how of school care. *Teachers College Record, 108*(7), 1460–1495.

Shahar, G., Henrich, C. C., Blatt, S. J., Ryan, R., & Little, T. D. (2003). Interpersonal relatedness, self-definition, and their motivational orientation during

adolescence: A theoretical and empirical integration. *Developmental Psychology, 39*(3), 470–483.

Shernoff, D. J., Csikszentmihalyi, M., Schneider, B., & Shernoff, E. S. (2003). Student engagement in high school classrooms from the perspective of flow theory. *School Psychology Quarterly, 18*(2), 158–176.

Shulman, L. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*(2), 4–14.

Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.

Valenzuela, A. (1999). *Subtractive schooling: US Mexican youth and the politics of caring*. Albany, NY: State University of New York.

Van Horn, M. L., & Ramey, S. L. (2003). The effects of developmentally appropriate practices on academic outcomes among former head start students and classmates, Grades 1–3. *American Educational Research Journal, 40*(4), 961–990.

Vermette, P. J. (2009). *Engaging teens in their own learning: 8 keys to student success*. Larchmont, NY: Eye on Education.

Vigil, J. D. (2004). Gangs and group membership: Implications for schooling. In M. Gibson, P. Gandara, & J. Peterson Koyama (Eds.), *School connections: US Mexican youth, peers, and school achievement* (pp. 87–106). New York, NY: Teachers College Press.

Wang, M., & Holcombe, R. (2010). Adolescents' perceptions of school environment, engagement, and academic achievement. *American Educational Research Journal, 47*(3), 633–662.

Willms, J. D. (2003). *Student engagement at school: A sense of belonging and participation: Results from PISA 2000*. Paris: Organisation for Economic Co-Operation and Development.

Wolf, M. K., Crosson, A. C., & Resnick, L. B. (2005). Classroom talk for rigorous reading comprehension instruction. *Reading Psychology, 26*(1), 27–53.

Yazzie-Mintz, E. (2009). *Charting the path from engagement to achievement: A report on the 2009 High School Survey of Student Engagement*. Bloomington, IN: Center for Evaluation & Education Policy, Indiana University School of Education.

Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage.

Yonezawa, S., Jones, M., & Joselowsky, F. (2009). Youth engagement in high schools: Developing a multidimensional, critical approach to improving engagement for all students. *Journal of Educational Change, 10*, 191–209.

Manuscript received June 22, 2012
Final revision received July 25, 2013
Accepted September 15, 2013