

TEACH CLASSROOM OBSERVATION TOOL*Background Paper***Evidence-Based Teaching****Effective Teaching Practices in Primary School Classrooms***Ezequiel Molina**Adelle Pushparatnam**Sara Rimm-Kaufman**Keri Ka-Yee Wong***WORLD BANK GROUP**

Education Global Practice

November 2018

Abstract

Even after spending five to six years sitting in a classroom almost every day for anywhere between four to seven hours, a significant share of students in low- and middle-income countries are still not able to read, write, or do basic arithmetic. What explains this “learning crisis?” A growing body of evidence suggests that poor teaching practices and little to no learning inside the classroom are the main culprits. As such, the learning crisis reflects a teaching crisis. So what

can teachers do inside the classroom to tackle these joint crises? This paper systematizes the evidence regarding effective teaching practices in primary school classrooms, with special focus on evidence from low- and middle-income countries. By doing so, the paper provides the theoretical and empirical foundations for the content of the newly developed *Teach* classroom observation tool. Implications for teacher education and evaluation are also discussed.

This paper is a product of the Education. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at <http://www.worldbank.org/research>. The authors may be contacted at molina@worldbank.org.

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

Evidence-Based Teaching

Effective teaching practices in primary school classrooms*

Ezequiel Molina^a, Adelle Pushparatnam^b, Sara Rimm-Kaufman^c, and Keri Ka-Yee Wong^d

JEL Classification: I20; O15

Keywords: Education; Teacher Performance; Teacher Training; Education Policy and Planning; Public Service Delivery

* We are grateful to the Teach Advisory Panel composed of Lindsay Brown (Research Director of 3EA), Michael Crawford (World Bank), Pam Grossman (Dean and George and Diane Weiss Professor, Graduate School of Education, University of Pennsylvania), Heather Hill (Jerome T. Murphy Professor in Education, Harvard Graduate School of Education), Andrew Ragatz (World Bank), Erica Woolway (Chief Academic Officer for the Teach Like a Champion), and Nick Yoder (Senior Consultant, AIR) who also provided feedback during the development of the tool. We are also grateful to Tracy Marie Wilichowski, Carolina Melo Hurtado, and Pelusa Orellana, who contributed to previous versions of this paper, and to Carolina Moreira for excellent research assistance. Finally, we are grateful to the World Bank, and in particular the SABER Trust Fund (funded in large part by DFID and DFAT), for supporting the research. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the Technical Advisory Board or the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent. The [Teach tool](#) and all its complementary resources can be found [here](#).

^aThe World Bank, molina@worldbank.org (corresponding author); ^bThe World Bank ; ^cCurry School of Education, University of Virginia; ^d Department of Psychology & Human Development, University College of London.

1. Introduction

A significant number of countries around the world are facing a “learning crisis”: a large share of children complete primary school lacking even basic reading, writing, and arithmetic skills (World Bank, 2018). This phenomenon is not new; research as far back as the 1980s highlights this problem, with early evidence provided for Brazil (Behrman & Birdsall, 1983).

How is it possible that after five to six years of sitting in a classroom almost every day for anywhere between four to seven hours, a large portion of students are still not able to read, write, or do basic arithmetic? To start answering this question, consider three examples. Each describes a scenario that is likely to lead to no learning gains among students. These scenarios were actually documented as part of our ongoing study of teaching practices in low- and middle-income countries.

In a classroom in Afghanistan, the teacher takes out a textbook and reads the lesson objective out loud. He asks one student to read a passage describing the learning objective, then asks another student to read the same passage, and yet a third student. By the end of the class, a total of eight students have read the same passage, spending more than 20 minutes on this activity.

In a classroom in Dar es Salaam, Tanzania, the teacher arrives 20 minutes late. During that time, students are unsupervised and have no learning activities in which to engage. Once the teacher arrives, she puts addition questions on the board and asks students to solve them individually. After sitting at her desk for 10 minutes, she asks a single volunteer to go to the board to solve one of the problems. When the student shows difficulty in solving the problem, the teacher becomes impatient and asks another student to come solve it. After the second student solves the problem correctly, the teacher asks the students if they understand. They respond in synchrony that they do and the class ends.

The final scenario takes place in Rawalpindi, Pakistan. The teacher asks students to divide 4 by 2. After some time goes by, he asks one student to solve the problem on the board. This student solves it correctly and all the students cheer. After that, the teacher erases the answer and asks another student to come to the board to solve the exact same question. The teacher follows the same process for five additional students.

These are not isolated examples. A growing body of evidence suggests that to a large extent the learning crisis is a reflection of a teaching crisis (Bold et al., 2017, Molina Fatima, Trako, & Wilichowski, 2018a; Molina, Trako, Hosseini, Matin, Masood, & Viollaz, 2018b;

Trako and Molina, 2018). Good-quality teaching is central for children's lives. Research in low- and middle-income countries shows the important impact of teachers: the difference between the impact of a weak versus a great teacher on student test scores has been estimated at 0.36 standard deviations (SDs) in Uganda (Buhl-Wiggers et al., 2017) and 0.54 SDs in Pakistan (Bau & Das, 2017). This is equivalent to more than two years of schooling as a consequence of having a higher quality teacher (Evans & Yuan, 2017). Teachers impact children's lives well beyond test scores. Recent work by Chetty, Friedman, & Rockoff (2014) showed that teachers' value added in a single year predicts key later-life outcomes such as teen pregnancy, college attendance, and labor market earnings long after students have left a teacher's classroom.

How can learning conditions improve for students worldwide? Until now, most efforts have focused on policies that do not affect the instructional and social environments children experience on a daily basis. This is in part because of insufficient knowledge of what practices and behaviors in the classroom make a difference on student learning. A simple Google (Google Scholar) search on "What are effective teaching practices?" produces 202 (3.95) million results. Despite the vast number of pages written on the topic, most of this work provides little empirical support for its claims. No clear consensus exists on what "good teaching" means; even experienced teachers and principals are poor at predicting which teachers are effective after watching them teach (Strong et al., 2011). This study showed experienced teachers and principals videos of "effective" and "ineffective" teachers, as measured by value added, and asked them to identify which teachers were in which group. Less than 50% of experienced teachers and principals correctly identified which group teachers belonged to, an outcome worse than that expected by pure chance.

While teaching has historically been recognized as a craft, the lack of data and research on what goes on inside classrooms creates a language barrier, as no common language exists for analyzing and describing teaching, limiting education systems' ability to learn and improve (Grossman et al., 2009).

Observing and measuring classroom quality is not a new idea. To date, a wide variety of observational measures have been applied to classrooms. Some are content-specific, focusing exclusively on math or language arts (MQI, PLATO, M-Scan). Others are general measures of teaching and can be used across content areas, such as the Classroom Assessment Scoring System (CLASS), which assesses the nature of interactions between teachers and children, and the Framework for Teaching (FFT). Several commonalities arise across these measures. Each involves sampling small amounts of time out of a lesson. They

are systematic and involve highly trained observers who observe behavioral indicators present in classrooms and make inferences about those observations (Cohen & Goldhaber, 2016).

To begin to address these gaps in knowledge and develop a common language for analysis of teacher practices, *Teach* is a new measure specifically designed for low- and middle-income countries. It focuses on several main elements that reflect universal experiences that lead to learning, regardless of the culture and physical conditions of the classroom (Molina, Fatima, Ho, Melo Hurtado, Wilichowski, & Pushparatnam, 2018c). The *Teach* framework has two main components (“Time on Task” and “Quality of Teacher Practices”). The latter component has three primary areas for evaluating the quality of teacher practices.

This paper makes two contributions to the literature. First, it systematizes the evidence on effective teaching practices. To the best of the authors’ knowledge, this is the first such paper to focus on primary classrooms and low- and middle-income countries. Second, it provides an organizing framework (*Teach*) that can serve as the first step to create a common language among educators in low- and middle-income countries to talk about teaching.

The paper is organized as follows. Section 2 presents *Teach*’s organizing framework and development process. Section 3 provides a literature review of the evidence used to develop *Teach*’s content. Section 4 concludes with a brief discussion of the implications for teacher education and evaluation.

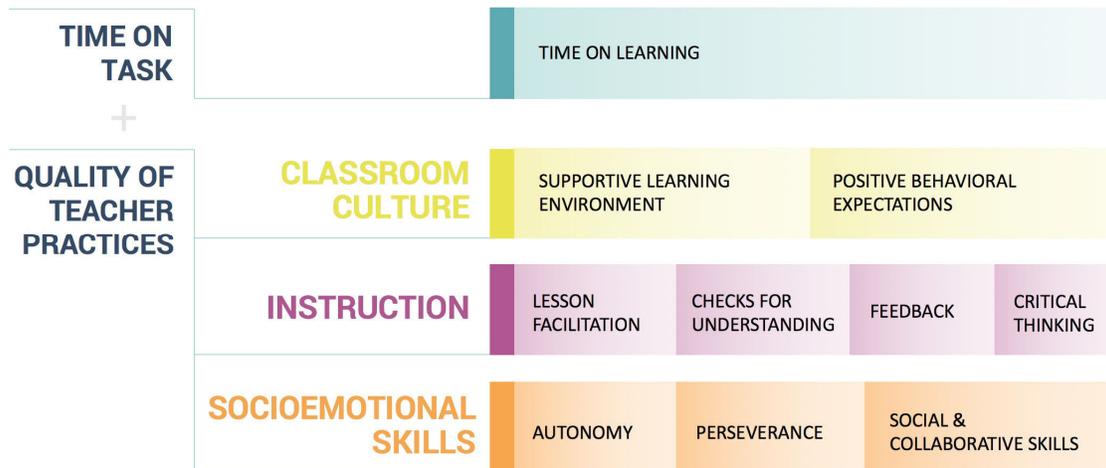
2. Framework

Teach measures over the course of a teacher’s lesson (i) the time a teacher spends on learning and the extent to which students are on task, and (ii) the quality of teaching practices that help develop students’ socioemotional and cognitive skills.

As part of the “Time on Task” component, three “snapshots” of 1–10 seconds are used to record both the teacher’s actions and the number of students who are on task throughout the observation. As noted in Section 1, the “Quality of Teaching Practices”

component is organized into three primary areas: Classroom Culture, Instruction, and Socioemotional Skills.¹

Figure 1: Teach Framework



The three “Quality of Teaching Practices” areas have nine corresponding elements that point to 28 behaviors (Figure 1). The behaviors are characterized as low, medium, or high, based on the quality of teacher practices observed. These behavior scores are translated into a five-point scale that quantifies teaching practices as captured in a series of two 15-minute lesson observations.

1. **Classroom Culture:** The teacher creates a culture that is conducive to learning. The focus here is not on the teacher correcting students’ negative behaviors but rather the extent to which the teacher creates: (i) a supportive learning environment by treating all students respectfully, consistently using positive language, responding to students’ needs, and both challenging gender stereotypes and not exhibiting gender bias in the classroom; and (ii) positive behavioral by setting clear behavioral expectations, acknowledging positive student behavior, and effectively redirecting misbehavior.

¹ It should be noted that it is impossible to draw a clear line between teacher practices linked to academic versus socioemotional learning. Many teacher practices included in common professional teaching frameworks do impact students’ socioemotional development, though are usually thought of in terms of academic rather than socioemotional learning. Explicitly linking teacher practices with socioemotional outcomes in measures used for assessment will serve to increase the salience of students’ socioemotional skills to teachers, as well as to other stakeholders and policymakers, thus ensuring a focus on both academic and socioemotional learning in the classroom.

2. **Instruction:** The teacher instructs in a way that deepens student understanding and encourages critical thinking and analysis. The focus here is not on content-specific methods of instruction, but rather the extent to which the teacher: (i) facilitates the lesson by explicitly articulating lesson objectives that are aligned to the learning activity, clearly explaining content, and connecting the learning activity to other content knowledge or students' daily lives, and by modelling the learning activity through enacting or thinking aloud; (ii) does not simply move from one topic to the next but checks for understanding by using questions, prompts, or other strategies to determine students' level of understanding, by monitoring students during group and independent work, and by adjusting his/her teaching to the level of students; (iii) gives feedback by providing specific comments or prompts to help clarify students' misunderstandings or identify their successes; and (iv) encourages students to think critically by asking open-ended questions and providing students with thinking tasks that require them to actively analyze content. Students exhibit critical thinking ability by asking open-ended questions or performing thinking tasks.

3. **Socioemotional Skills:** The teacher fosters socioemotional skills that encourage students to succeed both inside and outside the classroom. To develop students' social and emotional skills, the teacher: (i) instills autonomy by providing students with opportunities to make choices and take on meaningful roles in the classroom; students exhibit their autonomy by volunteering to participate in classroom activities; (ii) promotes perseverance by acknowledging students' efforts, rather than focusing solely on their intelligence or natural abilities, by having a positive attitude toward students' challenges, framing failure and frustrations as part of the learning process, and by encouraging students to set short- and long-term goals; and (iii) fosters social and collaborative skills by encouraging collaboration through peer interaction and by promoting interpersonal skills, such as perspective taking, empathizing, emotion regulation, and social problem solving. Students exhibit social and collaborative skills by collaborating with one another through peer interaction.

The *Teach* development team rigorously researched, revised, and piloted different iterations of the tool over a two-year timeframe: First, the development team — which comprised one education measurement expert, one instructional expert, one psychologist, and one teacher — assessed five classroom observation tools widely used in the United States to

create an inventory of teacher practices that are commonly evaluated.² The team then built upon this list to include behaviors from international classroom observation tools used in developing countries.³ Based on this preliminary analysis, the team created an inventory of three areas and 43 elements.⁴

Second, the development team hosted a working group of 22 education experts and practitioners to help further reduce and prioritize elements for the *Teach* framework. Participants were asked to indicate whether any elements were missing from the inventory, to rank the elements and areas by relevance, and to identify elements they characterized as unobservable. This process reduced the framework to 25 elements. Then the development team reviewed the theoretical and empirical evidence from developing countries to further eliminate elements from the framework. This process resulted in a downsized framework of 14 elements.

These 14 elements comprised the first working version of the tool, which aimed to capture both quality and frequency of teaching practices as measured by each element.⁵ This preliminary tool was piloted in person in Pakistan and Uruguay and using classroom video footage in Afghanistan, China, Pakistan, the Philippines, Tanzania, Uruguay, and Vietnam. From these pilots, it became apparent that observers struggled to code reliably when they had to simultaneously capture the frequency and quality of teaching practices for each element. In response, the development team revised the structure of the tool to address this challenge as well as other errors and logical inconsistencies. This process resulted in a tool that comprised 10 elements.

Next, the development team convened a technical advisory panel, including Lindsay Brown, Pam Grossman, Heather Hill, Andrew Ragatz, Sara Rimm-Kaufman, Erica Woolway, and Nick Yoder, to provide written feedback on the tool. These comments were compiled and addressed as part of a one-day technical workshop. During the workshop, the

² The *Teach* framework built upon the inventory created by Gill and others (2016), who conducted a content analysis of the differences in dimensions of instructional practice of five commonly used classroom observation tools comparing the behaviors they measure with the extent to which they predict student learning. The tools included CLASS, FFT, PLATO, Mathematical Quality of Instruction, and UTeach Observational Protocol. The content, predictive power, and potential bias of these instruments were also analyzed as part of this preliminary framework.

³ These included OPERA, SCOPE, SDI, Stallings, and TIPPS.

⁴ Elements refer to groups of multiple, similar behaviors that aim to capture teaching practices related to positive learning outcomes.

⁵ For example, the tool aimed to capture not just the quality with which a teacher checked for understanding (adjusting the lesson, prompting students to determine their level of understanding, etc.), but the frequency with which the teacher checked for understanding in each lesson.

experts advised the team on which issues to prioritize and how to incorporate the comments to further improve the tool. This updated version of the tool was applied in four settings, where observers were given a certification exam that ensured they could reliably code using *Teach*. In Mozambique, 74% of the observers passed the certification exam; in Pakistan and the Philippines, 96% passed; and in Uruguay, 100% passed. The observers also provided comments on the tool and training that was considered during the revision process.

Finally, the development team analyzed the psychometric properties of the tool (Molina et al., 2018c). Based on this analysis and feedback from the trainers and observers, the development team revised each element's structure and complementary examples to improve the tool's consistency and clarity. As part of this process, the "Time on Learning" element was modified to capture teachers' time on instruction and students' time on task through a series of snapshots. This process resulted in a tool that comprised one low-inference and nine high-inference elements. The final stage involved testing these revisions using the *Teach* video library.

3. Evidence

This section provides the evidence for Teach' framework.

3.1 Time on Learning

Effective teachers maximize the amount of time students spend on learning (Wharton-McDonald, Pressley, & Hampston, 1998; Bruns & Luque, 2014; Stronge, 2018). These activities can involve different instructional contexts, such as large group, small group, and individualized work, but the general consensus is that time lost in classroom instruction is associated with behavioral problems and poorer student academic outcomes (Bruns & Luque, 2014; Dobbie & Fryer, 2013; Lavy, 2010, 2015). This problem is even more acute in low- and middle-income countries, with high absence rates and low instructional time (Bold et al., 2017; World Bank, 2018). Thus *Teach* deemed it important to include the following two observable teacher behaviors to maximize time on learning in the classroom:

1 Teacher provides learning activity to most students

2 Students are on task

1 Teacher provides learning activity to most students

How time is spent in school is even more important than the *amount of time* spent in school (OECD, 2014). Classic work by Stallings (1976) summarized findings from 108 classrooms across 10 different large-scale teacher effectiveness study sites and found that classrooms where the school day is longer and there is more time for children to spend engaged in a reading activity were also related to higher reading scores in both first and third graders. Evidence from the PISA (2006) from 50 developed and developing countries demonstrated a large positive association between teachers' instructional time on students' test scores (Lavy, 2015). This finding was replicated in younger children: 10- to 13-year-olds in Israel (Lavy, 2010) exposed to more instruction showed higher test scores. Other studies in Germany, the United States, and Switzerland corroborated this finding, linking increased instructional time with higher student learning (Pischke, 2007; Dobbie & Fryer, 2013; Cattaneo, Oggenfuss, & Wolter, 2017).

These findings have also been replicated in studies of developing countries. Using data from seven Latin America countries, Bruns & Luque (2014) showed that teachers from schools ranked in the top 25th percentile of student learning averaged 80 percent of their time on task, compared to teachers in the bottom 75th percentile, who were only on task 30 percent of the time.

2 Students are on task

Student engagement is one important predictor of whether learning is taking place (Christenson et al., 2012; Castillo, 2017). Literature has characterized engagement as malleable, and factors like teacher support, classroom structure, and task characteristics influence how engaged students are (Fredricks, Blumenfeld & Paris, 2004). Bruns & Luque (2014) found that when students are on task and engaged (e.g., reading, writing, listening, or talking about a relevant topic versus staring out the window, engaging in idle chatter, or fiddling with the contents of one's desk), they learn significantly more than when they are not. A subsequent study of 51 secondary school math teachers in Chile found that teachers who keep students on task tend to have better classroom organizational skills overall and better behavioral management skills, and spend more time on classroom instruction (Bruns, De Gregorio, & Taut, 2016). When students are off task they not only limit their own learning opportunity but also disrupt their peers. This impacts peer learning in the short term (Hanushek, Kain, Markman, & Rivkin, 2003; Feld & Zolitz, 2017) and income in the long term (Carrell, Hoekstra, & Kuka, 2018).

3.2 CLASSROOM CULTURE

Classroom culture refers to a jointly shared set of beliefs, attitudes, and behaviors by the teacher and students. This culture can be explicit or implicit, and it serves to provide students with a framework to learn about themselves and expectations for how they should interact with others (Fullan, 2007). For a positive classroom culture to emerge, students, teachers, and staff members all need to understand and adhere to shared values and goals, which in turn form the identity and sense of a caring community of learners (Solomon, Battistich, Watson, Schaps, & Lewis, 2000). The teacher, in particular, holds the important role of developing a positive culture in the classroom. In *Teach*, “Classroom Culture” encompasses two elements: the extent to which the teacher creates a “Supportive Learning Environment” and the extent to which the teacher is effective at setting “Positive Behavioral Expectations” in the classroom.

3.2.1. Supportive Learning Environment

Teachers who create a positive environment where students feel supported in their learning and encouraged to meet high academic and behavioral standards can have long-lasting positive effects on students’ academic success (Burnett, 2003; Cornelius-White, 2007; Hamre & Pianta, 2006; OECD, 2009; Pianta, Hamre, & Stuhlman, 2003; Spilt, Hughes, Wu, & Kwok, 2012). Further work shows that teacher support toward students can reduce student internalizing (e.g., anxiety, depression) and externalizing (e.g., aggression) and enhance self-control (Griggs, Mikami, & Rimm-Kaufman, 2016; Merritt, Wanless, Rimm-Kaufman, Cameron, & Peugh, 2012). *Teach* included the following four behaviors to measure the extent to which the teacher is effective at establishing a supporting learning environment in the classroom:

1. *The teacher treats all students respectfully*
2. *The teacher uses positive language with students*
3. *The teacher responds to students’ needs*
4. *The teacher does not exhibit gender bias and challenges gender stereotypes in the classroom*

1. The teacher treats all students respectfully

Promoting a supportive learning environment for students is an ongoing goal for a teacher. While many ways exist to foster this environment, one aspect of positive classroom culture involves conveying respect and caring toward students (Gasser, Grütter, Buholzer, & Wettstein, 2018). Jennings & Greenberg (2009) provided a theoretical model that explains the importance of teachers treating all students respectfully for creating a prosocial classroom. Specifically, teachers who are socially and emotionally competent individuals themselves are aware of the impact of their actions on their students. As a result, they treat their students respectfully and act as positive role models for students. In contrast, when teachers lack social and emotional skills, they may show less respect toward students, resulting in prevalent classroom disruptions and behavioral problems (Osher, Sprague, Weissberg, Axelrod, Keenan, Kendziora et al., 2007).

Teachers' respectful behavior toward students has important consequences for children's academic and social development. When teachers treat their students respectfully, this promotes positive teacher–student relationships, which in turn has a significant long-term positive impact on students' academic achievements (Muller, 2001).

2. The teacher uses positive language with students

Teacher language is a key mechanism for communicating respect and caring toward students, and teachers' use of positive language, including praise and encouragement, is an observable behavior that has been widely studied and demonstrated to be important. A review of the literature reveals many correlational and experimental studies comparing positive praise versus neutral instruction – when children receive positive praise while completing problem-solving activities, they show boosts in their intrinsic motivation (Henderson & Lepper, 2002; Wharton-McDonald et al., 1998). Praise and encouragement provide information to students about what is expected of them (Koestner, Zuckerman, & Olsson, 1990) and help children recognize that the more engaged they are on the task, the more likely they are to reach their learning goals (Schunk & Zimmerman, 1997). This is line with classic theory and research showing that praise can be especially beneficial when it boosts students' self-efficacy, enhances their feelings of competence, and provides feelings of autonomy (Bandura, 1977; Deci & Ryan, 1985). For example, teachers who support students (e.g., by saying “Great job!” and “You can do this!”) and who focus on students' competency have been shown to enhance students' motivation and engagement with the learning task (Reeves, Herrington, & Oliver, 2004).

3. The teacher responds to students' needs

There is a growing body of theory and research on the important role that teacher responsiveness plays in the classroom. For instance, one study established that student-perceived emotional support was more important than instructional support in predicting students' social skills and academic competence (Malecki & Demaray, 2003). Sensitivity and responsiveness appears to be even more important for students at risk for low engagement or achievement (Hamre & Pianta, 2005).

Being responsive to students' needs may take a variety of forms. Responsive teachers show fairness and justice toward their students, demonstrate compassion toward students as individuals, and provide the emotional or physical support that students need in class (Bishop, Berryman, & Richardson, 2002; McGee & Fraser, 2001; Klem & Connell, 2004; Wharton-McDonald et al., 1998).

Overall, students whose needs are met enjoy the long-term benefits of being more engaged in school and performing better academically, socially, and behaviorally (Connell & Wellborn, 1991; Corno, 2008; Malecki & Demaray, 2003). Thus it is important for teachers to recognize individual students' needs and respond appropriately.

4. The teacher does not exhibit gender bias and challenges gender stereotypes in the classroom

Teacher behaviors such as calling on students of different races and genders equally and using inclusive language are central features of a positive learning environment and are linked with improved student achievement (Pittinsky, 2016; Pittinsky & Montoya, 2016). Unfortunately, it is still common that children of different genders are treated differently, and that teachers reinforce gender stereotypes in the classroom. For example, in a qualitative observational study of Zimbabwean students (equivalent to Grade 11 and 12 in the United States), classroom observations revealed that compared with girls, boys received significantly more teacher-initiated contact overall, more direct questions, more teacher feedback, and greater attention (Mutekwe & Modiba, 2012). Stark gender contrasts also arose in the educational materials used, where more masculine characters were depicted compared to feminine characters. Of the characters that were women, students were given a stereotypical image of women being weak or helpless, often wearing aprons or looking after babies.

Classic work describes that teachers' uneven expectations in the classroom have important consequences for student learning (Grossman & Grossman, 1994; Sadker &

Sadker, 1994; Zahn-Waxler, 1993). More recent findings demonstrate the cumulative effects of high versus low expectations (Rubie-Davies, Weinstein, Huang, Gregory, Cowan, & Cowan, 2014) and implicit prejudiced attitudes relating to students' academic performance (Peterson, Rubie-Davies, Osborne, & Sibley, 2016). Teachers' conscious or subconscious perceptions and biases about students may undermine students' achievement across various classrooms or simply the quality of instruction that they receive (Babad, 1993; Carlana, 2018; Harvey, Suizzo, & Jackson, 2016; Rosenthal & Jacobson, 1968). Thus, it is important that teachers are cognizant of their own biases and how these impact students' learning.

Finally, in a prospective study of Grade 6 and Grade 9 students (N=4,500) from a financially underresourced district in France, Terrier (2016) examined gender bias on students' mathematics and literacy skills. Findings showed that teachers' gender bias favoring girls significantly affected girls' progress in mathematics and increased their likelihood of majoring in a scientific track relative to that of boys. Similarly, Carlana (2018) showed how teachers' gender stereotypes, measured using an Implicit Association Test, affect girls' performance on mathematics by lowering their self-confidence. This is direct evidence of the importance of establishing an equitable learning environment for all students.

3.2.2. Positive Behavioral Expectations

Effective teachers create clear expectations for student behavior and notice when students behave in ways that match those expectations. When behavior problems emerge, effective teachers redirect students efficiently and effectively (Emmer & Stough, 2001; Simonsen, Fairbanks, Briesch, Myers, & Sugai, 2008). In doing so, teachers' positive behavioral expectations create a classroom culture that is safe, predictable, and reflective of effective teacher-student communication. Teachers' who are consistent and positive in establishing expectations not only help students reach their academic potential, but also support students' development of positive behavior, social skills, and self-control within a safe environment (Jones, Bouffard & Weissbourd, 2013; OECD, 2009). The presence of problem behaviors in school can have a cumulative effect, where early problem behaviors can strain teacher-student relationships, which in turn puts students at risk for later social problems or school failures (Berry & O'Connor, 2010; Jerome, Hamre, & Pianta, 2009; O'Connor, Dearing, & Collins, 2011).

Thus another aspect of positive classroom culture requires teachers to prevent behavior problems and intervene when disruptive behaviors occur because such behaviors interfere

with students' learning and development (Stronge, Ward, Tucker, & Hindman, 2007). Based on the evidence presented below, *Teach* included the following three behaviors to measure the extent to which the teacher is effective at setting positive behavioral expectations in the classroom:

1. *The teacher sets clear behavioral expectations for classroom activities*
2. *The teacher acknowledges positive student behavior*
3. *The teacher redirects misbehavior and focuses on the expected behavior, rather than the undesired behavior*

1. *The teacher sets clear behavioral expectations for classroom activities*

Studies have demonstrated that teachers who expect positive behaviors from students and set these standards help promote constructive teacher–student interactions (Banks, 2014), develop students' socioemotional skills and self-regulation (Reinke, Herman, & Stormont, 2013; Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009; Rimm-Kaufman, Baroody, Larsen, Curby, & Abry, 2015), as well as increase students' academic success (Bradshaw, Mitchell, & Leaf, 2010; O'Brennan, Waasdorp, & Bradshaw, 2014). Further, it is not enough for teachers to expect positive behaviors – they must also communicate them clearly to their students. Without clearly communicated expectations, students may be at loss for what is expected of them and may find it difficult to function with autonomy and responsibility, or to activate self-regulatory behaviors (Reeve, Ryan, Deci, & Jang, 2008).

A review of the literature suggests that students in classrooms where teachers communicate clear behavioral expectations are better able to reach learning goals compared to students without organized environments (Ames, 1992). For example, the “Good Behavior Game” is a program that supports teachers to set clear behavioral expectations (Barris, Saunders, & Wolf, 1969 in Bowman-Perrott, Burke, Zaini, Zhang, & Vannest, 2016). Students are divided into two teams and the teacher explains that violations of classroom behaviors (e.g., no talking without permission) will result in a point for the respective team; students learn instead to raise their hands and ask for permission. At the end of class, the team that behaves best (with lowest number of points for problematic behavior) is rewarded (i.e., its members leave class 10 minutes early). This game is effective at reducing undesirable classroom behavior and has been linked to improvements in student learning (Leflot, van Lier, Onghena, & Colpin, 2010).

2. The teacher acknowledges positive student behavior

Disruptive behavior is easy for teachers to notice; however, research emphasizes the importance of teachers attending to, recognizing, and acknowledging positive student behavior. Many commonly used teaching books and resources in the United States describe the importance of identifying positive behaviors in the classroom (e.g., students tidying up, walking properly in line) and then responding positively to students when they show that behavior (e.g., giving students a thumbs-up of acknowledgement) (Horner, Sugai, & Lewis-Palmer, 2010).

Building on classic behavioral learning models, desirable behaviors that are positively reinforced repeatedly will be increased while undesirable behaviors that are negatively reinforced will disappear (Hull, 1943; Rescorla & Wagner, 1972). Thus, researchers have been particularly interested in the many teacher behaviors that may be used to increase desirable behaviors. These include specific contingent praise, group reinforcement contingencies, behavior contracts, and token economies. Simonsen et al. (2008) reviewed the literature on various classroom management strategies and recommended the use of multiple reinforcement strategies. However, on balance, the evidence is strongest for teacher praise as a strategy to recognize students' successful behaviors, which in turn, leads to increases in correct responses (Sutherland & Wehby, 2001), student productivity, and accuracy (Craft, Alber, & Heward, 1998). Effective teacher behaviors include stating desirable classroom behavior (such as, "I like seeing how everyone lines up so quickly and quietly"). Still other examples of acknowledging positive behavior through positive phrasing have been found to improve school climate and prevent schoolwide behaviors such as bullying (Bosworth & Judkins, 2014). Teacher acknowledgement of positive behavior is therefore important to facilitate the learning process.

3. The teacher redirects misbehavior and focuses on the expected behavior, rather than the undesired behavior

Disruptive behaviors are often met with teacher punishments and reprimands, but research has consistently shown that this is not the best way to develop or sustain a positive teacher–student relationship and positive classroom culture (Emmer & Stough, 2001; Korpershoek, Harms, de Boer, van Kuijk, & Doolaard, 2016; Woolfolk Hoy & Weinstein, 2011; Wang, Haertal, & Walberg, 1993). In fact, research has demonstrated that classrooms with teachers who rely on reactive disciplinary strategies also exhibit more off-task behaviors

and increased teacher stress (Clunies-Ross, Little, & Kienhuis, 2008). Instead, by focusing on the expected behavior, the teacher could use disruptions in the classroom as an opportunity to explicitly communicate behavioral expectations (Lemov, 2015; Zimmerman, 2002). The general consensus from this body of research suggests that teachers who redirect misbehavior by focusing on the expected classroom behavior, also known as “differential reinforcement,” will see more desirable behaviors occur in the future (Simonsen et al., 2008), less aggressive and destructive classroom behaviors, and overall reductions in classroom stress levels (Lentfer & Franks, 2016; Meehan, Hughes, & Cavell, 2003; Stage & Quiroz, 1997).

3.3 INSTRUCTION

High-quality instruction is essential for student learning (Carver & Klahr, 2013). Decades of research point to a few key features present in virtually all definitions of effective instruction. Effective teachers deliver content in a way that is clear and interesting to students, engage students in varied activities that promote thinking, build in ways of assessing understanding, and offer feedback to students (Brophy, 1986, 1999; Porter & Brophy, 1988). Results from the Mid-Continental Research for Education and Learning (McREL; 2010) study indicate that the strategies of setting objectives, teaching the new material, and then checking students’ understanding and providing relevant feedback have positive impacts on students’ standardized achievement test scores. Teachers who demonstrate these behaviors produce as much as one-half of an SD gain in student achievement (Hattie, 2009). Further, instructional practices have been shown to be particularly beneficial for children with the lowest levels of academic abilities (Curby, Rimm-Kaufman, & Ponitz, 2009).

International research, too, draws attention to the importance of high-quality instruction. For instance, research from preschool classrooms in Chile linked teacher instructional practices to language and academic gains (Leyva, Weiland, Barata, Yoshikawa, Snow, Treviño, & Rolla, 2015), and research in German third grade classrooms revealed the importance of cognitive activation (e.g., presentation of challenging tasks, questions that ask students what they do or do not understand) in predicting student science understanding (DeCristan et al., 2015).

In *Teach*, “Instruction” encompasses four elements: the extent to which the teacher is effective at “Lesson Facilitation,” the extent to which the teacher “Checks for

Understanding,” the extent to which the teacher is effective at providing “Feedback,” and the extent to which the teacher encourages “Critical Thinking” in the classroom.

3.3.1. Lesson Facilitation

One of the most important roles of a teacher is in lesson facilitation, as this is where teachers can maximize learning for everyone in the classroom. A teacher who facilitates student learning effectively is one who communicates lesson goals and objectives clearly to students, and clearly explains not just the content but also connects this new knowledge with students’ daily lives and other content knowledge (Carpenter, Fennema, Peterson, Chiang, & Loef, 1989; Vosniadou, 2009; National Academies of Sciences, Engineering, and Medicine, 2018; Wharton-McDonald et al., 1998; Willingham, 2007). The quality of the lesson facilitation will directly influence whether students are engaged and can understand the content (Brophy, 1999; Ribera, BrckaLorenz, Cole, & Laird, 2012). Based on the literature, *Teach* included the following four behaviors to measure the extent to which the teacher is effective at facilitating the lesson to promote student comprehension:

1. *The teacher explicitly articulates the objectives of the lesson and relates classroom activities to the objectives*
2. *The teacher’s explanation of content is clear*
3. *The teacher makes connections in the lesson that relate to other content knowledge or students’ daily lives*
4. *The teacher models by enacting or thinking aloud*

1. *The teacher explicitly articulates the objectives of the lesson and relates classroom activities to the objectives*

Three key features of lesson facilitation are critical for teachers to produce effective learning. Teachers need to: (i) develop clear and specific learning objectives for the lesson; (ii) communicate the learning objectives to the class; and (iii) relate classroom activities to the objectives. Research shows that teachers who follow these steps increase students’ understanding and learning (Brophy, 1999).

Teachers often engage their students in interesting activities but fail to articulate how those activities link to the lesson objectives or the relevance of the activities for student

learning. Even the most interesting activities are unlikely to lead to learning without those links established clearly and explicitly through direct instruction. Research shows that teachers who establish clear and specific learning goals for each lesson use class time more effectively (Brophy, 1999; Clearinghouse, 2009; Shield & Dole, 2013). Teachers who clearly communicate lesson objectives in relation to classroom activities help students know what is expected of them at the end of the lesson, which in turn can help them focus their effort on the goal (Ribera et al., 2012) and improve academic performance (Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013; Hattie, 2009; Seidel & Shavelson, 2007).

2. The teacher's explanation of content is clear

In addition to clear lesson objectives tied in to relevant learning activities, teachers' ability to explain concepts clearly to students also promotes academic learning outcomes (Reeves, 2009). Classic work from the 1960s and 1970s, known as "clarity studies" which looked at different types of lessons, demonstrated that when teachers lack verbal fluency, known as teacher vagueness (Hiller, Fisher, & Kaess, 1969; Smith, 1977; Smith & Edmonds, 1978), or commonly have false starts or discontinuity (i.e., teacher interrupts the lesson by injecting irrelevant content), students perform less well on tests of achievement because they were distracted from important class content (Rosenshine, 1968). Further research also identified clear communication of classroom process to be as important as clear content (Civikly, 1992). These results highlight the importance of clear, focused instructions and explanations in helping students recognize what is important for learning.

Another teaching method found to be helpful is clarifying content to illustrate complicated concepts in the form of logical and/or visual representations using simple concept-maps and graphs (i.e., infographics). These methods of visualizing concepts can help synthesize important information and make clear to students how concepts are related. A vast number of studies have shown that visual information is easier to encode and understand (i.e., lower cognitive load on the brain) compared to large amounts of text or even information simply presented verbally (Klingner, Tversky, & Hanrahan, 2011), and visual information has been shown to be more easily understandable for students especially when learning about complex concepts (Boakes, 2009).

3. The teacher makes connections in the lesson that relate to other content knowledge or students' daily lives

Learning that takes place in the classroom should not be isolated from students' experience of the outside world. Drawing on students' prior knowledge and experiences of the world, pointing out connections between known and new information, can help students make sense of the new content and knowledge (Moll, Amanti, Neff, & Gonzalez, 1992; Carpenter et al., 1989; Vosniadou, 2009; Wharton-McDonald et al., 1998; Willingham, 2007, National Academies of Sciences, Engineering, and Medicine, 2018).

Effective teachers make lesson content relevant to students by bringing in examples from their daily lives, also known as “bridging scaffolds” (Brophy, 1999). As a result, students are more motivated to learn because they are able to integrate new knowledge and experience to older, more articulated social experience (Bouillion & Gomez, 2001). Not only can this process enhance learning outcomes, it can promote students' motivation, self-confidence, and perseverance (Tran, 2010).

Linking new information to prior knowledge is effective across subject areas, a finding demonstrated by a variety of key studies. Research shows that activating students' existing knowledge forms the foundation upon which new knowledge can build. Still another effective teaching strategy is engaging students in a discussion where they model the connections between new and old content; for example, teachers may use an anchoring table – where the teacher uses an existing concept, such as a mathematics equation, as an “anchor” from which new content is extended – so students can see how a new key concept is related to an existing concept (Deschler et al., 2011). This is especially useful for mathematics, for example, whereby addition and subtraction are the foundation to multiplication and division (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010). Research also demonstrates boosts in student performance in English when teachers integrate skills taught in reading comprehension as part of reading and writing, with positive consequences for students' performance (Knapp, Shields, & Turnbull, 1995).

Taken together, this research demonstrates the importance of connecting new material to students' other knowledge and experiences as a key mechanism for developing a deeper, more critical understanding of the subject and advancing overall student learning (Bransford & Johnson, 1972; Tharp & Gallimore, 1988; National Research Council, 2001).

4. The teacher models by enacting or thinking aloud

Effective teachers model their approach to problems in front of their students. Modeling has been shown to be particularly successfully at promoting student learning gains

(National Academies of Sciences, Engineering, and Medicine, 2018). For example, this type of modeling promotes cognitive development (Bandura, 1986; Brainerd, 1978; Rosenthal & Zimmerman, 1978). Hattie (2009) synthesized over 800 meta-analytic studies of various designs and found that learning activities where the teacher is actively involved with the lesson (e.g., works through the problem step-by-step with students) are particularly effective at promoting learning gains in students compared with activities where the teacher is less involved (e.g., teacher instructs students to complete a problem sheet independently). Beyond student gains, modelling is a means of promoting students' self-efficacy and self-regulation (Schunk & Zimmerman, 2007), which is central to students' learning process (Checa, Rodríguez-Bailón, & Rueda, 2008).

Enacting involves showing students the steps needed to complete a task. For example, effective teachers use worked examples (e.g., in mathematics, the teacher provides a step-by-step solution to a problem), which allows students to focus on understanding the logical step-by-step process to solving the problem without the cognitive burden on their working memory (Rosenshine, 2012).

Further, by thinking aloud and walking students through thought processes, students are then able to take a similar approach to solving similar problems on their own. The think-aloud strategy has been found to be particularly effective at promoting reading comprehension (Davey, 1983; Schon, 1987; Tishman, Jay, & Perkins, 1993), as it helps learners understand what the text really means and provides them with strategies that can be used to answer comprehension questions (Duke & Pearson, 2009; Durkin, 1978; Ortlieb & Norris, 2012; Parker & Hurry, 2007).

3.3.2. Checks For Understanding

One of the most salient characteristics of effective teaching is to recognize the difference between teaching a new concept and students' actual understanding of that same concept (Lemov, 2015). Teachers play an important role in checking whether and how much students understand the learning material. Strategies that teachers can apply to check student learning as they teach are described below. As such, *Teach* included three specific teacher behaviors that gauge whether the teacher is effective at checking for students' understanding:

1. *The teacher uses questions, prompts, or other strategies to determine students' level of understanding*
2. *The teacher monitors most students during independent/group work*
3. *The teacher adjusts teaching to the level of students*

1. *The teacher uses questions, prompts, or other strategies to determine students' level of understanding*

To bridge the gap between what teachers teach and what students learn, teachers need to collect data during the lesson on what are students learning. Asking students questions and checking the understanding of all students is a type of formative feedback that supports learning and has been identified as a critical component of instruction (Good & Grouws, 1977; Rosenshine, 2012). For example, in an study of Indian schools, Aslam & Kingdon (2011) compared math and language teachers on instructional performance and found positive and large effects on student learning of teacher questions and checks on understanding. It is important also for teachers to not just ask any questions (i.e., rhetorical questions such as “Everyone got it?”) but instead to ask clear questions that provide objective data on students' understanding (Lemov, 2015). Further, compared with less effective teachers, effective teachers have been found to be more aware of students' level of engagement in the class as a whole and are more likely to balance responses from volunteering and nonvolunteering students by calling upon students during class (Brophy & Good, 1985).

Other strategies shown to work include teachers presenting new material in small steps and checking student understanding by having students practice after each step. Such teaching practice has been found to improve student outcomes particularly for subjects like mathematics and English (Evertson, Anderson, Anderson, & Brophy, 1980).

2. *The teacher monitors most students during independent/group work*

Whether students are completing an in-class activity individually or in a group, it is recommended that teachers monitor what students are doing rather than wait passively until students have finished with the activity before they check for students' understanding (Lemov, 2015). For example, Knapp et al. (1995) observed classrooms in low socioeconomic neighborhoods in the United States and concluded that teachers' active monitoring and facilitation during independent and group work ensured that students were engaged and

increased learning. Similarly, Rosenshine (2012) found teachers' facilitation during in-class group work activities, such as monitoring student discussions and interjecting to clarify concepts and increase student engagement, is one of the most important principles of good teaching.

3. The teacher adjusts teaching to the level of students

Effective teachers are skilled at both recognizing and adjusting to students' individual and collective needs (Lemov, 2015). Several pieces of research point to the importance of teachers adjusting the level or pace of instruction to promote student engagement, self-regulation, and achievement (Borman & Overman, 2004; Connor, Ponitz, Phillips, Travis, Glasney, & Morrison, 2010; Decker, Dona, & Christenson, 2007; Dotterer & Lowe, 2011; Reyes, Brackett, Rivers, White, & Salovey, 2012; Roorda, Koomen, Spilt, & Oort, 2011).

The teacher's ability to teach to the varying levels of each student, better known as differentiated instruction, is grounded in Vygotsky's zone of proximal development (1978), which is the area between what a learner can do without guidance and what she/he cannot do. Brophy's (1986) review of the literature revealed that effective teachers know better how to adapt curriculum materials based on their knowledge of students' characteristics and achievement compared to less effective teachers. Classic works from the 1980s until today have documented several effective teaching strategies of differential instruction at the "macro" and "micro" levels; these include grouping techniques, continual assessment strategies, and tiered lessons (Corno, 2008; Levy, 2008).

Recent randomized intervention experiments conducted in India showed that teaching that is tailored to students' baseline level in mathematics improved children's overall math scores by one-half of an SD point, with effects lasting a year post-program conclusion (Banerjee, Cole, Duflo, & Linden, 2007). Similar effects of targeting teacher instruction and curriculum to students' initial achievement level were found to be effective for Kenyan children, as this is thought to reduce heterogeneity in the classroom learning environment (Duflo, Dupas, & Kremer, 2011). In Ghana, significant improvements in closing children's achievement gaps in numeracy and literacy skills were found after an in-school intervention (Duflo & Kiessel, 2017). Thus teachers who are better able to adapt their teaching strategies to better meet the needs of students can help them reach their potential.

3.3.3. Feedback

Feedback, defined as both formal and informal information from teachers (and peers, parents, etc) serves to provide students with a better understanding of their performance or learning (Hattie & Timperley, 2007; National Academies of Sciences, Engineering, and Medicine, 2018). Teacher feedback in general has been found to be one of the most powerful factors implicated in students' academic learning and resultant achievement (Hattie & Yates, 2014). Teachers who give consistent, periodical, and process-oriented feedback are associated with self-regulated, high-achieving students (Good, Biddle, & Brophy, 1975; Good & Grouws, 1977; Hamre & Pianta, 2005; Nicol & Macfarlane-Dick, 2006; Taylor, Pearson, Peterson, & Rodriguez, 2003; Wharton-McDonald et al., 1998), decreased off-task behavior and disruptive classroom behaviors, and increased academic engagement (Johnson, Stoner, & Green, 1996; Lane, Wehby, Menzies, Doukas, Munton, & Gregg, 2003; Lo, Loe, & Cartledge, 2002; McNamara, Evans, & Hill, 1986; Sharpe, Brown, & Crider, 1995; Rosenberg, 1986).

Based on a review of the literature, teacher feedback, both positive or negative, can be one of the most powerful influences on student learning and achievement, though the type of feedback, its timing, and the way it is given can dictate its overall effectiveness (Hattie & Timperley, 2007). Empirical studies on teacher feedback underscore the importance of providing feedback that is instructive, timely, referenced to the actual task, and focused on what is correct and what to do next (Hattie & Timperley, 2007; Shute, 2008). Research has also addressed the use of metacognitive versus results feedback. Metacognitive feedback serves as cues about the content and structure of the problem and ways to solve it, whereas results feedback provides cues related to the final outcome of the problem. For example, Kramarski & Zeichner (2001) investigated the use of both types of feedback in a sixth grade mathematics class as a way to help students identify what to do to improve their performance. Students who received metacognitive feedback significantly outperformed students who received results feedback, in terms of mathematical achievement and the ability to provide mathematical explanations, such that they were more likely to provide robust explanations of their mathematical reasoning.

Based on this literature, *Teach* included two behaviors to capture the extent to which the teacher provides feedback that can promote student comprehension:

1. The teacher provides specific comments or prompts that help clarify students' misunderstandings

2. The teacher provides specific comments or prompts that help identify students' successes

1. The teacher provides specific comments or prompts that help clarify students' misunderstandings

Teacher feedback that encourages students to raise questions about the learning task or to further clarify their misunderstandings can enhance the overall learning environment of the classroom. Hattie, Biggs, & Purdie (1996) found that students are better able to develop self-regulatory learning skills and detect errors in their understanding when teachers create a trusting learning environment where feedback is welcomed. For teachers to create a trusting environment, teachers not only need to detect and highlight errors, as well as respond to them appropriately (i.e., never criticizing students), but also to identify how their feedback can be most constructive for students moving forward (Brophy, 1986; Fischer, Mazor, Baril, Alper, DeMarco, & Pugnaire, 2006; Seifried & Wuttke, 2010; Yerushalmi & Polingher, 2006).

The consensus in the literature is for teachers to avoid using general questions (i.e., “How do you do this?”) or giving general declarations that do not identify specific aspects of the problem or task that needs improving, as this would only serve to confuse students more (Salomon & Globerson, 1989; Webb, 2009). Particularly, when students provide an incorrect answer, the teacher should help them identify the root of their misconception before moving on to a new topic (Brophy, 1986; Lemov, 2015). Teachers’ reaction to students’ errors is a well-researched area also found to relate to student success. When students need clarification on content or have misunderstood a concept, it is important for teachers to address the errors to avoid negative transfer and future misconceptions (National Research Council 2001, 2007).

2. The teacher provides specific comments or prompts that help identify students' successes

Just as identifying and clarifying students’ misunderstandings is important for learning, effective teachers highlight students’ successes, so students know they are on track. Classic work has shown the importance of teachers systematically offering positive reinforcement to students and building upon students’ responses to solidify these successes (Brophy & Good, 1985; Levin & Long, 1981; Wilen & Clegg, 1986). Effective teacher prompts and questions encourage students’ growth mindset by helping individual learners

identify what success looks like and ways to do even better in the future (Gelman & Raman, 2003; Heyman & Gelman, 1999).

3.3.4. Critical Thinking

One of the most important aspects of effective teaching is helping students critically analyze content. A teacher who encourages students to actively analyze and critique concepts (rather than passively receiving information) can help enhance students' learning process (National Academies of Sciences, Engineering, and Medicine, 2018). This involves the teacher asking open-ended questions that require reasoning, explanation, or generalization or have more than one correct answer (Lee, Kinzie, & Whittaker, 2012; Lopez, 2012; Roth, 1996; Samson, Strykowski, Weinstein, & Walberg, 1987). Beyond asking the right questions, teachers should provide thinking tasks, such as making predictions, identifying patterns, explaining thinking from different views, making connections, and interpreting information (Kember & Leung, 2005; Moon, 2007, Salomon, 1989). In a comprehensive review of thinking tasks, Moon (2008) explored and documented tasks that teachers from various subjects could use. These include but are not limited to: small group debates, group critical thinking tasks under timed pressure, posing controversial questions about a topic followed by a discussion at the end of class, and responding to critical thinking tasks through short answer questions (i.e., 300 words), as written exercise helps students "play with ideas" and forces them to develop precise and succinct writing and reasoning. Of course, for students to understand, teachers should not just ask open-ended questions and provide thinking tasks, but students should be able to answer those questions, ask other open-ended questions themselves, as well as perform the thinking tasks.

Critical thinking is often the weakest aspect of instruction for most teachers. Research has shown that 90% of teachers' questions do not gauge students' critical thinking skills and in fact involve recalling of facts, which is a more passive and superficial way of learning (Wragg, 1993; Lee & Kinzie, 2012). A seven-country study in Sub-Saharan Africa found that less than one-third of teachers use a mix of closed- and open-ended questions, with almost no questions that require students to apply what they learn in a different context (Bold et al., 2017). In Afghanistan, 98% of teachers present material without providing students with opportunities to apply those concepts and most of the questions asked of students are either closed-ended or require a short yes/no answer (Molina et al., 2018a). Similar results are found in Tanzania, Punjab, and Mindanao, Philippines (Trako and Molina, 2018; Molina et

al., 2018b). Based on this literature, *Teach* included three behaviors to capture the extent to which the teacher build students' critical thinking skills:

1. *The teacher asks open-ended questions*
2. *The teacher provides thinking tasks*
3. *The student asks open-ended questions or performs thinking tasks*

1. *The teacher asks open-ended questions*

The quality of teacher questioning is an important and well-documented and researched area (Simpson, Mokalled, Ellenburg, & Che, 2015; Walsh & Sattes, 2011, 2016). Questions that focus on higher-order skills (e.g., “What evidence do you have in saying that?”) rather than management-related (e.g., “Has everyone finished this piece of work now?”) and information recall-related (e.g., “How many sides does a quadrilateral have?”) questions have been found to be effective at developing critical thinking skills (Wragg, 1993). Particularly effective are open-ended questions, which have been found to be associated with student learning in a growing number of studies from widely different contexts (Azigwe, Kyriakides, Panayiotou, & Creemers, 2016; Hamre, Hatfield, Pianta, & Jamil, 2014; Gill, Shoji, Coen, & Place, 2016; Grossman, Loeb, Cohen, & Wyckoff, 2013; Tyler, Taylor, Kane, & Wooten, 2010). These findings were consistent with other studies where more teacher open-ended questions led to an increased amount of speaking by students in the classroom (Brock, 1986) and student led-learning (Nathan, Kim, & Grant, 2009).

2. *The teacher provides thinking tasks*

Effective teachers provide critical thinking tasks that promote deep learning (i.e., learning with understanding) rather than surface learning (i.e., rote learning) (Biggs, 1987). For example, Chin & Brown (2000) compared the learning approaches to chemistry in a group of eighth graders. They found that surface and deep learners differed across five dimensions: generative thinking, nature of explanations, asking questions, metacognitive activity, and approach to tasks. Specifically, deep learners allowed themselves to consider alternative explanations; gave more detailed explanations involving the mechanisms and cause/effect relationships or referred to personal experiences; followed up with questions that focused on why some phenomenon was happening, making predictions, and resolving discrepancies in knowledge; and engaged in in-the-moment theorizing. Surface learners, on

the other hand, had a more shallow, procedural understanding of the nature of the phenomenon. The authors proffered that teachers should (i) encourage a deep learning approach in students by providing prompts and contextualized scaffolding, and (ii) encourage students to ask questions, predict, and explain the phenomenon during activities.

3. The student asks open-ended questions or performs thinking tasks

Evidence of successful transfer of critical thinking skills from teachers to students is reflected in whether students ask open-ended questions or perform thinking tasks.

Particularly effective for student learning and knowledge consolidation is whether students engage in self-explanation, or engage in higher-order thinking (Taylor et al., 2003). This occurs when the individual tries to explain how new information is related to known information or explained in the steps taken during problem solving (Dunlosky et al., 2013). For example, students who probe particular concepts by asking “Why” (e.g., “Why would humans be interested in exploring space?”) will enhance their knowledge of the topic and their ability to summarize key points and how such new information can be integrated with existing knowledge.

3.4 Socioemotional Skills

One common problem with research on effective teaching is that an artificial duality exists between the development of academic skills versus socioemotional skills, whereby people that assume a high level of support for one outcome implies a low level of support for the other. Effective classroom environments produce rigorous academic experiences in a socially supportive manner, thus promoting both academic and socioemotional development (Ettetal, Kochenderfer-Ladd & Ladd, 2015; Lee & Smith, 1999).

Increasing evidence shows that socioemotional skills development plays an important role in academic achievement (Korpershoek et al., 2016). In a recent meta-analytic study assessing the efficacy of social and emotional (SEL) programs in kindergarten children through high-school students (N=270,034), students experiencing programs designed to enhance socioemotional skills showed an 11-percentile-point increase in academic achievement (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). Such programs showed positive consequences for improving student achievement and social and emotional skills even beyond the length of the program (from 6 months up to 18 years after receiving programs) (Taylor, Oberle, Durlak, & Weissberg, 2017). Specifically, the Taylor et al. meta-

analysis showed that social and emotional skills immediately after experiencing the SEL program improved academic performance, reduce emotional distress, and conduct problems (Taylor et al., 2017).

Effective teachers use techniques and strategies designed to improve children's socioemotional development. In doing so, they benefit children's understanding of the people in the world around them as well as support children's ability to understand and work with people who are different from them (CASEL, 2018; Elbertson, Brackett, & Weissberg, 2010). Effective teachers use strategies that develop students' ability to make responsible decisions related to learning, encourage students' self-awareness and self-management, and equip them with interpersonal skills to work effectively with others.

Considerable disagreement arises in how people name, define, and describe these skills; common terms include noncognitive skills, 21st century skills, and soft skills (National Research Council, 2012). Jones & Bouffard (2012) describe three key categories of socioemotional skills: emotional processes, cognitive regulation, and social and interpersonal skills. Emotional processes refer to students' knowledge, awareness, and management of emotion. Cognitive regulation involves students' management of their attention and inhibition of inappropriate responses. Social and interpersonal skills involve interpreting others' behaviors and interacting in positive ways with other people. *Teach* measures the ways that teachers cultivate these skills. Specifically, *Teach* measures how teachers support student autonomy (which implicates students' cognitive regulation skills), perseverance (which exercises students' emotional processes and cognitive regulation), and social and collaborative skills (which requires students' emotional processes and interpersonal skills).

3.4.1. Autonomy

Autonomy support is defined as “the instructional effort to involve, nurture, and develop students' inner motivational resources and capacity and responsibility for self-motivation” (Reeve, 2009, p. 168). Effective teachers foster autonomy in the classroom by creating opportunities for students to take ownership of their own learning by building instruction around students' interests, preferences, and choices (Evans & Boucher, 2015; Katz & Assor, 2007). Teacher practices that support autonomy nurture students' internal motivation to learn, rather than relying on external sources of motivation such as rewards, consequences, and deadlines (Reeve, 2009). Not all student choice is effective, however

(Katz & Assor, 2007). If teachers use choice carefully and in a way that matches students' interests and needs, students are more motivated and engaged, spend more time learning in ways that they prefer, can exercise their ability to assert their own opinion, and show better academic, behavioral, and socioemotional outcomes (Fredricks et al., 2004; Jang, Reeve, & Halusic, 2016; Katz & Assor, 2007; Reeve, 2006, 2009). *Teach* identified and included three behaviors that indicate teachers' support for autonomy in the classroom:

1. *Teacher provides students with choices*
2. *Teacher provides students with opportunities to take on roles in the classroom*
3. *Students volunteer to participate in the classroom*

1. *Teacher provides students with choices*

Providing students with the opportunities to make their own meaningful choices supports students' development as independent, motivated learners (Reeve & Jang, 2006). Offering students choice helps them be more actively engaged in the learning, feel less negative emotion associated with learning, and develop their own sense of optimal challenge in academic work (Reeve, 2009). Opportunities for choice cultivate students' socioemotional skills development (e.g., cognitive regulation) and student learning (Stefanou, Perencevich, DiCintio, & Turner, 2004).

Teachers vary in the ways that they support autonomy and autonomy-support behaviors can be categorized into three types: (i) organizational autonomy support, where students are given decision-making roles in classroom management (e.g., establishing classroom rules, choosing assignment deadlines); (ii) cognitive autonomy support, in which teachers support student ownership in learning (e.g., choosing their own paths toward a solution, justifying their claims with evidence, establishing their own personal learning goals); and (iii) procedural autonomy support, in which students have some choice in how they present their work (e.g., preparing a written report versus a brochure, choosing materials to use in an assignment) (Stefanou et al., 2004). Work describing these three types of autonomy support suggests that cognitive autonomy support is one of the strongest drivers of deep-level learning because of the metacognitive abilities that it imbues, whereas procedural autonomy support is the most superficial (Biggs, 1987; Stefanou et al., 2004).

Teach focuses on the aspects of autonomy support that are most likely to be observed during a *Teach* observation: cognitive and procedural autonomy support. Morgan & Wagner

(2013) studied how offering students the freedom to choose from various books to read and how they spent their time reading (i.e., cognitive autonomy support) led to increased task engagement, a deeper sense of identity, and higher scores on standardized tests. Similarly, in another study, providing students with choice around the type of homework (i.e., procedural autonomy support) led to an increase in student-reported intrinsic motivation to complete the task, competency, and performance on the standardized test compared to when no choice was given (Patall, Cooper, & Wynn, 2010). Together, this literature suggests that interest and achievement can be enhanced if a teacher provides the right type of autonomy support and meaningful choices around how students learn.

2. Teacher provides students with opportunities to take on roles in the classroom

Teachers who provide students with opportunities to take on different classroom roles and responsibilities can promote students' interest, social skills, and enjoyment in learning (Hay & Dempster, 2004). Presenting students with roles such as cleaning up after an activity or leading students in some aspect of a lesson cultivates students' responsibility for their immediate surroundings. If facilitated well by a teacher, students develop self-management skills (e.g., emotional processes, cognitive self-regulation) instead of simply complying with an adult request (Schwab & Elias, 2014). The literature on cooperative learning has found that assigning students to specific roles in a team, rotating the roles during the course of learning, and holding individuals and teams accountable is more effective in promoting student learning than independent learning (Felder & Brent, 2007). Research on classrooms suggests both socioemotional and academic benefits of assigning roles.

Many sociocultural theorists point to the importance of engaging children in meaningful tasks that prepare them for roles and responsibilities in adulthood (Rogoff, 1990; Vygotsky, 1978). Assigning students limited roles in the classroom (e.g., gathering water, taking attendance) is one way of engaging students in the culturally specific tasks of the community that may have modest implications for learning in that it boosts students' engagement (Rogoff, Moore, Najafi, Dexter, Correa-Chavez, & Solis, 2007). Deeper learning is likely to come when teachers assign roles to students related to academic content and then engage with those students as they complete those roles, thus providing scaffolding and enriched learning experiences (Rogoff, 1990). Reciprocal teaching is an often-used approach involving assigning roles to teach reading comprehension. First, the teacher facilitates reading comprehension by asking students questions and modeling question asking for them.

Next the teacher invites the students to ask teacher-like questions to one another to support learning (Palinscar & Brown, 1984).

Use of roles in the classroom can contribute to students' leadership skills in that teachers can create opportunities for students to set goals for their work, plan projects, and decide how to work with others in a team (Hay & Dempster, 2004). Teachers can also assign roles that relate to real school problems that need resolving (e.g., peer mediation to deal with school bullying) (Drago-Severson, 2004; Irvin & White, 2004; Wallin, 2003). Further, assigning roles may encourage students' more active engagement in and deeper understanding of the content (National Research Council, 2012). Taken together, existing work shows the value of activities that allow students to take on different roles and responsibilities.

3. Students volunteer to participate in the classroom

Classroom participation indicates active engagement in learning and is viewed as a highly desirable precursor of student learning. Classroom participation has two aspects. At the base level, the presence versus absence of student participation is one important indicator of classroom quality (Chen & Yang, 2017). Further, the extent to which most students volunteer to participate (versus just a few) stems from whether teachers have been successful at establishing a supportive classroom environment in which all students are comfortable and willing to take on roles in the classroom. Classroom dynamics studies find that students who generally volunteer their answers in class tend to be more intrinsically motivated to learn and perform at a higher level academically than those who do not volunteer (Evertson et al., 1980; Hattie et al., 2014), suggesting the importance of focusing attention on this element.

3.4.2. Perseverance

Learning is not always fun – it requires effort, and failures and frustrations are unavoidable. Thus teachers need to encourage students to persevere through learning challenges by (i) helping them understand that their abilities and knowledge can be developed, (ii) providing them with strategies for developing their abilities and knowledge, and (iii) reassuring them that setbacks are an integral part of learning (e.g., Dweck, 1999, 2002, 2013). Teachers should also encourage students to set learning goals for themselves, and to persevere in their efforts to reach these goals (e.g., Duckworth, Peterson, Matthews, & Kelly, 2007). Teachers can have longstanding influence on their students' perseverance, as

demonstrated by one study in which sixth graders from Estonia reported on their teachers' emotional support in their first three years of schooling. Students with the highest task persistence had teachers who were high on emotional support and low in psychological control in first grade (Kikas & Tang, 2018). *Teach* included the following three teacher behaviors that capture the extent to which teachers encourage perseverance in their students:

1. *Teacher acknowledges students' efforts – rather than focusing only on results, students' intelligence, or natural abilities*
2. *Teacher has a positive attitude toward student challenges*
3. *Teacher encourages goal setting*

1. *Teacher acknowledges students' efforts – rather than focusing only on results, students' intelligence, or natural abilities*

Effective teachers recognize students' efforts, not only work products. In doing so, teachers can promote students' "growth mindset" in learning; that is, the belief that intelligence is malleable rather than a fixed attribute of the child. Dweck and colleagues led a series of investigations on growth mindset; they recognized that praise molds students' beliefs about themselves, their motivation, and performance (Dweck, 1999, 2002, 2013). This finding is supported by numerous experimental and longitudinal studies in both parenting and classroom contexts. For example, the longitudinal experimental study of Gunderson, Gripshover, Romero, Dweck, Goldin-Meadow, & Levine (2013) demonstrated that parents who praised children's effort at 14–38 months had encouraged children to adopt an incremental motivational framework at seven to eight years of age. Similarly, studies of parents who view their children's failure as debilitating and focus on children's performance and ability rather than children's learning promote a fixed mindset rather than a growth mindset (Haimovitz & Dweck, 2016). In other words, teachers who help children see their ability as malleable, through their instructional practices, attribute success to hard work, encourage challenges, and generate strategies for improvement use behavioral practices that can promote a growth mindset in students (Park, Gunderson, Tsukayama, Levin, & Beilock, 2016).

Praise such as "Good boy" and "You are so clever" can undermine students' motivation to show effort and performance (Dweck, 1999; Mueller & Dweck, 1998). Dweck and colleagues repeatedly found that students with a growth mindset show higher

achievement across challenging school transitions and demonstrate greater course completion rates in challenging mathematics courses (Gunderson et al., 2013; Yeager & Dweck, 2012). A growth mindset relates not only to better academic outcomes, but also to better psychological well-being, including lower aggression and stress in response to peer victimization and exclusion, which in turn results in better school performance (Dweck, 2013).

Not all praise is effective at producing student learning. Research distinguishes between generic and nongeneric praise. As one example, Zentall & Morris (2010) conducted a study examining teacher praise on kindergarten children's drawing abilities. Teachers responded to the children's drawing with generic praise (i.e., "You are a good drawer!") versus nongeneric praise (i.e., "You did a good job drawing!"). The authors found that nongeneric praise promoted motivation. Generic praise, in contrast, contributed to feelings of helplessness (Cimpian, Arce, Markman, & Dweck, 2007). On balance, the evidence from these studies suggests that praise that focuses on students' effort promotes learning and development.

Further investigations have explored the mechanisms responsible for the link between praise and outcomes. One study of mathematics and reading skills showed that teacher feedback that attributed student performance to ability ("You are very talented") versus effort ("You are really trying hard") or conveyed negative information ("You can do better" or "You make silly mistakes") related to children's self-talk (either positive or negative), which in turn, related to evaluations of their academic self-concept (Burnett, 2003). Still other studies showed that specific praise (in which a teacher shows positive affect and describes what the child did well) rather than positive praise (in which a teacher only indicates general positive affect about a behavior) promoted fourth graders' academic self-concept, on-task behavior, and enjoyment of mathematics (Chalk & Bizo, 2004). These findings are consistent with other studies showing the positive contribution of process-centered praise versus person-centered praise or criticism (Kamins & Dweck, 1999). Thus, effective teacher feedback can improve students' esteem and mindset about their academic performance. Effective teachers give praise that acknowledges student effort toward mastering new skills and identifies these efforts explicitly, thus encouraging a growth mindset.

2. Teacher has a positive attitude toward student challenges

Effective teachers have positive attitudes toward students' challenges and help students understand that frustration and failure are a normal part of the learning process. This attitude and the teacher practices that stem from these beliefs cultivate student motivation and

achievement. As one example, Zentall & Morris (2010) examined student responses to various scenarios illustrating student failure. First, students received scenarios in which hypothetical students completed drawings and teachers responded with generic (“You are a good drawer”) versus nongeneric praise (“You did a good job drawing”). Later in these scenarios, teachers looked at “failed” drawings and responded with, “That doesn’t look like a cat; it has no ears.” Then the children continued working on the cat pictures. After completion, teachers said, “You found a really good way to draw the cat. I see that it is black and has ears.” Various forms of these scenarios were repeated to examine consistent versus inconsistent use of type of praise (generic versus nongeneric). When the majority of the praise students received was nongeneric, students reported feeling happy about the scenarios, suggesting the emergence of a mastery orientation toward learning. When the majority of the praise was generic, students reported feeling sad about the vignettes (corresponding to helplessness in learning). Teachers’ feedback in failure situations conveys important information to students that can motivate them to do better in the future.

Student self-efficacy is an important driver of students’ approach to failure, especially in mathematics instruction, which is fraught with opportunities for student mistakes. For that reason, various studies have examined the types of teaching practices that contribute to high self-efficacy. In one study, high levels of emotional support (i.e., positive climate, teachers’ sensitivity to students’ point of view) was found to relate to higher student self-efficacy in mathematics (a 1.0 SD increase in emotional support was associated with a 0.14 SD increase in student self-efficacy [Blazar & Kraft, 2017]). In another study, fifth grade students low in self-efficacy showed lower engagement in learning in math. However, when teachers were emotionally supportive, students low in math self-efficacy were just as engaged as those students who were high in math self-efficacy (Martin & Rimm-Kaufman, 2015). Yet another study linked emotionally supportive classrooms (e.g., students’ perception of emotional support from teachers, academic support from peers, encouragement from teachers to discuss their work) to student achievement with academic self-efficacy and engagement with peers in academic work as important explanatory factors contributing to student achievement (Patrick, Ryan, & Kaplan, 2007).

A rich literature exists on how teachers can cultivate positive attitudes toward student struggle and failure. Effective teachers focus on the process of learning, not just product. In one study, fifth and sixth grade students were given instructions for a computerized problem-solving task. Some students were given instructions that drew attention to the task and away from concerns about performance (i.e., “It doesn’t matter at all how much you get

right...these problems are kind of hard”), whereas other students did not receive these instructions. The different types of instructions given were especially important for students who tended to believe that their performance was outside of their control (low-effort orientation). The low-effort orientation students used better problem-solving strategies when the assignment was given in a way that de-emphasized student performance (Stipek & Kowalski, 1989) and explicitly stated that students might struggle. Teachers convey their attitudes about the content to their students. One study measured students’ view of their teachers’ enthusiasm during teaching (e.g., “tries to get the students excited about the subject of mathematics during instruction” and “really seems to enjoy teaching mathematics”) and showed that teacher enthusiasm related to student interest in mathematics (Frenzel, Goetz, Pekrun, & Watt, 2010).

3. Teacher encourages goal setting

Research in the last three decades has highlighted several factors important to self-regulated learning and how teachers can promote such behavior in the classroom. Setting goals for learning is a demonstration of self-direction and initiative, referred to in the field as self-regulated learning (Zimmerman & Schunk, 1989). In encouraging students to set goals for their learning, teachers effectively demonstrate that students need to identify goal-directed actions (e.g., achievement of cooperation on task), promote persistence at engaging in the task despite obstacles, and be encouraged to restart unfinished tasks even in the presence of more attractive alternatives (Bargh et al., 2001).

Teachers who encourage students to set short- and long-term goals are found to improve students’ academic performance and achievement in school (Zimmerman, 2010). Teachers with high-achieving students tend to be particularly effective at integrating multiple goals in one lesson (indicating a high density of content); even more importantly, they make sure that their students are aware of those goals (Wharton-McDonald et al., 1998). One study compared fourth grade teachers teaching writing. Half of the teachers taught writing and self-regulation strategies (e.g., goal setting, self-assessment, and strategy monitoring) whereas the others (the control group) only taught writing. Students who learned both writing and self-regulation strategies were better able to use their knowledge when planning and revising a story and wrote stories that were more complete and of higher quality than the stories of control students (Glaser & Brunstein, 2007).

Recent work in psychology points to the importance of “grit” for student achievement. Grit is defined as a “passion for and perseverance toward especially long-term

goals” (Duckworth & Gross, 2014, p. 319). Students showing more grit are more successful at persevering and ultimately achieving their long-term goals, including staying and completing military service, staying in their jobs as teachers, holding down a job, staying married, and finishing school (Duckworth et al., 2007; Eskreis-Winkler, Duckworth, Shulman, & Beal, 2014; Robertson-Kraft & Duckworth, 2014). As students apply grit to persevere toward long-term goals, they are often confronted with smaller, short-term opportunities that can distract them from long-term objectives. Students with more self-control are better able to resist temptation and say no to these short-term opportunities. Thus self-control helps students keep their focus as they show grit and work toward singular, superordinate goals (Duckworth & Gross, 2014).

Teachers play an important role in developing students’ self-control and cultivating grit. One study points to the importance of well-organized kindergarten classrooms on student self-control. When teachers used effective management strategies, used time productively, and made expectations clear, students showed higher self-control (e.g., were able to stick to what they were doing even during lengthy unpleasant tasks, and were able to work toward goals) (Rimm-Kaufman et al., 2009). Other research examined the relation between grit and language arts achievement in fourth and fifth grade Latino students. This work found that the association between grit and student achievement was most evident when students perceived that their teachers were caring and supportive and the classroom was well managed (i.e., expectations for learning were clear) (Banse & Palacios, 2018).

Teachers also support students in their ability to delay gratification. The classic experiment by Mischel & Ebbesen (1970) tested three-year-olds to see the extent to which children were able to withhold from eating one marshmallow immediately (small reward) versus waiting 20 minutes to get two marshmallows (a larger reward). This delayed gratification behavior in early childhood was associated with completing high school, higher SAT scores, higher esteem, and better coping strategies for managing challenges and stress in later adulthood (Mischel, 2014; Mischel, Shoda, & Peake, 1988; Mischel, Shoda, & Rodriguez, 1989; Shoda, Mischel, & Peake, 1990). For students low in their ability to delay gratification, supportive classrooms in which teachers provide plentiful structure in their interactions with students are essential for positive learning outcomes (Brock, Rimm-Kaufman, & Wanless, 2014).

Taken together, the existing research suggests that effective teachers encourage students to set both short- and long-term goals. Support for self-control, grit, and delayed gratification helps students persevere through tasks, with sustained positive academic effects.

3.4.3. Social & Collaborative Skills

Academic learning is an intensely social experience. Positive interactions with peers of the same age contribute to students' academic, psychosocial, behavioral, and emotional well-being. These peer interactions take on increasing importance as children proceed through development (Parker & Asher, 1993; Hartup, 2009). Through peer relationships and experiences, children establish their concept of trust, practice critical social skills, develop a sense of their own identity, and develop perceptions of other people and the world, with lasting effects into later life. Competent social skills lead to friendships among students. In turn, the interactions that occur within those friendships can establish positive norms for engagement in learning and boost achievement (Kindermann, 2007; Skinner & Pitzer, 2012).

Teachers serve an important role in providing the classroom conditions conducive to positive peer interactions. Teachers guide peer culture by establishing classroom norms and producing an equitable social hierarchy within the classroom (Gest & Rodkin, 2011). When done effectively, teachers can create social environments in which students engage with each other, resulting in enhanced learning. In contrast, when teachers do not do this well, classroom environments can feel psychologically unsafe and students become unwilling to take intellectual risks and bullying interactions may prevail (Farmer, Lines, & Hamm, 2011). Based on the literature, *Teach* included three items to capture effective teacher behaviors that have been found to support student learning through peer interactions:

1. *The teacher promotes students' collaboration through peer interaction*
2. *The teacher promotes students' interpersonal skills*
3. *Students collaborate with one another through peer interaction*

1. *The teacher promotes students' collaboration through peer interaction*

The promotion of student collaboration in the classroom has benefits for children's socioemotional development as well as their academic performance. Structured activities that promote collaboration often take the form of cooperative learning, which has been found to improve children's relationships with peers – especially for those of different social and ethnic groups. Cooperative learning encourages students to share ideas, see problems from different perspectives, and practice oral language skills and social skills in small groups (Cohen, Brody, & Sapon-Shevin, 2004). In Sherif's (1954) classic Robber's Cave

Experiment, intergroup conflict was dissolved when groups of boys participated in a teamwork-driven task, where all children had to work together to achieve a common goal. This was one of the first demonstrations of the power of teamwork and shared goals in resolving conflict between children, and this finding has since been observed in other studies (Bargh, 2001; Tajfel, 1979). Cooperative learning is not always effective in classrooms and there is a consensus in the literature that effective cooperative learning requires both group goals and individual accountability to be effective (Slavin, 1991).

Other studies show the possible benefits of group work. Working in groups can help students better understand tasks than working on tasks alone (Cohen et al., 2004). In a study of Bruneian students, Kani & Shahrill (2015) found that when teachers assigned students to work in pairs to think-aloud and solve a set of math problems, improvements were observed in students' problem-solving strategies and their understanding of the problem. Further, when paired with peers working at a slightly higher level of knowledge, scaffolding can occur; that is, the less-skilled peer's memory recall and use of learning strategies improve while also increasing the more-skilled peer's self-esteem (Manion & Alexander, 1997). This is consistent with Wharton-MacDonald et al.'s (1998) study, which found that the most effective teachers with the highest-performing students tended to encourage instructional groupings in which students are encouraged to read or write with a partner during some part of the lesson or work in small-group activities cooperatively. Together this suggests that collaboration between students, when structured well, can be conducive to positive learning outcomes for both parties.

2. The teacher promotes students' interpersonal skills such as perspective taking, empathizing, emotion regulation, and social problem solving

Teachers cultivate students' interpersonal skills, which are important in their own right, and also enhance students' personal development and academic success. Teachers play an important role in children's social and emotional development by modeling positive behaviors (Gest & Rodkin, 2011), providing support to students to manage strong emotions (Denham, Bassett, & Zinsser, 2012), and managing naturally occurring power imbalances that can lead to aggression and bullying (Farmer et al., 2011).

Yet another way teachers promote students' interpersonal skills is by facilitating their perspective-taking ability (better known as theory of mind (ToM) skills). ToM skills have traditionally been thought to develop during early childhood, but recent studies suggest that classroom experiences and culture can influence the development of ToM skills in middle

childhood through teaching practices (Wang, Devine, Wong, & Hughes, 2016). A meta-analytic study of 32 studies (N=1529) showed that enhancing ToM skills through training that involves role-playing games, and the use of imagination and modeling, are effective tools at teaching students to reason about other people's mental states (Hoffman et al., 2016). Improved ToM skills have a direct impact on children's development in language (Hale & Tager-Flusberg, 2003; Harris, de Rosnay, & Pons, 2005; Lohmann & Tomasello, 2003; Longobardi, Spataro, & Rossi-Arnaud, 2016; Peskin & Astington, 2004), executive functioning skills such as working memory (Devine, White, Ensor, & Hughes, 2016), social skills (Bosacki & Wilde Astington, 1999; Devine et al., 2016; Longobardi et al., 2016; Zarrella, Lonigro, Perrella, Caviglia, & Laghi, 2018), and academic performance (Patrick, 1997; Zarrella et al., 2018).

Effective teachers promote students' ability to recognize and manage emotions (e.g., manage frustration, or modulate strong emotions to become calm and ready to learn). These skills – whether temperamentally based or learned in the classroom – are important for school readiness, student engagement, and many other aspects of social and academic competence (Checa et al., 2008; Denham, 2006). During the school years, teachers are instrumental in teaching skills, including the ability to recognize, label, and manage strong emotions and the ability to take multiple perspectives on a situation (Greenberg, Kusche, & Speltz, 1991). In one study comparing effective versus less-effective teachers, researchers found that children and adolescents whose teachers encouraged them to regulate their emotions performed the best academically compared to peers in classrooms where their teachers did not encourage emotion regulation (Wharton-McDonald et al., 1998). Other studies examining teachers' facilitation of programs (such as PATHS, RULER) designed to teach emotion knowledge and regulation show promising results for preschool children (Greenberg, Kusche, Cook, & Quamma, 1995; Mihic, Novak, Basic, & Nix, 2016) and middle school youth (Brackett et al., 2012), with important implications for reduced behavior problems, improved study skills, and less bullying.

3. Students collaborate with one another through peer interaction

Effective teachers facilitate students' positive interactions and collaboration to create caring classroom environments conducive to learning. Two processes of socialization occur simultaneously in classrooms: teachers socialize students on how to behave in positive ways with one another and students socialize each other on what is considered acceptable or not

acceptable (Farmer et al., 2011). The consequences of these teacher-to-student and student-to-student socialization experiences emerge in the classroom in various ways. Some teachers offer students many opportunities to work with peers whereas others do not. Peer interactions in some classrooms are positive (characterized by positive conversation and cooperation) whereas others are negative (characterized by name calling, teasing, or bullying).

Synthesis work on peer relationships in schools points to a few key features of effective peer relationships: warmth, structure, and autonomy support. Warm peer relationships give students an opportunity to listen to each other and talk openly. These interactions provide emotional support, establish a basis for respect, and give students a sense of belonging. Although the structure provided by peers differs from that offered by teachers, peer interactions offer structure by clearly signaling to students that they can rely on each other for help and guidance, by offering models of competent academic behavior, and by establishing clear and consistent expectations about shared materials. Peer interactions can also offer autonomy support in that working to understand each other's viewpoints, explaining the relevance of school work to one another, or the healthy negotiation that comes in group work helps students develop a sense of autonomy (Furrer, Skinner, & Pitzer, 2014).

The quality of peer interactions and student collaboration skills has been linked to academic competence in both the short and long term. In one longitudinal study, Buhs, Ladd, & Herald (2006) examined longitudinal data from kindergarten to fifth grade to examine the extent to which peer rejection early on related to later classroom engagement and achievement. Further, the work considered the extent to which being excluded by peers or peer abuse (e.g., kids saying bad things about them) was the mechanism explaining the relation between early peer rejection and later outcomes. Findings showed that a student's own perception of peer rejection was related to subsequent poor treatment by peers toward that child, resulting in the student's withdrawal from classroom participation and more avoidance of school. It appears that the chronic maltreatment from peers perpetuated problems and led to a downward spiral toward lower participation and achievement. Further longitudinal research links classroom peer relationships in third through fifth grade to graduation rates 10 years later. Researchers measured peers' perception of relationships (social preference, aggression, and withdrawal) and found that students with the greatest aggressiveness were less likely to graduate from high school (Risi, Gerhardstein, & Kistner, 2003).

Taken together, the research shows that teachers play an important role in facilitating positive versus negative peer social interactions in their classrooms, often acting as “the

invisible hand” in these relationships (Farmer et al., 2011). Teachers who demonstrate their liking toward all children, signal that all children are valuable, contradict children when they show prejudice toward a child, and minimize stratification based on ability set the stage for positive peer interactions (Mikami, Lerner, & Lun, 2010). Children naturally develop patterns of interactions and relationships, sort themselves into groups, and develop and form distinct peer groups. Teachers have an important influence on those social dynamics; teachers set the emotional tone for the classroom and establish seating arrangements, grouping strategies, and disciplinary approaches that drive social interactions (Farmer, Dawes, Hamm, Lee, Mehtaji, Hoffman, & Brooks, 2018).

4. Discussion

This paper presented *Teach*'s organizing framework for effective teaching practices and empirical evidence on these practices' importance for student learning, with special focus on evidence from primary classrooms in low- and middle-income countries. This evidence provides the foundation for the areas, elements, and behaviors included in the *Teach* classroom observation tool. Aside from providing strong confidence on the foundations for *Teach*, this evidence, together with other recent contributions (World Bank, 2018; Grossman, 2018), points to the need to improve teacher education to move beyond teachers' content knowledge to informing teachers what they need to do in the classroom, focusing on evidence-based core teacher practices. Teacher education must be reformed using the insights of evidence-based teaching and simulation of practice with well-prepared coaches (Grossman, Hammerness, & McDonald, 2009). While this may seem obvious, talking these results seriously would revolutionize teacher education. Once teachers are trained on those practices, *Teach* can help to monitor their enactment in the classroom, support teachers in improving their practices, and evaluate teachers' progress.

It is important to note the limitations of an ambitious study such as this, which attempts to isolate core teaching practices that can be easily measured by observers in a classroom. The empirical literature on teaching practices is still nascent, especially in low- and middle-income countries. As more evidence accumulates, a more precise understanding of how best to capture what exactly matters for student learning should emerge. This review has a strong focus on primary classrooms, but the findings may be different for preprimary and secondary education. While the evidence from this study provide strong confidence on the theoretical and empirical foundations of *Teach*' content we hope that the data generated

by Teach in classrooms worldwide will allow us to continue to improve not just Teach, but also our understanding of effective teaching practices.

References

- Ambrose, S. A., Bridges, M. W., DiPietro, M., Lovett, M. C., & Norman, M. K. (2010). *How learning works: Seven research-based principles for smart teaching*. John Wiley & Sons.
- Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84*(3), 261.
- Aslam, M. and G. Kingdon (2011): What can teachers do to raise pupil achievement? *Economics of Education Review, 30*, 559-574.
- Azigwe, J. B., Kyriakides, L., Panayiotou, A., & Creemers, B. P. M. (2016). The impact of effective teaching characteristics in promoting student achievement in Ghana. *International Journal of Educational Development, 51*, 51- 61.
- Babad, E. (1993). Teachers' differential behavior. *Educational Psychology Review, 5*(4), 347-376.
- Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191.
- Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory. *Journal of Social and Clinical Psychology, 4*(3), 359-373.
- Banerjee, A. V., Cole, S., Duflo, E., & Linden, L. (2007). Remediating education: Evidence from two randomized experiments in India. *The Quarterly Journal of Economics, 122*(3), 1235-1264.
- Banks, J. A. (2014). Diversity, group identity, and citizenship education in a global age. *Journal of Education, 194*(3), 1-12.
- Banse, H., & Palacios, N. (2018) Supportive classrooms for Latino English language learners: Grit, ELL status, and the classroom context. *The Journal of Educational Research, 111*(6), 645-656. doi: [10.1080/00220671.2017.1389682](https://doi.org/10.1080/00220671.2017.1389682)
- Bargh, J. A., Gollwitzer, P. M., Lee Chai, A., Barndollar, K., & Trötschel, R. (2001). The automated will: Nonconscious activation and pursuit of behavioral goals. *Journal of Personality and Social Psychology, 81*, 1014-1027.
- Bau, N. and Jishnu, D. (2017). The Misallocation of Pay and Productivity in the Public Sector: Evidence from the Labor Market for Teachers. Policy Research Working Paper, 8050. World Bank, Washington, D.C. Behrman, J. R., & Birdsall, N. (1983). The quality of schooling: Quantity alone is misleading. *American Economic Review, American Economic Association, 73*(5), 928-946.

- Berry, D., & O'Connor, E. (2010). Behavioral risk, teacher–child relationships, and social skill development across middle childhood: A child-by-environment analysis of change. *Journal of Applied Developmental Psychology, 31*(1), 1-14.
- Biggs, J. B. (1987). *Student approaches to learning and studying. Research monograph.* Australian Council for Educational Research Ltd., Radford House, Frederick St., Hawthorn 3122, Australia.
- Bishop, R., Berryman, M., & Ricardson, C. (2002). Te Toi Huarewa: Effective teaching and learning in total immersion Maori language educational settings. *Canadian Journal of Native Education, 26*(1), 44.
- Blazar, D., & Kraft, M. A. (2017). Teacher and teaching effects on students' attitudes and behaviors. *Educational Evaluation and Policy Analysis, 39*(1), 146-170.
- Boakes, N. (2009). The impact of origami-mathematics lessons on achievement and spatial ability of middle-school students. In *Origami4: Fourth International Meeting of Origami Science, Mathematics, and Education* (pp. 471-481).
- Bold, T., Filmer, D., Martin, G., Molina, E., Rockmore, C., Stacy, B., Svensson, J., & Wane, W. (2017). *What do teachers know and do? does it matter? Evidence from primary schools in Africa.* Washington, DC: The World Bank.
- Borman, G. D., & Overman, L. T. (2004). Academic resilience in mathematics among poor and minority students. *The Elementary School Journal, 104*(3), 177-195.
- Bosacki, S., & Wilde Astington, J. (1999). Theory of mind in preadolescence: Relations between social understanding and social competence. *Social Development, 8*(2), 237-255.
- Bosworth, K., & Judkins, M. (2014). Tapping into the power of school climate to prevent bullying: One application of schoolwide positive behavior interventions and supports. *Theory Into Practice, 53*(4), 300-307.
- Bouillion, L. M., & Gomez, L. M. (2001). Connecting school and community with science learning: Real world problems and school–community partnerships as contextual scaffolds. *Journal of Research in Science Teaching: The Official Journal of the National Association for Research in Science Teaching, 38*(8), 878-898.
- Bowman-Perrott, L., Burke, M. D., Zaini, S., Zhang, N., & Vannest, K. (2016). Promoting positive behavior using the Good Behavior Game: A meta-analysis of single-case research. *Journal of Positive Behavior Interventions, 18*(3), 180-190.
- Brackett, M. A., Rivers, S. E., Reyes, M. R., & Salovey, P. (2012). Enhancing academic performance and social and emotional competence with the RULER feeling words curriculum. *Learning and Individual Differences, 22*, 218-224.
- Bradshaw, C. P., Mitchell, M. M., & Leaf, P. J. (2010). Examining the effects of schoolwide positive behavioral interventions and supports on student outcomes: Results from a randomized controlled effectiveness trial in elementary schools. *Journal of Positive Behavior Interventions, 12*(3), 133-148.

- Brainerd, C. J. (1978). The stage question in cognitive-developmental theory. *Behavioral and Brain Sciences*, 1(2), 173-182.
- Bransford, J. D., & Johnson, M. K. (1972). Contextual prerequisites for understanding: Some investigations of comprehension and recall. *Journal of Verbal Learning and Verbal Behavior*, 11(6), 717-726.
- Brock, C. A. (1986). The Effects of Referential Questions on ESL Classroom Discourse. *TESOL Quarterly*, 20, 77-59. <http://dx.doi.org/10.2307/3586388>
- Brock, L. L., Rimm-Kaufman, S. E., & Wanless, S. B. (2014). Delay of gratification in first grade: The role of instructional contexts. *Learning and Individual Differences*, 29, 81-88.
- Brophy, J. (1986). Teacher influences on student achievement. *American Psychologist*, 41(10), 1069.
- Brophy, J. (1999). Toward a model of the value aspects of motivation in education: Developing appreciation for. *Educational Psychologist*, 34(2), 75-85.
- Brophy, J., & Good, T. L. (1984). Teacher behavior and student achievement. Occasional Paper No. 73.
- Brophy, J., & Good, T. L. (1985). Teacher behavior and student achievement, In M. C. Wittrock (Ed.), *Third handbook of research on teaching*. New York: Macmillan.
- Bruns, B., & Luque, J. (2014). *Great teachers: How to raise student learning in Latin America and the Caribbean*. Washington, DC: The World Bank.
- Bruns, B., De Gregorio, S., & Taut, S. (2016). Measures of effective teaching in developing countries. *Research on Improving Systems of Education (RISE) Working Paper*, 16(009). London.
- Buhl-Wiggers, J., Kerwin, J. T., Smith, J. A., and Thorton, R. (2017). The impact of teacher effectiveness on student learning in Africa. Research on Improving Systems of Education (RISE) Working Paper.
- Buhs, E. S., Ladd, G. W., & Herald, S. L. (2006). Peer exclusion and victimization: Processes that mediate the relation between peer group rejection and children's classroom engagement and achievement. *Journal of Educational Psychology*, 98(1), 1-13.
- Burnett, P. C. (2003). The impact of teacher feedback on student self-talk and self-concept in reading and mathematics. *The Journal of Classroom Interaction*, 11-16.
- Carlana, M. (2018). Implicit stereotypes: Evidence from teachers' gender bias. HKS Faculty Research Working Paper Series RWP18-034.
- Carpenter, T. P., Fennema, E., Peterson, P. L., Chiang, C. P., & Loef, M. (1989). Using knowledge of children's mathematics thinking in classroom teaching: An experimental study. *American Educational Research Journal*, 26(4), 499-531.
- Carrell, S. E., Hoekstra, M., & Kuka, E. (2018). The long-run effects of disruptive peers. *American Economic Review*, 108 (11), 3377-3415.

- Carver, S. M., & Klahr, D. (2013). *Cognition and instruction: Twenty-five years of progress*. Psychology Press.
- Castillo Castro, C. (2017). Teacher practices in primary schools with high value-added scores and engaging lessons in disadvantaged communities in rural Mexico. A dissertation submitted to the University of Cambridge for the degree of Doctor of Philosophy in the Faculty of Education
<https://www.repository.cam.ac.uk/bitstream/handle/1810/275368/TODO%2010Hardbound.pdf?sequence=1>
- Cattaneo, M. A., Oggenfuss, C., & Wolter, S. C. (2017). The more, the better? The impact of instructional time on student performance. *Education Economics*, 25(5), 433-445.
- Chalk, K., & Bizo, L. A. (2004). Specific praise improves on-task behaviour and numeracy enjoyment: A study of year four pupils engaged in the numeracy hour. *Educational Psychology in Practice*, 20(4), 335-351.
- Checa, P., Rodríguez-Bailón, R., & Rueda, M. R. (2008). Neurocognitive and temperamental systems of self-regulation and early adolescents' social and academic outcomes. *Mind, Brain, and Education*, 2(4), 177-187.
- Chen, D., & Yang, X. (2017). Improving active classroom participation of ESL students: Applying culturally responsive teaching strategies. *Theory and Practice in Language Studies*, 7(1), 79-86.
- Chetty, R., Friedman, J. N., and Rockoff, J. E. (2014). Measuring the impacts of teachers II: Teacher value-added and student outcomes in adulthood. *American Economic Review*, 104(9): 2633-2679.
- Chin, C., & Brown, D. E. (2000). Learning in science: A comparison of deep and surface approaches. *Journal of Research in Science Teaching: The Official Journal of the National Association for Research in Science Teaching*, 37(2), 109-138.
- Christenson, S., Reschly, A. L., & Wylie, C. (2012). *Handbook of research on student engagement*. New York: Springer.
- Cimpian, A., Arce, H., Markman, E. M., & Dweck, C. S. (2007). Subtle linguistic cues impact children's motivation. *Psychological Science*, 18, 314-316.
- Civikly, J. M. (1992). Clarity: Teachers and students making sense of instruction. *Communication Education*, 41(2), 138-152.
- Clearinghouse, W. W. (2009). READ 180. *What Works Clearinghouse Intervention Report*. *What Works Clearinghouse*.
- Clunies-Ross, P., Little, E., & Kienhuis, M. (2008). Self-reported and actual use of proactive and reactive classroom management strategies and their relationship with teacher stress and student behaviour. *Educational Psychology*, 28(6), 693-710.

- Cohen, E. G., Brody, C. M., & Sapon-Shevin, M. (Eds.). (2004). *Teaching cooperative learning: The challenge for teacher education*. Suny Press.
- Cohen, L., Manion, L., & Morrison, K. (2004) *A guide to teaching practice*. London: Routledge.
- Cohen, J. & Goldhaber, D. (2016). Building a More Complete Understanding of Teacher Evaluation Using Classroom Observations. *Educational Researcher*, 45. Collaborative for Academic, Social, and Emotional Learning (CASEL). (2018). *Core social and emotional learning competencies*. Retrieved from: <http://www.casel.org/social-and-emotional-learning/core-competencies/>
- Connell, J. P., & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: A motivational analysis of self-system processes. In M. R. Gunnar & L. A. Sroufe (Eds.), *The Minnesota symposia on child psychology, Vol. 23. Self-processes and development* (pp. 43-77). Hillsdale, NJ, US: Lawrence Erlbaum Associates, Inc.
- Connor, C. M., Ponitz, C. C., Phillips, B. M., Travis, Q. M., Glasney, S., & Morrison, F. J. (2010). First graders' literacy and self-regulation gains: The effect of individualizing student instruction. *Journal of School Psychology, 48*(5), 433-455. <http://dx.doi.org/10.1016/j.jsp.2010.06.003>
- Cornelius-White, J. (2007). Learner-centered teacher–student relationships are effective: A meta-analysis. *Review of Educational Research, 77*(1), 113-143.
- Corno, L. Y. N. (2008). On teaching adaptively. *Educational Psychologist, 43*(3), 161-173.
- Craft, M. A., Alber, S. R., & Heward, W. L. (1998). Teaching elementary students with developmental disabilities to recruit teacher attention in a general education classroom: Effects on teacher praise and academic productivity. *Journal of Applied Behavior Analysis, 31*(3), 399-415.
- Curby, T. W., Rimm-Kaufman, S. E., & Ponitz, C. C. (2009). Teacher–child interactions and children’s achievement trajectories across kindergarten and first grade. *Journal of Educational Psychology, 101*(4), 912-925. <http://dx.doi.org/10.1037/a0016647>
- Davey, B. (1983). Think aloud: Modeling the cognitive processes of reading comprehension. *Journal of Reading, 27*(1), 44-47.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self determination in human behavior*. New York: Plenum Press.
- Decker, D. M., Dona, D. P., & Christenson, S. L. (2007). Behaviorally at-risk African American students: The importance of student–teacher relationships for student outcomes. *Journal of School Psychology, 45*(1), 83-109.
- DeCristan, J., Klieme, E., Kunter, M., Hochweber, J., Büttner, G., Fauth, B., Hondrich, A. L., Rieser, S., Hertel, S., & Hardy, I. (2015). Embedded formative assessment and classroom process quality: How do they interact in promoting science understanding? *American Educational Research Journal, 52*(6), 1133-1159.

- Denham, S. A. (2006). Social-emotional competence as support for school readiness: What is it and how do we assess it? *Early education and development*, 17(1), 57-89.
- Denham, S. A., Bassett, H. H., & Zinsler, K. (2012). Early childhood teachers as socializers of young children's emotional competence. *Early Childhood Education Journal*, 40(3), 137-143.
- Devine, R. T., White, N., Ensor, R., & Hughes, C. (2016). Theory of mind in middle childhood: Longitudinal associations with executive function and social competence. *Developmental Psychology*, 52(5), 758.
- Dobbie, W., & Fryer Jr, R. G. (2013). Getting beneath the veil of effective schools: Evidence from New York City. *American Economic Journal: Applied Economics*, 5(4), 28-60.
- Dotterer, A. M., & Lowe, K. (2011). Classroom context, school engagement, and academic achievement in early adolescence. *Journal of Youth and Adolescence*, 40(12), 1649-1660.
- Drago-Severson, E. (2004). *Helping teachers learn: Principal leadership for adult growth and development*. London: Sage Publications.
- Duckworth, A., & Gross, J. J. (2014). Self-control and grit: Related but separable determinants of success. *Current Directions in Psychological Science*, 23(5), 319-325.
- Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, 92(6), 1087.
- Duflo, A., & Kiessel, J. (2017). Evaluating the Teacher Community Assistant Initiative in Ghana. Retrieved on 14 October 2018. <https://www.poverty-action.org/study/evaluating-teacher-community-assistant-initiative-ghana>.
- Duflo, E., Dupas, P., & Kremer, M. (2011). Peer effects, teacher incentives, and the impact of tracking: Evidence from a randomized evaluation in Kenya. *American Economic Review*, 101(5), 1739-74.
- Duke, N. K., & Pearson, P. D. (2009). Effective practices for developing reading comprehension. *Journal of Education*, 189(1-2), 107-122.
- Dunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, D. T. (2013). Improving students' learning with effective learning techniques: Promising directions from cognitive and educational psychology. *Psychological Science in the Public Interest*, 14(1), 4-58.
- Durkin, D. (1978). What classroom observations reveal about reading comprehension instruction. *Reading Research Quarterly*, 14, 481-533.
- Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development*, 82(1), 405-432.

- Dweck, C. S. (1999). Caution: Praise can be dangerous. *American Educator*, 23(1), 1–5.
- Dweck, C. S. (2002). Messages that motivate: How praise molds students' beliefs, motivation, and performance (in surprising ways). *Improving academic achievement: Impact of Psychological Factors on Education*, 37-60.
- Dweck, C. S. (2013). *Self-theories: Their role in motivation, personality, and development*. Psychology Press.
- Elbertson, N. A., Brackett, M. A., & Weissberg, R. P. (2010). School-based social and emotional learning (SEL) programming: Current perspectives. In *Second international handbook of educational change* (pp. 1017-1032). Dordrecht: Springer.
- Emmer, E. T., & Stough, L. M. (2001). Classroom management: A critical part of educational psychology, with implications for teacher education. *Educational Psychologist*, 36(2), 103-112.
- Eskreis-Winkler, L., Duckworth, A. L., Shulman, E. P., & Beal, S. (2014). The grit effect: Predicting retention in the military, the workplace, school and marriage. *Frontiers in Psychology*, 5, 36.
- Ettekal, I., Kochenderfer-Ladd, B., & Ladd, G. W. (2015). A synthesis of person- and relational-level factors that influence bullying and bystanding behaviors: Toward an integrative framework. *Aggression and Violent Behavior*, 23, 75– 86.
- Evans, M., & Boucher, A. (2015). Optimizing the power of choice: supporting student autonomy to foster motivation and engagement in learning. *Mind, Brain and Education*, 9(2), 87-91.
- Evans, D. K., and Yuan, F. (2017). Economic returns to interventions that increase learning. Background paper, World Development Report 2018, World Bank, Washington, D.C.
- Evertson, C. M., Anderson, C. W., Anderson, L. M., & Brophy, J. E. (1980). Relationships between classroom behaviors and student outcomes in junior high mathematics and English classes. *American Educational Research Journal*, 17(1), 43-60.
- Farmer, T.W., Lines, M.M., & Hamm, J. V. (2011). Revealing the invisible hand: The role of teachers in children's peer experiences. *Journal of Applied Developmental Psychology* 32, 247–256.
- Farmer, T. W., Dawes, M., Hamm, J. V., Lee, D., Mehtaji, M., Hoffman, A. S., & Brooks, D. S. (2018). Classroom social dynamics management: Why the invisible hand of the teacher matters for special education. *Remedial and Special Education*, 39(3), 177-192.
- Feld, J., & Zolitz, U.. (2017). Understanding peer effects: On the nature, estimation, and channels of peer effects. *Journal of Labor Economics*, 35(2), 387-428.
- Felder, R. M., & Brent, R. (2007). Cooperative learning. In *Active learning: Models from the analytical sciences*, ACS Symposium Series (Vol. 970, pp. 34-53).

- Fischer, M. A., Mazor, K. M., Baril, J., Alper, E., DeMarco, D., & Pugnaire, M. (2006). Learning from mistakes. *Journal of General Internal Medicine*, 21(5), 419-423.
- 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.
- Frenzel, A. C., Goetz, T., Pekrun, R., & Watt, H.M.G. (2010). Development of mathematics interest in adolescence: Influences of gender, family, and school context. *Journal of Research on Adolescence*, 20(2), 507-537.
- Fullan, M., (2007) *The new meaning of educational change*, Routledge, New York.
- Furrer, C. J., Skinner, E. A., & Pitzer, J. R. (2014). The influence of teacher and peer relationships on students' classroom engagement and everyday motivational resilience. *National Society for the Study of Education*, 113(1), 101-123.
- Gasser, L., Grütter, J., Buholzer, A., & Wettstein, A. (2018). Emotionally supportive classroom interactions and students' perceptions of their teachers as caring and just. *Learning and Instruction*, 54, 82-92.
<http://dx.doi.org/10.1016/j.learninstruc.2017.08.003>
- Gelman, S. A., & Raman, L. (2003). Preschool children use linguistic form class and pragmatic cues to interpret generics. *Child Development*, 24, 308-325.
- Gest, S. D., & Rodkin, P. C. (2011). Teaching practices and elementary classroom peer ecologies. *Journal of Applied Developmental Psychology*, 32(5), 288-296.
- Gill, B., Shoji, M., Coen, T., and Place, K. (2016). The content, predictive power, and potential bias in five widely used teacher observation instruments. (REL 2017-191). Washington, DC.
- Glaser, C., & Brunstein, J. C. (2007). Improving fourth-grade students' composition skills: Effects of strategy instruction and self-regulation procedures. *Journal of Educational Psychology*, 99(2), 297-310.
- Goldenberg, C. (1992). Instructional conversations: Promoting comprehension through discussion. *The Reading Teacher*, 46(4), 316-326.
- Good, T. L., Biddle, B. J., & Brophy, J. E. (1975). *Teachers make a difference*. New York: Holt, Rinehart and Winston.
- Good, T. L., & Grouws, D. A. (1977). Teaching effects: A process-product study in fourth-grade mathematics classrooms. *Journal of Teacher Education*, 28(3), 49-54.
- Good, T. L., & Grouws, D. A. (1979). The Missouri Mathematics Effectiveness Project: An experimental study in fourth-grade classrooms. *Journal of Educational Psychology*, 71(3), 355.
- Greenberg, M. T., Kusche, C. A., Cook, E. T., & Quamma, J. P. (1995). Promoting emotional competence in school-aged children: The effects of the PATHS curriculum. *Development and Psychopathology*, 7(1), 117-136.

- Greenberg, M. T., Kusche, C. A., & Speltz, M. (1991). Emotional regulation, self-control, and psychopathology: The role of relationships in early childhood. In D. Cicchetti & S. L. Toth (Eds.), *Rochester Symposium on Developmental Psychopathology*, Vol. 2. Internalizing and externalizing expressions of dysfunction (pp. 21-55). Hillsdale, NJ, US: Lawrence Erlbaum Associates, Inc.
- Griggs, M. S., Mikami, A. Y., & Rimm-Kaufman, S. E. (2016). Classroom quality and student behavior trajectories in elementary school. *Psychology in the Schools*, *53*(7), 690-704. <http://dx.doi.org/10.1002/pits.21941>
- Grossman, P. (Ed.) (2018). *Teaching core practices in teacher education*. Cambridge, MA: Harvard Education Press.
- Grossman, H., & Grossman, S. H. (1994). *Gender issues in education*. Needham Heights, MA: Allyn and Bacon, A Division of Simon & Schuster, Inc.
- Grossman, P., Hammerness, K., & McDonald, M. (2009). Redefining teaching, re-imagining teacher education. *Teachers and Teaching*, *15*(2), 273-289.
- Grossman, P., Loeb, S., Cohen, J., & Wyckoff, J. (2013). Measure for measure: The relationship between measures of instructional practice in middle school English language arts and teachers' value-added scores. *American Journal of Education*, *119*(3), 445-470.
- Gunderson, E. A., Gripshover, S. J., Romero, C., Dweck, C. S., Goldin-Meadow, S., & Levine, S. C. (2013). Parent praise to 1-to 3-year-olds predicts children's motivational frameworks 5 years later. *Child Development*, *84*(5), 1526-1541.
- Haimovitz, K., & Dweck, C. S. (2016). Parents' views of failure predict children's fixed and growth intelligence mind-sets. *Psychological Science*, *27*(6), 859-869.
- Hale, C. M., & Tager-Flusberg, H. (2003). The influence of language on theory of mind: A training study. *Developmental Science*, *6*(3), 346-359.
- Hamre, B. K., & Pianta, R. C. (2005). Can instructional and emotional support in the first-grade classroom make a difference for children at risk of school failure?. *Child Development*, *76*(5), 949-967.
- Hamre, B. K., & Pianta, R. C. (2006). Student-teacher relationships. In G. G. Bear & K. M. Minke (Eds.), *Children's needs III: Development, prevention, and intervention* (pp. 59-71). Washington, DC, US: National Association of School Psychologists.
- Hamre, B., Hatfield, B., Pianta, R., & Jamil, F. (2014). Evidence for general and domain-specific elements of teacher-child interactions: Associations with preschool children's development. *Child Development*, *85*(3), 1257-1274.
- Hanushek, E. A, Kain, J. F., Markman, J. M., & Rivkin, S. G. (2003). Does peer ability affect student achievement? *Journal of Applied Econometrics*, *18*(5), 527-544.
- Harris, P. L., de Rosnay, M., & Pons, F. (2005). Language and children's understanding of mental states. *Current Directions in Psychological Science*, *14*(2), 69-73.

- Hartup, W. W. (2009). Critical issues and theoretical viewpoints. *Handbook of peer interactions, relationships, and groups*. In K. Rubin, W. Bukowski, B Laursen (Eds). *Handbook of peer interactions, relationships, and groups*, (pp. 3-19). New York, NY, US: Guilford Press.
- Harvey, K. E., Suizzo, M. A., & Jackson, K. M. (2016). Predicting the grades of low-income–ethnic-minority students from teacher–student discrepancies in reported motivation. *The Journal of Experimental Education*, 84(3), 510-528.
- Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. New York: Routledge.
- Hattie, J., Biggs, J., & Purdie, N. (1996). Effects of Learning Skills Interventions on Student Learning: A Meta-Analysis. *Review of Educational Research*, 66(2), 99–136
- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, 77(1), 81-112.
- Hattie, J., & Yates, G. (2014). *Visible learning and the science of how we learn*. London: Routledge, Taylor & Francis Group.
- Hay, I., & Dempster, N. (2004). Student leadership development through general classroom activities. In *Educating: Weaving research into practice: Volume 2* (pp. 141-150).
- Henderlong, J., & Lepper, M. R. (2002). The effects of praise on children’s intrinsic motivation: A review and synthesis. *Psychological Bulletin*, 128, 774 –795.
- Heyman, G., & Gelman, S. A. (1999). The use of trait labels in making psychological inferences. *Child Development*, 70, 604–619.
- Hiller, J. H., Fisher, G. A., & Kaess, W. (1969). A computer investigation of verbal characteristics of effective classroom lecturing. *American Educational Research Journal*, 6(4), 661-675.
- Horner, R. H., Sugai, G., & Lewis, T. (2007). Is school-wide positive behavior support an evidence-based practice.
- Hofmann, S. G., Doan, S. N., Sprung, M., Wilson, A., Ebesutani, C., Andrews, L. A., Curtiss, J., ... Harris, P. L. (2016). Training children's theory-of-mind: A meta-analysis of controlled studies. *Cognition*, 150, 200-12.
- Hull, C. L. (1943). *Principles of behavior: An introduction to behavior theory*.
- Irvin, L. E., & White, D. (2004). Keys to effective leadership. *Principal Leadership*, 6, 20–24.
- Jang, H., Reeve, J., & Halusic, M. (2016). A new autonomy-supportive way of teaching that increases conceptual learning: Teaching in students' preferred ways. *The Journal of Experimental Education*, 84(4), 686-701.

- Jennings, P. A., & Greenberg, M. T. (2009). The prosocial classroom: Teacher social and emotional competence in relation to student and classroom outcomes. *Review of Educational Research, 79*(1), 491-525.
- Jerome, E. M., Hamre, B. K., & Pianta, R. C. (2009). Teacher-child relationships from kindergarten to sixth grade: Early childhood predictors of teacher-perceived conflict and closeness. *Social Development, 18*(4), 915-945.
- Johnson, T. C., Stoner, G., & Green, S. K. (1996). Demonstrating the experimenting society model with classwide behavior management interventions. *School Psychology Review, 25*(2), 199-214.
- Jones, S. M., Bouffard, S. M., & Weissbourd, R. (2013). Educators' social and emotional skills vital to learning. *Phi Delta Kappan, 94*(8), 62-65.
- Jones, S. M., & Bouffard, S. M. (2012). Social and emotional learning in schools: From programs to strategies. Social Policy Report. *Society for Research in Child Development, 26*(4).
- Kamins, M. L., & Dweck, C. S. (1999). Person versus process praise and criticism: Implications for contingent self-worth and coping. *Developmental Psychology, 35*(3), 835.
- Kani, N. H. A., & Shahrill, M. (2015). Applying the thinking aloud pair problem solving strategy in mathematics lessons. *Asian Journal of Management Sciences and Education, 4*(2), 20-28.
- Katz, I., & Assor, A. (2007). When choice motivates and when it does not. *Educational Psychology Review, 19*, 429-442
- Kember, D. & Leung, D. Y. P. (2005) The influence of active learning experiences on the development of graduate capabilities, *Studies in Higher Education, 30*:2, 155-170
- Kikas, E. & Tang, X. (2018). Child-perceived teacher emotional support, its relations with teaching practices, and task persistence. *European Journal of Psychology of Education. <https://doi.org/10.1007/s10212-018-0392-y>*
- Kindermann, T. A. (2007). Effects of naturally existing peer groups on changes in academic engagement in a cohort of sixth graders. *Child Development, 78*(4), 1186-1203.
- Klem, A. M., & Connell, J. P. (2004). Relationships matter: Linking teacher support to student engagement and achievement. *Journal of School Health, 74*(7), 262-273.
- Klingner, J., Tversky, B., & Hanrahan, P. (2011). Effects of visual and verbal presentation on cognitive load in vigilance, memory, and arithmetic tasks. *Psychophysiology, 48*(3), 323-332.
- Knapp, M. S., Shields, P. M., & Turnbull, B. J. (1995). Academic challenge in high-poverty classrooms. *Phi Delta Kappan, 76*(10), 770.
- Koestner, R., Zuckerman, M., & Olsson, J. (1990). Attributional style, comparison focus of praise, and intrinsic motivation. *Journal of Research in Personality, 24*, 87-100.

- Korpershoek, H., Harms, T., de Boer, H., van Kuijk, M., & Doolaard, S. (2016). A meta-analysis of the effects of classroom management strategies and classroom management programs on students' academic, behavioral, emotional, and motivational outcomes. *Review of Educational Research*, 86(3), 643-680.
- Kramarski, B., & Zeichner, O. (2001). Using technology to enhance mathematical reasoning: Effects of feedback and self-regulation learning. *Educational Media International*, 38(2-3), 77-82.
- Lane, K. L., Wehby, J., Menzies, H. M., Doukas, G. L., Munton, S. M., & Gregg, R. M. (2003). Social skills instruction for students at risk for antisocial behavior: The effects of small-group instruction. *Behavioral Disorders*, 28(3), 229-248.
- Lavy, V. (2010). *Do differences in schools' instruction time explain international achievement gaps? Evidence from developed and developing countries* (No. w16227). National Bureau of Economic Research, Cambridge, MA.
- Lavy, V. (2015). Do differences in schools' instruction time explain international achievement gaps? Evidence from developed and developing countries. *The Economic Journal*, 125(588), F397-F424.
- Lee, Y., & Kinzie, M. B. (2012). Teacher question and student response with regard to cognition and language use. *Instructional Science: An International Journal of the Learning Sciences* 40(6): 857-874.
- Lee, V., & Smith, J. B. (1999). Social support and achievement for young adolescents in Chicago: The role of school academic press. *American Education Research Journal*, 36, 907-945.
- Lee, Y., Kinzie, M. B., & Whittaker, J. V. (2012). Impact of online support for teachers' open-ended questioning in pre-k science activities. *Teaching & Teacher Education*, 28, 568-577. <http://dx.doi.org/10.1016/j.tate.2012.01.002>
- Leflot, G., van Lier, P. A., Onghena, P., & Colpin, H. (2010). The role of teacher behavior management in the development of disruptive behaviors: An intervention study with the good behavior game. *Journal of Abnormal Child Psychology*, 38(6), 869-882.
- Lemov, D. (2015). *Teach like a champion 2.0: 62 techniques that put students on the path to college*. John Wiley & Sons.
- Lentfer, V., & Franks, B. A. (2016). The redirect behavior model and the effects on pre-service teachers' self-efficacy. *Journal of Curriculum, Teaching, Learning and Leadership in Education*, 1(1), 2.
- Levin, T., with Long, R. (1981). *Effectiveness instruction*. Washington, DC: Association for Supervision and Curriculum Development.
- Levy, H. M. (2008). Meeting the needs of all students through differentiated instruction: Helping every child reach and exceed standards. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 81(4), 161-164.

- Leyva, D., Weiland, C., Barata, M., Yoshikawa, H., Snow, C., Treviño, E., & Rolla, A. (2015). Teacher–child interactions in Chile and their associations with prekindergarten outcomes. *Child Development, 86*(3), 781-799.
- Lo, Y. Y., Loe, S. A., & Cartledge, G. (2002). The effects of social skills instruction on the social behaviors of students at risk for emotional or behavioral disorders. *Behavioral Disorders, 27*(4), 371-385.
- Lohmann, H., & Tomasello, M. (2003). The role of language in the development of false belief understanding: A training study. *Child Development, 74*(4), 1130-1144.
- Longobardi, E., Spataro, P., & Rossi-Arnaud, C. (2016). Relations between theory of mind, mental state language and social adjustment in primary school children. *European Journal of Developmental Psychology, 13*(4), 424-438.
- Lopez, F. A. (2012). Moderators of language acquisition models and reading achievement for English language learners: The role of emotional warmth and instructional support. *Teachers College Record, 114*(8).
- Malecki, C. K., & Demaray, M. K. (2003). What type of support do they need? Investigating student adjustment as related to emotional, informational, appraisal, and instrumental support. *School Psychology Quarterly, 18*(3), 231-252.
<http://dx.doi.org/10.1521/scpq.18.3.231.22576>
- Manion, V., & Alexander, J. M. (1997). The benefits of peer collaboration on strategy use, metacognitive causal attribution, and recall. *Journal of Experimental Child Psychology, 67*(2), 268-289.
- Martin, D. P., & Rimm-Kaufman, S. E. (2015). Do student self-efficacy and teacher–student interaction quality contribute to emotional and social engagement in fifth grade math? *Journal of School Psychology, 53*(5), 359-373.
- McGee, C. F., & Fraser, D. (Eds.). (2001). *The professional practice of teaching*. Dunmore Press.
- McNamara, E., Evans, M., & Hill, W. (1986). The reduction of disruptive behaviour in two secondary school classes. *British Journal of Educational Psychology, 56*(2), 209-215.
- Meehan, B. T., Hughes, J. N., & Cavell, T. A. (2003). Teacher–student relationships as compensatory resources for aggressive children. *Child Development, 74*, 1145–1157.
- Merritt, E. G., Wanless, S. B., Rimm-Kaufman, S. E., Cameron, C., & Peugh, J. L. (2012). The contribution of teachers' emotional support to children's social behaviors and self-regulatory skills in first grade. *School Psychology Review, 41*(2).
- Mihic, J., Novak, M., Basic, J., & Nix, R. L. (2016). Promoting social and emotional competencies among young children in Croatia with preschool PATHS. *International Journal of Emotional Education, 8*(2), 45-59.
- Mikami, A. Y., Lerner, M. D., & Lun, J. (2010). Social context influences on children's rejection by their peers. *Child Development Perspectives, 4*(2), 123-130.

- Mischel, W. (2014). *The Marshmallow Test: Mastering self-control*. New York, NY, US: Little, Brown and Co.
- Mischel, W., & Ebbsen, E. B. (1970). Attention in delay of gratification. *Journal of Personality and Social Psychology*, *16*(2), 329.
- Mischel, W., Shoda, Y., & Peake, P. K. (1988). The nature of adolescent competencies predicted by preschool delay of gratification. *Journal of Personality and Social Psychology*, *54*(4), 687.
- Mischel, W., Shoda, Y., & Rodriguez, M. I. (1989). Delay of gratification in children. *Science*, *244*(4907), 933-938.
- Molina, E., Fatima, S.F., Trako, I., & Wilichowski, T.M. (2018a). Teaching practices in Philippines. Policy Paper. World Bank, Washington, D.C.
- Molina, E., Trako, I., Hosseini Matin, A., Masood, E. & Viollaz, M. (2018b). The learning crisis in Afghanistan. Policy Paper. World Bank, Washington, D.C.
- Molina, E., Fatima, S.F., Ho, A.D., Melo Hurtado C., Wilichowski, T.M., & Pushparatnam, A. (2018c). Measuring teaching practices at scale. Results from the development and validation of the Teach classroom observation tool. Policy Paper. World Bank, Washington, D.C.
- Moll, L. C., Amanti, C., Neff, D., & Gonzalez, N. (1992). Funds of knowledge for teaching: Using a qualitative approach to connect homes and classrooms. *Theory into Practice*, *31*(2), 132-141.
- Moon, J. (2007) *Critical Thinking: An Exploration of Theory and Practice*. London. Routledge Falmer
- Morgan, D.N., & Wagner, C.W. (2013). “What’s the catch?” Providing reading choice in a high school classroom. *Journal of Adolescent & Adult Literacy*, *56*(8), 659-667.
- Mueller, C. M., & Dweck, C. S. (1998). Praise for intelligence can undermine children's motivation and performance. *Journal of Personality and Social Psychology*, *75*(1), 33.
- Muller, C. (2001). The role of caring in the teacher-student relationship for at-risk students. *Sociological Inquiry*, *71*(2), 241-255.
- Mutekwe, E., & Modiba, M. (2012). Girls’ career choices as a product of a gendered school curriculum: The Zimbabwean example. *South African Journal of Education*, *32*(3), 279-292.
- Nathan, M. J., Kim, S., & Grant, T. S. (2009). Instituting change in classroom discourse structure: Human and computer based motif analysis. WCER Working Paper No. 2009-1, Madison, WI: University of Wisconsin-Madison, Wisconsin Center for Education Research.
- National Academies of Sciences, Engineering, and Medicine. 2018. *How people learn II: Learners, contexts, and cultures*. Washington, DC: The National Academies Press.

- National Research Council (U.S.), Bransford, J., Pellegrino, J. W., & Donovan, S. (2001). *How people learn: Bridging research and practice*. Washington, DC: The National Academies Press.
- National Research Council. (2007). *Taking science to school: Learning and teaching science in grades K-8*. Washington, DC: The National Academies Press.
<https://doi.org/10.17226/11625>.
- National Research Council. (2012). *Education for life and work: developing transferable knowledge and skills in the 21st century*. Committee on Defining Deeper Learning and 21st Century Skills, J.W. Pellegrino & M.L. Hilton, Editors. Board on Testing and Assessment and Board on Science Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.
- Nicol, D. J., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in Higher Education, 31*(2), 199-218, doi: 10.1080/03075070600572090
- O'Brennan, L. M., Waasdorp, T. E., & Bradshaw, C. P. (2014). Strengthening bullying prevention through school staff connectedness. *Journal of Educational Psychology, 106*(3), 870.
- O'Connor, E. E., Dearing, E., & Collins, B. A. (2011). Teacher-child relationship and behavior problem trajectories in elementary school. *American Educational Research Journal, 48*(1), 120-162.
- Organisation for Economic Co-operation and Development (OECD) (2014). How much time do primary and lower secondary students spend in the classroom? *Education Indicators in Focus*, April, 1-4. [http://www.oecd.org/education/skills-beyond-school/EDIF%202014--N22%20\(eng\).pdf](http://www.oecd.org/education/skills-beyond-school/EDIF%202014--N22%20(eng).pdf)
- OECD (2009). *Creating Effective Teaching and Learning Environments: First Results from TALIS*. Paris, France.
- OECD (2017). *PISA 2015 Results (Volume III): Students' Well-Being*. Paris: OECD Publishing.
- Ortlieb, E., & Norris, M. R. (2012). Preventing the development of struggling readers: Comprehension instruction in the science classroom. *Current Issues in Education, 15*(1).
- Osher, D., Sprague, J., Weissberg, R. P., Axelrod, J., Keenan, S., Kendziora, K., et al. (2007). A comprehensive approach to promoting social, emotional, and academic growth in contemporary schools. In A. Thomas & J. Grimes (Eds.), *Best practices in school psychology* (Vol. 5, 5th ed., pp. 1263–1278). Bethesda, MD: National Association of School Psychologists.
- Palinscar, A. S., & Brown, A. L. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. *Cognition and Instruction, 1*(2), 117-175.
- Park, D., Gunderson, E. A., Tsukayama, E., Levine, S. C., & Beilock, S. L. (2016). Young children's motivational frameworks and math achievement: Relation to teacher-

- reported instructional practices, but not teacher theory of intelligence. *Journal of Educational Psychology*, 108(3), 300.
- Parker, J. G., & Asher, S. R. (1993). Friendship and friendship quality in middle childhood: Links with peer group acceptance and feelings of loneliness and social dissatisfaction. *Developmental Psychology*, 29(4), 611-621.
- Parker, M., & Hurry, J. (2007). Teachers' use of questioning and modelling comprehension skills in primary classrooms. *Educational Review*, 59(3), 299-314.
- Patall, E. A., Cooper, H., & Wynn, S. R. (2010). The effectiveness and relative importance of choice in the classroom. *Journal of Educational Psychology*, 102(4), 896.
- Patrick, H. (1997). Social self-regulation: Exploring the relations between children's social relationships, academic self-regulation, and school performance. *Educational Psychologist*, 32(4), 209-220.
- Patrick, H., Ryan, A. M., & Kaplan, A. (2007). Early adolescents' perceptions of the classroom social environment, motivational beliefs, and engagement. *Journal of Educational Psychology*, 99(1), 83-98.
- Peskin, J., & Astington, J. W. (2004). The effects of adding metacognitive language to story texts. *Cognitive Development*, 19(2), 253-273.
- Peterson, E. R., Rubie-Davies, C., Osborne, D., & Sibley, C. (2016). Teachers' explicit expectations and implicit prejudiced attitudes to educational achievement: Relations with student achievement and the ethnic achievement gap. *Learning and Instruction*, 42, 123-140.
- Pianta, R. C., Hamre, B., & Stuhlman, M. (2003). Relationships between teachers and children. *Handbook of psychology*, 199-234.
- Pischke, J. S. (2007). The impact of length of the school year on student performance and earnings: Evidence from the German short school years. *The Economic Journal*, 117(523), 1216-1242.
- Pittinsky, T. L. (2016). Backtalk: Why overlook microaffirmations? *Phi Delta Kappan*, 98(2), 80-80.
- Pittinsky, T. L., & Montoya, R. M. (2016). Empathic joy in positive intergroup relations. *Journal of Social Issues*, 72(3), 511-523.
- Porter, A. C., & Brophy, J. (1988). Synthesis of research on good teaching: Insights from the work of the Institute for Research on Teaching. *Educational leadership*, 45(8), 74-85.
- Programme for International Student Assessment, & Source OECD (Online service). (2006). *Assessing scientific, reading and mathematical literacy: A framework for PISA 2006*. Publications de l'OCDE.
- Reeve, J. (2006). Teachers as facilitators: What autonomy-supportive teachers do and why their students benefit. *The Elementary School Journal*, 106(3), 225-236.

- Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. *Educational Psychologist, 44*(3), 159-175.
- Reeve, J., & Jang, H. (2006). What teachers say and do to support students' autonomy during a learning activity. *Journal of Educational Psychology, 98*(1), 209.
- Reeve, J., Ryan, R., Deci, E. L., & Jang, H. (2008). Understanding and promoting autonomous self-regulation: A self-determination theory perspective. *Motivation and Self-Regulated Learning: Theory, Research, and Applications, 223-244*.
- Reeves, T. C., Herrington, J., & Oliver, R. (2004). A development research agenda for online collaborative learning. *Educational Technology Research and Development, 52*(4), 53.
- Reinke, W. M., Herman, K. C., & Stormont, M. (2013). Classroom-level positive behavior supports in schools implementing SW-PBIS: Identifying areas for enhancement. *Journal of Positive Behavior Interventions, 15*(1), 39-50.
- Rescorla, R. A., & Wagner, A. R. (1972). A theory of Pavlovian conditioning: Variations in the effectiveness of reinforcement and nonreinforcement. *Classical Conditioning II: Current Research and Theory, 2*, 64-99.
- Reyes, M. R., Brackett, M. A., Rivers, S. E., White, M., & Salovey, P. (2012). Classroom emotional climate, student engagement, and academic achievement. *Journal of Educational Psychology, 104*(3), 700.
- Ribera, T., BrckaLorenz, A., Cole, E. R., & Laird, T. F. N. (2012, April). Examining the importance of teaching clarity: Findings from the faculty survey of student engagement. In Paper presented at the Annual Meeting of the American Educational Research Association.
- Rimm-Kaufman, S. E., Curby, T., Grimm, K., Nathanson, L., & Brock, L. (2009). The contribution of children's self-regulation and classroom quality to children's adaptive behaviors in the kindergarten classroom. *Developmental Psychology, 45*(4), 958-972.
- Rimm-Kaufman, S. E., Baroody, A., Larsen, R., Curby, T. W., & Abry, T. (2015). To what extent do teacher-student interaction quality and student gender contribute to fifth graders' engagement in mathematics learning? *Journal of Educational Psychology, 107*(1), 170-185. doi: <http://dx.doi.org/10.1037/a0037252>
- Risi, S., Gerhardstein, R., & Kistner, J. (2003). Children's classroom peer relationships and subsequent educational outcomes. *Journal of Clinical Child and Adolescent Psychology, 32*(3), 351-361.
- Robertson-Kraft, C., & Duckworth, A. L. (2014). True grit: Trait-level perseverance and passion for long-term goals predicts effectiveness and retention among novice teachers. *Teachers College Record (1970), 116*(3).
- Rogoff, B. (1990). *Apprenticeship in thinking*. New York City, New York: Oxford University Press.

- Rogoff, B., Moore, L., Najafi, B., Dexter, A., Correa-Chávez, M., & Solís, J. (2007). Children's development of cultural repertoires through participation in everyday routines and practices. In J. E. Grusec & P. D. Hastings (Eds.), *Handbook of socialization: Theory and research* (pp. 490-515). New York, NY, US: Guilford Press.
- Roorda, D. L., Koomen, H. M., Spilt, J. L., & Oort, F. J. (2011). The influence of affective teacher–student relationships on students’ school engagement and achievement: A meta-analytic approach. *Review of Educational Research, 81*(4), 493-529.
- Rosenberg, M. (1986). *Conceiving the self*. Reprint Edition. Melbourne, FL: Krieger.
- Rosenshine, B. (1968). To explain: A review of research. *Educational Leadership, 27*5-280.
- Rosenshine, B. (2012). Principles of instruction: research-based strategies that all teachers should know. *American Educator, 36*(1), 12.
- Rosenthal, R., & Jacobson, L. (1968). Pygmalion in the classroom. *The Urban Review, 3*(1), 16-20.
- Rosenthal, T. L., & Zimmerman, B. J. (1978). *Social learning and cognition*. New York: Academic Press.
- Roth, M. W. (1996). Teacher questioning in an open-inquiry learning environment: Interactions of context, content, and student responses. *Journal of Research in Science Teaching, 33*, 710-735. [http://dx.doi.org/10.1002/\(SICI\)1098-2736\(199609\)33:73.0.CO;2-R](http://dx.doi.org/10.1002/(SICI)1098-2736(199609)33:73.0.CO;2-R)
- Rubie-Davies, C. M., Weinstein, R. S., Huang, F. L., Gregory, A., Cowan, P. A., & Cowan, C. P. (2014). Successive teacher expectation effects across the early school years. *Journal of Applied Developmental Psychology, 35*(3), 181-191.
- Sadker, M., & Sadker, D. (1994). *Failing at fairness: How our schools cheat girls*. New York: Touchstone.
- Salomon, G., & Globerson, T. (1989). When teams do not function the way they ought to. *International journal of Educational Research, 13*(1), 89-99.
- Samson, G. K., Strykowski, B., Weinstein, T., & Walberg, H. J. (1987). The effects of teacher questioning levels on student achievement. *The Journal of Educational Research 80*(5), 290–295.
- Schon, D. A. (1987). *Educating the reflective practitioner. Toward a new design for teaching and learning in the professions*. The Jossey-Bass Higher Education Series. San Francisco, CA: Jossey-Bass Publishers.
- Schunk, D. H., & Zimmerman, B. J. (1997). Social origins of self regulatory competence. *Educational Psychologist, 32*, 195–208.
- Schunk, D. H., & Zimmerman, B. J. (2007). Influencing children's self-efficacy and self-regulation of reading and writing through modeling. *Reading & Writing Quarterly, 23*(1), 7-25.

- Schwab, Y., & Elias, M. J. (2014). From compliance to responsibility. In E. Emmer & E. Sabornie (Eds.), *Handbook of classroom management* (pp.94-115). London, England: Routledge.
- Seidel, T., & Shavelson, R. J. (2007). Teaching effectiveness research in the past decade: The role of theory and research design in disentangling meta-analysis results. *Review of Educational Research, 77*(4), 454-499.
- Seifried, J., & Wuttke, E. (2010). Student errors: how teachers diagnose and respond to them. *Empirical Research in Vocational Education and Training, 2* (2), 147-162.
- Sharpe, T., Brown, M., & Crider, K. (1995). The effects of a sportsmanship curriculum intervention on generalized positive social behavior of urban elementary school students. *Journal of Applied Behavior Analysis, 28*(4), 401-416.
- Sherif, M. (1954). Experimental study of positive and negative intergroup attitudes between experimentally produced groups: robbers cave study
- Shield, M., & Dole, S. (2013). Assessing the potential of mathematics textbooks to promote deep learning. *Educational Studies in Mathematics, 82*(2), 183-199.
- Shoda, Y., Mischel, W., & Peake, P. K. (1990). Predicting adolescent cognitive and self-regulatory competencies from preschool delay of gratification: Identifying diagnostic conditions. *Developmental Psychology, 26*(6), 978.
- Shute, V. J. (2008). Focus on formative feedback. *Review of Educational Research, 78*(1), 153-189.
- Simonsen, B., Fairbanks, S., Briesch, A., Myers, D., & Sugai, G. (2008). Evidence-based practices in classroom management: Considerations for research to practice. *Education and Treatment of Children, 35*1-380.
- Simpson, A., Mokalled, S., Ellenburg, L. A., & Che, S. M. (2015). A tool for rethinking teachers' questioning. *Mathematics Teaching in the Middle School, 20*(5), 294-302.
- Skinner, E. A., & Pitzer, J. R. (2012). Developmental dynamics of student engagement, coping, and everyday resilience. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 21-44). New York: Spring Science+Business Media, LLC.
- Slavin, R. E. (1991). Synthesis of research on cooperative learning, *Educational Leadership, 48*(5), 71-82.
- Smith, L. R. (1977). Aspects of teacher discourse and student achievement in mathematics. *Journal for Research in Mathematics Education, 19*5-204.
- Smith, L., & Edmonds, E. (1978). Teacher vagueness and pupil participation in mathematics learning. *Journal for Research in Mathematics Education, 9*(3), 228-232.
doi:10.2307/749000
- Spilt, J. L., Hughes, J. N., Wu, J. Y., & Kwok, O. M. (2012). Dynamics of teacher–student relationships: Stability and change across elementary school and the influence on

- children's academic success. *Child Development*, 83, 1180–1195.
<http://dx.doi.org/10.1111/j.1467-8624.2012.01761.x>
- Solomon, D., Battistich, V., Watson, M., Schaps, E., & Lewis, C. (2000). A six-district study of educational change: Direct and mediated effects of the Child Development Project. *Social Psychology of Education*, 4(1), 3-51.
- Stage, S. A., & Quiroz, D. R. (1997). A meta-analysis of interventions to decrease disruptive classroom behavior in public education settings. *School Psychology Review*, 26(3), 333-368.
- Stallings, J. A. (1976). How instructional processes relate to child outcomes in a national study of follow through. *Journal of Teacher Education*, 27(1), 43-47.
- Stefanou, C. R., Perencevich, K. C., DiCintio, M., & Turner, J. C. (2004). Supporting autonomy in the classroom: Ways teachers encourage student decision making and ownership. *Educational Psychologist*, 39(2), 97-110.
- Stipek, D. J., & Kowalski, P. S. (1989). Learned helplessness in task-orienting versus performance-orienting testing conditions. *Journal of Educational Psychology*, 81(3), 384-391.
- Stronge, J. H., Ward, T. J., Tucker, P. D., & Hindman, J. L. (2007). What is the relationship between teacher quality and student achievement? An exploratory study. *Journal of Personnel Evaluation in Education*, 20(3-4), 165-184.
- Stronge, J. H. (2018). *Qualities of effective teachers*. ASCD.
- Strong, M., Gargani, J., and Hacifazlıoğlu, Ö. (2011). "Do we know a successful teacher when we see one? Experiments in the identification of effective teachers." *Journal of Teacher Education*, 62(4) 367-82.
- Sutherland, K. S., & Wehby, J. H. (2001). The effect of self-evaluation on teaching behavior in classrooms for students with emotional and behavioral disorders. *The Journal of Special Education*, 35(3), 161-171.
- Tajfel, H. (1979). Individuals and groups in social psychology. *British Journal of Social and Clinical Psychology*, 18(2), 183-190.
- Taylor, R. D., Oberle, E., Durlak, J. A., & Weissberg, R. P. (2017). Promoting positive youth development through school-based social and emotional learning interventions: A meta-analysis of follow-up effects. *Child Development*, 88(4), 1156-1171.
- Taylor, B. M., Pearson, P. D., Peterson, D. S., & Rodriguez, M. C. (2003). Reading growth in high-poverty classrooms: The influence of teacher practices that encourage cognitive engagement in literacy learning. *The Elementary School Journal*, 104(1), 3-28.
- Trako, I., & Molina, E. (2018). The learning crisis in Tanzania. Working Paper. World Bank, Washington, D.C.

- OECD (2009). Creating effective teaching and learning environments: First results from TALIS.
- Terrier, C. (2016). Boys lag behind: How teachers' gender biases affect student achievement. IZA Discussion Paper No. 10343. Available at SSRN: <https://ssrn.com/abstract=2868309>
- Tharp, R. G., & Gallimore, R. (1988). *Rousing minds to life: Teaching, learning, and schooling in social context*. New York, NY, US: Cambridge University Press.
- Tishman, S., Jay, E., & Perkins, D. N. (1993). Teaching thinking dispositions: From transmission to enculturation. *Theory into Practice*, 32(3), 147-153.
- Tyler, J. H., Taylor, E. S., Kane, T. J., & Wooten, A. L. (2010). Using student performance data to identify effective classroom practices. *American Economic Review*, 100(2), 256-60.
- Vosniadou, S. (Ed.). (2009). *International handbook of research on conceptual change*. Routledge.
- Vygotsky, L. S. (1978). *Mind in society*. Cambridge, MA: Harvard University Press.
- Wallin, D. (2003). Student leadership and democratic schools: A case study. *National Association of Secondary School Principals NASSP Bulletin*, 87, 55-78.
- Walsh, J. A., & Sattes, B. D. (2011). *Thinking through quality questioning: Deepening student engagement*. Corwin Press.
- Walsh, J. A., & Sattes, B. D. (2016). *Quality questioning: Research-based practice to engage every learner*. Corwin Press.
- Wang, M. C., Haertel, G. D., & Walberg, H. J. (1993). Toward a knowledge base for school learning. *Review of Educational Research*, 63(3), 249-294.
- Wang, Z., Devine, R. T., Wong, K. K., & Hughes, C. (2016). Theory of mind and executive function during middle childhood across cultures. *Journal of Experimental Child Psychology*, 149, 6-22.
- Webb, N. M. (2009). The teacher's role in promoting collaborative dialogue in the classroom. *British Journal of Educational Psychology*, 79(1), 1-28.
- Wharton-McDonald, R., Pressley, M., & Hampston, J. M. (1998). Outstanding literacy instruction in first grade: Teacher practices and student achievement. *Elementary School Journal*, 99, 101-128.
- Wilén, W. W., & Clegg, A. A. (1986). Effective questions and questioning: A research review. *Theory & Research in Social Education*, 14(2), 153-161, doi: 10.1080/00933104.1986.10505518
- Willingham, D. T. (2007). Critical thinking. *American Educator*, 31(3), 8-19.

- Woolfolk Hoy, A., & Weinstein, C. (2011). Student and teacher perspectives on classroom management. In Evertson, C, & Weinstein, C. (Eds.), *Handbook of classroom management, research, practice, and contemporary issues* (pp. 181-219). New York, NY: Routledge.
- World Bank. (2018). *World Development Report 2018: Learning to Realize Education's Promise*. Washington, DC: World Bank
- Wragg, E. C. (1993). *Questioning in the primary classroom*. London: Routledge.
- Yeager, D. S., & Dweck, C. S. (2012). Mindsets that promote resilience: When students believe that personal characteristics can be developed. *Educational Psychologist*, 47(4), 302-314.
- Yerushalmi, E., & Polinger, C. (2006). Guiding students to learn from mistakes. *Physics Education*, 41(6), 532–538.
- Zahn-Waxler, C. (1993). Warriors and worriers: Gender and psychopathology. *Development and Psychopathology*, 5(1-2), 79-89.
- Zarella, I., Lonigro, A., Perrella, R., Caviglia, G., & Laghi, F. (2018). Social behaviour, socio-cognitive skills and attachment style in school-aged children: What is the relation with academic outcomes? *Early Child Development and Care*, 188(10), 1442-1453.
- Zeidner (Eds.), *Handbook of self-regulation* (pp. 13-39). Academic Press: San Diego
- Zentall, S. R., & Morris, B. J. (2010). “Good job, you’re so smart”: The effects of inconsistency of praise type on young children’s motivation. *Journal of Experimental Child Psychology*, 107(2), 155-163.
- Zimmerman, B. J., & Schunk, D. H. (Eds.). (1989). Springer series in cognitive development. *Self-regulated learning and academic achievement: Theory, research, and practice*. New York, NY, US: Springer-Verlag Publishing
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice*, 41(2), 64-70.
- Zimmerman, B.J. (2010). Attainment of self-regulation: A social cognitive perspective. In M.Boekaerts, P.R. Pintrich & M.