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Teacher Quality Discourse and the Institutionalization of Educational Reforms: Social Capital and Teacher Self-Efficacy Across 31 Countries

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Teacher Quality Discourse and the Institutionalization of Educational Reforms:
Social Capital and Teacher Self-Efficacy Across 31 Countries

by

Joseph P. Brereton

Presented to the Graduate and Research Committee
of Lehigh University
in Candidacy for the Degree of
Doctor of Philosophy
in
Comparative and International Education

Lehigh University

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April 2018

Dissertation Signature Sheet

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Abstract

A teacher quality discourse has emerged, disseminated globally by a network of international organizations. Reform efforts, therefore, have become institutionalized in the global sphere, making it increasingly likely that educational systems adopt similar models to improve the quality of their teaching force. Although the accountability functions of individual teacher evaluation have often been given primacy in policy documents, Professional Learning Communities (PLCs) and development-oriented principal observation and feedback are increasingly promoted as means by which to develop teacher quality. Despite the diffusion of these policy strategies, there is little international research to determine their effectiveness.

The purpose of this study is to examine global trends in the relationships between social capital reforms and teacher self-efficacy (TSE), as a proxy measure of teacher quality, in an international model of 31 countries. Hierarchical Linear Modelling (HLM) is used to test a normative policy logic that two reform strategies, conceptualized in this study as horizontal and vertical social capital reforms—PLCs and principal observations and feedback, respectively—impact TSE in instruction, student engagement, and classroom management. Teacher and principal survey data from the Teaching and Learning International Survey (TALIS) 2013 were used in the analyses. Results indicated a significant and positive relationship between PLC components, including reflective dialogue, collective focus on student learning, and collaborative professional activity and TSE. No relationship, however, was found between principal observation and feedback and TSE. Findings suggest that investing in the development of teachers' social capital, in policy and practice, is a worthwhile endeavor, and that PLCs may be a sustainable model of supervision that promotes the collective capacity of teachers to provide all children with quality learning opportunities.

Chapter One: Introduction

Problem Statement

Across the globe, a discourse has emerged which places teacher quality at the center of educational reform efforts (Akiba, 2013; LeTendre & Wiseman, 2015). Thus, a network of international organizations and nation-states has undertaken an elusive search for variables related to improved teacher effectiveness. In fact, teacher quality is recognized consistently as one of the most important policy initiatives a system can undertake to improve student learning (Akiba & LeTendre, 2009; Engel, Reich, & Viela, 2014). The teacher quality discourse is rooted in a commonly held ideology that links education to economic development of individuals and nation-states (Hanushek, 2011; Robertson, 2012). Therefore, efforts to improve teacher quality have manifested themselves in policy initiatives related to teacher standards, evaluation and accountability measures, and teacher professional development (LeTendre & Wiseman, 2015; Organisation for Economic Co-operation and Development [OECD], 2009). Such responses have resulted in increasingly similar attempts to improve teacher quality through supervisory models that develop teachers' social capital (Baker-Doyle, 2015; Elliot, 2015).

Although teacher quality reform efforts have focused primarily on improving individual human capital through accountably functions of teacher supervision and evaluation (Elliot, 2015; Frazer & Ikoma, 2015), recent research suggests that developing teachers' social capital can lead to sustainable improvement, in which teachers and administrators provide support for one another through collaboration and feedback (Baker-Doyle, 2015). International organizations such as the OECD have placed considerable emphasis on the potential of educational reforms, including professional learning communities (PLCs) and principal observations and feedback, as vehicles for improving teachers' performances. Public policy is no longer benchmarked against

purely national standards (Kamens, 2013; LeTendre & Wiseman, 2015). International assessments and surveys have become powerful instruments for research and policy by enabling countries to benchmark themselves against international models often revered for their systemic efforts to improve teacher quality.

Despite the faith placed in international benchmarking for research and policy initiatives by organizations such as the OECD, there is little empirical research that examines these efforts or the contextual effects that exist at multiple levels in a system—from the individual teacher’s classroom to the school to the country level—that may impact the viability and ultimate success of these reforms. Likewise, because much of the policy logic for these reforms emanates from high performing systems, it is necessary to determine whether these reforms may be equally effective across varying contexts. As nations continue to look toward international models and scripts to improve teacher quality, often adopting them only nominally, without regard to these contextual influences on implementation, there is no guarantee they will be successful.

Therefore, a cross-national study of 31 countries that examines the relationship between social capital reform efforts and teacher self-efficacy (TSE) at multiple contextual levels is warranted. Using the Teaching and Learning International Survey (TALIS) 2013 data from 31 countries, this study will examine factors tied to reform efforts, namely PLCs and principal observations and feedback, two social capital strategies that—at least at the policy level—are gaining traction internationally (Darling-Hammond et al., 2017; Hargreaves & Fullan, 2012; OECD, 2014). The research has two purposes. First, it will situate these social capital reforms within a larger international discourse on teacher quality to explain how they diffuse globally. Second, it will examine whether PLCs and principal observation and feedback have any significant effects on

TSE in instruction, student engagement, and classroom management in an international model comprised of 31 countries.

World Culture and the Emerging Teacher Quality Discourse

Since the 1990 World Conference on Education for All (WCEFA), the assertion that every human being has a right to a basic education has been the primary educational policy objective of nation-states and international governmental and non-governmental organizations (IGOs, INGOs), solidifying the global link between education and national development (Chabbott, 2003). The initial focus of Education for All (EFA) was to ensure that all primary-aged children had access to school infrastructures—teachers, roofs, and desks—but the last decade has seen a global shift to ensuring that children have access to quality education (Tatto et al., 2015). Although school enrollment has risen dramatically over the past two decades, many countries have failed to meet the basic objectives of universal primary education (UNESCO, 2015).

Despite these shortfalls, policy makers have increasingly shifted their emphasis to teacher quality as a major factor in nations' attempts to improve student learning (Engel et al., 2014). Thus, “educational policy across the globe now stresses the importance of quality of educational outcomes for students and societies, with the spotlight placed on the productivity of educational systems” (Valverde, 2014, p. 14). The teacher quality discourse is rooted in a commonly held ideology that links education to economic development of individuals and nation-states. As beliefs about the function of education spread across the globe, so too do its forms. As such, internationally, creators of educational policy objectives have shifted their emphases from issues of access to improving teacher quality and equitable student learning.

In examining definitions and measurements of teacher quality, it appears that the world culture of education is slowly impacting evaluation systems of teacher quality, moving toward global blueprints set by international organizations such as the OECD. To succeed in the global knowledge economy, nations have increasingly rationalized the link between teacher quality and student achievement and have developed similar methods of quantifying and measuring teacher performance through teacher evaluation and supervision (Akiba, 2013).

Among a constellation of international organizations, the OECD has emerged as an impressive force in international educational policy and is, in large, responsible for the normative link between a high-quality teaching force, student achievement, and economic competitiveness (Akiba, 2013; Bieber & Martens, 2011; Robertson, 2012). Perhaps more than any other organization, the OECD has symbolic control over teacher policy and practice because of its role in generating an alignment between education and the economy through cross-national comparisons and international benchmarking (Robertson, 2012). Nations that score poorly on international assessments, therefore, are deemed at risk for lower levels of economic prosperity (Martens & Niemann, 2013). Based on the link between high quality education and economic development, the OECD has placed improving teacher quality at the top of its policy agenda (Bieber & Martens, 2011).

Concerned about the international challenges in teacher recruitment, attainment, and quality, the OECD launched TALIS in 2008. A collaboration between OECD member states and non-members, TALIS questions lower secondary teachers and principals about the learning environments in their schools. The initial survey themes of TALIS 2008 included teacher beliefs and attitudes and the role of the school leader, and later expanded to include pedagogical practices and TSE and job satisfaction in the 2013 benchmarking survey. One of the consistent

themes assessed in both surveys, however, was the ways teacher supervision and evaluation were used as a means of improving teacher quality, a policy aim of the OECD that is well documented (OECD, 2009; OECD, 2014).

In fact, teacher supervision and evaluation has been identified as a “key lever for increasing the focus on teaching quality and continuous professional development for teachers, in keeping with the growing recognition that the quality of teaching affects student learning outcomes” (Darling-Hammond, 2013, pp. 3-4). Beyond promoting individual teacher growth and professional development, the OECD views measures of teacher quality as a means of holding teachers accountable for their performances: “Promoting teacher evaluation is clearly in the national interest as well as serving students and their families and communities...teachers should be accountable for their performance and progress in their careers based on demonstrated effective teaching practice” (OECD, 2014, p. 120). Thus, the OECD, as an international authority in teacher quality reforms, has reinforced the dual functions of teacher supervision and evaluation: holding teachers accountable through administrative oversight while facilitating their growth and improvement.

Accountability reform efforts focus on improving human capital of individual teachers through increased certifications, experience, degrees, and credentialing to improve teacher quality (Akiba & LeTendre, 2009; Frazer & Ikoma, 2015). As such, teachers are held accountable for the quality of their performances through administrative oversight and evaluation. The accountability functions of supervision and evaluation have been a primary policy objective in many countries (Darling-Hammond, 2013; Hargreaves & Fullan, 2012) and assume that teacher quality is subject to reliable forms of measurement that can distinguish individual teacher performance and link it to student achievement (Hallinger, Heck, & Murphy,

2014). These propositions are reflected in common teacher evaluation models that focus on standards based administrative evaluations, which attempt to measure teacher quality against predefined criteria, as well linking individual teacher quality to student achievement data.

Despite the ubiquity of the accountability mechanisms of supervision and evaluation, there is little evidence to suggest that they are a reliable and effective means of improving teacher quality (Garrett & Steinberg, 2015; Hallinger et al., 2014; Kimball & Milanowski, 2009).

World Culture and the Diffusion of Social Capital Reform Efforts

Given the lackluster success of supervision and evaluation models that rely exclusively on human capital approaches that emphasize teacher accountability, there has been an increased emphasis on the development or improvement function of supervision and evaluation systems (Darling-Hammond, 2013). Along with accountability functions that highlight qualities of individual teachers, focus has been placed on improving the teaching context (Darling-Hammond et al., 2017) by increasing teacher collaboration (Baker-Doyle, 2015), conceptualized for the purposes of this study as social capital reform efforts—developing individual and collective capacity through PLCs and principal observation and feedback.

Contrasting with accountability models, this type of supervision advocates PLCs and principal observations and feedback as the primary means of developing teaching capacity (Brambrick-Santoyo, 2012; Glickman, Gordon, & Ross-Gordon, 2013; Stark, McGhee, & Jimerson, 2016). Recent international research in this area highlighted practices, including collaborative learning and facilitating communities of practice that establish common goals and a collective responsibility for instructional improvement (Darling-Hammond et al., 2017). Although focusing primarily on high-performing educational systems including those in Canada, Singapore, Australia, and Finland, the National Council on Education and the Economy's

(NCEE) Center for International Benchmarking recently released a study examining policy levers designed to improve teaching, including teacher professional community and growth-oriented feedback from the principal (Darling-Hammond et al., 2017).

There is consensus across a wide range of international reports and policy papers that much of the success of high achieving countries is attributable to the quality of their teaching forces, which has been improved systemically with a commitment to developing their capacities through PLCs and growth-oriented principal observation and feedback (Darling-Hammond et al., 2017; Hargreaves & Fullan, 2012; OECD, 2013; OECD, 2016; Sahlberg, 2011), the social capital indicators in this study. Although these social capital reforms have been held up as international models, to date, there is little cross-national empirical research to support their effectiveness or the unique contextual factors that exist at the teacher, school, and country levels that may support or hinder them.

Social capital has been conceptualized and operationalized in different ways (Pil & Leana, 2009) but, at its core, has recognized social relationships and networks as forms of capital upon which individuals and groups can draw to yield benefit or profit (Bourdieu, 1985; Coleman, 1998; Portes, 1998). Social capital accrued by teachers in Finland, for instance, “is found in the widespread habit of cooperation, in pervasive feelings of trust, and in a collective sense of shared moral responsibility” (NCEE, 2016, p. 52). In Singapore, social capital accumulates through the “professional learning connections that are made in the conversation between teachers and their reporting officers, which covers both what the teacher has done well and where there are areas for development” (NCEE, 2016, p. 9). In Australia, teachers reported that collaborative planning and peer observations were the most useful forms of feedback, followed by feedback from other teachers and their supervisors (Darling-Hammond et al., 2017). Although these countries are

held up as international models, there is a growing body of research that shows that PLCs are advocated by reformers across the globe as a systematic way to improve teacher quality (Moolenaar, Slegers, & Daly, 2011).

Therefore, as a means of increasing teachers' social capital by promoting collaboration and trust among teachers, reform efforts increasingly include PLC models (DuFour, DuFour, Eaker, & Many, 2006; Seashore Louis, Marks, & Kruse, 1996; Vescio, Ross, & Adams, 2008). PLCs have become a policy strategy designed to improve teacher isolation, collaborative decision-making, and student achievement (DuFour et al., 2016; Hord & Sommers, 2008; Vangrieken, Meredith, Packer, & Kyndt, 2017). Although PLCs focus on the relationships between teachers, or horizontal social capital, research suggests that vertical social capital, or the relationships between teachers and their supervisors, typically school principals, can also be beneficial (Pil & Leana, 2009). Specific feedback from the principal linked to a meaningful plan for professional improvement (Darling-Hammond, 2013; Marshall, 2005) has been perceived routinely by teachers as an effective form of supervision (Day & Sammons; 2013; Louis et al., 2010).

In summary, opportunities to increase teacher social capital through PLCs and principal observations and feedback have been highlighted in numerous international reports as best practices in supervision and evaluation with significant potential to improve teacher quality (Darling-Hammond et al., 2017; Hargreaves & Fullan, 2012; NCEE, 2016, OECD, 2014). If these reform efforts continue to diffuse internationally, it is critical to examine whether they influence teacher quality, as well as to identify which contextual effects at the teacher, school, and country levels may impact this relationship. TALIS 2013 provides significant data on the teaching context, as reported by teachers and principals, across 31 countries and will be used to

determine the extent to which specific social capital reform efforts, operationalized as PLCs and principal observation and feedback, have diffused globally. Additionally, these reforms will be examined in relation to teacher perceptions of their own quality, specifically, measures of TSE in instruction, student engagement, and classroom management.

Significance of the Study

By reframing issues of educational access and equity as a teacher quality issue, it is increasingly likely that the suggestions and policy recommendations emanating from international organizations such as the OECD will spread globally (Akiba & LeTendre, 2009), resulting in similar ways of defining, operationalizing, and measuring teacher quality through specific models of teacher supervision and evaluation. The proposed study is significant in the way it frames the research questions using two macro-sociological theories often studied separately in the field of comparative and international education (CIE)—world culture theory and social capital theory. Additionally, it contributes to international school improvement research in the distinctive way it combines constructs, as well as its utility to inform international policy and practice related to teacher quality.

First, this study adds to a growing body of literature framed by world culture theory, which suggests that educational reform efforts diffuse globally (Baker, 2014; Sahlberg, 2011) and are often adopted regardless of their functionality in specific contexts (Wiseman, Astiz, & Baker, 2014). In other words, rather than implementing reform efforts that suit the needs of the school, system, or state, the enactment of global scripts results in the implementation of similar models, even if lacking in practical significance or utility (Ramirez & Meyer, 2002; Wiseman et al., 2014). From a world culture perspective, these taken-for-granted reform efforts may manifest themselves in varying degrees across contexts, but generally demonstrate isomorphic

tendencies (Lechner & Boli, 2005; Ramirez, 2012). Therefore, as part of this study, the amount of cross-country variability in the relationship between social capital reforms and TSE will be examined.

Second, from a more functionalist perspective, this study will use social capital theory to frame the potential relationship between social capital reform efforts that have diffused globally and teacher quality. Although the constructs for this proposed study, including teacher supervision and evaluation, TSE, and PLCs, have been reviewed sufficiently in the literature, no studies combine these constructs, especially in an international context. Whereas several empirical studies have conceptualized teacher collaboration and PLCs as social capital (Leana, 2010; Penuel et al., 2009), few have envisioned teacher social capital as separate and consisting of distinct organizational components that have emerged from the literature on PLCs, including reflective dialogue, deprivatized practice, collaborative professional activity, shared sense of purpose, and collective focus on learning (Hord & Sommers, 2008; Kruse & Louis, 1993). In other words, the general strategy of PLCs has been examined using a social capital approach, but the strategy has been delineated infrequently by its various components (Vanblaere & Devos, 2016; Slegers, 2013) and never in a cross-national study (Stoll & Seashore Louis, 2007). Similarly, no studies have combined these horizontal measures of social capital, defined as PLCs between teachers, and vertical social capital, or the social capital that can be accrued by teachers through dialogue and feedback with their supervisors (Pil & Leana, 2009). Thus, the proposed research is also significant in that it provides social capital researchers with a conceptual framework to analyze social capital in schools at different levels in the system, among teachers and between teachers and principals.

Although the research makes significant contributions to two theoretical frameworks, it also has pragmatic implications for international policy and practice. The extent to which teacher supervision and evaluation impacts teachers' learning and the learning of their students is debated in educational reform research (Darling-Hammond, 2013; Hallinger et al., 2014). In fact, in some countries, teacher evaluation has been shown qualitatively to stifle teacher creativity and increase stress levels (Larsen, 2005) and has little impact on their professional development needs (Darling-Hammond, 2013). A study that examines the impact of teacher supervision and evaluation on teachers' perception about their own quality is a valuable contribution with significant implications for policy and practice. Therefore, from a more pragmatic perspective, this study contributes to an educational research body that examines the relationship between efforts to improve teacher quality through social capital reform efforts and TSE.

Because most studies have not found a direct link between teacher supervision and evaluation and student outcomes (Hallinger et al., 2014; Supovitz, Sirindes, & May, 2009), researchers suggest that new variables related to teacher quality should be considered (Ebmeier, 2003; Wiseman & Al-bakr, 2015). This study further addresses the gap in the literature by examining teachers' beliefs about their own quality, specifically regarding their self-efficacy in instruction, student engagement, and classroom management (Tschannen-Moran & Woolfolk Hoy, 2001) as outcome variables. Although teacher quality might best be measured through the direct observation and analysis of the contextual dynamics in the classroom and how they impact students, measures are limited to the available data in TALIS 2013. TSE, therefore, serves as a proxy indicator of teacher quality, given its strong empirical associations with a host of educational outcomes, including teacher professionalism and teacher improvement (Malmberg,

Hagger, & Webster; 2014; Zee & Koomen, 2016). Additionally, increasing interest in TSE as an outcome influenced by social capital reform efforts is justified given the powerful influence self-efficacy seems to have on classroom practice and subsequent student achievement (Ebmeier, 2003; Lu et al., 2015).

Purpose of the Study and Research Questions

This empirical study will test a normative policy logic that two reform strategies, conceptualized in this study as social capital reforms—PLCs and principal observation and feedback—impact TSE in instruction, student engagement, and classroom management. This proposed study uses quantitative analyses to understand how social capital reform efforts have become a primary policy lever by which educational systems try to improve teacher quality, as well as their impact in international contexts.

A global discourse has emerged that places teacher supervision and evaluation at the center of educational reform efforts aimed at improving teacher quality. As reform movements have become institutionalized, national and local policy makers respond in increasingly similar attempts to improve teacher quality through social capital reforms, including PLCs and principal observations and feedback. High-performing, high-equity countries are promoted as international models by the OECD for their implementation these ‘best practice’ social capital reforms, but there have been no empirical studies that measure the effectiveness of these reforms across countries. The overarching goals of this study, therefore, are: (a) to understand global trends in the relationships between PLCs and principal observation and feedback and teacher quality as measured by TSE in instruction, student engagement, and classroom management; and (b) to determine whether these effects vary by country. More specifically, this multi-level

analysis will construct an international model comprised of 31 countries using TALIS 2013 data to examine the following research questions:

RQ1: How does horizontal social capital between teachers accrued through the five PLC components—reflective dialogue, collective focus on student learning, shared sense of purpose, deprivatized practice, and collaborative professional activity—impact TSE in instruction, student engagement, and classroom management?

RQ2: How does vertical social capital between teachers and principals accrued through principal observations and feedback impact TSE in instruction, student engagement, and classroom management?

RQ3: How does horizontal social capital between teachers accrued through the five PLC components—reflective dialogue, collective focus on student learning, shared sense of purpose, deprivatized practice, and collaborative professional activity—aggregated at the school level, impact TSE in instruction, student engagement, and classroom management?

RQ4: Do the relationships between school level PLC components and TSE in instruction, student engagement, and classroom management vary by country and, if so, does country achievement and equity impact these relationships?

Comparative and International Education Context

This section will place the research questions, the proposed multi-level analyses, and the way they are framed by world culture and social capital theories within the broader context of CIE research. What makes CIE research unique is its recognition of the futility in trying to understand the specific processes of teaching and learning—what happens inside the walls of the classroom—without a thorough understanding of the contributions social, economic, historical,

and cultural factors make in shaping these processes. Both academics and practitioners in CIE “understand the importance of culture and are trained to account for or accommodate the contextualized impact of culture on their specific work in the field” (Wiseman & Matherly, 2009, p. 347). At their cores, numerous studies that focus on cross-national comparisons recognize that distinctions in policy, practice, and achievement, among other variables, mean little unless examined in a cultural context (Carnoy, 2007; Fleisch, 2008; Tobin, Hsueh, & Karasawa, 2009). For the comparativist, this is perhaps the most salient challenge: how to compare and frame the different levels of culture—from the global to the local—that all interact in a way to shape and reshape policy enactment and implementation. The proposed cross-national, multi-level analysis of social capital reform efforts and their relationship to TSE positions itself within this burgeoning field of research, as it will examine contextual factors at three system levels—the teacher, the school, and the country.

Ragin (1989) suggested that what distinguishes comparative social science is its “defining and operationalizing of macro-social units” (p. 18). In other words, research must account for the macro-social influences that impact cross-national comparisons (Bray & Thomas, 1995; Ragin, 1989). By framing this study within in a teacher quality discourse that links education and economic development, the macro-social influence is accounted for and provides a framework to understand the diffusion of reform efforts internationally. Therefore, the proposed study will explain the phenomena under study using overlapping theoretical frameworks of world culture and social capital theories. World culture theory situates reform efforts in an emergent teacher quality discourse examining the diffusion of international education policies and practices, while accounting for influences at various levels. The more functional aspirations of this study attempt to frame these reform efforts using social capital theory to determine the

potential benefits of increased social capital on teachers' self-efficacy and any supportive or mitigating contextual factors.

Methodologically, CIE scholars most effectively contribute to theory building and testing when they try to capture the global and local contextual factors by “introducing as many levels of analysis as possible to portray the complex interplay of different social forces and how individual and local units of analysis are embedded in multiple layered contexts” (Arnone, 2013, p, 12). Theoretical perspectives that lead to multi-level design can achieve a more complete and balanced understanding and “facilitate more comprehensive and possibly more accurate presentation of the phenomena they address” (Bray & Thomas, 1995, p. 484). The teachers studied in this research are located in schools that are situated in national education systems, all of which are influenced by a global culture of education. Thus, a multi-level analysis provides an opportunity to understand the contextual factors at all three levels that may impact the relationship between social capital reform efforts and TSE.

Comparative researchers also draw distinctions between the more academic and practical elements of their work (Arnone, 2013; Wiseman & Matherly, 2009). For practitioners to be effective, however, their work must be grounded in these scientific or academic endeavors. Like any other field—medicine, science, social sciences, among others—the nexus between theory and practice is where change is effected (Wiseman & Matherly, 2009). The potential for reform efforts that are sustainable and help build teachers' capacities is significant. If the goal of teacher supervision and evaluation is not solely accountability, but rather to improve teacher quality, it is necessary to determine how teachers perceive the effectiveness of these reforms. Improving teacher quality using supervision and evaluation is less likely if teachers view evaluation solely in terms of accountability, with the feedback they receive having little impact

on their instruction (Marshall, 2005). Potential gaps between teacher perceptions and the effectiveness of policies aimed at improving teacher quality must be reconciled (OECD, 2009). Gathering additional information from teachers and principals about the kinds of supervision and evaluation that have impacted their instruction, ability to engage students, and classroom management could be an initial step. Overall, a cross-national comparison of the relationship between teacher social capital reforms and TSE, which has been linked to improved instruction for students, will provide researchers and policymakers with valuable information that could lead to improved teacher quality.

Key Factors

The literature review in Chapter Two will fully explicate the theoretical framework and key constructs of the study, as well as identify the conceptual and methodological strengths and gaps in the literature. This section will briefly define the key factors associated with the study, to orient the reader to the conceptual and operational framework of the research questions. Each of these key factors will be reviewed in more detail in the next chapter.

World culture theory. The global diffusion of reform efforts aimed at improving teacher quality can be framed broadly by world culture theory, a strand of sociological neo-institutionalism. World culture theory focuses on large cultural scripts that influence behaviors at various levels, from the international level to the organizational level, and highlight legitimacy seeking behaviors as nations adopt policies and practices that may not be entirely suitable for their contextual needs (Baker & LeTendre, 2005; Powell & DiMaggio, 1991). In examining educational reforms, theorists suggest that a world culture of education has emerged, one that compels nation-states to promote growth and progress through education (Meyer, 2007; Ramirez, 2012). The global script, widely accepted by states trying to prove their legitimacy,

maintains that learning increases human capital and, therefore, promotes economic growth and progress. In addition, education is a means by which universal ideals of citizenship, progress, and justice become institutionalized (Chabbott, 2003). These two powerful discourses have constructed social and economic development as human rights, which are promoted through education. Rather than doing this in a manner that suits the needs of the state, enacting these global scripts results in the implementation of strikingly similar forms and functions of schooling (Baker & LeTendre, 2005).

As a manifestation of these discourses, teacher quality has become “a phenomenon that is deeply embedded in the larger institutional environment, where collective meaning is taken for granted” (Cha & Ham, 2014, p. 84). As such, international efforts to improve teacher quality reflect a normalized faith in international benchmarking that results in isomorphic trends in teacher reforms (Baker, 2014; LeTendre & Wiseman, 2015). Therefore, world culture theory will help explain how social capital reforms—PLCs and principal observations and feedback—have diffused across the 31 countries in the TALIS 2013 study.

Social capital theory. Social capital theory provides a more nuanced and functional framework for studying the specific reform efforts considered in this study and their relationship to TSE. If, in fact, these social capital reform efforts have diffused globally, one would expect them to have a positive effect on teacher quality. Research has conceptualized and operationalized social capital in different ways, but at its core has recognized social relationships and networks as forms of capital upon which individuals and groups can draw to yield benefit or profit (Portes, 1998). Coleman (1998) highlighted the manifestation of social capital through relationships, delineating various forms of social capital activated through obligations and trust, information channels, and norms and sanctions. It is suggested that through these relationships

and networks, individual teachers and groups of teachers may gain access to specific benefits, including higher self-efficacy in instruction, student engagement, and classroom management.

Teacher supervision and evaluation. Internationally, an emerging logic has identified teacher supervision and evaluation as a strategy for school improvement, which is dependent on the strength of a causal relationship between measures of teacher quality and student achievement (Gates Foundation, 2013; Robinson, Lloyd, & Rowe, 2008). Therefore, policy advocates assert teaching quality is subject to reliable forms of measurement that can distinguish the performances of teachers and link it to students' achievements (Hallinger et al., 2014). OECD policy documents and strategy position papers identify several policy challenges for countries, including the development of a clear understanding of high-quality teaching, while balancing the dual functions of appraisal—accountability and development.

Accountability functions. Proponents of teacher accountability efforts assume that teacher quality can be measured with reliability and accuracy and can distinguish the performances of teachers with respect to their students' performances (Gates Foundation, 2013; Milanowski, Kimball, & Odden, 2005). These propositions reflect a human capital approach in which teacher quality is linked to certification, advanced degrees, and accountability based evaluation models that attempt to measure teacher quality against predefined criteria, as well as student achievement data.

Developmental functions. Researchers have suggested that administrators may be more impactful facilitating peer collaboration among teachers, rather than using accountability based evaluation as the primary means of improving teacher quality (Hallinger et al., 2014; Marshall, 2005). Studies highlight social capital reforms, including developing PLCs and facilitating communities of practice that establish common goals and a collective responsibility for

instructional improvement (Hallinger et al., 2014; NCEE, 2017). This type of supervision advocates PLCs and administrative coaching and supervisory models that offer growth-oriented feedback as the primary means of developing teaching capacity (Brambrick-Santoyo, 2012; Glickman et al., 2013; Stark et al., 2016).

PLCs. PLCs engage teachers in reflection and dialogue about instructional strategies that affect student achievement. (DuFour et al., 2006; E. R. Hollins, McIntyre, DeBose, K. S. Hollins, & Towner, 2004; Seashore Louis et al., 1996; Strahan, 2003; Vescio et al., 2008). A PLC is composed of collaborative teams whose members work interdependently to achieve goals linked to student learning. Although there is little variation in the ways PLCs are defined conceptually in the literature, there are distinct attempts to delineate the critical elements of a PLC (Hord & Sommers, 2008; Vanblaere & Devos, 2016). For the purposes of this study, the analytic framework developed by Kruse and Louis (1993), which outlined components of PLCs, will be used as a measure of horizontal social capital. Their research identified five elements of PLCs, which were also measured by TALIS 2013: (a) reflective dialogue, (b) collective focus on student learning, (c) shared sense of purpose, (d) deprivatized practice, and (e) collaborative professional activity. Although most PLC research has been conducted in the U.S., there is an expanding literature that studies PLCs in an international context (Popp & Goldman, 2016; Sargent & Hannum, 2010).

Principal observation and feedback. Specific feedback from the principal linked to a meaningful plan for professional improvement (Darling-Hammond, 2013; Marshall, 2005) has been perceived routinely by teachers as an effective form of supervision (Day & Sammons, 2013; Louis et al., 2010). Similarly, Delvaux (2013) found that teachers' self-efficacy was linked to the clarity and utility of the feedback they received and that principals played important

roles in the effectiveness of evaluation systems. In this study, principal observation and feedback will account for the vertical social capital, or the relationships between teachers and administrators.

Teacher self-efficacy. Because most studies have not found a direct link between teacher evaluation and student outcomes (Hallinger et al., 2014; Supovitz et al., 2009), Ebmeier (2003) suggested that TSE could provide insight into the impact of teacher supervision and evaluation. Based on Bandura's social cognitive theory, which links behavioral changes to human agency, self-efficacy is defined as a belief in one's own capacity to achieve success in certain situations (Bandura, 1993). Increasing interest in TSE as a proxy indicator for teacher quality is justified given its strong associations with more traditional measures of teacher quality including classroom practice and student achievement (Ebmeier, 2003). The self-efficacy instrument used in TALIS 2013 is based on the *Teachers' Sense of Efficacy Scale* (Tschannen-Moran & Woolfolk Hoy, 2001). The domain-specific scale aligns with the theoretical foundations of TSE (Klassen et al., 2010), yet delineates domain-specific measures for TSE in instruction, student engagement, and classroom management, the outcome variables for this study.

Principal instructional leadership. Internationally, studies have concluded that the principal has direct and indirect effects on teacher and student learning (Day & Sammons, 2013; Louis et al., 2010; OECD, 2014). Direct effects result from the organizational learning that occurs through a collaborative focus on teaching and learning, which subsequently has an indirect effect on students' motivation, level of engagement, and achievement (Day & Sammons; 2013; Louis et al., 2010; Robinson, Hohepa, & Lloyd, 2008). The principal's leadership style plays a significant role in establishing the organizational and logistical support for the learning

that occurs through PLCs and administrative feedback (Balyer, Kararas, & Alci, 2015; Day & Sammons, 2013; OECD, 2016; Supovitz, 2009). TALIS 2013 constructed an *Instructional Leadership Index* that will be included as a control variable in the school level model.

Conclusion

In summary, this empirical study will test a normative policy logic that two reform strategies, conceptualized in this study as social capital reforms—PLCs and principal observation and feedback—impact TSE in an international model. Vanblaere and Devos (2016) suggested that there “is an unprecedented international call for schools to be professional learning communities where teachers take responsibility for achieving high quality student learning and where teachers are willing to learn from other colleagues through systematic collaboration to achieve this goal” (p. 26). Regardless of the practical, organizational, and structural requirements to implement PLCs, more and more schools adopt these strategies, at least in name. If these reform efforts continue to diffuse internationally, it is important to examine whether they influence TSE, as a proxy indicator for teacher quality, as well as to identify which contextual effects at the teacher, school, and country levels may impact this relationship. Additionally, if teachers, as the primary stakeholders of reform efforts, are not convinced of their impact, significant gaps between policy goals and implementation will emerge, leading ultimately to the all too familiar failure of educational reform efforts (Burch, 2007; Darling-Hammond, 2013).

Chapter Two: Literature Review and Theoretical Framework

Introduction

The following chapter reviews the literature on the main constructs of the study, including teacher evaluation and supervision models, principal leadership, and TSE. To begin, it will provide a historical overview of the development of a teacher quality discourse that has emerged globally. Nation-states are not only expected to provide for mass education, but also to ensure that students are exposed to quality teaching (Baker, 2014; LeTendre & Wiseman, 2015). Therefore, an international organizational network has emerged that places teacher supervision and evaluation squarely within this discourse as a primary means of improving teacher quality (Darling-Hammond et al., 2017; Elliot, 2015).

Next, an empirical review of literature pertaining to each of the key variables in the study is presented. As a global teacher discourse has emerged, international organizations urge nation states to monitor and evaluate their teachers, while also making provisions to develop their individual and collective capacities (OECD 2009; OECD, 2013c). As such, the dual functions of supervision and evaluation need to be reconciled in policy and practice. Therefore, a review of the accountability and development functions of supervision and evaluation models that have emerged globally will be examined. Next, two developmental approaches that are often cited in the literature as best practice in developmental supervision—PLCs and principal observation and feedback—will be reviewed. Although a large body of literature exists on the ways principal leadership style impacts educational reforms, a brief overview of instructional leadership will be provided, as it is delineated as a control variable in this study. Finally, the outcome variable, TSE, will be examined to justify its use as a proxy variable for teacher quality.

The final section will frame the research in two complementary theories often used in CIE research, but rarely combined in one study: world culture theory and social capital theory. World culture theory situates reform efforts in an emergent teacher quality discourse examining the diffusion of international education policies and practices, while accounting for influences at various levels. The more functional aspirations of this study attempt to frame these reform efforts using social capital theory to determine the potential benefits of increased social capital on TSE and any supportive or mitigating contextual factors. Finally, based on this empirical and theoretical review, hypotheses related to each research question will be articulated at the end of the chapter.

Historical Background

In the aftermath of World War II, newly established international agreements and organizations helped define norms that inextricably linked education as a means of national and individual economic progress and education as a human right (Chabbott, 2003). The international community committed itself to upholding the right to an education through Article 26 of the 1948 Universal Declaration of Human Rights document and defined a set of universal norms about educational rights and educational development. As the colonial empires began to break up, nascent postcolonial nations remained strongly connected with their Western counterparts, and educational cooperation helped to strengthen geopolitical and economic ties. Therefore, education became increasingly viewed as a primary factor in improving economic development and growth for individuals and nations (McCowan & Unterhalter, 2015; Sobel, 1978).

Thus, nation-states are expected to commit themselves to free and universal education. These commitments “persist because of expert conceptions of education as human capital, and

by legal and moral advocates of education as a universal human right. Experts and advocates alike facilitate managing and expanding schooling as a means of attaining a better society” (Ramirez & Meyer, 2002, p. 3). In the ensuing decades, a network of multilateral organizations, including the United Nations Educational, Scientific, and Cultural Organization (UNESCO), the United Nations International Children’s Emergency Fund (UNICEF), and the World Bank emerged, alongside bilateral aid organizations. These networks served to reinforce a human capital discourse that manifested itself through international agreements such as EFA. For instance, the international consensus to achieve universal primary education is evidence of acceptance of the logic linking educational investment, especially at the primary levels, to economic growth (Phillips & Schweisfurth, 2011). Although school enrollment has risen significantly over the past two decades, many countries have failed to meet the basic objectives of universal primary education (UNESCO, 2015). Despite these shortfalls, the last decade has seen a global shift from educational access to ensuring that children have quality experiences once they are in schools—in other words, quality teachers (Elliot, 2015).

The institutionalization of ideologies regarding the function of education has resulted in the internationalization of education policy, whereby it becomes increasingly likely that nations will begin to look outside of their borders for solutions to their educational problems (Baker, 2014; Kamens, 2013; Wiseman & Baker, 2005). International comparative data are widely available through the International Education Association’s (IEA) Trends in International Math and Science Study (TIMSS) and Progress in International Reading Literacy Study (PIRLS), as well as the OECD’s Program for International Student Assessment (PISA). Data compiled and evaluated by these organizations, and their subsequent research reports and technical assistance, give them “the international authority to disseminate ideas about education and educational

policy, as well as enforce implementation of ideas within certain nations around the world” (Wiseman & Baker, 2005, p. 5). Thus, the discourse on teacher quality has become institutionalized, built upon a core logic that to compete economically, states must improve education, and the primary means of doing this is to improve teacher quality (Akiba & LeTendre, 2009; OECD, 2009).

Global efforts to improve teacher quality “represent a transnational acceptance of the logic of human capital development and an acceptance of a direct link between educational achievement and national economic potential” (Akiba & LeTendre, 2009, p. 9). As such, human capital in teaching involves teachers having the requisite knowledge and skills to prepare students to become productive members of society, usually defined in economic terms. From an institutionalist perspective, nations increasingly see the value of return on their educational investments and consider quality education as the primary means to develop globally competitive workforces (Chabbott, 2003; Hanushek, 2011).

Among an array of international organizations, the OECD has emerged as the leader in international educational policy and is largely responsible for the normative link between a high-quality teaching force, student achievement, and economic competitiveness (Akiba, 2013; Bieber & Martens, 2011; Robertson, 2012). Perhaps more than any other organization, the OECD has symbolic control over teacher policy and practice because of its role in generating an alignment between education and the economy through cross-national comparisons (Robertson, 2012). Nations that score poorly on international assessments are seen as at risk for lower levels of economic prosperity (Martens & Niemann, 2013). Based on the link between high quality education and economic development, the OECD has placed improving teacher quality at the top of its policy agenda (Bieber & Martens, 2011). In other words, because the OECD controls the

discourse, it also controls the educational policy agenda (Leuze et al., 2008), an agenda that includes, in no small part, a focus on teacher supervision and evaluation as a means of improving teacher quality.

More recent research on human capital investments to education, defined as teacher quality improvements, have further solidified the primacy of education in national economic development (Tikly & Barrett, 2015). For instance, Hanushek (2011) showed the relationship between low teacher quality and economic growth, as well as the impact of increased student achievement on individual earnings. He suggested that replacing the bottom 5% to 8% of teachers could move the U.S. near the top of the international rankings in math and science, a move valued in the trillions of dollars. Although not without detractors, human capital approaches aimed at improving teachers have become taken for granted as the primary means of education development within government agencies and international organizations (Chabbott, 2003).

As the availability of cross-national data has increased, a network of international organizations and nation-states has undertaken an elusive search for variables related to improved teacher effectiveness. As such, teacher quality is recognized consistently as one of the most important policy initiatives a system can undertake to improve student learning (Akiba & LeTendre, 2009; Engel et al., 2014). Efforts to improve quality have manifested themselves in policy initiatives related to teacher standards, evaluation and accountability measures, and teacher professional development (LeTendre & Wiseman, 2015; OECD, 2009). Such responses have resulted in increasingly similar attempts to improve teacher quality through teacher supervision and evaluation.

As an extension of the policy initiatives and technical reports of international organizations, conferences and summits convene annually to discuss issues of teachers and teacher quality (Stewart, 2013). Cosponsored by the U.S. Department of Education, the OECD, and the Asia Society, the 2013 International Summit of the Teaching Profession focused its efforts on improving teacher quality around the world. Policies and mechanisms aimed at developing high quality and high equity educational systems, propelled by increased calls for accountability, ensured that teacher appraisal systems were included on the conference agenda. Teacher evaluation systems were discussed as a “potentially powerful engine for improving teaching” (Stewart, 2013, p. x). Although there is “little research on what works or how expenditures in appraisal compare to other uses of funds to strengthen teacher quality” (Stewart, 2013, p. 2), there was consensus among participants regarding the criteria that should be used to evaluate teachers: (a) qualifications, training, and certifications, (b) teacher instructional performance and interactions with students, and (c) teachers’ contributions to student learning outcomes and their content and pedagogical knowledge (Asia Society, 2013).

In their recent review of evaluation and assessment policies, the OECD recognized several international policy challenges, including the development of a clear understanding of high-quality teaching that balances the dual functions of appraisal: accountability-based evaluation and teacher professional growth. One of the constant themes addressed in the document was the way teacher supervision and evaluation should be used as a means of measuring and improving teacher quality, a policy aim of the OECD that is well documented (OECD, 2009; OECD, 2013c). In fact, teacher evaluation is a “key lever for increasing the focus on teaching quality and continuous professional development for teachers, in keeping with the growing recognition that the quality of teaching affects student learning outcomes” (OECD,

2013c, p. 6). In addition to promoting individual teacher growth and professional development, the OECD views measures of teacher quality as a means of holding teachers accountable for their performance.

Thus, the OECD has solidified the dual accountability and development functions of supervision and evaluation, and linked both practices to national and individual economic competitiveness:

Promoting teacher evaluation is clearly in the national interest as well as serving students and their families and communities. Teachers need feedback on their performance to help them identify how to better shape and improve their teaching practice. At the same time, teachers should be accountable for their performance and progress in their careers based on demonstrated effective teaching practice. (OECD, 2014, p. 120)

In sum, OECD policies and technical support linking teacher quality with economic competitiveness and educational equity manifested in subtexts identifying supervision and evaluation as the primary means to ensure teacher quality. Thus, supervision for accountability and development purposes were further entrenched and are now part of the larger global discourse on teacher quality (Elliot, 2015; Gabriel, 2015; OECD 2013c).

Review of Empirical Literature

A teacher quality discourse has emerged, whereby countries have begun to implement similar models of supervision and evaluation that try to reconcile the dual functions of accountability and development. These models demonstrate a shift from a purely human capital approach focused on teacher accountability, to one in which social capital strategies are increasingly viewed as promising reforms. This section will begin by reviewing the empirical

literature related to these dual functions. Research around the accountability functions of supervision focuses on the two main areas in the literature: teacher standards and value-added models. Teacher and principal perceptions of these models will also be explored. Next, a review of the research on the developmental or improvement functions of supervision will include research on PLC models and principal observation and feedback as a means of improving teaching quality. Because the principal's leadership style plays a significant role in establishing the support for the organizational learning that occurs through PLCs and teacher feedback (Balyer et al., 2015; Day & Sammons, 2013; OECD, 2016; Supovitz et al., 2009), a review of the literature related to principal leadership style will be included. Finally, TSE, as the outcome variable in this study, will be reviewed. A specific emphasis will be placed on the way it has been conceptualized and operationalized in the literature to justify its use as a proxy measure of teacher quality.

Supervision and evaluation as accountability. An emerging logic has identified teacher evaluation as a strategy for school improvement and is dependent on the strength of a causal relationship between measures of teacher quality and student achievement (Gates Foundation, 2013; Robinson, Lloyd, & Rowe, 2008). Therefore, policy advocates assert teacher quality is subject to reliable forms of measurement that can distinguish the performances of teachers and link it to student achievement (Hallinger et al., 2014). In general, accountability based supervision evaluates teacher performance, with results often used for career progressions, salary determinations, and personnel decisions, including promotion and termination (Elliot, 2015).

Researchers have conceptualized teacher evaluation as a causal change that can positively impact student achievement through at least two interconnected pathways. First, teacher

evaluations are capable of “weeding out” poor teachers who are unable to demonstrate positive effects on student learning. Second, evaluations have a positive impact on student learning by providing teachers with quality feedback that can improve their instruction (Bambrick-Santoyo, 2012; Hallinger et al., 2014). These propositions are reflected in common teacher evaluation models that focus on standards based evaluations that attempt to measure teacher quality against predefined criteria. In addition, evaluations in many countries are linked increasingly to student achievement data, including value-added indicators that propose to measure the individual teacher’s impact on student learning as measured by student growth on standardized achievement tests (Darling-Hammond, 2010).

The accountability functions of teacher evaluation are based on the underlying assumptions that administrative evaluation will improve teachers’ effectiveness (Marshall, 2005) and that variations in teacher quality are associated with differentiated learning opportunities and achievement of students (Hanushek, 2011; Sanders & Horn, 1994). Additionally, proponents of teacher accountability efforts assume that teacher quality can be measured with reliability and accuracy and is capable of distinguishing performances of teachers with respect to their students’ performances (Gates Foundation, 2013; Milanowski et al., 2005). In other words, an emerging logic has identified teacher evaluation as a strategy for school improvement, one that assumes a causal relationship between teacher quality and student test scores (Gates Foundation, 2013; Robinson, Lloyd, & Rowe, 2008). Therefore, policy advocates assert teacher quality is subject to reliable forms of measurement that can differentiate teacher performance and link it to student achievement (Hallinger et al., 2014).

Teacher standards. These propositions are reflected in common standards-based administrative evaluations that attempt to measure teacher quality against predefined criteria, as

well as the increasing use of student achievement data. These systems delineate specific standards and rating scales, with accompanying rubrics designed to remove the subjectivity inherent in the clinical model of supervision. The OECD policy briefings on teacher quality urge member nations to develop systematic definitions of teacher quality and operationalize evaluation measures to hold teachers accountable through similar means (OECD, 2014).

The OECD suggests that the Danielson Framework for Teaching and Learning, an evaluation model common in the U.S., has influenced many teacher evaluation systems around the world, as it provides a more consistent and shared understanding of teacher quality. The framework, which attempts to quantify teacher performance based on measuring several components across domains of planning and preparation, classroom environment, instruction, and professional responsibilities, has been adopted to varying degrees in countries ranging from the U.S. to India to Chile (OECD, 2013c). According to its authors, the system was designed to apply to all content areas and to inform both the accountability and development functions of teacher supervision (Danielson & McGreal, 2000).

The use of standards-based systems for teacher supervision and evaluation, however, has been criticized for reducing the complexities of teaching to an overly-simplistic level (Kimball & Milanowski, 2009; Robinson et al., 2008). Furthermore, the claim of objectivity promulgated by advocates of standards-based systems has been called into question (Kimball & Milanowski, 2009). In a study on the validity of teacher evaluation ratings in a school district using the Danielson Framework, inconsistency was found across evaluator ratings (Kimball & Milanowski, 2009). The differences in validity among principals were attributed to principal motivation, skill, and context, suggesting subjectivity in their ratings. In other words, detailed rubrics designed to measure teacher quality are no guarantee that a standards-based system of

supervision and evaluation is an objective or accurate indicator of teacher quality, and has not been linked empirically to improved student achievement (Garrett & Steinberg, 2015; Hallinger et al., 2014).

Value added measures. As a second form of accountability, teacher evaluations in many countries are linked increasingly to student achievement data, including value-added measures that propose to measure an individual teacher's impact on student learning. As part of its policy initiatives to support countries' efforts to develop evaluation and assessment frameworks, the OECD advocates for these more stringent teacher accountability measures. Value-added analyses that measure and attribute student academic growth to individual teachers is one such approach. Despite its warnings about the statistical challenges and the prohibitive cost of such analyses, the OECD suggests that "value-added models represent significant progress as they are designed to control for the individual student's previous results, and therefore have the potential to identify the contribution an individual teacher made to a student's achievement" (OECD, 2009, p. 2).

Despite the growing movement toward using value-added measures of teacher effectiveness, they have been subject to significant critiques (Darling-Hammond, Amrein-Beardsley, Haertel, & Rothstein, 2012; Hallinger et al., 2014; Sludden, Westmaas, Beaver, & Schott, 2015). Although value-added models may be useful for looking at outcomes for groups of teachers over time (Darling-Hammond, 2010), they yield inconsistent patterns of results over time for individual teachers, calling into question their validity (Darling-Hammond et al., 2012). Polikoff and Porter (2014) found a weak relationship between value-added models of teacher effectiveness and the content and quality of their instruction. Additionally, researchers studying value-added measures that purported to control for out-of-school factors found a strong

correlation between poverty and student performance, raising doubts about their validity and reliability for purposes of teacher accountability (Sludden et al., 2015).

Critiques of value-added measures focus on the long-standing finding that family background contributes significantly to student learning outcomes (Coleman et al., 1966). Darling-Hammond et al. (2012) suggested that “value-added ratings are unable to disentangle the many other influences that contribute to student progress, thereby providing an incomplete and distorted measure of an individual teacher’s effectiveness” (p. 9-10). Beyond their inability to measure teacher quality reliably, developing a highly skilled and trained teacher workforce is often neglected in value-added measures (Tikly & Barrett, 2015). Value-added analyses do not consider the necessary infrastructure to recruit and train students in teacher education programs and to develop and improve teachers’ practices continually through high-quality professional development (Fuller & Schrott, 2015). Therefore, Fuller and Schrott (2015) suggested that capacity building and sustainable models of teacher improvement must exist alongside attempts to evaluate teachers through accountability-based systems.

Teacher perceptions. Although considerable research has been conducted regarding the impact of accountability functions of teacher supervision, there is also a body of literature that examines the perceptions of the main actors in this process: teachers and principals. Teachers often have negative associations with the process of supervision and evaluation, especially with the more conventional accountability models, including the observation process (Blase & Blase, 1999; Ellermeyer, 1999; Rous, 2004; Shulman, Sullivan, & Glanz, 2008). In their qualitative study of nearly 800 teachers across the U.S., Blase and Blase (1999) examined teachers’ perspectives on the instructional leadership capacities of their principals and the impact of these capacities on their teaching. Although their findings suggest that effective principal-teacher

interactions focused on promoting professional growth through processes including inquiry, reflection, and exploration, the clinical model of supervision used traditionally in many schools continues to promote the idea of supervision as a threatening interaction between supervisor and subordinate. Instead of promoting professional growth and reflection, this model “provokes little more than teachers jumping through hoops and giving dog and pony shows based on reductionist algorithms presumed to define good teaching” (Blase & Blase, 1999, p. 370). The typical administrator’s focus on teacher behaviors and the process of their work, rather than its outcomes (e.g., student motivation and learning) further inhibit the utility of many teacher supervision models (Darling-Hammond et al., 2012).

Similarly, in a study of reform efforts and their impact on the instructional supervision process, researchers (Shulman et al., 2008) surveyed and interviewed teachers regarding the relationship between professional development and instructional supervision. In a system that primarily used a directive, clinical approach to supervision, teachers overwhelmingly viewed the purpose of supervision as evaluative. Describing the supervision process that occurred typically, teachers reported that the traditional model involved a pre-conference and a post-conference during which administrators used checklists or narratives to document the observations and meetings. Most teachers (51 of 86 questionnaire respondents) did not see any value or utility in the process. In fact, 20 out of 21 teachers who were interviewed viewed supervision as “evaluative, rigid, undemocratic, unproductive, and intimidating” (p. 413).

Teachers have even less faith in value-added measures to facilitate their professional growth. Cohen and Goldhaber (2016) asserted that many teachers question whether standardized testing is a valid measure of student learning. Additionally, they suggested that teachers have difficulty interpreting results of value-added measures, a function of the lack of information they

provide to target areas for improvement. Value-added measures can also negatively impact collective responsibility for student learning and peer collaboration: “When policymakers use VAMs to identify, reward, and dismiss teachers, they may perpetuate the egg-crate model of schooling and undermine efforts to build instructional capacity schoolwide” (S. M. Johnson, 2015, p. x).

The role of school principals. Administrators’ lack of time to devote to the process of supervision has also resulted in negative perceptions of administrators regarding accountability supervision. Marshall (2005) identified reasons this process is not an effective means of improving teaching. First and foremost, he argued that principals evaluate an extremely small amount of teaching. He found that a typical teacher might teach upwards of 900 classes per year. At best, a principal might observe an experienced teacher one time per year, thus evaluating only 0.1% of the teacher’s instruction. Even if the principal could conduct three evaluations, the observational time in that teacher’s classroom would only increase to 0.3%. No matter how skilled a principal is at conducting observations, “this is a ridiculously thin supervision of one of the school’s most important employees” (Marshall, 2005, p. 728).

Similarly, Rous (2004) showed that principals’ absence in classrooms had a negative impact on teacher perceptions of instructional supervision: “Teachers reported that when supervisors were not in the classroom enough, they couldn’t have a positive influence on classroom instruction. While supervisors were in the classrooms for formal observations and visits, teachers wanted administrator presence beyond those required visits” (p. 277). In summary, supervising individual teachers through a more traditional approach is a time-consuming task, and a principal’s effectiveness in supervision of instruction is often impeded by

the lack of time he or she should devote to such activities (Ellermeyer 1992; Glatthorn, 1998; Kauchak, Peterson, & Driscoll, 1985; Rous, 2004).

Even when lack of time was not considered to be a factor, Woulfin, Donaldson, and Gonzalez (2016) found that district leaders, including principals, tended to focus far more on the accountability functions of each state's evaluation system, despite the policy intent to balance the two approaches. In a document analysis of 35 excerpts related to a policy's accountability and development features, 74% aligned with an accountability frame. As expected, interviews with district leaders after policy implementations revealed that most chose to implement the accountability functions of the plan, with little regard for its developmental aspects. Thus, the authors indicated that the school leaders may have inadvertently limited teacher improvement—the main policy objective.

Similarly, the limited international research available has suggested that teacher quality policies and practices often fail to reconcile the accountability and developmental functions of evaluation (Delvaux et al, 2013). In fact, evaluation has been shown to stifle teacher creativity and increase stress levels (Larsen, 2005), and has little impact on their professional development needs (Darling-Hammond, 2015). TALIS 2013 results showed that among the OECD countries, nearly 40% of teachers reported that teacher appraisals and feedback had little impact on the way they taught in the classroom (OECD, 2014). Over 50% reported that teacher feedback and appraisals were completed largely to fulfill administrative requirements.

Based on scant empirical evidence that teacher evaluation based solely on accountability measures are effective, emerging policy research suggests alternative strategies that may produce more positive effects, generally falling into four domains: (a) providing growth-oriented feedback to teachers, (b) creating professional collaborative communities, (c) developing

systems that have opportunities for job-embedded and ongoing professional learning, and (d) offering tangible support, such as coaching and mentoring, to support teachers' efforts.

Therefore, according to international organizations such as the OECD, effective evaluation systems should include opportunities for teacher self-reflection and assessment, teacher collaboration, and specific feedback from evaluators linked to a meaningful plan for professional improvement (Darling-Hammond, 2013; Marshall, 2005; OECD, 2013c; OECD, 2014; OECD, 2016). As will be shown in the next section, the social capital reforms in this study—PLCs and principal observation and feedback—encompass these policy recommendations.

Supervision and evaluation as development. Although the accountability functions of teacher evaluation continue to play a significant role in international policy recommendations as a means of improving teacher quality, there has also been an increased emphasis in the development or improvement function of supervision and evaluation systems. Contrasting with accountability models, this type of supervision emphasizes collaboration and growth-oriented coaching conducted by administrators, supervisors, or peers aimed solely at developing teaching capacity (Brambrick-Santoyo, 2012; Glickman et al., 2013; Stark et al., 2016). Darling-Hammond et al. (2017) suggested that high-performing systems focus on teacher growth and feedback; thus, the goal of teacher supervision “tends to be to provide information to help teachers improve their performance, rather than to identify and sanction low-performers” (p. 132). This section will review the emerging literature on models of supervision that highlight teacher development and improvement, focusing specifically on the social capital reforms of PLCs and principal observation and feedback.

Given the lack of research regarding the impact supervision has on student achievement and the limited effectiveness of the accountability-based model in promoting individual teacher

growth, researchers and practitioners have turned their attention to alternate models. In recognizing the deficiencies of traditional teacher evaluation, Glatthorn (1998) proposed a rationale for a differentiated model of supervision in which teachers were provided with options about the kinds of supervision and evaluation they received. In addition to an evaluative clinical observation, which he argued may be appropriate for beginning teachers or teachers in need of intense remediation, he outlined two additional options: cooperative development and self-directed development. In both options, a teacher develops a goal and works either cooperatively or independently under the supervision of the principal. Arguing that teachers need work environments that create and support their professionalism, Glatthorn's model emphasized the importance of collaboration, inquiry, and continuous improvement to promote professional growth.

Blase and Blase (1999) identified a similar movement to professionalize teaching through a process of supervision that promotes shared inquiry and decision-making as opposed to the authority-based, bureaucratic imposition of more traditional modes of accountability focused-supervision. Similarly, Feeney (2007) identified best practices in supervision and evaluation that emphasize reflection and setting individual or collaborative goals that focus on improved student learning. Overall, facilitating teacher collaboration and collective learning has become an important strategy for improving their individual and collective capacities (Avalos, 2011; Baker-Doyle, 2015; Popp & Goldman, 2016).

In their study analyzing the potential link between instructional supervision and student achievement, Glanz (2007) expanded the definition of supervision of instruction, emphasizing the need for a more collegial model. In summarizing emerging trends in the field, he identified attributes that provide a more specific link between leadership, supervision, and teacher growth,

including a collegial relationship between teachers and supervisors and facilitation of teacher collaboration. Researchers have argued that effective supervision is linked inextricably to staff development, and should emphasize partnership, coaching, and collaboration between principals and staff to improve student achievement (Koops & Winsor, 2006; Lockwood, McCombs, & Marsh, 2010; Marsh, McCombs, & Martorell, 2010; Wanzare & da Costa, 2000). To foster this relationship, organizational leaders are called to establish a culture that values professional, reciprocal interactions among participants through team planning and peer review of practice.

Professional learning communities. To build teacher capacity, international policy studies provide clear guidance on the types of professional learning that are most likely to lead to sustainable change. For instance, workshops and school visits are not as impactful as meaningful self-reflection, collaborative action research, and PLCs (Akiba & LeTendre, 2009; OECD, 2013c; Sahlberg, 2011; Wahlstrom & Louis, 2008). Stoll (2010) suggested that educational reforms aimed at improving individual teacher quality are no longer sufficient and that systemic change can only be attained through continuous learning of groups. Similarly, Baker-Doyle (2015) asserted that human capital approaches focused on improving the individual capacities of teachers are limiting and restrictive. Rather, she proposed that social capital should be considered as a critical aspect of teacher quality: “It is the only measure that expands our views of teaching beyond, the static, individually held characteristics of training and student outcomes. . . . [It] helps us to understand that some aspects of teacher quality do not simply exist within the individual teachers, but between teachers and within the school community” (Baker-Doyle, 2015, p. 377).

Therefore, as a model of supervision, “collaborative forms of teacher development are increasingly privileged, informed by a growing consensus on principles of effective professional

development” (Gore et al., 2015, p. 82). As a means of creating professional teaching networks and promoting collaboration and trust among teachers, reforms increasingly employ PLC models (DuFour et al., 2006; Louis et al., 1996; Vescio et al., 2008). Although definitions vary somewhat, a PLC is composed of collaborative teams whose members work interdependently to achieve goals linked to student learning by engaging in collective inquiry (Stoll & Louis, 2007). PLCs also engage teachers in reflection and dialogue about instructional strategies that affect student achievement. (DuFour et al., 2006; E. R. Hollins et al., 2004; Louis et al., 1996; Strahan, 2003; Vescio et al., 2008). Much like action research teams, PLCs engage in collective inquiry by gathering evidence of student learning and using this data to inform instruction.

PLCs have become a policy strategy designed to improve teacher isolation, collaborative decision-making, and student achievement (DuFour & Eaker, 1998; Hord & Sommers, 2008; Vangrieken et al., 2017). In a review of literature on the impact of PLCs on teaching and learning, Vescio et al. (2008) found that well developed PLCs have a positive impact on both teaching practice and student achievement. They found four characteristics of PLCs that worked to enhance improved teaching culture and professional practice: collaboration, a focus on student learning, teacher empowerment, and continuous teacher learning. According to the authors, many studies that described the impact of PLCs focused on teacher and principal perceptions, making it difficult to establish a direct link to student achievement. Conversely, PLCs have been tied to improved instructional practices (Vescio et al., 2008), higher levels of collective-efficacy (Moolenaar et al., 2011), and teacher job satisfaction (Reeves et al., 2017), variables which have been associated with increased student achievement.

Principal’s role in facilitating PLCs. Although teacher supervision is generally within the purview of the school principal, researchers have suggested that administrators may be more

impactful facilitating peer collaboration among teachers, rather than using evaluation as the primary means of improving teacher quality (Hallinger et al., 2014). Therefore, the school principal plays a significant role in establishing the organizational and logistical support for PLCs as a means of developing teacher capacity (Balyer et al., 2015; Day & Sammons, 2013; OECD, 2013c; OECD, 2016; Supovitz et al., 2009). In fact, experts agree that sustainable teacher reform efforts should place less emphasis on improving individual teacher quality, and more on developing their collective capacity (Darling-Hammond et al., 2017; Fullan 2002; Hargreaves & Fullan, 2013; Sparapani et al., 2015).

Additional studies serve to highlight the role of the principal in facilitating professional collaboration and its potential impact on teacher quality. Penuel et al. (2009) focused on how professional interactions nurtured by principals facilitate the exchange of ideas, information, and resources teachers need to enact curricular reform efforts. The study provided indirect evidence that teachers' social capital, defined as formal professional networks and teacher collaboration, was important in facilitating teacher change and improved instructional practice. Leana (2010) found that teachers with high levels of peer collaboration increased their students' math scores compared to their colleagues and that low ability teachers perform as well as average ability teachers if social capital indicators are high in their schools.

Supovitz et al. (2009) examined the effects of principal leadership and peer teacher influences on teaching and learning. They identified the key activities found across the literature in which school principals engage to support instructional improvement: setting mission and goals, encouraging trust and collaboration, and actively supporting instruction through teacher networks. Concurrent with this synthesis of research on principal leadership, the authors examined "an array of other actors who either consistently, or situationally, take a leadership role

in schools” (p. 36) and how the interaction among faculty around issues of teaching and learning, and the instructional advice networks that form, impacted student achievement. Their results indicated a positive association between both principal leadership and peer influence and teachers’ change in instructional practice: “Higher level of instructional conversation, interaction around teaching and learning, and advice networks among peer teachers were associated with increases in the amount of change in instruction that a teacher reports” (p. 44).

Components of PLCs. In the literature and in practice, the term PLC has become ubiquitous, often without a clear conceptualization of its key components (Vanblaere & Devos, 2016). Although PLCs have a focus on improved student learning, Hord and Sommers (2008) identified five characteristics of PLCs that most often occur in the literature: supportive and shared leadership, shared vision and goals, collective learning and application, shared individual practice, and supportive physical and human conditions. The authors referenced the multidimensional nature of the PLC, which consists of organizational, personal, and interpersonal capacities. Organizational capacities include the material, structural, and logistical support necessary for PLCs. Personal capacities refer to an individual teacher’s use of reflection to improve instruction. Finally, interpersonal capacities consist of behavioral components including shared values and vision, collective learning, and shared practices. For the purposes of this study, the analytic framework developed by Kruse and Louis (1993), which outlined personal and interpersonal components of PLCs, was used. Their research identified five elements of PLCs, which served as the basis of TALIS 2013 survey questions related to PLCs: (a) reflective dialogue, (b) collective focus on student learning, (c) shared sense of purpose, (d) deprivatized practice, and (e) collaborative professional activity. A recent OECD (2016) report

entitled *School Leadership for Learning: Insights from TALIS 2013* summarized the interconnected PLC practices measured in the TALIS 2013 survey:

- Reflective dialogue: refers to the extent to which teachers engage in professional conversations about specific educational issues. Based upon these reflections, teachers are inclined to further improve their teaching;
- Collective focus on learning: indicates a high level of teachers' commitment to students' success. An undeviating concentration on student learning is a core characteristic of professional community;
- Shared sense of purpose: represents the teachers' alignment with the school's mission and its operational principles. It refers to common goals, and a common mindset to work towards them and to take them into account for decision making.
- Deprivatized practice: refers to teachers observing other teachers' classes, with the goal of providing feedback on their teaching...deprivatized practice implies discussion about teaching practices and sharing ideas and problems among staff based on observations by peers;
- Collaborative activity: represents a measure of the extent to which teachers engage in cooperative activities. Professional communities foster the sharing of expertise, and faculty members call on each other to discuss the development of skills related to the implementation of practice (OECD, 2016, p. 49).

Principal observation and feedback. The PLC components above represent the horizontal social capital measures in this study; principal observation and feedback will account for the vertical social capital. Specific feedback from the principal linked to a meaningful plan for professional improvement (Darling-Hammond, 2013; Marshall, 2005) has been perceived

routinely by teachers as an effective form of supervision (Day & Sammons; 2013; Louis et al., 2010). Similarly, Delvaux (2013) found that teachers' self-efficacy was linked to the clarity and utility of the feedback they received, and that principals played important roles in the effectiveness of evaluation systems.

Historically, supervisory feedback focused more on the qualities of the classroom environment—arrangement of desks, teacher penmanship, and classroom management—than on improving teaching and learning (Aseltine, Faryniarz, & Rigazo-DiGillio, 2006; Hazi & Rucinski, 2009). The information collected from sporadic observations was used as a summative assessment of teachers' skills and was documented in the teachers' personnel files. Through such a process, supervision served as “means by which administrators and others could maintain the status quo and rigid adherence to bureaucratic mandates and practices” (Glanz, 2005, p. 2).

The dilemma that exists between classroom observations as a formative process and the summative nature of evaluation is well documented (Carroll, 1997; Hazi & Rucinski, 2009; Holland & Adams, 2002; Zepeda, 2001). More recently, efforts have been made to make the supervisory process more democratic by incorporating teacher input and reflection and attempting to reframe supervision from a strictly evaluative function to a form of professional training through the development a growth-oriented supervision model (Hazi & Rucinski, 2009). Such models advocated for involving teachers in the process of supervision through observation, reflective dialogue, and goal setting (Glatthorn, 1998; Hazi & Rucinski, 2009; Holland & Adams, 2002; Sergiovanni & Starratt, 2006). In its most basic form, during an observation cycle, the principal pre-conferences with the teacher, works with the teacher to develop areas of focus for the observation, observes the teacher, conducts a post-observation conference, and finally, synthesizes these conversations and observations in a summative write-up. In theory, the

focus of administrative feedback should be on teacher support and improvement, emphasizing the formative nature of supervisory process.

As such, most studies show that developmental growth-oriented feedback has a more significant impact on teacher instructional practices and subsequent student achievement than accountability-based evaluation (Glickman et al., 2013). Thus, “the primary purpose of supervision and feedback should not be to judge the quality of teachers, but to find the most effective ways to coach them to improve student learning” (Brambrick-Santoyo, 2012, p. 121). In a review of school leadership practice effects on student outcomes, Robinson et al. (2008) reviewed 17 effect sizes from six studies and noted an average effect size of .42 when principals were involved directly in supervising teaching through frequent classroom visits accompanied by meaningful teacher feedback. Teachers in higher performing schools reported that their principals set clear performance expectations that aligned with the feedback they received to help them improve their teaching. Similarly, Hallinger et al. (2014) found that classroom observations have a positive impact on student learning by providing teachers with quality feedback that can improve their instruction. Alvoid and Black (2014) suggested that one of the most impactful strategies to improve student learning was to recalibrate the role of principal from evaluator to coach, using growth-oriented feedback to improve teaching and learning.

Research on developmental feedback has generally found positive relationships with teacher and student outcomes, but it is not always perceived by teachers as such. Whereas over 80% of teachers surveyed in TALIS 2013 reported receiving feedback following an observation, nearly 40% said that it had little impact on their classroom practice, and almost half reported that it was an administrative formality (OECD, 2013c, OECD, 2014). Including principal

observation and feedback as a form of vertical social capital in this study will help to clarify this discrepancy by measuring its impact on TSE.

Impact of principal instructional leadership. Since the school principal bears the primary responsibility for facilitating conditions conducive to PLCs and administrative feedback, an overview of principal leadership effects is relevant for this study. Internationally, studies have concluded that the principal has direct and indirect effects on teacher and student learning (Day & Sammons, 2013; Louis et al., 2010; OECD, 2013c). Direct effects result from the organizational learning that occurs through a collaborative focus on teaching and learning, which, subsequently, has an indirect effect on students' motivation, levels of engagement, and achievement (Day & Sammons; 2013; Louis et al., 2010; Robinson, Hohepa, & Lloyd, 2008). A meta-analysis of five key leadership dimensions that influence student outcomes indirectly found a large effect size (0.84) for "promoting teacher learning and development," which included a measure of collaboration and collective responsibility for student achievement (Robinson, Lloyd, & Rowe, 2008). The second largest effect size was for "planning, coordinating and evaluating teaching and curriculum," which included observing in classrooms and providing useful feedback to teachers. Instructional leadership is generally linked to the collective learning that occurs in schools (Day & Sammons, 2013; OECD, 2016); therefore, it will be included in the study as a control variable to isolate the potential impacts of PLC components, given their strong association with principal leadership.

The primary focus of instructional leadership is improving the quality of teaching and learning in schools. As such, it emphasizes establishing and supporting a schoolwide vision and clearly established goals, aligning the curriculum, and supporting and evaluating teachers (Day & Sammons, 2013; Leithwood, Louis, Anderson, & Wahlstrom, 2004; OECD, 2016).

Recognizing that a school principal cannot be solely responsible for managing the entire instructional program, more recent definitions of instructional leadership have viewed instructional leader as responsible for promoting teacher improvement through professional development and growth-oriented coaching, as a means of facilitating student learning (OECD, 2016).

The impact of principal leadership on student learning has been studied over the past several decades, especially as it relates to the instructional responsibilities of school leaders (Hallinger & Heck, 1998; Waters, Marzano, & McNulty, 2003; Witziers, Bosker, & Kruger, 2003). Although there are many competencies and dispositions that fall under the umbrella of instructional leadership, studies have attempted to synthesize the major behaviors associated with it. Many definitions of effective school leadership include similar performance indicators, dimensions, and behaviors (Bosker & Witziers, 1995; Hallinger & Heck, 2010; Leithwood, Patten, & Jantzi, 2010; J.P. Johnson, Livingston, Schwartz, & Slate, 2001; Robinson et al., 2008; Supovitz et al., 2009).

In their meta-analysis of findings from 27 studies on the relationship between leadership and school outcomes, Robinson et al. (2008) inductively derived five sets of leadership practices: establishing goals and expectations; resourcing strategically; planning, coordinating, and evaluating teaching and the curriculum; promoting and participating in teacher learning and development; and ensuring an orderly and supportive environment. Leithwood, Patten, and Janzi's (2010) similarly derived synthesis identified four broad categories of successful school leadership practices, including setting direction, developing people, redesigning the organization, and managing the instructional program. Supovitz et al. (2009) recognized the difficulty in identifying the essential activities of effective school leadership given the varied contexts in

which principals operate, but their analysis revealed three factors that were common across the literature: the role principals play in focusing the mission and goals of the organization, how principals encourage collaboration and trust in the building, and the extent to which principals actively support instructional improvement.

Whereas most PLC research has focused on the general construct of teacher collaboration, Vanblaere and Devos (2016) found that principal leadership styles were related to specific PLC characteristics, including collective responsibility, deprivatized practice, and reflective dialogue, with instructional leaders supporting deprivatized practice and reflective dialogue more frequently than other types of leaders. They suggested that PLCs are a promising strategy for teacher improvement and, therefore, future research should examine how school leaders impact PLC characteristics in their schools. They also recommended that future modeling might include teacher experience and self-efficacy. Based on these findings, principal instructional leadership will be added to the statistical models as a control variable to isolate the potential impact of social capital indicators, PLCs and principal observation and feedback, on TSE outcomes.

Teacher self-efficacy. TSE—a teacher’s beliefs about his or her ability to positively impact student learning—is an important construct to consider given the role it plays in shaping a teacher’s behaviors and dispositions (Klassen & Chiu, 2010) and its associations with a range of classroom processes (Zee & Koomen, 2016). Recent international surveys, including TALIS 2013 and the Teacher Education and Development Survey in Mathematics (TEDS-M) have included it as a survey measure given its relevance for teaching and learning (Vieluf, Kunter, van de Vijver, & Fons, 2013). Because most studies have not found a direct link between teacher supervision and student outcomes (Hallinger et al., 2014; Supovitz et al., 2009), Ebmeier (2003)

suggested that TSE could help provide insight into the impact of teacher supervision and evaluation. Based on Bandura's social cognitive theory, which links behavioral changes to human agency, self-efficacy is defined as a belief in one's own capacity to achieve success in certain situations (Bandura, 1993). Increasing interest in self-efficacy as an outcome variable influenced by teacher supervision and feedback is "justified given the powerful influence efficacy seems to have on classroom practice and subsequent student achievement" (Ebmeier, 2003, p. 3).

There has been significant debate regarding how TSE should be measured, with numerous overlapping surveys available to researchers. The self-efficacy indices used in TALIS 2013 are based on Tschannen-Moran and Woolfolk Hoy's (2001) Teachers' Sense of Efficacy Scale. The domain-specific scale aligns with the theoretical foundations of TSE (Klassen & Chiu, 2010), but delineates domain-specific measures for TSE in instruction, student engagement, and classroom management—the outcome variables for this study. As the main components of a teacher's job, these three outcomes and their potential relationship to the social capital reforms provide researchers and practitioners with potential strategies to improve teaching and learning. This section will provide the theoretical background and constructs related to TSE, review the empirical literature that examines its relationship to student and teacher outcomes, and discuss the emerging body of literature that studies TSE in an international context.

Sources of TSE. As the leader in self-efficacy theory, Bandura is responsible for a significant body of research that suggests that self-efficacy, or individuals' beliefs in their own abilities, significantly influences their behaviors in a variety of contexts, including schools, businesses, and health fields (Bandura, 1993, 1997). Essentially, TSE research expands this

construct to answer two questions: Does TSE affect the behaviors of teachers in their classrooms, and does it, through its impact on teaching, affect student achievement (Protheroe, 2008)? TSE is said to improve with experience or performance accomplishments (Bandura, 1993), and has predicted “the effort people put forth, how well they persevere when faced with obstacles, [and] how effectively they monitor and motivate themselves” (Morris, Usher, & Chen, 2016). Despite the lack of research on the sources of TSE (Klassen, Tze, Betts, & Gordon, 2011), most researchers rely on the sources originally identified in Bandura’s work: mastery experience, verbal persuasion, vicarious experience, and physiological arousal.

Mastery experiences refer to past performance achievements or goals that have been accomplished through individual efforts and personal actions. Bandura (1997) viewed mastery experiences as the most influential source of self-efficacy, in that they provide tangible evidence of success or failure on a given task. The more people view their past actions as successes, the more likely they are to handle similar future situations with increased confidence (Bandura, 1986). To the contrary, those who deem their attempts as failures are more likely to doubt their personal capabilities (Morris et al., 2016). In school research, mastery experiences have been operationalized as teachers successfully teaching a particularly difficult concept (Mintzes, Marcum, Messerschmidt-Yates, & Mark, 2013) and attributing higher levels of student achievement to their actions in the classroom (Fackler & Malmberg, 2016). Additionally, teachers’ mastery experiences may result from teachers gaining technological, pedagogical, or content area knowledge (Morris et al., 2016). Nevertheless, acquiring new knowledge does not guarantee higher TSE, as there is a process of reflection that often follows. In other words, mastery experiences are a result of successful professional experiences and improvement of pedagogical skills and knowledge through a process self-reflection (Nolan & Molla, 2017).

Verbal persuasions can also influence TSE positively, through growth-oriented feedback from a peer or supervisor, but can be equally diminished with overly negative or discouraging feedback. Therefore, verbal persuasion is mediated by the way feedback is delivered and the perceived expertise and credibility of the person delivering the feedback (Morris et al., 2016). In their study on elementary science teachers' self-efficacy, Mintzes et al. (2012) suggested that participating in PLCs, mentoring, and receiving peer feedback were verbal persuasions that could impact TSE positively. A vicarious experience may result from observing someone else model a task, and is especially impactful if the individual is observing a novel task (Bandura, 1997) and perceives himself or herself as being similar to the observer (Morris et al., 2016). Peer observations and deprivatized practice—components of PLCs—have been examined through this lens, as have personal characteristic of the school principal and the principal's leadership style (Mintzes et al., 2012).

Finally, physiological arousal can impact TSE, but it less well defined in the literature (Morris et al., 2016). For instance, some scholars focus only on the negative physiological states and their impact on TSE. Palmer (2006) examined the impact of stress, fear, and anxiety on in-service science teachers' TSE. Similarly, Klassen and Durkson (2014) investigated the patterns of aspiring teachers' self-efficacy and work stress during their initial practicum experiences. Both studies noted that negative physiological states can have varying impacts on TSE deepening on an individual's coping mechanisms, as “moderate levels of stress can energize high achievers but can debilitate low achievers” (Palmer, 2006, p. 338). Other studies measure positive affective states and their links to TSE. For instance, Nolan and Molla (2016) suggested that teachers develop self-efficacy when “they have ongoing learning opportunities that evoke psychological arousal in the form of interest and curiosity toward experimenting with new ideas

and teaching strategies” (p. 12). Mintzes et al. (2012) recognized the powerful emotional support that participating in a professional community could provide for teachers.

Collaboration, student achievement, and TSE. Across several studies, TSE has been examined as the potential link between teacher collaboration and student achievement. Mintzes et al. (2013) used an experimental design to determine the impact of PLCs on TSE. Significant posttest changes were found in self-efficacy for science teachers who participated in PLCs over a 3-year period. The experimental treatment (PLCs) had a large effect size, signifying that the increase in self-efficacy was attributed to teachers’ participation in PLCs, which was associated positively with student achievement. Malmberg, Hagger, and Webster (2014) investigated the effects of lesson instructional design, student characteristics, and teacher experience on their mastery experiences, and reported a positive relationship between TSE and student achievement.

Reeves, Pun, and Chung (2017) studied the influence of teacher collaboration on job satisfaction and student achievement in the U.S. and Japan. They found that time spent visiting colleagues’ classrooms was a positive predictor of job satisfaction and collaborative planning was a significant predictor of student achievement in the U.S. Durksen, Klassen, and Daniels (2017) highlighted the positive relationship between motivation and collaborative professional learning. They found that “teachers with high self-efficacy tend to approach professional learning more positively and confidently” (p. 55). Teacher collaboration was a positive predictor of participating in professional learning—namely, building a professional community—as well as TSE. The study also found a positive relationship between collaborative professional learning and teachers’ career phases, with the strongest relationship for mid-career teachers.

Moolenaar et al. (2011) suggested that the relationship between teacher collaboration and student achievement was likely indirect, mediated through teacher collective efficacy. By

offering shared experiences and collective goals and vision, collaborative teacher networks may enhance perceptions of their collective self-efficacy, which impacts student achievement. Findings suggested “that the density of work related and personal advice networks affected teachers’ perceptions of collective efficacy, which in turn, was associated with increased student achievement” (Moolenaar et al., 2011, p. 258). They also articulated a need for multi-level analyses that consider the nested nature of student and teacher data in schools. Finally, they suggested that future research should look at the specific design of collaborative networks—in other words, examining which specific collaborative strategies or designs support strong networks which may impact efficacy. The inclusion of the five components of PLCs in this study addresses this research gap by specifying different collaborative strategies.

TSE in an international context. TSE has only been studied recently in a cross-national context, in part because of the lack of empirical evidence that the constructs of TSE would be valid across different cultures. Therefore, Vieluf et al. (2013) set out to test whether the concept of self-efficacy, rooted in U.S. literature, could be applied to other cultural contexts. They examined self-efficacy in a cross-national setting using TALIS 2008 data to determine whether self-efficacy could help researchers understand differences in student achievement on international tests. They found the construct of self-efficacy had a similar factor structure and patterns of positive correlations with classroom pedagogy and teacher job satisfaction, but not with student achievement. They warned, however, that variations in means between countries do not necessarily reflect higher or lower self-efficacy at the country level. In other words, individual TSE is not the same as aggregated TSE at the country level. Cultural norms regarding self-presentation and modesty, for instance, may have an impact on cross-national differences in self-efficacy, as teachers in countries where these traits are valued were less likely to choose

extreme points on the Likert scales, which resulted in lower mean self-efficacy scores. Thus, “a low country mean is more indicative of cultural modesty norms than of low TSE. This speaks against the use of aggregated TSE scores as indicators of education systems for policy purposes” (Vieluf et al., 2013, p. 100).

Fackler and Malmberg (2016) conducted one of the only other cross-national studies of TSE, and examined the effects of teacher characteristics, school contextual factors, and leadership effects on TSE in a sample of 44,701 teachers in 2,648 schools across 14 countries. Expanding on Vieluf et al.’s (2013) model, which did not account for the school level, their model was fitted across three levels and confirmed that TSE is a valid measure at the teacher, school, and country levels. Using multi-level modeling to account for variance at each level, they found the most variance in TSE was between individual teachers; however, the school and country level effects were significant, indicating that researchers should identify variables on how schools, as learning organizations, can influence TSE. They also found principals’ experiences and leadership styles were statistically significant predictors of TSE, and suggested a new area of research on the relationship between principal leadership and TSE.

Both studies above were very instructive in the design of this study. For instance, they both used a single measure for TSE but suggested that future studies use of a multidimensional construct of TSE, with Fackler and Malmberg (2016) advising that it would be valuable to replicate their study using the three subscales of TSE in TALIS 2013, which this study does. Given the prevalence of single country studies in the literature, they also made a case for further cross-national examinations of TSE, using multi-level models to account for effects at different levels. Finally, they point out that there are few existing studies that consider the influence of principal and school factors on TSE and that studies could close this research gap by “taking into

account features of the school, its environment, and the principal, as a key figure in creating work conditions of teachers at school, where TSE is developed” (p. 186).

Overall, the social capital indicators in this study, PLCs and principal observation and feedback, align quite well with the sources of TSE delineated initially by Bandura (1993), and eventually operationalized in the TSE empirical literature reviewed in this section. As a form of horizontal social capital, the five components of PLCs—reflective dialogue, collective focus on student learning, shared sense of purpose, deprivatized practice, and collaborative professional activity—align conceptually with the four sources of TSE—mastery experiences, verbal persuasion, vicarious experiences, and physiological arousal—and, therefore, may play a critical role in developing it (Zonoubi, Rasekh, & Tavakoli, 2017). For example, collaboration and dialogue about effective instructional strategies may lead to successful implementation in the classroom, thereby providing teachers with mastery experiences. Opportunities to observe successful teachers engaging and motivating their students provide teachers with vicarious experiences. The constructive and growth-oriented feedback teachers get from peers may serve as forms of verbal persuasion (Nolan & Molla, 2016). Finally, collaboration with peers and a sense of belonging to a group who shares similar norms and values may provide emotional support during stressful times, and elevate teachers’ feelings of innovation and creativity as they attempt to provide meaningful instruction for their students.

Vertical social capital effects at the school level, including principal observation and feedback, also align with the Bandura’s (1993) sources of TSE. Stipek (2012) found that TSE increased when teachers perceived that they had supportive and encouraging administrators. Other studies have found significant and direct relationships between instructional leadership and individual and collective teacher efficacy (Lu et al., 2015). Administrative feedback following

an observation can be considered a source of verbal persuasion, with increases in pedagogical knowledge and successful implementation of new instructional strategies providing opportunities for mastery experiences (Fackler & Malmberg, 2016). In summary, the collaborative nature of the social capital indicators in this study provide access to all four sources of TSE, which may impact a teacher's beliefs about his or her ability to provide quality instruction, student engagement, and classroom management, thereby providing justification for including TSE as an outcome variable related to teacher quality.

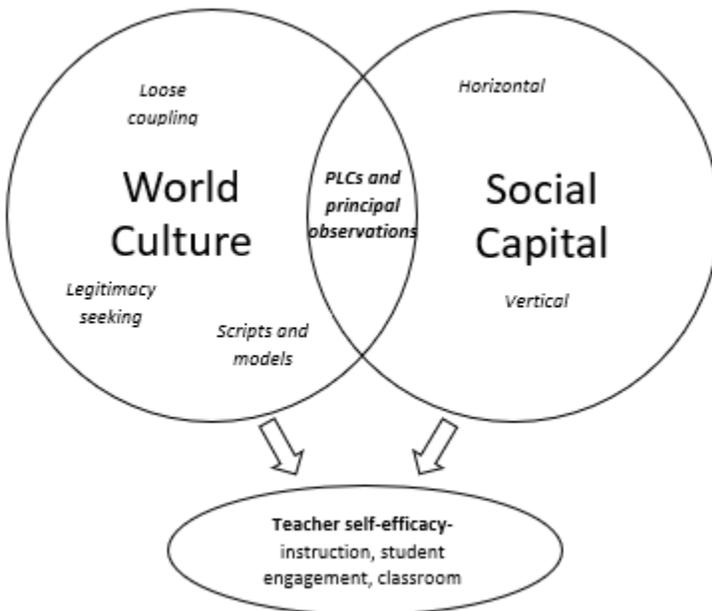
Theoretical Frameworks

The proposed study is theoretically situated to explain the diffusion of social capital reforms using the overlapping theoretical frameworks of world culture and social capital theories. World culture theory places reform efforts in an emergent teacher quality discourse by examining the diffusion of international education policies and practices, while accounting for influence at various levels in educational systems. While teacher quality reforms often place their emphases on improving the human capital of individual teachers through certifications, trainings, and accountability-based evaluations, international organizations like the OECD have concurrently promoted social capital reforms as a means of improving the teaching context. Reform efforts like PLCs and principal classroom observations, therefore, diffuse globally because they are promoted as best practices anchored in social capital theory literature that emphasizes supervision models based on trust and collaboration to improve teacher quality. Therefore, the more functional aspirations of this study attempt to frame these reform efforts using social capital theory to determine the potential benefits of increased social capital on teachers' self-efficacy and any supportive or mitigating contextual factors.

Figure 1 represents the two complementary frameworks. World culture theory will be used to explain the global spread of social capital reforms, specifically examining scripts and models promulgated by international organizations like the OECD, and how educational systems around the world, in order to be seen as legitimate actors on the world stage, adopt these reforms to varying degrees in policy and practice. Although world culture theory suggests that reforms may diffuse regardless of their utility in different contexts, and may only be loosely-coupled to their original intents, the reforms are based on an expanding literature base that suggests that PLCs and principal observations and feedback improve teacher quality. In other words, the global diffusion of a teacher quality discourse helps explain the spread of social capital reforms, which are, in turn, based on literature grounded in social capital theory. Thus, through the integration of these two theoretical frameworks, the effects of horizontal social capital (PLCs) and vertical social capital (principal observation and feedback) on TSE in instruction, student engagement, and classroom management will be examined in an international model comprised of 31 countries. Each theory will be explained below, including their main tenets and a brief overview of how they have been empirically studied. Based on this review, hypotheses related to each research question will be articulated at the end of the chapter.

Figure 1.

Theoretical frameworks



World culture theory. World culture theory is uniquely situated to explain how and why ideas about schooling, its purposes, and its structures and practices exhibit isomorphic tendencies in contexts that are strikingly different (Lechner & Boli, 2005; Ramirez, 2012; Wiseman, Astiz, & Baker, 2014). The emerging teacher quality discourse outlined above serves as a framework for studying the diffusion of two developmental models for supervision, conceptualized as social capital reforms, PLCs and principal observation and feedback. As such, world culture theory will be used to explain how and why these two reform strategies—strongly promoted by international organizations such as the OCED—have spread globally.

Overview. World culture theorists suggest that formal education systems across varying states are bound by global norms of rationality, which construct cognitive models and shared expectations that become normalized over time (Lechner & Boli, 2005). The origins of world

culture “lie in the Western cultural account [and include] notions of individual value and autonomy and the importance of rationality in the pursuit of secular progress” (Lechner & Boli, 2005, p. 46). Actors in a world society, including individuals, organizations, and institutions, have identities that are “constructed and constrained” by a wider world culture (Ramirez, 2003). As an actor itself (Wiseman et al., 2014), world culture constructs the boundaries in which other actors operate and establishes norms and values that become shared globally (Ramirez, 2003).

This process of isomorphism, defined as conformity over time to dominant, legitimated, or taken-for-granted views, is critical to the spread of world culture (DiMaggio & Powell, 1983). Recognizing that other theories, including world-systems theory, examine culture as a process of hegemonic imposition, world culture theorists are less interested in power and economic struggles than they are in explaining alternate models of cultural diffusion through normative means. Thus, world culture scholars seek to understand the processes and consequences of world culture, rather than endorsing a set of cultural views or treating homogeneity as preferred or inevitable (Wiseman et al., 2014).

Cultural institutions such as mass education, however, have become so institutionalized that they exert significant influence in not just reproducing world culture, but in constructing it (Baker, 2014). Although institutions are a product of their own histories, “by the very fact of their existence, [they] control human conduct by setting up predefined patterns of conduct, which channel it in one direction as against the many other directions that would theoretically be possible” (Berger & Luckmann, 1966, p. 72). These patterns of conduct delineate boundaries and expectations that result in cognitive models, or scripts, as well as shared expectations about legitimacy that become normalized over time. Therefore, three components of world culture theory are critical to explaining these isomorphic tendencies in education reform efforts: scripts

and models, legitimacy seeking behaviors, and loose-coupling. Policies and practices, including those related to teacher supervision and evaluation, are borrowed and diffused globally, making world culture theory ideally suited to frame these processes.

Cognitive models and scripts. A world culture of education diffuses a model whereby states promote development and growth through education, increasingly linking it to a teacher quality discourse. In education, these scripts manifest themselves in a cognitive model that places significant faith in education as the primary means of individual and national economic development. Educational equity for traditionally marginalized students is a policy objective, as well, not only to improve students' individual circumstances, but to prepare them to be productive members of the workforce (OECD, 2012). From this, a teacher quality discourse emerged linking high-quality teachers, educational achievement and equity, and economic competitiveness (Akiba, 2013; Robertson, 2012).

Scripts are spread through a vast network of International Governmental Organizations (IGOs) and International Non-Governmental Organizations (INGOs), which urge compliance to the principles codified in universal declarations such as EFA and the Sustainable Development Goals (SDG), which emphasize teacher quality discourse. Although access to and quality of education are seen as global human rights accepted by most countries around the world, nation-states are still sovereign and cannot be forced into operationalizing these mandates. Given the lack of a world state or a mechanism for global enforcement, IGOs and INGOs are uniquely situated to exert their influence and encourage compliance: "Acting as the primary carriers of culture, and as agents of many categories of individuals and peoples, INGOs translate the global identity and authority of world citizenship into specific rights, claims, and prescriptions for state behavior" (Boli & Thomas, 1999, p. 40).

Therefore, not only do citizens have a right to an education, but they have a right to quality teachers. Thus, the responsibility for teacher quality increasingly falls under the purview of the nation-state, with policy-makers often looking to international organizations for their technical expertise and strategy initiatives. Rather than imposing their international authority on nations-states, they use their rationalistic voluntary authority to “work as forums that, in an apparently technical and neutral way, help countries to identify (and consequently to emulate) the education strategies of the most successful performers” (Mundy, Green, Lingard, & Verger, 2016, p. 9). Organizations like the OECD, therefore, constitute an influential form of governance through a “global consultancy network” that diffuses “best practices” (Ramirez, Meyer, & Lerch, 2016). The vast network of international organizations has increasingly been shown to influence educational policy developments, with nations that are more firmly entrenched within this network, more likely to adhere to global policies and strategies.

For instance, Cha and Ham (2014) examined the institutionalization of multicultural policies and curriculum standards across countries. They showed that countries with stronger links to global civil society, measured by INGO membership, were more likely to have policies and standards related to multicultural education. Moon and Koo (2011) identified links to INGO consultants that, from a neo-institutional perspective, contributed to changes in civic and human rights education in Korean textbooks. As a country promoted heavily by the OECD, Takayama et al. (2013) examined how print media accentuated Finnish education in the process of inserting this external reference into the domestic political discourses around performance and teacher quality in Australia, Japan, and Germany. Thus, facilitated by INGOs, cognitive models and scripts further manifest themselves in increasingly standardized policies and practices, increased

participation in large-scale assessments and international benchmarking, and similar teacher quality measures.

Standardization. World cultural theorists point to increasingly common structures, such as centralized educational policy, compulsory education laws, and the collection of educational data to inform policy as evidence of a common form of schooling (Anderson-Levitt, 2003; Cha & Ham, 2014; Moon & Koo, 2011). The common forms that exist at the level of the schoolhouse manifest themselves in a way that would make the business of schooling easily recognizable to most, even if the language of instruction is incomprehensible (Anderson-Levitt, 2003). Students are typically divided by age, there are prescribed forms of student/teacher interactions, and there seems to be a core curriculum (Baker & LeTendre, 2005). In a study of institutional isomorphism across three countries that participate in TIMSS, researchers found that teachers across all three countries appear to follow a similar script, instructional core for mathematics instruction, and belief patterns regarding students' mathematical abilities (LeTendre et al., 2001).

Large-scale assessments and benchmarking. The emphasis on large-scale assessment as a means of measuring educational quality and informing policy and practice is one manifestation of the world culture of education constructed by IGOs and INGOs. The degree to which “a country looks like an educational winner or loser is now made evident at a global level” (Ramirez & Meyer, 2002, p. 3), pressuring countries to participate in large-scale assessments to be considered legitimate global actors (Wiseman, 2010). In world culture literature, academic achievement “has been one of the most stable and widespread characteristics of a global culture of education since the mid-20th century and, [therefore], the product of schooling is improved student learning evidenced by high levels of academic achievement” (Wiseman & Baker, 2006,

p. 3). Similarly, math and science achievement on international assessments has become synonymous with economic development (Ramirez et al., 2006), with countries striving to improve student performance to enhance their economic competitiveness.

With an increased expectation for improved student performance on international assessments, nation-states are increasingly compelled to benchmark not only their performance, but their policies and practices, against other countries. Thus, to improve teacher quality, nations seek out “educational heroes and cross-national best practices...[which] facilitates the rise of educational consulting without borders” (Ramirez, Meyer, & Lerch, 2016, p. 43). Student performance has become thoroughly linked to an increasingly similar definition of effective teaching and similar ways to evaluate and measure teacher quality.

Teacher quality measures. Perhaps more than any other organization, the OECD has symbolic control over teacher policy and practice because of its role in generating an alignment between education and the economy through cross-national comparisons (Robertson, 2012). Attempts to improve learning have resulted in similar models of licensure or certification as a commonly proposed measure of teacher quality (Wiseman & Al-bakr, 2013; Wiseman, Davidson, & Brereton, 2018). For instance, a cross-national comparison of 46 countries examined the relationship between the percentage of quality math teachers—those with full certification, a mathematics major, and 3 years of teaching experience—and TIMSS performance. Countries with higher percentages of teachers meeting these criteria outperformed their international peers (Akiba, LeTendre, & Scribner, 2007).

The existing literature on international comparisons of teacher quality framed by world culture theory have predominantly focused on teacher education and certification (Akiba, 2013). Tatto et al. (2012) studied quality control measures for pre-service teachers in 17 countries and

found that teachers subjected to stronger quality assurance systems had higher levels of mathematics content and instructional knowledge. McKinsey (2007) examined the top performing countries on the Program for International Student Assessment (PISA) and found that teachers who are recruited into the profession are top academic performers, who meet highly selective entry requirements, and are provided with on-going mentoring and professional development. A cross-national comparison of 46 countries examined the relationship between the percentage of quality math teachers—those with full certification, a mathematics major, and three years of teaching experience—and TIMSS performance. Countries with higher percentages of teachers meeting these criteria outperformed their international peers (Akiba et al., 2007). Although researchers did not find a consistent association between teacher certification and student achievement in Gulf Cooperation Council countries, they acknowledged that teacher licensure or certification is a commonly proposed measure of teacher quality (Wiseman & Al-bakr, 2013).

Legitimacy seeking. World culture theory focuses on the spread of cognitive models and scripts and the growing global similarities in policy and practice. Their subsequent manifestation in education systems may not serve any functional need; rather, they are adopted by nations seeking legitimacy (Wiseman et al., 2014). Thus, policy implementation and diffusion can be explained when nations adopt models and scripts to be legitimate actors on the world stage, even though such adoption may not be based in any practical need (Wiseman et al., 2014). As a macro-level example, Ramirez (2012) suggested that because nation-states accept the logic that educational expansion is a normative responsibility of legitimate governments, they may expand schooling beyond what local or national conditions might dictate.

Focusing on specific global scripts, world culture research suggests that multicultural policies and curriculum are becoming an integral part of education policy discourse regardless of individual countries' immediate societal needs or levels of ethno-linguistic homogeneity. Mori and Baker (2010) found that although shadow programs may help individual students, there was no evidence to suggest that they raise national levels of achievement. Nevertheless, these programs continue to expand across many country contexts. They identified the cause of this trend as the growing institutional forces driving the world culture of education, suggesting that shadow education develops alongside other isomorphic tendencies of mass public schooling. Cha and Ham (2015) found that multiculturalism is viewed as a legitimate policy agenda based on a highly rationalized discourse that students will become more responsible global citizens, but may not have any immediate utility in individual countries. Therefore, the adoption of multicultural policies in countries with little diversity, like South Korea for example, is "largely understood as an institutional embodiment of world-level educational norms and values not simply an instrumental means to meet concrete intra-societal needs" (Cha & Ham, 2015, p. 85).

Educational reforms to improve teacher quality are also adopted, often only nominally, by countries seeking to measure their success against high-performing OECD nations (Kamens, 2013). Robertson (2016) suggested that the OECD maintains supremacy in the global governance of teacher quality reforms because of the urgency with which they have linked reforms to global competitiveness. She argued that the launch of TALIS in 2008 was aimed at identifying benchmarking data on teachers that could then be linked to PISA scores, giving countries an opportunity to compare not only their performance, but their policies and practices against other countries. Through TALIS, the OECD "strongly classifies and frames 'the good teacher' in that there is a strong normative view injected into what a good teacher is" (Robertson,

2016, p. 282). Teacher measures like the frequency with which they participate in mentoring systems or engage professionally with their colleagues are, like PISA tables, rank ordered by country means. Countries can therefore compare themselves with other countries “to develop more effective policies to improve teaching and learning” (OECD, 2014, p. 32). Thus, nations seeking legitimacy on the world stage may adopt institutional social capital reforms, like PLCs, with the expectation that they are easily transferable across contexts, but more importantly, because they mirror reforms of high-performing countries.

Loose-coupling. World cultural theorists point to increasingly common structures, such as centralized educational policy, compulsory education laws, and the collection of educational data, to inform policy as evidence of a common form of schooling (Anderson-Levitt, 2003; Moon & Koo, 2011). Although these shared expectations, ideals, and structures have become institutionalized, world culture allows for varying conceptualizations and differentiated enactment at the local level—explained as loose-coupling—despite critiques suggesting that it does not. There is not just one world culture that is moving in a unidirectional manner toward inevitable homogenization (Wiseman et al., 2014); rather, there are multiple cultural accounts interacting continually with one another, resulting in the enactment of similar models and institutions, as well as common forms of resistance to those models. Komatsu (2016) studied the nature of educational reforms in post-conflict societies given the increased accountability to INGOs. He found isomorphic tendencies in Bosnia-Herzegovina’s educational reforms, which aligned closely with policy papers and legislation promoted by INGOs, but also loose-coupling, in which local actors either ignored or resisted these scripts.

As this study will examine the extent to which various components of PLCs have spread internationally, it is reasonable to expect that certain components may be adopted with more

fidelity than others depending on various contextual factors. For instance, Lee and Kim (2016) found that measures of deprivatized practice in South Korea were significantly higher than the international mean, which they attributed to recent policy mandates regarding classroom observations by multiple stakeholders. They went on to suggest that components of school-based PLCs, despite similar conceptualizations, may be shaped by country-specific contexts.

The confluence of two discourses related to education—education as a universal human right and education as a means of individual progress, both in social and economic terms—created an environment in which mass education could flourish. With a global mandate to promote progress through education firmly entrenched, IGOs and INGOs, through rationalized procedures and organization (Boli & Thomas, 1999), formulated global principles and diffused global educational models. Similar curricular reforms, methods of evaluation and accountability, and core instructional practices are ubiquitous. The result is that a world culture of education is easily recognizable in the legitimized models of teaching and learning seen in schools across the globe. World culture theory, therefore, links the spread of social capital reforms—PLCs and principal observation and feedback—to a global teacher quality discourse to help explain how these strategies have diffused globally. The next section will review social capital theory literature upon which international organizations, like the OECD, have based their policy recommendations to improve social capital of teachers across the globe through PLCs and principal observation and feedback.

Social capital theory. World culture theory situates social capital reforms within an international cultural context of educational reform movements. Social capital theory provides a complementary framework and rationale for studying the impact of specific reform efforts of PLCs and principal observation and feedback considered in this study, which, despite policy

diffusion, have not been studied cross-nationally. The review of literature on social capital will begin with an overview of social capital theory and its main tenets. Next, a nascent, but expanding, literature on teacher social capital in schools, and the way it had been conceptualized will be considered, as it directly relates to the main constructs of this study. Finally, the way social capital reforms have manifested themselves in global scripts and models of international organizations, like the OECD, will be examined.

Overview. Research has conceptualized and operationalized social capital in different ways but, at its core, has recognized social relationships and networks as a form of capital upon which individuals and groups can draw to yield benefit or profit (Portes, 1998; Shoji, Haskins, Rangel, & Sorenson, 2014). Bourdieu (1986) defined social capital as “the sum of resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition” (p. 248). Through these relationships and networks, individuals and groups gain access to specific benefits, namely, economic resources, but access to social capital is significantly impacted by social class. Coleman (1988) expanded this definition, highlighting the manifestation of social capital through relationships, but delineating various forms of social capital activated through obligations and trust, information channels, and norms and sanctions. Through these relationships and networks, individuals and groups may gain access to benefits beyond economic resources. For instance, increased social capital may result in improved academic achievement for students or, for teachers, improved instructional practices.

International organizations such as UNESCO and the World Bank have “engaged in extensive conceptual, empirical, and policy related work in the area of social capital” (Mulford, 2007, p. 166) based on this theoretical framework. In a study undertaken by the World

Bank's Social Capital Initiative, Grootaert and van Bastelar (2001) differentiated two distinct but related forms of social capital. The first, cognitive social capital, refers to the resources (shared norms, trust, ideas, and support) that individuals can obtain through their network of relationships. The second, structural social capital, "facilitates information sharing, collective action and decision-making" through an individual's involvement in various informal networks and formal organizations (Grootaert & van Bastelar, 2001, p. 3).

Both forms of social capital have been studied in family and school research, through the lenses of potential benefits social capital yields, as well as the marginalizing effect for those with less social capital access. Some researchers have incorporated Bourdieu's conceptualization in studying differential access to social capital in schools experienced by low-status and minority students (Desimone, 1999; Dika & Singh, 2002; Lareau, 1987; Lee & Bowen, 2006). While limited access to social capital may play a marginalizing role, many education related studies have focused on Coleman's role of social capital in the creation of human capital—in this case, improved student outcomes (Dika & Singh, 2002; Portes 1998). Overall, researchers using this approach generally found positive links between social capital and educational outcomes, including achievement, aspirations, and attainment (Desimone, 1999; Dika & Singh, 2002; Freeman & Condron, 2011; Parcel & Dufur, 2001). While there is a significant research base linking family and school social capital, not until recently, have researchers begun to examine social capital among teachers and its potential relationship to teacher and student outcomes.

Teacher social capital. Researchers have examined home and school networks as proxy indicators for social capital in relation to student outcomes, but far less research has focused on teacher social capital, how it develops, and how it might be related to improved teacher quality (Baker-Doyle, 2015; Hargreaves & Fullan, 2012; Leana, 2010; Shoji et al., 2014). Although

most teacher quality reform efforts have focused primarily on improving human capital through improved training and credentialing (Leana, 2010), recent research suggests that developing teachers' social capital can lead to sustainable improvement efforts, in which teachers provide support for one another through collaboration and information exchange (Baker-Doyle, 2015; Mulford, 2007).

In research on professional interactions in schools and PLCs, few studies have examined their potential through the theoretical lens of social capital theory (Leana, 2010; Penuel et al., 2009). In fact, Hargreaves and Fullan (2012) maintained that “the development of social capital as a strategy has not caught on in the teaching profession [despite the fact that] social capital strategies are one of the cornerstones for transforming the profession” (p. 91). Mulford (2007) asserted that facilitation of various forms of social capital can be increased through the creation of critical friend networks and PLCs. He recognized the role principals play in not only promoting social capital among parents through strong home and school connections, but also in creating professional norms, trust, and collaboration among staff that may impact student achievement.

Highlighting the importance of social capital in schools, Leana (2010) indicated that the “interactions among teachers in a school [are] often overlooked in discussions of instructional quality. Research suggests that social capital thrives in an atmosphere of mutual trust and collective practice—and that it is a powerful predictor of student achievement” (p. 16). She and her research team surveyed over 1,000 fourth and fifth grade teachers in a representative sample of elementary schools in a large urban school district to determine the relationship between human capital, social capital, and student achievement. Social capital was operationalized as the frequency and focus of instructional conversations among colleagues, and the feelings of

professional trust and collegiality between teachers. She found that teachers with high levels of social capital increased their students' scores on standardized math tests by 5.7% more than teachers with lower social capital scores. She also found that low-ability teachers perform as well as average ability teachers if social capital indicators are high in their schools.

Similarly, Jackson and Bruegmann (2013) found that individual teachers' performances were significantly impacted by the quality of their peers. They documented that students had larger test score gains when their teachers experienced an improvement in the observable characteristics of their colleagues, including years of experience and an advanced degree. In fact, over time, peer quality accounted for almost 20% of the within-teacher variance, leading the authors to suggest that teachers be provided time for peer collaboration and learning.

Penuel et al. (2009) studied how professional interactions facilitated the exchange of ideas, information, and resources teachers needed to enact curricular reform efforts. Two analytic methods were used as a means of interpreting case study data on teachers' social capital: social network analysis and grounded theory. Social network analysis was used to "map the internal social structure of the school, identifying the positions of mentors and coaches, and analyzing the value of teachers' interactions in terms of the resources and expertise they exchange" (Penuel et al., 2009, p. 131). As a complement to this analysis, they employed grounded theory methods to reveal specific themes from the teacher and principal interviews regarding collaboration and resource exchange. The study provided indirect evidence that teachers' social capital, defined as formal professional networks and teacher collaboration, was important in facilitating teacher change and improved instructional practice.

Daly and Finnegan (2010) also drew upon social capital and social network theory literature to examine a school district implementing reform efforts. They operationalized social

capital as the network ties between individuals in an organization that create a structure for individuals to access or leverage the resources of others. Using an exploratory case study design, they employed social network analysis to quantify and visualize ties and overall structure of formal and informal networks. In addition, semi-structured interviews of central office leaders and classroom teachers asked participants to describe patterns of communication and knowledge flow throughout the school district. To ensure the trustworthiness of interpretations, member-checking procedures were carried out as emerging themes were developed and were shared with participants. They found that “a more coordinated effort at building ties between different levels in a system is critical to enhancing an organization’s overall capacity for change, increasing the likelihood of success, and improving student achievement” (p. 132). Thus, ties at multiple levels in an organization, between teachers and between teachers and principals, are important constructs that provide justification for including horizontal and vertical social capital variables in this study, which will be discussed in in the next section.

Social capital at multiple organizational levels. The studies cited above show the potential benefits of facilitating opportunities to increase teacher social capital through collaboration and PLCs. Pil and Leana (2009) made a significant contribution to social capital theory research by simultaneously studying two levels of social capital in schools, horizontal and vertical social capital. Their study examined variability in student achievement growth based on these two effects. Horizontal social capital was defined as the ties between people who shared the same group membership and were at the same hierarchal level in an organization, in this case, teachers. They measured these linkages based on the number and strength of ties within groups of teachers, which they hypothesized would lead to increased access to information and stronger collaborative relationships.

The quality of relationships with an individual's direct supervisor is also an important component of social capital within the organizational structure of a school. In fact, Sparrowe and Liden (1997) showed that "higher-quality exchanges with supervisors led to increased job performance" (p. 540). Pil and Leana (2009) suggested that the number and quality of ties between a teacher and a principal should affect teacher performance as "they are more likely to share information that might expose their professional challenges as well as strengths and thus open the door to learning about how to better address those challenges" (p. 1105). Thus, vertical social capital was articulated as the strength of the ties between teachers and their immediate supervisors, in most cases their school principals. An index was created to measure the frequency with which teachers engaged in instructional conversations with their principals, as well as the teachers' reported closeness to their principals.

Results of the study found that strong horizontal social capital between teachers—specifically for teachers working in teams with strong group ties—resulted in stronger student performance. Additionally, students demonstrated more growth in math achievement when their teachers had stronger ties to their school principal (Pil & Leana, 2009). Although the results of this study are an important contribution to social capital literature, the study design is equally instructive for the way it conceptualized and measured social capital at different levels. Because teacher social capital had rarely been studied at different organizational levels (Oh, Chung, & Labianca, 2004), their decisions to model the effects at multiple levels enabled them "to capture the complex nature of these phenomena [and] to uncover relationships that may be missed in research conducted at a single level of analysis, or with only one form of capital" (Pil & Leana, 2009, p. 1116). Their research was critical to the conceptualization of social capital in this study. Not only did it inform the choice to include PLCs as a measure of horizontal social capital, but it

influenced the decision to include principal observation and feedback as a vertical social capital indicator.

Social capital reforms and the world culture of education. Despite the ubiquity of human capital measures of teacher quality including certification and degree attainment, international organizations are beginning to promote social capital reforms like PLCs as either an addendum, or an alternative, to their policy strategies. Gabriel and Allington (2015), in an article on the World Bank's strategies for measuring teacher quality, critiqued the overemphasis on human capital input measures and their causal links to output measures of student achievement. Rather, they suggested that classroom observations, reflective dialogue about teaching, and teacher collaboration—reforms that focus on the processes of teaching rather than merely inputs and outputs—provide “the highest quality of information for countries seeking to continuously improve their collective understanding and execution of teaching” (Gabriel & Allington, 2015, p. 224). The OECD, in its policy papers on teacher evaluation, has also placed a heavy emphasis on input and output measures of teacher quality. Concurrently, however, they promote policies of high-performing countries like Finland and Singapore, for their more balanced approach to teacher quality reforms—routinely spotlighting policy initiatives that support the collective capacity of teachers through collaboration and PLCs (Robertson, 2016; Sahlberg, 2016).

In their research for the OECD, and subsequent book on global educational reform models, for example, Hargreaves and Shirley (2012) attributed Finland's success to its commitment to developing the professional capital of its teachers. In addition to human capital measures of individual skills and qualifications, they identified social capital that accrued “through collaborative patterns of interaction and levels of trust that contribute to mutual learning” (Hargreaves & Shirley, 2012, p. 49) as having a significant impact on teacher quality.

In an OECD report following the administration of TALIS 2008, two chapters were devoted to PLCs with country level policy recommendations (OECD, 2012). Similarly, in a summary publication after TALIS 2013, the OCED identified teacher collaboration with colleagues, along with meaningful feedback from multiple sources, including the school principal, as primary policy objectives (OECD, 2014). In another technical report on school leadership, the OECD asserted that “teachers who actively engage in professional learning communities will increase their professional knowledge, which will lead to the enhancement of student learning” (OECD, 2016, p. 28) and that principals bear the responsibility for creating a culture and climate to support PLC implementation. Beyond these policy recommendations to educational systems, the OECD published a guide for teachers and school leaders emphasizing the importance of social capital efforts aimed to improve their collaboration, trust, and the development of a shared vision (OECD, 2014a).

Competing theories. Most studies related to PLCs and administrative feedback are found in educational leadership literature, which uses several theories to explain the impact of these reform efforts, including social network analysis (Daly & Finnegan, 2010). As this study is rooted in a CIE context, competing theories used in the field to frame educational reforms are broadly considered critical sociocultural theories. From the critical perspective, international education reforms represent the process by which hegemonic powers use education as a means of maintaining dominance on the world stage. As core nations emerged as politically and economically dominant, they legitimized their power and used education as a means of reinforcing capitalist ideology. Smith (2003) argued that the application of neo-liberal principles has resulted in the adoption of “a human capital resource model for education, whereby reforms are directed at producing workers for a new globalizing market system” (p. 371). In other words,

rather than implementing reforms that suit the needs of an individual education system, the enactment of the global script manifests itself in the implementation of global models of reform that reproduce power differentials between nations-states and between individuals, and continue to marginalize students from non-dominant groups.

Teacher supervision and evaluation studies do not generally fall within the field of CIE, but a few studies have used methods anchored in the critical theory including Critical Discourse Analysis (CDA) to examine teacher evaluation policies and instruments. CDA is a means of analyzing how social power, dominance, and inequality are enacted, reproduced, and resisted by text and talk in social and political contexts (Vavrus & Seghers, 2010; Wodak & Meyer, 2009). As a methodological and conceptual approach, it acknowledges that knowledge is socially constructed and shaped by power relations, as certain discourses are privileged by dominant groups, and, therefore, serves to reproduce power differentials. Educational policy documents are particularly relevant for CDA as they serve as “important expressions of social power in that they convey the values of authoritative actors and institutions whose particular forms of knowledge about the social world are reflected in these texts” (Vavrus & Seghers, 2010, p. 77). By examining the forms of knowledge that are privileged in and excluded from policy documents, social relations of power and how they influence policy production, circulations, and implementation come into sharp relief (Ball, 2005).

During the past decade, educational researchers have increasingly used CDA as a means of uncovering and critiquing the relationship between language and power, as well as the role discourse plays in constituting social inequalities (Rogers et al., 2005). For instance, a critical examination of education leadership standards in the U.S. found that language in the standards was used as a legitimization strategy to please multiple constituencies, and focused implicitly on

public control and deficit theories of children and poor communities (Anderson, 2001).

Caughlan and Jiang (2014) used CDA to examine the grammar of pre-service teacher evaluative instruments and the way they limited the agency of teacher candidates and influenced the assumed pedagogical relationship between pre-service teachers, their mentors, and their students.

Although critical theories and the accompanying methodologies may have been appropriate for the research questions in the above studies, they are not the most appropriate choice for this study. Rather than focusing on power differentials and the way students and teachers might be marginalized because of reform efforts, this study is more interested in the normative process by which international reform efforts serve as global scripts and models, aiding in the diffusion of these policies. Likewise, social capital theory provides a functional perspective to highlight the potential utility of reform efforts in improving teaching and learning, rather than any marginalizing effects they might have.

Hypotheses. A global discourse has emerged that places teacher supervision and evaluation at the center of educational reform efforts aimed at improving teacher quality. As reform movements have become institutionalized, national and local policy makers have responded in increasingly similar ways to improve teacher quality through social capital reforms, including PLCs and principal observation and feedback. World culture theory suggests that isomorphism is not a uniform or linear process, and that varying degrees of loose-coupling occur based on contextual factors specific to each teacher, school, and country. Despite these contextual effects, the study expects to find isomorphic tendencies in a global statistical model that incorporates 31 countries. The hypotheses for the study are:

H1: The five PLC components, as measures of horizontal social capital, will make distinct contributions to the models and will significantly and positively predict TSE in instruction, engagement, and classroom management.

H2: Principal observation and feedback, as a measure of vertical social capital, will significantly and positively predict TSE in instruction, engagement, and classroom management.

H3: The five PLC components, aggregated at the school level, as a measures of school level horizontal social capital, will make distinct contributions to the models and will significantly and positively predict TSE in instruction, engagement, and classroom management.

H4: The relationships between school level PLC components and TSE in instruction, engagement, and classroom management will vary significantly by country, but will not be impacted by country achievement and equity.

Chapter Three: Methodology

Introduction

The study used hierarchical linear modeling (HLM) as the main inferential statistical method to examine the research questions and corresponding hypotheses. Although TALIS 2013 provides indicators related to the conditions of teaching and learning environments, the OECD encourages policymakers and consumers of TALIS data to examine the variability in environments within and across various levels of educational systems. Therefore, TALIS instruments were designed to include inputs and processes of teaching and learning at three levels: the teacher level, the school level, and the country level. The OECD encourages the use of “statistical models that account for the inherent multi-level structure of the TALIS data as a useful means of explaining and understanding differences within and across schools and within and across countries” (OECD, 2013d, p. 13). Therefore, multi-level modeling was an appropriate method of analysis to examine the relationship between social capital reforms and TSE based on the three-level structure of the TALIS 2013 data.

This chapter will review the sample and participants across TALIS countries. Next it will discuss the independent and dependent measures used in the study, including the OECD created indices, as well the indices that were constructed to delineate PLC components specific to this research: reflective dialogue, collective focus on student learning, shared sense of purpose, deprivatized practice, and collaborative professional activity. Finally, the research design and procedures will be presented, including variables at each level, model equations for the analyses and their corresponding hypotheses, and a brief description of required assumption tests.

Sample, Participants, and Site

In total, 34 countries, including 24 OECD countries and 9 partner countries, participated in TALIS 2013. Cross-national data samples such as TALIS do not follow a simple random sampling approach, whereby each teacher or principal in the target population is chosen with equal probability. Rather, in each country, a stratified cluster sampling procedure was used in which samples of schools were drawn with probability proportional to size (i.e., large schools chosen with higher probability).

After agreeing to participate, the selected schools provided each national coordinator with a list of all eligible teachers working at the International Standard Classification of Education (ISCED) level-2 (lower secondary education level, equivalent to U.S. grades 7 through 9). For the purposes of TALIS, a teacher is defined as “one whose primary or major activity in the school is student instruction, involving the delivery of lessons to students. Teachers may work with students as a whole class, in small groups, or one-to-one inside or outside regular classrooms” (OECD, 2014, p. 28). Teacher assistants and support personnel were not included in this definition. After identifying eligible teachers, each national center drew a random sample of teachers. The goal was to select 200 schools and 20 teachers per school for each participating country, resulting in approximately 4,000 teachers surveyed in each country, sample sizes at each level that meet the threshold for sufficient power in HLM analyses (Peugh, 2010). The OECD’s required participation rates to meet sampling standards were 75%; therefore, the U.S. was excluded from the data set (Freeman, O’Malley, & Eveleigh, 2014). Cyprus was excluded given it did not meet the minimum threshold for number of participating schools. Finally, data from Iceland were excluded, as they did not give permission to have their data released publicly. In total, 31 countries were included in the international data set for this study. Table 1 presents the teacher and school sample sizes for each of the countries included in this study.

Table 1

TALIS 2013 participation (OECD, 2014)

	Number of participating schools	Number of teachers in participating schools	Overall participation rate (%)
<i>Countries</i>			
Australia ^{1,2}	123	2059	70
Brazil	1070	14291	91
Bulgaria	197	2975	96
Chile	178	1676	85
Croatia	199	3575	95
Czech Republic ¹	220	3219	98
Denmark ^{1,2}	148	1649	62
Estonia ¹	197	3129	99
Finland ^{1,2}	146	2739	90
France ²	204	3002	61
Israel ²	195	3403	85
Italy	194	3337	88
Japan ¹	192	3484	95
Korea ^{1,2}	177	2933	78
Latvia	116	2126	77
Malaysia ²	150	2984	73
Mexico ²	187	3138	87
Netherlands ^{1,2}	127	1912	61
Norway ^{1,2}	145	2981	58
Poland	195	3858	97
Portugal ²	185	3628	86
Romania	197	3286	98
Serbia ²	191	3857	92
Singapore ¹	159	3109	99
Slovak Republic	193	3493	95
Spain	192	3339	88
Sweden ²	186	3319	84
<i>Sub-national entities</i>			
Abu Dhabi (UAE) ²	166	2433	74
Alberta (Canada) ^{1,2}	182	1773	87
England (UK) ^{1,2}	154	2496	63
Flanders (BE) ^{1,2}	168	3129	75

Note. ¹High achievement/high equity designation by OECD; ²Above average educational expenditure as % of GDP

The study administered two questionnaires: a survey designed to assess school level variables was administered to principals, and a teacher questionnaire was administered to assess teacher level variables. During a 5-month period in the southern hemisphere, and another 5-month period in the northern hemisphere, a total of 170,000 teachers and 10,000 school principals were surveyed (OECD, 2013d).

Measures

TALIS 2013 is an international survey of teaching and learning based on questionnaires completed by teachers and their school principals. Since its original administration in 2008, the main goal of TALIS has been to “increase the international information available to OECD countries and partner countries on teachers, teaching, and the impact teachers can have on student learning” (OECD, 2013d, p. 7). With this goal in mind, TALIS includes policy-relevant indicators to countries interested in promoting effective teaching and learning.

The survey questions and subsequent indicators were created through a priority rating exercise in which all countries were invited to participate prior to the development of the survey. The goal of the exercise was to ensure that the survey questions were valid and reflected the policy priorities of participating countries. Each country was asked to distribute a total of 200 points across 20 proposed themes, with higher allocations reflecting a higher priority (OECD, 2013c). In addition to general themes, countries were asked to prioritize specific indicators related to each theme. The rating exercise resulted in the inclusion of several themes: school leadership, teacher training and professional development, teacher appraisal and feedback, teachers’ pedagogical beliefs, and teachers’ pedagogical practices. After a drafting and revision process, a qualitative pilot study was conducted in 21 countries, during which focus groups provided feedback on the organization of the questions, the reliability and validity of the

constructs, the translations, and the cultural relevance of the surveys (OECD, 2013e). Survey items were then revised to ensure cultural and linguistic validity (OECD, 2014).

TALIS indices. The TALIS questionnaires include items regarding school characteristics and teachers' and principals' beliefs, backgrounds, and perceptions. As self-reported psychological constructs, therefore, responses and interpretations of questions may be influenced by individual, school, and country cultural factors (OECD, 2014). Additionally, many of the TALIS 2013 questionnaire items were designed to be combined into indices that were not directly observable but, rather, representative of an underlying theoretical framework. For instance, a complex scale index was created for principal instructional leadership based on a combination of factors assessed in the survey. Per the OECD, the complex scales were constructed and validated using confirmatory factor analysis (CFA; OECD, 2013d). Cronbach's alpha was then used to evaluate the quality and reliability of the scale items across all country participants. TALIS indices, related survey questions used in this study, and corresponding Cronbach's alpha values are outlined in Table 2.

Dependent variables. The dependent variables in this study are TALIS indices that represent TSE in instruction (SEINSS; $M = 12.50$, $SD = 2.01$), student engagement (SEENG; $M = 12.01$, $SD = 2.02$), and classroom management (SECLSS; $M = 12.80$, $SD = 1.99$). Each variable was developed using four questionnaire items outlined in Table 2, with each item measured on a 4-point rating scale (1 = *not at all*, 2 = *to some extent*, 3 = *quite a bit*, 4 = *a lot*). Variables were recoded in SPSS version 24, so that a value of 0 indicated the absence of teachers' beliefs to effectively accomplish the specified activities.

Level-1 predictor variables. As discussed in previous chapters, PLCs are often measured as a single construct, but this study used distinct variables to represent the individual

effects of five PLC components (Vanblaere & Devos, 2016): reflective dialogue, collective focus on student learning, shared sense of purpose, deprivatized practice, and collaborative professional activity. For the purposes of this study, collaborative professional activity was represented by the TCEXCHS ($M = 11.18$, $SD = 2.09$) index (OECD, 2016). The index was created by the OECD using four questionnaire items outlined in Table 2. Each item was measured on a 6-point rating scale indicating the frequency of which teachers participated in the activity (1 = *never*, 2 = *once a year or less*, 3 = *2-4 times per year*, 4 = *5-10 times per year*, 5 = *once per month*, 6 = *once a week or more*). The variable was recoded in SPSS version 24 from 0 to 5, so that a value of 0 indicated that the teacher never participated in the activity.

Deprivatized practice (DEPRIVP; $M = .23$, $SD = .42$) is a dichotomous variable represented by only one questionnaire item asking teachers if they observe in other teachers' classrooms (0 = *no*, 1 = *yes*). The three remaining PLC component variables were constructed using exploratory factor analysis (EFA). EFA was used by previous researchers to construct PLC component scales (OECD, 2016), and served as a guide in constructing scales for the three remaining PLC components in this study. The reflective dialogue scale (DIALOG; $M = 2.64$, $SD = .80$) was based on teacher questionnaire items related to the extent various forms of feedback led to positive changes in (a) classroom management, (b) content knowledge and understanding, (c) teaching practices, (d) methods for teaching children with special needs and (e) their use of assessments to improve student learning. The five questionnaire items were measured on a 4-point scale (1 = *no change*, 2 = *a small change*, 3 = *a moderate change*, 4 = *a large change*; OECD, 2016).

The scale for shared sense of purpose (PURPOSE; $M = 2.85$, $SD = .63$) was constructed using two teacher questionnaire items that assess teacher agreement with the following

statements: (a) the school has a culture of shared responsibility, and (b) the school has a collaborative culture that is characterized by mutual support. Each item was measured on a 4-point scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, 4 = *strongly agree*; OECD, 2016). Finally, the collective focus on student learning scale (FOCUS; $M = 3.35$, $SD = .62$) was constructed using questionnaire items that asked teachers what emphasis is placed on the feedback they receive regarding (a) student performance, (b) content knowledge and understanding, (c) pedagogical competency, (d) student assessment practices, and (e) student behavior and classroom management. Each item was measured on a 4-point scale (1 = *not considered at all*, 2 = *considered with low importance*, 3 = *considered with moderate importance*, 4 = *considered with high importance*; OECD, 2016).

Control variables at level-1 included a dichotomous variable, teacher gender (FEMALE; $M = .62$, $SD = .34$), which was recoded as 0 = *male* and 1 = *female*. Additionally, the number of years of teaching experience (YRSEXP; $M = 16.19$, $SD = 0.39$) was included as a control variable.

Constructing variables using EFA. In a previous study on the impact of principal leadership styles on PLC activities, EFA was used to reduce TALIS questionnaire items into explanatory constructs representative of the multidimensional nature of PLCs (OECD, 2106). EFA examines shared variance between variables and helps identify latent factors based on theoretical assumptions. If all assumptions for the analysis are met, including sufficient sample size, normality, and correlations that do not exceed 0.8/0.9 (Field, 2014), the researcher can extract distinct factors from numerous survey items. The reliability of the PLC components in the OECD's study were determined based on an examination of each factor's Cronbach's alpha, with values of 0.70 and above deemed reliable. In sum, EFA was used by the OECD to reduce

problems with multicollinearity by combining variables that correlated with one another into distinct explanatory PLC constructs. A summary of the survey items that loaded onto the five PLC component variables in this study are listed in Table 3.

Level-2 predictor variables. The final TALIS index that was used as a level-2 control variable is principal instructional leadership (PINSLEADS; $M = 11.13$, $SD = 1.95$). The variable was measured by three principal questionnaire items outlined in Table 2. Each item was measured on a 4-point scale indicating the frequency with which the principal engaged in the activity (1 = *never or rarely*, 2 = *sometimes*, 3 = *often*, 4 = *very often*). Variables were recoded in SPSS 24 from 0 to 3, so that a value of 0 indicated that the principal never or rarely engaged in the specified activity. The next level-2 independent variable is principal observation and feedback (OBSERVE; $M = 1.24$, $SD = .43$), which identifies the frequency with which a principal observes each teacher. This item was measured on a 3-point scale (1 = *never*, 2 = *once per year*, 3 = *twice per year or more*). Teacher level PLC components were aggregated to the school level to create new school level PLC variables. In other words, teachers' PLC component scores in each school were averaged to create new school level variables: mean reflective dialogue ($M = 2.64$, $SD = .42$); mean collective focus ($M = 3.34$, $SD = .32$); mean shared purpose ($M = 2.86$, $SD = .32$); mean deprivatized practice ($M = .23$, $SD = .19$); mean collaborative professional activity ($M = 11.12$, $SD = 1.27$). Finally, level-2 control variables included school enrollment (ENROLL; $M = 713.91$, $SD = 492.69$) and percentage of students from disadvantaged homes (SCHOOLSES; $M = .32$, $SD = .29$), both of which are continuous variables.

Level-3 predictor variable. The only variables entered at the country level were country achievement and equity, entered as an interaction term, and education expenditure as a percent of GDP, entered as a control variable. Country designations for each are identified in Table 1. The

OECD routinely promotes what they designate as high achieving, high equity countries for their social capital reforms. The OECD created a matrix that places countries into one of four quadrants based on their mean achievement on PISA and the percentage of variation in scores that is attributed to socioeconomic status. High achieving, high equity countries have higher than average scores, with above average equity (lower proportion of variance in scores attributable to socioeconomic status). Because there was no expected linear relationship between this variable and TSE, it was coded as a dichotomous variable (0 = *low*, 1 = *high*). Essentially, at level-3, the study tested whether the relationships between PLCs and TSE outcomes varied by country. When they did, ACHEQU ($M = .38$, $SD = .47$) was added to the model to assess if designation as a high achieving, high equity country significantly impacted the relationship between PLCs components and TSE. Education expenditure as a percentage of GDP (EXPGDP; $M = .46$; $SD = .50$) was entered as a dichotomous control variable (0 = *low*, 1 = *high*) to isolate the potential effects of the intervention term.

Table 2

TALIS 2013 indices created by the OECD used in the proposed study

<i>TALIS 2013 Indices</i>	<i>Relevant survey questions</i>
<i>LEVEL-2: School Level Indices</i>	
Instructional leadership (PINLEADS) Cronbach's $\alpha = .79$	TC2G21C Took actions to support cooperation in new teaching practices TC2G21D Took actions to ensure teacher take responsibility for improving their teaching TC2G21E Took actions to ensure teachers feel responsible for students' learning outcomes
<i>LEVEL-1: Teacher Level Indices</i>	

<p>Exchange and coordination for teaching (TCEXCHS) Cronbach's $\alpha = .71$</p>	<p>TT2G33D Exchange teaching materials with colleague TT2G33E Engage in discussions about learning development of students TT2G33F Work with other teachers to ensure common standards in evaluations for assessing student progress TT2G33G Attend team meetings</p>
<p>DV: Self-efficacy: management (SECLSS) Cronbach's $\alpha = .84$</p>	<p>TT2G34D Control disruptive behavior TT2G34F Make expectations clear TT2G34H Get students to follow rules TT2G34I Calm a disruptive student</p>
<p>DV Self-efficacy: instruction (SEINSS) Cronbach's $\alpha = .79$</p>	<p>TT2G34C Craft good questions TT2G34J Use variety of assessment strategies TT2G34K Provide alternate explanations TT2G34L Implement alternative instructional strategies</p>
<p>DV Self-efficacy: engagement (SEENGs) Cronbach's $\alpha = .83$</p>	<p>TT2G34A Get students to believe they can do well TT2G34B Help students values learning TT2G34E Motivate students who show low interest TT2G34G Help students think critically</p>

Table 3

Proposed indices for PLC component variables

<i>PLC component</i>	<i>Relevant survey questions</i>
<p>Reflective dialogue (DIALOG) Cronbach's $\alpha = .89$</p>	<p>TT2G30H Classroom practices TT2G30I Knowledge and understanding of subject TT2G30J Teaching practice TT2G30K Methods for teaching student with special needs</p>

	TT2G30L Use of assessments to improve student learning
Collective focus on student learning (FOCUS) Cronbach's $\alpha = .83$	TT2G29A Student performance TT2G29B Knowledge and understanding of subject fields TT2G29C Pedagogical competency in subject fields TT2G29D Student assessment practices TT2G29E Student behavior and classroom management
Deprivatized practice by classroom observation (DEPRIVP)	TT2G28A5 feedback from other teachers following observation
Shared sense of purpose (PURPOSE) Spearman's $\rho = .66, p < .001$	TT2G44D School has a culture of shared responsibility TT2G44E Collaborative culture that is characterized by mutual support
Collaborative professional activity (COLLAB) Cronbach's $\alpha = .71$	TCEXCHS Index above TT2G33D Exchange teaching materials with colleague TT2G33E Engage in discussions about learning development of students TT2G33F Work with other teachers to ensure common standards in evaluations for assessing student progress, TT2G33G Attend team meetings

Research Design

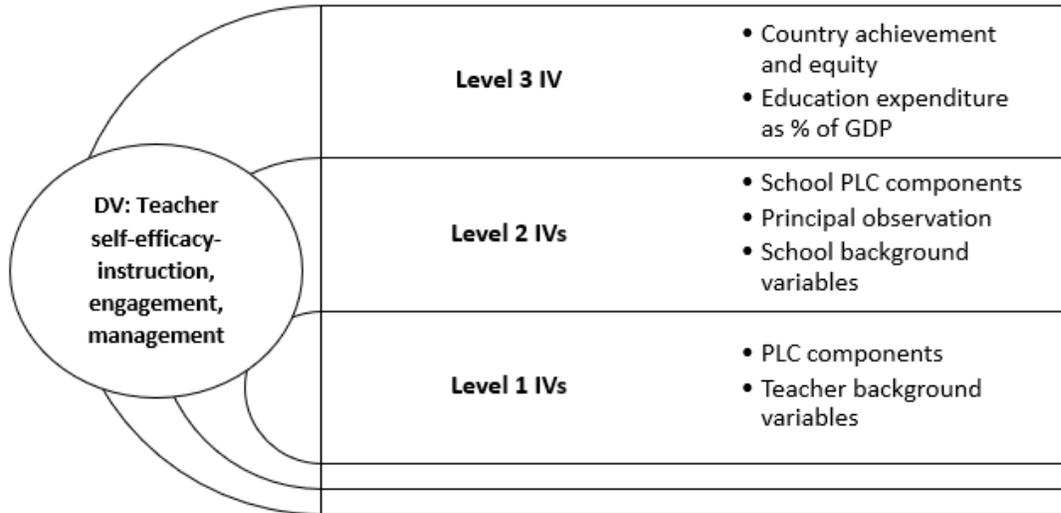
Figure 2 presents a conceptual model of the main effects that were tested. At the teacher level, PLC components served as indicators of horizontal social capital. Controlling for teacher gender and years of experience, factors associated with TSE in previous research (Fackler &

Malmberg, 2016), teacher PLC components were entered to predict TSE in three separate models: one for instruction, one for student engagement, and one for classroom management. It was hypothesized that higher levels of horizontal social capital would predict higher levels of TSE.

At the school level, after controlling for principal instructional leadership, school enrollment, and percentage of students from disadvantaged homes, principal observation and feedback, the vertical social capital indicator in the study, was entered as a predictor of TSE. It was hypothesized that more frequent principal observations and feedback would predict higher levels of TSE. Additionally, PLC components aggregated to the school level were entered as new school level PLC constructs. It was hypothesized that they would have a significant and positive impact on TSE outcomes, and that coefficients would add distinct contributions to the model. Finally, a third-level country variable was added, country achievement and equity. This variable was entered as an interaction variable to test the hypothesis that the relationships between social capital reforms and TSE would not be impacted by a country's designation as a high achieving, high equity country.

Figure 2.

Conceptual model of main effects



Procedures

In the TALIS 2013 data set used for this study, teachers are nested in schools, which are nested in countries. A statistical model needs to account for the nested data, as well as the teacher, school, and country level effects on TSE (Snijders & Boskar, 2012). Therefore, HLM version 7 software (Raudenbush, Bryk, Cheong, & DuToit, 2011) was used to construct the three-level hierarchical models for this study. Most of the research on PLCs has not considered the nested effects of teachers situated in schools, a flaw that has been discussed by other researchers (Fackler & Malmberg, 2015). Ignoring the nested structure of the TALIS data could result in inflated Type 1 error rates and violate the assumption of errors (Raudenbush & Bryk, 2002; Snijders & Boskar, 2012). Therefore, using HLM gives the researcher some flexibility; the assumption of independent errors is not required, as multi-level models allow the researcher to account for the relationships between errors (Field, 2014; Raudenbush & Bryk, 2002). The

multi-level models for this study, therefore, accounted for the fact that teachers in a school may be more like one another than they are like teachers in other schools. HLM also allows the researcher to estimate teacher, school, and country variance simultaneously, while maintaining distinct levels of the predictors (Raudenbush & Bryk, 2002). As the proposed study is cross-national and used data from a large-scale assessment, there were additional considerations that had to be accounted for before conducting the data analysis (Rutkowski et al., 2010). For instance, using non-weighted samples can lead to severely biased results. Therefore, sampling weights were used to accommodate for the fact that teachers and schools in the TALIS survey were selected with differing probabilities (OECD, 2013d). Each database in TALIS comes with the appropriate set of weights for school-level and teacher-level analyses (Rutkowski et al., 2010). In preparing the data for the HLM models, the International Database (IDB) Analyzer software was used in conjunction with SPSS. The IDB Analyzer allows the user to merge files by generating SPSS syntax that considers the sampling weights used in TALIS, which, in turn, computes the standard errors associated with the dataset (OECD, 2013c). Missing data for all relevant variables was recoded as “SYSMIS” in SPSS. Additionally, HLM 7 accounts for missing data when developing syntax for the hierarchical models. To ensure that all models for this study included the same number of cases, missing data was deleted when creating the syntax file for the models, rather than when running each analysis.

In setting up the multi-level models for the study, a bottom-up approach was used, with parameters added first at the teacher level, then at the school level, and, finally, at the country level. Because there were no model comparisons specified, the default restricted maximum likelihood (REML) estimation method was selected (Raudenbush & Bryk, 2002). The final model included level-1, level-2, and level-3 variables, and added an interaction effect of country

achievement and equity at level-3 to determine its potential impact on the relationships between school level PLC components and TSE outcomes. Woltman et al. (2012) provided a useful framework for analyzing hierarchical data using HLM, which was used as guide to build the models below.

Fully unconditional model. A one-way ANOVA was performed in HLM to determine whether the variances in level-2 (school level) and level-3 (country level) were significantly different than 0, when no predictors were specified. If there were no variance at level-2 or level-3, HLM would be unnecessary. The intraclass correlation coefficient (ICC) was then calculated to determine how much overall variance could be accounted for at level-1, level-2, and level-3.

Level-1 predictor model. This model tested the relationship between the level-1 independent variables and the outcome variables, which are considered at level-1 in multi-level analyses: TSE in instruction, student engagement, and classroom management. Regression coefficients (π) and their significance ($p < .05$) identify potential relationships between independent level-1 variables and the three outcomes variables for TSE. An effect size (R^2) was then calculated to explain the amount of variance in the dependent variables that could be explained by the level-1 independent variables. Centering involves rescaling predictor variables so that a value of 0 can be interpreted in a meaningful way (Peugh, 2009). Therefore, the main level-1 PLC component variables were group mean centered. Centering around the group means of level-1 predictors also helps with problems of multicollinearity (Scientific Software International, 2016), which was a concern given the five predictors are distinct components of the same overall PLC construct.

Level-2 predictor model. This model tested the relationships between the level-2 independent variables and the outcome variables for TSE. Regression coefficients (β) and their

significance ($p < .05$) were used to confirm potential relationships between independent level-2 variables and TSE outcome variables. An effect size (R^2) was calculated to explain the amount of variance in the dependent variables that could be explained by the level-2 independent variables after controlling for level-1 variables. Principal instructional leadership was grand mean centered at level-2, since a value of 0 in the index is not meaningful. School level PLC components were group centered for the reasons stated above.

Level-3 predictor model. This model tested whether the relationship between school level PLC components and TSE varied by country after controlling for education expenditure as a percent of GDP. No linear relationships between the level-3 predictors and TSE outcomes were hypothesized. An effect size (R^2) was calculated to explain the amount of variance in the dependent variable that could be explained by the level-3 independent variables after controlling for level-1 and level-2 variables. Education expenditure as a percent of GDP and country achievement and equity are dichotomous variables and were, therefore, not centered in HLM.

Full random coefficient model. This model included level-1 through level-3 predictor models, as well as an interaction effect of country achievement and equity on the relationships between school aggregate PLC components and TSE outcomes. In other words, the interaction effect was modeled on the slopes between school level PLC variables and the TSE outcome variables.

The model specifications for the final model, which encompasses the previous models, is delineated below. In the level-1 model, TSE_{ijk} is the expected outcome in three measures of TSE in instruction, student engagement, and classroom management for the i th teacher in the j th school in the k th country. π_{0jk} is the intercept for each j th school in the k th country, π_{1jk} through π_{7jk} are the level-1 regression coefficients (teacher effects) on TSE_{ijk} , and e_{ijk} is the teacher level

residual. The level-2 model uses the intercept from the level-1 model as a dependent variable, for which β_{00k} is the average TSE_{ijk} score across schools and β_{01k} through β_{09k} are the level-2 coefficients (school effects) on TSE_{ijk} . The error term in the level-2 model is r_{0jk} . Finally, the level-3 model adds two predictors, γ_{001} , which is the effect of country achievement and equity on TSE_{ijk} ; and γ_{002} , the effect of education expenditure as a percent of GDP. Five additional fixed effects are included in the level-3 model, γ_{051} through γ_{091} , which represent the effects of country achievement and equity on the slopes between school aggregate PLC components and TSE outcomes. The error terms in the level-3 model are μ_{00k} and μ_{05k} through μ_{09k} . It is important to note that in the full random coefficient model, the teacher level predictors are controlled in the estimation of school level and country level effects and are, therefore, statistically independent from them (Raudenbush & Bryk, 2002).

Fully Unconditional Model

Level-1 Model: TSE_{ijk} (*instruction, student engagement, classroom management*) = $\pi_{0jk} + e_{ijk}$

Level-2 Model: $\pi_{0jk} = \beta_{00k} + r_{0jk}$

Level-3 Model: $\beta_{00k} = \gamma_{000} + u_{00k}$

Mixed Model: $TSE_{ijk} = \gamma_{000} + r_{0jk} + u_{00k} + e_{ijk}$

Level-1 Model

$$TSE_{ijk} = \pi_{0jk} + \pi_{1jk}*(DIALOG_{ijk}) + \pi_{2jk}*(FOCUS_{ijk}) + \pi_{3jk}*(PURPOSE_{ijk}) + \pi_{4jk}*(DEPRIV_{ijk}) + \pi_{5jk}*(COLLAB_{ijk}) + \pi_{6jk}*(GENDER_{ijk}) + \pi_{7jk}*(YRSEXP_{ijk}) + e_{ijk}$$

Level-2 Model

$$\pi_{0jk} = \beta_{00k} + \beta_{01k}*(SCHOOLSES_{jk}) + \beta_{02k}*(ENROLL_{jk}) + \beta_{03k}*(INSTLDR_{jk}) + \beta_{04k}*(OBSERVE_{jk}) + \beta_{05k}*(DIALOG_M_{jk}) + \beta_{06k}*(FOCUS_M_{jk}) + \beta_{07k}*(PURPOSE_M_{jk}) + \beta_{08k}*(DEPRIV_M_{jk}) + \beta_{09k}*(COLLAB_M_{jk}) + r_{0jk}$$

$$\pi_{1jk} = \beta_{10k}$$

$$\pi_{2jk} = \beta_{20k}$$

$$\pi_{3jk} = \beta_{30k}$$

$$\pi_{4jk} = \beta_{40k}$$

$$\pi_{5jk} = \beta_{50k}$$

$$\pi_{6jk} = \beta_{60k}$$

$$\pi_{7jk} = \beta_{70}$$

Level-3 Model

$$\beta_{00k} = \gamma_{000} + \gamma_{001}(ACHEQU_k) + \gamma_{002}(EXPGDP_k) + u_{00k}$$

$$\beta_{01k} = \gamma_{010}$$

$$\beta_{02k} = \gamma_{020}$$

$$\beta_{03k} = \gamma_{030}$$

$$\beta_{04k} = \gamma_{040}$$

$$\beta_{05k} = \gamma_{050} + \gamma_{051}(ACHEQU_k) + u_{05k}$$

$$\beta_{06k} = \gamma_{060} + \gamma_{061}(ACHEQU_k) + u_{06k}$$

$$\beta_{07k} = \gamma_{070} + \gamma_{071}(ACHEQU_k) + u_{07k}$$

$$\beta_{08k} = \gamma_{080} + \gamma_{081}(ACHEQU_k) + u_{08k}$$

$$\beta_{09k} = \gamma_{090} + \gamma_{091}(ACHEQU_k) + u_{09k}$$

$$\beta_{10k} = \gamma_{100}$$

$$\beta_{20k} = \gamma_{200}$$

$$\beta_{30k} = \gamma_{300}$$

$$\beta_{40k} = \gamma_{400}$$

$$\beta_{50k} = \gamma_{500}$$

$$\beta_{60k} = \gamma_{600}$$

$$\beta_{70k} = \gamma_{700}$$

Combined Model

$$\begin{aligned} TSE_{ijk} = & \gamma_{000} + \gamma_{001} * ACHEQU_k + \gamma_{002} * EXPGDP_k + \gamma_{010} * SCHOOLSE_{jk} + \gamma_{020} * ENROLL_{jk} + \\ & \gamma_{030} * INSTLDR_{jk} + \gamma_{040} * OBSERVE_{jk} + \gamma_{050} * DIALOG_M_{jk} + \gamma_{051} * DIALOG_M_{jk} * ACHEQU_k + \\ & \gamma_{060} * FOCUS_ME_{jk} + \gamma_{061} * FOCUS_M_{jk} * ACHEQU_k + \gamma_{070} * PURPOSE_{jk} + \\ & \gamma_{071} * PURPOSE_{jk} * ACHEQU_k + \gamma_{080} * DEPRIV_M_{jk} + \gamma_{081} * DEPRIV_M_{jk} * ACHEQU_k + \\ & \gamma_{090} * COLLAB_M_{jk} + \gamma_{091} * COLLAB_M_{jk} * ACHEQU_k + \gamma_{100} * DIALOG_{ijk} + \gamma_{200} * FOCUS_{ijk} + \\ & \gamma_{300} * PURPOSE_{ijk} + \gamma_{400} * DEPRIV_{ijk} + \gamma_{500} * COLLAB_{ijk} + \gamma_{600} * GENDER_{ijk} + \gamma_{700} * YRSEXP_{ijk} + \\ & r_{0jk} + u_{00k} + u_{05k} * DIALOG_M_{jk} + u_{06k} * FOCUS_ME_{jk} + u_{07k} * PURPOSE_{jk} + u_{08k} \\ & * DEPRIV_M_{jk} + u_{09k} * COLLAB_M_{jk} + e_{ijk} \end{aligned}$$

Data Analysis Plan

To begin, the analysis will present cross-national descriptive statistics, which help orient the reader to the main predictor variables that were in later analyses. Descriptive statistics at the teacher, school, and country levels, variables which represent the contextual effects of teacher background, as well as the school environment, will also be presented. Control variables for the teacher level included gender and years of experience; contextual variables for the school level included school enrollment and school socioeconomic status (SES); and the contextual variable for the country level was education expenditure as a percent of GDP. These factors account for potential variation that may not be related to the main independent variables.

The main inferential statistical analysis used was HLM. With HLM, “each of the levels in the structure is formally represented by its own sub-model. These sub-models express

relationships among variables within a given level, and specify how variables at one level influence relations occurring at another” (Bryk & Raudenbush, 1992, p. 4). As discussed above, HLM is an appropriate means to examine data related to teaching and learning at the three levels. It is also useful in investigating the relationships within and between hierarchical levels of grouped data and accounting for the variances among variables at different levels (Woltman et al., 2012). Multi-level models, therefore, were constructed to estimate the impact of PLCs and principal observation and feedback on TSE in instruction, student engagement, and classroom management.

The results section will include a correlation matrix to show support for the hypotheses that PLC component variables (level-1), and principal observation and feedback and school aggregate PLC components (level-2) are positively related to TSE. Based on these preliminary findings, a multi-level analysis was run using the model specifications above.

Assumption testing. The results section will also include standard assumption tests for HLM, including assessing level-1 residuals for the final model for normality, assessing level-1 residuals versus the fitted values to determine homoscedasticity of variance, assessing the level-2 and level-3 residuals for the final model for normality, and assessing multicollinearity between predictor values at the same levels.

Fully unconditional model. The first step in the multi-level analysis was to run the fully unconditional model in HLM, which contained no predictors. This not only provided a base model for comparison against subsequent models, but estimated how much variance in the outcome variables was accounted for at the teacher level (level-1), the school level (level-2), and the country level (level-3). A statistically insignificant proportion of the variance at level-2 or level-3 would have indicated that multi-level modelling was unnecessary. The fully

unconditional model was run three times, once for each outcome variable—TSE in instruction, student engagement, and classroom management. To determine the proportions of variance accounted for at each level in each of the three models, an ICC was calculated for level-2 ($ICC = \tau_{\pi} / \tau_{\beta} + \tau_{\pi} + \sigma^2$) and level-3 ($ICC = \tau_{\beta} / \tau_{\beta} + \tau_{\pi} + \sigma^2$).

Level-1, within-schools model. The next step in the multi-level analysis was to build the level-1 model using teacher level variables as predictors of TSE in instruction, student engagement, and classroom management. The level-1 model was designed to answer the following research question and hypothesis:

RQ1: How does horizontal social capital between teachers accrued through the five PLC components—reflective dialogue collective focus on student learning, shared sense of purpose, deprivatized practice, and collaborative professional activity—impact TSE in instruction, student engagement, and classroom management?

H1: The five PLC components, as measures of horizontal social capital, will make distinct contributions to the models and will significantly and positively predict TSE in instruction, engagement, and classroom management.

The main research predictors are the five PLC components, and control variables include gender and years of teaching experience. The results of the level-1 models for each TSE outcome will be presented in a table and will identify significant predictors for TSE (e.g., gender [$\tau_{1jk} = --; t(--)=--, p < .---$]). The amount of variance accounted for by level-1 variables will also be presented ($R^2 = \sigma^2_{FUM} - \sigma^2_{NEW} / \sigma^2_{FUM}$).

Level-2, between-schools model. In the level-2 analysis, the between-school models, the variations in average levels of TSE in instruction, student, engagement, and classroom

management are explained by the joint effects of the level-1 and level-2 variables. This model addressed the following research questions and hypotheses:

RQ2: How does vertical social capital between teachers and principals accrued through principal observations and feedback impact TSE in instruction, student engagement, and classroom management?

H2: Principal observation and feedback, as a measure of vertical social capital, will significantly and positively predict TSE in instruction, engagement, and classroom management.

RQ3: How does horizontal social capital between teachers accrued through the five PLC components—reflective dialogue, collective focus on student learning, shared sense of purpose, deprivatized practice, and collaborative professional activity—aggregated at the school level, impact TSE in instruction, student engagement, and classroom management?

H3: The five PLC components, aggregated at the school level, as a measures of school level horizontal social capital, will make distinct contributions to the models and will significantly and positively predict TSE in instruction, engagement, and classroom management.

Principal instructional leadership, school enrollment, and percentage of students from disadvantaged homes were added as control variables. The main level-2 variable of interest used as an indicator of vertical social capital, principal observation and feedback, was also entered at level-2. Additionally, school level PLC components, as measures of school level horizontal social capital, were analyzed. The results of the level-2 models for each TSE outcome will be

presented in a table (e.g., enrollment [$\beta_{01k} = \dots$; $t(\dots) = \dots$, $p = \dots$]). The amount of variance accounted for by level-2 variables will also be presented ($R^2 = \tau_{\pi \text{ FUM}} - \tau_{\pi \text{ NEW}} / \tau_{\pi \text{ FUM}}$).

Level-3, between-countries model and full random coefficients model. The level-3 models tested whether the relationships between school level PLC aggregates and TSE varied by country after controlling for education expenditure as a percent of GDP. No linear relationship between the level-3 predictors and TSE outcomes was hypothesized, but the slopes between PLC components and TSE were permitted to vary by country. Country achievement and equity was entered as an interaction effect on the slopes that did vary by country. Specifically, the level-3 model and full random coefficients model tested the following research question and hypothesis:

RQ4: Does the relationship between social capital reforms and TSE in instruction, student engagement, and classroom management vary by country and, if so, does country achievement and equity impact these relationships?

H4: The relationships between school level PLC components and TSE in instruction, engagement, and classroom management will vary significantly by country, but will not be impacted by country achievement and equity.

An effect size (R^2) will be presented to explain the amount of variance in the dependent variables that is accounted for by the level-3 predictor variables. The results of the level-3 models for each TSE outcome will be also be presented (e.g., enrollment [$\gamma_{001} = \dots$; $t(\dots) = \dots$, $p = \dots$]), including the amount of variance accounted for by level-3 variables ($R^2 = \tau_{\beta \text{ FUM}} - \tau_{\beta \text{ NEW}} / \tau_{\beta \text{ FUM}}$).

Conclusion

This chapter delineated the methodology for this study and provided a rationale for the use of multi-level analyses. The independent and dependent measures used in the study,

including the OECD created indices, as well the indices that were constructed to delineate PLC components specific to this research were presented. Next, the research design, model building procedures, and model equations were explained. Finally, a data analysis plan was offered for the teacher, school, and country level models in relation to each of the study's proposed hypotheses.

Chapter Four: Results

Introduction

In the TALIS 2013 data set for the 31 countries that comprise the international model in this study, teachers are nested in schools, which are nested in countries. To account for this hierarchical data, HLM models were created to examine teacher, school, and country level effects on TSE in instruction, student engagement, and classroom management. The level-1 predictor model examined the relationship between teacher perceptions of five distinct PLC components, as measures of horizontal social capital, and TSE outcomes. The level-2 model tested whether the vertical social capital indicator, principal observation and feedback, had any significant impact on TSE outcomes. Additionally, teacher level PLC components were aggregated to the school level, creating new level-2 PLC variables, which were also examined in relation to TSE.

The level-3 predictor model considered the fixed effect, country achievement and equity. Although there was no hypothesized relationship with TSE outcomes, it was considered an interaction effect in the final model. First, however, the full random coefficient model allowed the slopes to vary to determine whether the relationships between school level PLC components and TSE outcomes varied significantly by country. Subsequently, the variable country achievement and equity was entered as an interaction effect to determine whether it accounted for any potential variance in these relationships.

The results section presents findings as they pertain to each research question and hypothesis. To begin, descriptive statistics will be presented for each variable in the study, as well as correlations between all predictor variables and TSE outcome variables. Next, results from the fully unconditional models, which measure the proportion of variance in TSE outcomes

at each of the three levels, will be presented. Finally, the results for the HLM models pertaining to each research question and hypothesis will be delineated, including effect sizes that measure how much variance in TSE outcomes is accounted for by the combined statistically significant predictors at each level.

Preliminary Statistical Analyses

Table 4 provides the descriptive statistics for all level-1, level-2, and level-3 predictors, and for the three outcome variables, which are specified as level-1 variables in HLM.

Table 4

International Descriptive Statistics for Level-1, Level-2, and Level-3 Variables

Variables	N	Mean	SD	Min	Max
<i>Level-1 teacher level statistics</i>					
TSE instruction	98,996	12.50	2.01	2.95	15.87
TSE engagement	98,996	12.01	2.02	3.80	15.38
TSE management	98,996	12.80	1.99	3.97	15.69
Reflective dialogue	85,001	2.64	.80	1.00	4.00
Collective focus on learning	85,944	3.35	.62	1.00	4.00
Shared sense of purpose	98,214	2.85	.63	1.00	4.00
Deprivatized practice	98,240	.23	.42	0.00	1.00
Collaborative activity	99,089	11.18	2.09	4.77	15.95
Gender	102,430	.68	.47	0.00	1.00
Years teaching experience	95,860	16.19	10.39	0.00	58.00
<i>Level-2 school level statistics</i>					
School SES	5,934	.32	.29	0.00	1.00
School enrollment	5,927	656.03	491.98	0.00	4,335
Principal observation and feedback	5,953	2.54	.81	1.00	4.00
Instructional leadership	5,972	11.14	1.96	5.07	15.10
Mean reflective dialogue	6,323	2.64	.42	1.00	4.00
Mean collective focus on learning	6,323	3.34	.32	1.80	4.00
Mean shared sense of purpose	6,330	2.86	.32	1.00	4.00
Mean deprivatized practice	6,329	.23	.19	0.00	1.00
Mean collaborative activity	6,332	11.12	1.27	5.60	15.41
<i>Level-3 country level statistics</i>					

Education expenditure as % of GDP	31	.46	.50	0.00	1.00
Achievement and equity	31	.38	.47	0.00	1.00

Correlations in Table 5 show partial support for the hypothesis that teacher level PLC components would be significant predictors of TSE outcomes. Reflective dialogue, collective focus on student learning, shared sense of purpose, and collaborative professional activity are significantly and positively associated with TSE in instruction, student engagement, and classroom management. Only one PLC component, deprivatized practice, is significant and negatively associated with the three TSE outcomes. The five PLC components were aggregated to the school level to create school mean variables for each. Four of the PLC components at the school level are significantly and positively associated with TSE outcomes, with deprivatized practice maintaining a significant and negative association. Correlations between the vertical social capital indicator, principal observation and feedback, and TSE outcomes are also significant and positive, providing partial support for the hypothesized relationship. Finally, although there was no hypothesized direct relationship between the level-3 predictor, country achievement and equity, and TSE outcomes, a significant and negative association between them was found. In summary, apart from deprivatized practice at the teacher and school levels, all PLC predictors showed positive and significant correlations with TSE in instruction, student engagement, and classroom management.

Table 5

Summary of Bivariate Correlations Between Teacher, School, and Country Level Variables and TSE Outcomes

Variables	TSE in instruction	TSE in student engagement	TSE in classroom management
<i>Country level indicators</i>			
Educational expenditure as % of GDP	.07***	.10***	.09***
Achievement and equity	-.30***	-.28***	-.19***
<i>School level indicators</i>			
School SES	.11***	.15***	.07***
Enrollment	.15***	.19***	.09***
Instructional leadership	.14***	.17***	.11***
Principal observation	.02***	.03***	.04***
Mean reflective dialogue	.11***	.17***	.08***
Mean collective focus	.25***	.27***	.20***
Mean shared purpose	.07***	.06***	.08***
Mean deprivatized practice	-.13***	-.11***	-.12***
Mean collaborative activity	.07***	-.01	.07***
<i>Teacher level indicators</i>			
Gender	.07***	.06***	.05***
Years of experience	.03***	.04***	.07***
Reflective dialogue	.21***	.24***	.17***
Collective focus	.23***	.27***	.23***
Shared purpose	.13***	.14***	.13***
Deprivatized practice	-.04***	-.04***	-.05***
Collaborative activity	.21***	.15***	.18***

Note. * $p < .05$, ** $p < .001$, *** $p < .001$

Multicollinearity between PLC components. Although few studies have tested the individual effects of PLC components on teacher outcomes, researchers have suggested that such studies are warranted given the multidimensionality of PLCs (Sleegers et al., 2013). Potential multicollinearity was considered, however, given that the five PLC components are part of the same overall construct and could have represented highly overlapping concepts. An initial test for multicollinearity included bivariate correlations between independent variables, with values above .8 generally considered problematic for regression models (Newton & Rudestam, 2013). Prior to running the HLM models, therefore, bivariate correlations were run between each of the PLC components, with results indicating no significant correlations above .5 (see Appendix A,

Table 12). Additionally, prior to running the full models in HLM, test analyses were conducted for each TSE outcome. PLC predictors were entered one at a time into the test models, to determine changes in their coefficients and standard errors. Yu, Jiang, and Land (2015) suggested that inflated standard errors, as predictors are added, could indicate problems with multicollinearity. As each PLC component was added to the test models, standard errors remained relatively constant (see Appendix B, Tables 13-15), indicating no problems with multicollinearity. Based on these preliminary findings, multi-level analyses were run using the model specifications delineated in Chapter 3.

Fully Unconditional Model

The first step in the multi-level analysis was to run the fully unconditional model in HLM, which contained no predictors. This not only provided a base model for comparison against subsequent models, but estimated how much variance in the outcome variables was accounted for at the teacher level (level-1), school level (level-2), and country level (level-3). A statistically nonsignificant proportion of the variance accounted for at level-2 or level-3 would indicate that multi-level modeling was unnecessary (Woltman et al., 2012). The fully unconditional model was run three times, once for each outcome variable: TSE in instruction, student engagement, and classroom management. In all three models, there was a significant portion of variance accounted for at level-2: TSE in instruction ($\chi^2(5771) = 7918.79, p < .001$), TSE in student engagement ($\chi^2(5771) = 7982.23, p < .001$), and TSE in classroom management ($\chi^2(5771) = 7493.26, p < .001$). There was also a significant portion of variance accounted for at level-3: TSE in instruction ($\chi^2(30) = 22344.61, p < .001$), TSE in student engagement ($\chi^2(30) = 30883.56, p < .001$), and TSE in classroom management ($\chi^2(30) = 13409.77, p < .001$). Thus, the fact that teachers are nested in schools, which are nested in countries, resulted in a significant

portion of variance that was accounted for at level-2 and level-3 for all three outcome variables, signaling that hierarchical linear modeling was an appropriate methodological choice.

Variance in TSE in instruction. To determine the proportions of variance accounted for at each level in each of the three models, an interclass correlation coefficient (ICC) was calculated at level-1 ($ICC = \sigma^2 / (\tau_\beta + \tau_\pi + \sigma^2)$), level-2 ($ICC = \tau_\pi / (\tau_\beta + \tau_\pi + \sigma^2)$), and level-3 ($ICC = \tau_\beta / (\tau_\beta + \tau_\pi + \sigma^2)$). The fully unconditional model for TSE in instruction resulted in the following ICC values: level-1 ICC = .699, level-2 ICC = .020, and level-3 ICC = .281. Thus, 69.9% of the variance in TSE in instruction was accounted for at the teacher level, 2% was accounted for at the school level, and 28.1% was accounted for at the country level.

Variance in TSE in student engagement. The fully unconditional model for TSE in student engagement resulted in the following ICC values: level-1 = .639, level-2 = .020, and level-3 = .341. Thus, 63.9% of the variance in TSE in student engagement was accounted for at the teacher level, 2% was accounted for at the school level, and 34.1% was accounted for at the country level.

Variance in TSE in classroom management. The fully unconditional model for TSE in classroom management resulted in the following ICC values: level-1 = .797, level-2 = .019, level-3 = .184. Thus, 79.7% of the variance in TSE in classroom management was accounted for at the teacher level, 1.9% was accounted for at the school level, and 18.4% was accounted for at the country level.

Despite the significant level-2 variance accounted for in each model, far less variance in TSE in instruction, student engagement, and classroom management was found between schools compared to within schools and within countries. Level-2 variance was approximately 2% in all three models. The small proportion of variance of TSE between schools is of the same

magnitude as other studies that measured TSE in an international context (Vieluf, 2013), yet remains an important component of the organizational structure of a school that should be modeled (Fackler & Malmberg, 2016).

Results for Research Question 1

Research question 1. How does horizontal social capital between teachers accrued through the five PLC components—reflective dialogue, collective focus on student learning, shared sense of purpose, deprivatized practice, and collaborative professional activity—impact TSE in instruction, student engagement, and classroom management?

Hypothesis 1. The five PLC components, as measures of horizontal social capital, will make distinct contributions to the models and will significantly and positively predict TSE in instruction, engagement, and classroom management.

Level-1 assumption tests. Residual files were created in HLM and checked for violations at level-1 using SPSS. The assumption for normality of level-1 residuals was upheld for TSE in instruction (skewness = -.03; kurtosis = -.02); TSE in student engagement (skewness = -.02; kurtosis = -.03); and TSE in classroom management (skewness = -.26; kurtosis = -.15). All values fell within the acceptable range of -2 to +2 (Field, 2014). Additionally, visual inspections of histograms created in SPSS confirmed the normality of level-1 residuals. The assumption of homoscedasticity of level-1 residuals was also upheld. Plots of level-1 residuals (L1RESID) against predicted scores in TSE (L1FITVAL) revealed no strong structure or patterns in the residuals, indicating that the spread of residuals was relatively constant (Field, 2014).

Results for level-1 model: TSE in instruction. The next step in the multi-level analyses was to build the level-1 models using teacher level variables as predictors of TSE in instruction, student engagement, and classroom management. The main research predictors at level-1 were

teacher perceptions on the five PLC components: reflective dialogue, collective focus on student learning, shared sense of purpose, deprivatized practice, and collaborative professional activity. Control variables included gender and years of teaching experience. The results of the level-1 model for TSE in instruction are presented in Table 6.

Table 6

Summary of HLM Model for Fixed Effects of Social Capital Indicators on TSE in Instruction

Fixed effects	Coefficient	SE	<i>t</i> -ratio	<i>p</i> -value
<i>Country level indicators^a</i>				
Educational expenditure as % of GDP	1.05	.31	3.43	.002
Achievement and equity	-1.23	.34	-3.60	.001
Mean reflective dialogue slope	-.19	.12	-1.62	.117
Mean shared purpose slope	.02	.07	.23	.817
Mean deprivatized practice slope	-.10	.13	-.72	.475
Mean collaborative activity slope	-.01	.03	-.42	.677
<i>School level indicators^b</i>				
School SES	-.04	.03	-1.48	.140
Enrollment	.00	.00	.87	.385
Instructional leadership	.01	.00	1.40	.162
Principal observation	.01	.01	.99	.320
Mean reflective dialogue	.34	.06	5.62	<.001
Mean collective focus	.50	.05	9.96	<.001
Mean shared purpose	.05	.04	1.21	.237
Mean deprivatized practice	.11	.09	1.16	.257
Mean collaborative activity	.17	.02	8.65	<.001
<i>Teacher level indicators^c</i>				
Gender	.08	.03	2.39	.017
Years of experience	.01	.00	4.57	<.001
Reflective dialogue	.28	.03	8.08	<.001
Collective focus	.33	.02	17.66	<.001
Shared purpose	.18	.02	10.06	<.001
Deprivatized practice	-.07	.02	-4.36	<.001
Collaborative activity	.19	.01	14.55	<.001
Intercept	12.31	.26	47.68	<.001
<i>Random effects</i>				
	Variance component			
Level-3 intercept, u_{00k}	.74			<.001
Mean reflective dialogue, u_{05k}	.05			<.001
Mean collective focus, u_{06k}	.02			.176

Mean shared purpose, u_{07k}	.01	.050
Mean deprivatized practice, u_{08k}	.06	.008
Mean collaborative activity, u_{09k}	.00	<.001
Level-2 intercept, r_{0jk}	.06	<.001
Level-1 variance, e_{ijk}	2.51	

Note. ^a Country N = 31, ^b School N = 5802, ^c Teacher N = 72615

Significant predictors for TSE in instruction included gender ($\pi_{6jk} = .08$; $t(66620) = 2.39$, $p = .017$) and teaching experience ($\pi_{7jk} = .01$; $t(66620) = 4.57$, $p < .001$). After accounting for these variables, the following PLC component variables, representing horizontal social capital, were also significant and positive predictors of TSE in instruction: reflective dialogue ($\pi_{1jk} = .28$; $t(66620) = 8.08$, $p < .001$), collective focus on student learning ($\pi_{2jk} = .33$; $t(66620) = 17.66$, $p < .001$), shared sense of purpose ($\pi_{3jk} = .18$; $t(66620) = 10.06$, $p < .001$), and collaborative professional activity ($\pi_{5jk} = .19$; $t(66620) = 14.55$, $p < .001$). Deprivatized practice was a significant and negative predictor of TSE in instruction ($\pi_{4jk} = -.07$; $t(66620) = -4.36$, $p < .001$). Overall, the level-1 predictors accounted for approximately 11.1% of the variance in TSE in instruction within schools ($R^2 = \sigma^2_{\text{FUM}} - \sigma^2_{\text{NEW}} / \sigma^2_{\text{FUM}}$).

Independence of level-1 PLC coefficients. The Hausman test was used to determine whether the significant level-1 PLC coefficients were statistically different from one another, thus addressing potential concerns regarding multicollinearity between predictors, given they are components of the same overall PLC construct. A significant chi-squared value at $\alpha = .05$ would indicate that the coefficients are statistically different. Table 7 shows that the impact of teacher level reflective dialogue on TSE in instruction is statistically different from the impact of collective focus on student learning ($\chi^2 = 5.11$, $p = .024$), shared sense of purpose ($\chi^2 = 10.58$, $p = .001$), deprivatized practice ($\chi^2 = 141.96$, $p < .001$), and collaborative professional activity ($\chi^2 = 6.28$, $p = .012$). The only pairwise comparison that did not result in a significant difference

was between collaborative professional activity and shared sense of purpose ($\chi^2 = 1.88, p = .171$). Thus, although they are both positive predictors of TSE in instruction, no conclusion can be drawn regarding their relative impacts. Most of the coefficients for significant PLC components at level-1 are statistically different from one another; therefore, it is valid to argue that collective focus on student learning has a stronger positive association with TSE in instruction ($\pi = .33$), followed by reflective dialogue ($\pi = .28$) and collaborative professional activity ($\pi = .19$).

Table 7

Summary of Hausman Test Results for Independence of Teacher-Level PLC Coefficients: TSE in Instruction

<i>Level-1^a</i>		Dialog	Focus	Purpose	Depriv	Collab
Dialog	χ^2					
	p^b					
Focus	χ^2	5.11				
	p	.024				
Purpose	χ^2	10.58	329.39			
	p	.001	<.001			
Depriv	χ^2	141.96	2221.12	1818.94		
	p	<.001	<.001	<.001		
Collab	χ^2	6.28	100.63	1.875	-777.01	
	p	.012	<.001	.171	<.001	

^aTeacher N = 72615, ^b Significant p -values indicate that coefficients are statistically different from one another

Results for level-1 model: TSE in student engagement. The results of the level-1 model for the teacher effects on TSE in student engagement are presented in Table 8. Of the two control variables, only teaching experience ($\pi_{7jk} = .01; t(66620) = 6.59, p < .001$) was a significant predictor for TSE in student engagement. Teacher gender was not a significant predictor in this model ($\pi_{6jk} = .01; t(66620) = .50, p = .617$). After accounting for the control variables, the following PLC component variables that represented horizontal social capital were

found to be significant and positive predictors of TSE in student engagement: reflective dialogue ($\pi_{1jk} = .29$; $t(66620) = 11.67$, $p < .001$), collective focus on student learning ($\pi_{2jk} = .31$; $t(66620) = 17.12$, $p < .001$), shared sense of purpose ($\pi_{3jk} = .20$; $t(66620) = 10.94$, $p < .001$), and collaborative professional activity ($\pi_{5jk} = .16$; $t(66620) = 15.21$, $p < .001$). Again, deprivatized practice was a negative predictor of TSE in student engagement ($\pi_{4jk} = -.09$; $t(66620) = -6.04$, $p < .001$). Overall, the level-1 predictors accounted for approximately 11.9% of the variance in TSE in student engagement within schools ($R^2 = \sigma^2_{\text{FUM}} - \sigma^2_{\text{NEW}} / \sigma^2_{\text{FUM}}$).

Table 8

Summary of HLM Model for Fixed effects of Social Capital Indicators on TSE in Student Engagement

Fixed effects	Coefficient	SE	t-ratio	p-value
<i>Country level indicators^a</i>				
Educational expenditure as % of GDP	.92	.37	2.47	.020
Achievement and equity	-1.10	.41	-2.72	.011
Mean reflective dialogue slope	-.26	.09	-2.92	.007
Mean shared purpose slope	.06	.06	1.02	.315
Mean collaborative activity slope	-.01	.027	-.21	.835
<i>School level indicators^b</i>				
School SES	-.06	.02	-3.33	<.001
Enrollment	.00	.00	.66	.511
Instructional leadership	.00	.00	1.52	.128
Principal observation	.01	.01	1.33	.184
Mean reflective dialogue	.36	.04	8.60	<.001
Mean collective focus	.52	.04	11.80	<.001
Mean shared purpose	.07	.04	1.65	.109
Mean deprivatized practice	.07	.06	1.13	.269
Mean collaborative activity	.13	.02	8.81	<.001
<i>Teacher level indicators^c</i>				
Gender	.01	.03	.50	.617
Years of experience	.01	.00	6.59	<.001
Reflective dialogue	.29	.03	11.67	<.001
Collective focus	.31	.02	17.12	<.001
Shared purpose	.20	.02	10.94	<.001
Deprivatized practice	-.09	.02	-6.04	<.001
Collaborative activity	.16	.01	15.21	<.001

Intercept	11.85	.26	44.98	<.001
<i>Random effects</i>	<i>Variance component</i>			
Level-3 intercept, u_{00k}	.97			<.001
Mean reflective dialogue, u_{05k}	.02			.002
Mean collective focus, u_{06k}	.02			.140
Mean shared purpose, u_{07k}	.01			.026
Mean deprivatized practice, u_{08k}	.04			.054
Mean collaborative activity, u_{09k}	.00			.003
Level-2 intercept, r_{0jk}	.05			<.001
Level-1 variance, e_{ijk}	2.24			

Note. ^aCountry N = 31, ^bSchool N = 5802, ^cTeacher N = 72615

Independence of level-1 PLC coefficients. Table 9 shows the results of the pairwise comparisons of teacher level PLC coefficients using the Hausman test. The impact of teacher level reflective dialogue on TSE in student engagement was found to be statistically different from the impact of shared sense of purpose ($\chi^2 = 28.64, p < .001$), deprivatized practice ($\chi^2 = 268.64, p < .001$), and collaborative professional activity ($\chi^2 = 32.69, p = .012$). The only pairwise comparison that did not result in a significant difference was between reflective dialogue and collective focus on student learning ($\chi^2 = 1.88, p = .171$). Thus, although they are both positive predictors of TSE in student engagement, no conclusion can be drawn regarding their relative impacts. It is valid to argue, however that although reflective dialogue ($\pi = .29$) and collective focus on student learning ($\pi = .31$) may account for some of the same variance in the model, both have a stronger positive association with TSE in student engagement than shared sense of purpose ($\pi = .20$) and collaborative professional activity ($\pi = .16$).

Table 9

Summary of Hausman Test Results for Independence of PLC Coefficients: TSE in Engagement

<i>Level-1^a</i>	Dialog	Focus	Purpose	Depriv	Collab
Dialog	χ^2				

Focus	p^b				
	χ^2	1.08			
Purpose	p	.299			
	χ^2	28.64	321.11		
Depriv	p	<.001	<.001		
	χ^2	268.64	1640.50	635.56	
Collab	p	<.001	<.001	<.001	
	χ^2	32.69	110.84	6.76	508.03
	p	<.001	<.001	.009	<.001

Note. ^a Teacher N = 72615; ^b Significant p -values indicate that coefficients are statistically different from one another.

Results for level-1 model: TSE in classroom management. The results of the level-1 model for the teacher effects on TSE in classroom management are presented in Table 10. As was the case for control variables in the TSE in student engagement model, only teaching experience ($\pi_{7jk} = .02$; $t(66620) = 9.17$, $p < .001$) was a significant predictor for TSE in classroom management. Teacher gender was not a significant predictor in this model ($\pi_{6jk} = .00$; $t(66620) = -.01$, $p = .991$). After accounting for the control variables, the following PLC component variables, representing horizontal social capital, were significant and positive predictors of TSE in student engagement: reflective dialogue ($\pi_{1jk} = .20$; $t(66620) = 5.91$, $p < .001$), collective focus on student learning ($\pi_{2jk} = .33$; $t(66620) = 17.57$, $p < .001$), shared sense of purpose ($\pi_{3jk} = .17$; $t(66620) = 9.41$, $p < .001$), and collaborative professional activity ($\pi_{5jk} = .15$; $t(66620) = 14.51$, $p < .001$). Deprivatized practice remained a negative predictor in the TSE in classroom management model ($\pi_{4jk} = -.08$; $t(66620) = -4.53$, $p < .001$). Overall, the level-1 predictors accounted for approximately 7.6% of the variance in TSE in classroom management within schools ($R^2 = \sigma^2_{\text{FUM}} - \sigma^2_{\text{NEW}} / \sigma^2_{\text{FUM}}$).

Table 10

Summary of HLM Model for Fixed Effects of Social Capital Indicators on TSE in Classroom Management

Fixed effects	Coefficient	SE	t-ratio	p-value
<i>Country level indicators^a</i>				
Educational expenditure as % of GDP	.76	.29	2.61	.014
Achievement and equity	-.87	.30	-2.88	.008
Mean reflective dialogue slope	-.24	.12	-2.02	.052
Mean shared purpose slope	.09	.09	1.11	.275
Mean collaborative activity slope	-.03	.03	-1.12	.272
<i>School level indicators^b</i>				
School SES	-.05	.02	-2.84	.005
Enrollment	.00	.00	1.18	.238
Instructional leadership	.00	.00	.74	.462
Principal observation	.02	.01	1.88	.061
Mean reflective dialogue	.28	.05	5.65	<.001
Mean collective focus	.53	.05	10.59	<.001
Mean shared purpose	.05	.04	1.55	.131
Mean deprivatized practice	-.01	.06	-.18	.856
Mean collaborative activity	.13	.02	6.99	<.001
<i>Teacher level indicators^c</i>				
Gender	.00	.05	-.01	.991
Years of experience	.02	.00	9.17	<.001
Reflective dialogue	.20	.03	5.91	<.001
Collective focus	.33	.02	17.57	<.001
Shared purpose	.17	.02	9.41	<.001
Deprivatized practice	-.08	.02	-4.53	<.001
Collaborative activity	.15	.01	14.51	<.001
Intercept	12.77	.19	67.33	<.001
<i>Random effects</i>				
	Variance component			
Level-3 intercept, u_{00k}	.55			<.001
Mean reflective dialogue, u_{05k}	.05			<.001
Mean collective focus, u_{06k}	.01			.164
Mean shared purpose, u_{07k}	.01			.030
Mean deprivatized practice, u_{08k}	.02			.190
Mean collaborative activity, u_{09k}	.00			<.001
Level-2 intercept, r_{0jk}	.05			<.001
Level-1 variance, e_{ijk}	2.93			

Note. ^a Country N = 31, ^b School N = 5802, ^c Teacher N = 72615

Independence of level-1 PLC coefficients. Table 11 shows the results of the pairwise comparisons of teacher level PLC coefficients using the Hausman test. The impact of teacher-level reflective dialogue on TSE in classroom management is statistically different from the impact of collective focus on student learning ($\chi^2 = 23.57, p < .001$), deprivatized practice ($\chi^2 = 101.03, p < .001$), and collaborative professional activity ($\chi^2 = 2.24, p < .001$). The coefficient for shared sense of purpose and was not statistically different from the coefficients for reflective dialogue ($\chi^2 = 1.17, p = .280$) or collaborative professional activity ($\chi^2 = 1.17, p = .280$). Thus, although they are all positive predictors of TSE in student engagement, no conclusions can be drawn regarding their relative impacts. It is valid to argue, however, that although shared sense of purpose may account for some of the same variance as reflective dialogue and collaborative professional activity, collective focus on student learning ($\pi = .33$), with the largest coefficient in the model, has the strongest impact on TSE in classroom management followed by reflective dialogue ($\pi = .20$) and collaborative professional activity ($\pi = .15$).

Table 11

Summary of Hausman Test Results for Independence of PLC Coefficients: TSE in Classroom Management

<i>Level-1^a</i>		Dialog	Focus	Purpose	Depriv	Collab
Dialog	χ^2					
	p^b					
Focus	χ^2	23.57				
	p	<.001				
Purpose	χ^2	1.17	700.57			
	p	.280	<.001			
Depriv	χ^2	101.03	2323.35	17132.03		
	p	<.001	<.001	<.001		
Collab	χ^2	2.24	121.40	1.39	252.64	
	p	<.001	<.001	.230	<.001	

Note. ^a Teacher N = 72615; ^b Significant p -values indicate that coefficients are statistically different from one another

In summary, hypothesis 1 was partially confirmed. Four of the five PLC components at the teacher level—reflective dialogue, collective focus on student learning, shared sense of purpose, and collaborative professional activity—were significant and positive predictors of TSE in instruction, student engagement, and classroom management. Deprivatized practice was a significant and negative predictor of all three TSE outcomes.

Results for Research Question 2

In the level-2 analyses, the between school models, the variations in average levels of TSE in instruction, student engagement, and classroom management, are explained by the joint effects of the level-1 and level-2 variables. School enrollment and percentage of students from disadvantaged homes were added as control variables. Principal instructional leadership was also added to the model to determine whether principal leadership style impacted TSE outcomes. The main level-2 variable of interest used as an indicator of vertical social capital, the frequency of principal observations and feedback, was also entered at level-2.

Research question 2. How does vertical social capital between teachers and principals accrued through principal observations and feedback impact TSE in instruction, student engagement, and classroom management?

Hypothesis 2. Principal observation and feedback, as a measure of vertical social capital, will significantly and positively predict TSE in instruction, engagement, and classroom management.

Level-2 assumption tests. Residual files were created in HLM and checked for violations at level-2 using SPSS. The assumption for normality of empirical Bayes residuals of intercepts (EBINTRCPT1) was upheld at level-2 for TSE in instruction (skewness = .06; kurtosis = .72); TSE in student engagement (skewness = .08; kurtosis = .84); and TSE in classroom

management (skewness = -.10; kurtosis = .80). All values fell within the acceptable range of -2 to +2 (Field, 2014). Additionally, visual inspections of histograms created in SPSS confirmed the normality of level-2 residuals. The assumption of homoscedasticity of level-2 residuals was also upheld. Plots of empirical Bayes residuals of intercepts (EBINTRCPT1) against predicted scores in TSE outcomes (FVINTRCPT1) revealed no strong structure or patterns in the residuals, indicating that the spread of residuals was relatively constant (Field, 2014).

Results of the level-2 model: Principal observation and feedback and TSE in instruction. The results of the level-2 model for the school effects on TSE in instruction are presented in Table 6. None of the control variables at level-2 were significant predictors of TSE in instruction and, therefore, did not account for any of the variance in the model: school SES ($\beta_{01k} = -.04$; $t(5612) = -1.48$, $p = .140$), school enrollment ($\beta_{02k} = .00$; $t(5612) = .87$, $p = .385$), principal instructional leadership ($\beta_{03k} = .01$; $t(5612) = 1.40$, $p = .162$). After accounting for the control variables, the vertical social capital indicator in the study, principal observation and feedback was not a significant predictor of TSE in instruction ($\beta_{04k} = .01$; $t(5612) = .99$, $p = .320$).

Results of the level-2 model: Principal observation and feedback and TSE in student engagement. The results of the level-2 model for the school effects on TSE in student engagement are presented in Table 8. Percentage of students from economically disadvantaged homes was a significant negative predictor ($\beta_{01k} = -.06$; $t(5612) = -3.33$, $p < .001$). School enrollment, however, was not significant ($\beta_{02k} = .00$; $t(5612) = .66$, $p = .511$), nor was principal instructional leadership: ($\beta_{03k} = .00$; $t(5612) = 1.52$, $p = .128$). After accounting for the control variables, the vertical social capital indicator in the study, principal observation and feedback,

was not found to be a significant predictor of TSE in student engagement ($\beta_{04k} = .01$; $t(5612) = 1.33$, $p = .184$).

Results of the level-2 model: Principal observation and feedback and TSE in classroom management. The results of the level-2 model for the school effects on TSE in student engagement are presented in Table 10. The percentage of students from economically disadvantaged homes was a significant negative predictor in the TSE in classroom management model ($\beta_{01k} = -.05$; $t(5612) = -2.84$, $p = .005$). School enrollment, however, was not found to be significant ($\beta_{02k} = .00$; $t(5612) = 1.18$, $p = .238$), nor was principal instructional leadership ($\beta_{03k} = .00$; $t(5612) = .74$, $p = .462$). As was the case in the previous two level-2 models, principal observation and feedback, although approaching significance, was not a significant predictor of TSE in classroom management ($\beta_{04k} = .02$; $t(5612) = 1.88$, $p = .06$).

In summary, hypothesis 2 was not confirmed. Principal observation and feedback, as a measure of vertical social capital, was not a significant predictor for TSE in instruction, student engagement, or classroom management.

Results for Research Question 3

Each of the five PLC variables was aggregated to the school level to determine whether school average for each of the PLC components had an impact on TSE in instruction, student engagement, and classroom management. This was done, first, to control for source bias in the level-1 survey responses, as the possibility exists that teachers who reported higher levels of TSE may be more likely to report higher scores on their perceptions of PLC components.

Additionally, PLCs are school level constructs, so aggregating teachers' perceptions of these components at the school level could more accurately measure their impact on TSE outcomes (Vanblaere & Devos, 2016b).

Research question 3. How does horizontal social capital between teachers accrued through the five PLC components—reflective dialogue, collective focus on student learning, shared sense of purpose, deprivatized practice, and collaborative professional activity—aggregated at the school level, impact TSE in instruction, student engagement, and classroom management?

Hypothesis 3. The five PLC components, aggregated at the school level, as a measures of school level horizontal social capital, will make distinct contributions to the models and will significantly and positively predict TSE in instruction, engagement, and classroom management.

Results of the level-2 model: PLC aggregates and TSE in instruction. The results of the level-2 model for the PLC effects on TSE in instruction are presented in Table 6. Once aggregated to the school level, the following PLC component variables, as measures of school level horizontal social capital, were significant and positive predictors of TSE in instruction: reflective dialogue ($\beta_{05k} = .34$; $t(5762) = 5.62$, $p < .001$), collective focus on student learning ($\beta_{06k} = .50$; $t(5762) = 9.96$, $p < .001$), and collaborative professional activity ($\beta_{09k} = .17$; $t(5762) = 8.65$, $p < .001$). Shared sense of purpose ($\beta_{07k} = .05$; $t(5762) = 1.21$, $p = .237$) and deprivatized practice ($\beta_{08k} = .11$; $t(5762) = 1.16$, $p = .257$) were both nonsignificant predictors of individual TSE in instruction once aggregated to the school level. Given that three school level PLC variables were significant in the level-2 model for TSE in instruction, an effect size was calculated. Overall, the level-2 predictors accounted for approximately 33.02% of the variance in TSE in instruction between schools ($R^2 = \tau_{\pi \text{ FUM}} - \tau_{\pi \text{ NEW}} / \tau_{\pi \text{ FUM}}$).

Independence of level-2 PLC coefficients. To determine whether the three positive and significant school level PLC coefficients were statistically different from one another and that each made a unique contribution to TSE in instruction, pairwise comparisons were made using

the Hausman test. The impact of school level collective focus on TSE in instruction was statistically different from the impact of school level reflective dialogue ($\chi^2 = 21.89, p < .001$). Its impact was also statistically different from the impact of school level collaborative professional activity ($\chi^2 = 49.68, p < .001$). Additionally, the impact of reflective dialogue was statistically different from that of collaborative professional activity ($\chi^2 = 8.10, p = .004$). Given that the coefficients for significant PLC components at level-2 are statistically different from one another, it is valid to argue that collective focus on student learning ($\beta = .50$) has a stronger association with TSE in instruction, followed by reflective dialogue ($\beta = .34$) and collaborative professional activity ($\beta = .17$).

Results of the level-2 model: PLC aggregates and TSE in student engagement. The results of the level-2 model for the PLC effects on TSE in student engagement are presented in Table 8. Once aggregated to the school level, the following PLC component variables, as measures of school level horizontal social capital, were significant and positive predictors of TSE in student engagement: reflective dialogue ($\beta_{05k} = .36; t(5762) = 8.60, p < .001$), collective focus on student learning ($\beta_{06k} = .52; t(5762) = 11.80, p < .001$) and collaborative professional activity [$\beta_{09k} = .13; t(5762) = 8.81, p < .001$]. Shared sense of purpose ($\beta_{07k} = .07; t(5762) = 1.65, p = .109$) and deprivatized practice ($\beta_{08k} = .07; t(5762) = 1.13, p = .269$) were both nonsignificant predictors of TSE in student engagement once aggregated to the school level. Overall, the three significant level-2 predictors accounted for approximately 29.87% of the variance in TSE in student engagement between schools ($R^2 = \tau_{\pi \text{ FUM}} - \tau_{\pi \text{ NEW}} / \tau_{\pi \text{ FUM}}$).

Independence of level-2 PLC coefficients. Pairwise comparisons using the Hausman test indicated that the impact of school level collective focus on TSE in student engagement was statistically different from the impact of school level reflective dialogue ($\chi^2 = 156.37, p < .001$).

Its impact was also statistically different from the impact of school level collaborative professional activity ($\chi^2 = 89.35, p < .001$). Additionally, the impact of reflective dialogue was statistically different from that of collaborative professional activity ($\chi^2 = 33.48, p < .001$). Given that the coefficients for significant PLC components at level-2 were statistically different from one another, it is valid to argue that collective focus on student learning ($\beta = .52$) has a stronger association with TSE in student engagement, followed by reflective dialogue ($\beta = .36$) and then collaborative professional activity ($\beta = .13$).

Results of the level-2 model: PLC aggregates and TSE in classroom management.

The results of the level-2 model for the PLC effects on TSE in classroom management are presented in Table 10. Once aggregated to the school level, the following PLC component variables, as measures of school level horizontal social capital, were significant and positive predictors of TSE in classroom management: reflective dialogue ($\beta_{05k} = .28; t(5762) = 5.65, p < .001$), collective focus on student learning ($\beta_{06k} = .53; t(5762) = 10.59, p < .001$), and collaborative professional activity ($\beta_{09k} = .13; t(5762) = 6.99, p < .001$). Shared sense of purpose ($\beta_{07k} = .05; t(5762) = 1.55, p = .131$) and mean deprivatized practice ($\beta_{08k} = -.01; t(5762) = -.18, p = .856$) were both nonsignificant predictors of individual TSE in classroom management once aggregated to the school level. Overall, the three significant level-2 predictors accounted for approximately 28.37% of the variance in TSE in classroom management between schools ($R^2 = \tau_{\pi \text{ FUM}} - \tau_{\pi \text{ NEW}} / \tau_{\pi \text{ FUM}}$).

Independence of level-2 PLC coefficients. Pairwise comparisons using the Hausman test indicated that the impact of school level collective focus on TSE in classroom management was statistically different from the impact of school level reflective dialogue ($\chi^2 = 656.91, p < .001$). Its impact was also statistically different from the impact of school level collaborative

professional activity ($\chi^2 = 74.43, p < .001$). Additionally, the impact of reflective dialogue was statistically different from that of collaborative professional activity ($\chi^2 = 10.31, p = .001$). Given that the coefficients for significant PLC components at level-2 were statistically different from one another, it is valid to argue that collective focus on student learning ($\beta = .53$) has a stronger association with TSE in classroom management, followed by reflective dialogue ($\beta = .28$) and collaborative professional activity ($\beta = .13$).

In summary, hypothesis 3 was partially confirmed. Three of the five PLC components aggregated to the school level, reflective dialogue, collective focus on student learning, and collaborative professional activity, were significant and positive predictors of TSE in instruction, student engagement, and classroom management. Additionally, their coefficients were statistically different from one another, indicating that they each had a unique impact on TSE outcomes.

Results for Research Question 4

In the level-3 analyses, the between countries model, the variations in average levels of TSE in instruction, student, engagement, and classroom management are explained by the joint effects of the level-1, level-2, and level-3 variables. Additionally, the full random coefficients model tested whether the relationships between school level PLC components and TSE outcomes varied by country after controlling for the level-3 variable, education expenditure as a percent of GDP. No direct relationships between the level-3 predictors and TSE outcomes were hypothesized, but the slopes between school level PLC components and TSE were expected to vary by country. Accordingly, any significant variation could subsequently be modeled by adding an interaction effect in the level-3 model. To test hypothesis 4, therefore, country

achievement and equity was added as an interaction effect to determine its potential impact on the relationships between school level PLC components and TSE outcomes.

Research question 4. Do the relationships between school level PLC components and TSE in instruction, student engagement, and classroom management vary by country and, if so, does country achievement and equity impact these relationships?

Hypothesis 4. The relationships between school level PLC components and TSE in instruction, engagement, and classroom management will vary significantly by country, but will not be impacted by country achievement and equity.

Level-3 assumption tests. Residual files were created in HLM and checked for violations at level-3 using SPSS. The assumption for normality of empirical Bayes residuals of intercepts (EBINTRCPT1) was upheld at level-3 for TSE in instruction (skewness = .00; kurtosis = -.10); TSE in student engagement (skewness = -.46; kurtosis = -.38); and TSE in classroom management (skewness = -.43; kurtosis = .41). Next the additional five random effects at level-3 for each model were checked for normality. For TSE in instruction, all residuals met the assumption of normality: EBDIALOG (skewness = .49; kurtosis = .17); EBFOCUS (skewness = .43; kurtosis = .99); EBPURPOSE (skewness = -.20; kurtosis = -.86); EBDEPRIV (skewness = -.01; kurtosis = -.40); and EBCOLLAB (skewness = -.18; kurtosis = 1.01). All values fell within the acceptable range of -2 to +2 (Field, 2014). Additionally, visual inspections of histograms confirmed relatively normal distributions for level-3 random effects.

For TSE in student engagement, all random effect residuals met the assumption of normality: EBDIALOG (skewness = .30; kurtosis = -.43); EBFOCUS (skewness = .25; kurtosis = -.01); EBPURPOSE (skewness = -.22; kurtosis = -.15); EBDEPRIV (skewness = -.06; kurtosis = .06); and EBCOLLAB (skewness = .14; kurtosis = .01). All values fell within the acceptable

range of -2 to +2 (Field, 2014). Additionally, visual inspections of histograms confirmed relatively normal distributions for level-3 random effects.

For TSE in classroom management, most random effect residuals met the assumption of normality: EBDIALOG (skewness = .64; kurtosis = 3.44); EBFOCUS (skewness = .36; kurtosis = .34); EBPURPOSE (skewness = -.68; kurtosis = 3.64); EBDEPRIV (skewness = .62; kurtosis = -.18); and EBCOLLAB (skewness = .35; kurtosis = .67). The kurtosis values for EBDIALOG and EBPURPOSE were marginally beyond the acceptable range of -2 to +2. However, visual inspections of histograms confirmed relatively normal distributions for all random effects at level-3.

Finally, the assumption of homoscedasticity of level-3 residuals was also upheld. Plots of empirical Bayes residuals of random effects (EBINTRCPT1, EBDIALOG, etc.) against predicted scores in TSE outcomes (FVINTRCPT1, FVDIALOG, etc.) revealed no strong structure or patterns in the residuals, indicating that the spread of residuals was relatively constant (Field, 2014).

Results of level-3 predictor and full random coefficients models: TSE in instruction.

The results of the level-3 predictor model and the random coefficients model for the random and fixed effects on TSE in instruction are presented in Table 6. The control variable, education expenditure as a percent of GDP, was a significant and positive predictor for TSE in instruction ($\gamma_{002} = 1.05$; $t(28) = 3.43$, $p = .002$). Although there was no hypothesized relationship between country achievement and equity and TSE outcomes, results indicated a significant and negative relationship with TSE in instruction ($\gamma_{001} = -1.23$; $t(28) = -3.60$, $p = .001$). Overall, the level-3 predictors accounted for approximately 34.95% of the variance in TSE in instruction between countries ($R^2 = \tau_{\beta \text{ FUM}} - \tau_{\beta \text{ NEW}} / \tau_{\beta \text{ FUM}}$).

To test whether the relationship, or slopes, between the five school level PLC components and TSE in instruction varied by country, the significance levels of their respective variance components were analyzed at level-3. A significant chi-squared statistic would indicate that there is sufficient variance in slopes between countries that can be modeled. The relationships between four school level PLC components and TSE in instruction varied between countries: reflective dialogue ($\chi^2(29) = 76.42, p < .001$), shared sense of purpose ($\chi^2(29) = 42.50, p = .05$), deprivatized practice ($\chi^2(29) = 50.76, p = .008$), and collaborative professional practice ($\chi^2(29) = 64.15, p < .001$). The relationship between collective focus on student learning and TSE in instruction did not vary significantly by country ($\chi^2(30) = 37.05, p = .176$).

Since the slopes for four PLC components and TSE in instruction varied by country, the fixed effect, country achievement and equity, was entered as an interaction term at level-3 to determine whether it significantly impacted these slopes. Country achievement and equity was not a significant predictor of the slopes for reflective dialogue ($\gamma_{051} = -.19; t(29) = -1.62, p = .117$), shared sense of purpose ($\gamma_{071} = .02; t(29) = .23, p = .817$), deprivatized practice ($\gamma_{081} = -.10; t(29) = -.72, p = .475$), or collaborative professional practice ($\gamma_{091} = -.01; t(29) = -.42, p = .677$).

Results of level-3 predictor and full random coefficients models: TSE in student engagement. The results of the level-3 predictor model and the random coefficients model for the random and fixed effects on TSE in student engagement are presented in Table 8. The control variable educational expenditure as a percent of GDP was a significant and positive predictor in TSE in student engagement ($\gamma_{002} = .92; t(28) = 2.47, p = .020$). Although there was no hypothesized relationship between country achievement and equity and TSE, results indicated a significant and negative relationship with TSE in student engagement ($\gamma_{001} = -1.10; t(28) = -$

2.72, $p = .011$). Overall, the level-3 predictors accounted for approximately 28% of the variance in TSE student engagement between countries ($R^2 = \tau_{\beta \text{ FUM}} - \tau_{\beta \text{ NEW}} / \tau_{\beta \text{ FUM}}$).

To test whether the relationship, or slopes, between the five school level PLC components and TSE in student engagement varied by country, the significance levels of their respective variance components were analyzed at level-3. The relationships between three school level PLC components and TSE in student engagement varied between countries: reflective dialogue ($\chi^2(29) = 56.87, p = .002$), shared sense of purpose ($\chi^2(29) = 45.48, p = .026$), and collaborative professional practice ($\chi^2(29) = 54.93, p = .003$). The relationship between collective focus on student learning and TSE in student engagement did not vary significantly by country ($\chi^2(30) = 37.05, p = .176$), nor did the relationship between deprivatized practice and TSE in student engagement ($\chi^2(29) = 43.35, p = .054$).

Since the slopes for three PLC components and TSE in student engagement varied by country, the fixed effect, country achievement and equity, was entered as an interaction term at level-3 to determine whether it significantly impacted these slopes. Country achievement and equity was not a significant predictor of the slopes for shared sense of purpose ($\gamma_{071} = .06; t(29) = 1.02, p = .315$), or collaborative professional practice ($\gamma_{091} = -.01; t(29) = -.21, p = .835$). It was, however, a negative and significant predictor for the slope between reflective dialogue and TSE ($\gamma_{051} = -.26; t(29) = -2.92, p = .007$).

Results of level-3 predictor and full random coefficients models: TSE in classroom management. The results of the level-3 predictor model and the random coefficients model for the random and fixed effects on TSE in classroom management are presented in Table 10. The control variable educational expenditure as a percent of GDP was a significant and positive predictor in TSE in student engagement ($\gamma_{002} = .76; t(28) = 2.61, p = .014$). Although there was

no hypothesized relationship between country achievement and equity and TSE, results indicated a significant and negative relationship with TSE in classroom management ($\gamma_{001} = -.87$; $t(28) = -2.88$, $p = .008$). Overall, the level-3 predictors accounted for approximately 25% of the variance in TSE classroom management between countries ($R^2 = \tau_{\beta \text{ FUM}} - \tau_{\beta \text{ NEW}} / \tau_{\beta \text{ FUM}}$).

To test whether the relationship, or slopes, between the five school level PLC components and TSE in classroom management varied by country, the significance levels of their respective variance components were analyzed at level-3. The relationships between three PLC components at the school level and TSE in classroom management varied between countries: reflective dialogue ($\chi^2(29) = 70.29$, $p < .001$), shared sense of purpose ($\chi^2(29) = 44.82$, $p = .030$), and collaborative professional practice ($\chi^2(29) = 61.76$, $p < .001$). The relationship between collective focus on student learning and TSE in classroom management did not vary significantly by country ($\chi^2(30) = 37.46$, $p = .164$), nor did the relationship between deprivatized practice and TSE in classroom management ($\chi^2(30) = 36.58$, $p = .190$).

Since the slopes for three PLC components and TSE in classroom management varied by country, the fixed effect, country achievement and equity, was entered as an interaction term at level-3 to determine whether it significantly impacted these slopes. Country achievement and equity was not a significant predictor of the slopes for reflective dialogue and TSE ($\gamma_{051} = -.24$; $t(29) = -2.02$, $p = .052$), shared sense of purpose ($\gamma_{071} = .09$; $t(29) = 1.11$, $p = .275$), or collaborative professional practice ($\gamma_{091} = -.03$; $t(29) = -1.12$, $p = .272$).

In summary, although there was no hypothesized relationship between country achievement and equity and TSE, it was a significant negative predictor for all three outcomes in the level-3 predictor model. In the full random coefficients model, the slopes between school level PLC components and TSE outcomes were analyzed to determine whether they varied

across countries. Country achievement and equity was then modeled against any statistically significant random slopes to determine whether it impacted these relationships. Hypothesis 4 was generally confirmed: Country achievement and equity did not have a significant impact on the relationships between school PLC components and TSE in instruction, student engagement, or classroom management in nine of the 10 slopes that were modeled.

Summary

Three-level HLM models were created to test the four hypotheses. The level-1 predictor model measured the relationships between teacher perceptions of five PLC components in their schools and their self-efficacy in instruction, student engagement, and classroom management. The first hypothesis was partially confirmed: Reflective dialogue, collective focus on student learning, shared sense of purpose, and collaborative professional activity were significant and positive predictors of TSE outcomes. Deprivatized practice was a significant and negative predictor for all three outcomes. The second hypothesis was tested by adding principal observation and feedback as a fixed effect in the level-2 model. For all three TSE outcomes, principal observation and feedback was not a significant predictor, indicating that, as a measure of vertical social capital, it had no impact on TSE. Thus, hypothesis 2 was not supported.

Hypothesis 3 was tested by aggregating the five teacher level PLC components to the school level and adding them to the level-2 model as fixed effects. Hypothesis 3 was partially confirmed, as school level reflective dialogue, collective focus on student learning, and collaborative professional activity were all significant and positive predictors of TSE outcomes. Furthermore, post-hoc analyses using the Hausman test indicated that the three coefficients were statically different from one another; thus, each added an independent contribution to the model.

Collective focus on student learning had the largest impact, followed by reflective dialogue and collaborative professional activity, respectively.

Finally, hypothesis 4 was confirmed. After entering education expenditure as a percentage of GDP, as well as country achievement and equity as fixed effects in the level-3 model, the random coefficients model tested whether the relationships, or slopes, between school level PLC components and TSE outcomes varied by country. Any statistically significant random effects at level-3 were then modeled using country achievement and equity as a level-3 interaction effect. As hypothesized, with only one exception in the slope between reflective dialogue and student engagement, country achievement and equity did not account for variation in the relationships between school level PLC predictors and TSE in instruction, student engagement, or classroom management.

Chapter Five: Discussion

Introduction

A teacher quality discourse has emerged, disseminated globally by international organizations such as the OECD. To improve teacher quality, education policy makers often benchmark themselves against the policies of their high performing peers. Thus, reform efforts have become institutionalized in the global sphere, making it increasingly likely that nations and school systems adopt similar models to improve the quality of their teaching forces. Although the accountability functions of teacher supervision often have been given primacy in policy documents, alternative forms of supervision have been gaining prominence. PLCs and principal observation and feedback, characterized as social capital reforms, are a means by which teachers and principals work collaboratively to improve student learning. Despite the diffusion of these policy strategies, there is little international research to determine their effectiveness. Using TALIS 2013 data, this study examined global trends in social capital reforms by empirically examining their relationship with TSE in instruction, student engagement, and classroom management in an international model of 31 countries.

Although there is much debate internationally about how to best conceptualize teacher quality, and whether a global definition even exists (Katz & Wykoff, 2018), commonly used measures have been recently contested for their strictly human capital approach that emphasizes standardization and accountability (Akiba & LeTendre, 2018). Therefore, researchers have advocated for expanded conceptualizations of teacher quality by focusing, for instance, on improving the teaching context through organizational support, collaborative networks, and professional development (Akiba & LeTendre, 2018). Additionally, methodological advances in international surveys such as like TALIS have made this elusive construct more attainable.

Thus, teacher quality measures in the international context have expanded to include dimensions related to teacher pedagogical and content expertise, teacher job satisfaction, and TSE (Akiba & LeTendre, 2018).

Although teacher quality might best be measured through the direct observation and analysis of the contextual dynamics in the classroom and how they impact students, such measures are not available in large-scale international data sets. Therefore, TSE serves as a proxy indicator of teacher quality, given its strong empirical associations with a host of educational outcomes, including student achievement, teacher professionalism, and teacher classroom processes (Zee & Koomen, 2016). As a multidimensional construct, TSE, when further delineated into the classroom processes in which teachers engage, including instruction, student engagement, and classroom management, provides insights into teachers' perceptions of their own quality, but equally important, their perceptions on the efficacy of educational reforms.

This chapter will provide a summary of the significant findings related to the four research questions. Next, the results will be discussed in relation to the theoretical framework of the study and the extant literature, and implications for policy and practice will be identified. In the final sections, several limitations of the study will be addressed and suggestions for future research will be offered.

Summary of Results

There is consensus in international education policy that teacher quality can be improved systemically with a commitment to developing teacher capacity through PLCs and principal observations and feedback (Darling-Hammond et al., 2017; Hargreaves & Fullan, 2012; OECD, 2013; OECD, 2016; Sahlberg, 2011). High performing and high equity countries have been held up as international models in this area, despite the lack of empirical studies that demonstrate the

efficacy of their reform efforts. This study examined horizontal and vertical social capital in an international model of 31 countries. Overall, the study expected to find both teacher and school level PLC variables, as well as principal observation and feedback, to be significant and positive predictors of TSE outcomes. Additionally, it did not expect to find that country achievement and equity would impact these relationships.

Teacher perceptions of PLCs and TSE. The goal of the first research question was to determine how the five distinct PLC components impacted TSE in instruction, student engagement, and classroom management. In the level-1 analyses for TSE, gender was a significant and positive predictor for only one of the TSE outcomes. Female teachers reported higher levels of TSE in instruction, but not student engagement or classroom management. Teacher experience, however, was a significant and positive predictor in all three models. Teachers with more experience reported higher levels of TSE in instruction, student engagement, and classroom management. After controlling for gender and experience in the first model for TSE in instruction, the hypothesized relationship between the horizontal social capital indicators and TSE was supported for four of the five PLC components. Higher levels of reflective dialogue, collective focus on student learning, shared sense of purpose, and collaborative professional activities were related to higher reported TSE in instruction.

As was the case for the TSE in instruction model, reflective dialogue, collective focus on student learning, shared sense of purpose, and collaborative professional activity were significant and positive predictors of TSE in student engagement. Similarly, increased levels of these same four components were related to higher levels of TSE in classroom management. In summary, teacher perceptions of four PLC components predicted higher levels of TSE in the three outcome variables. A fifth PLC component, deprivatized practice, was significantly related to each

outcome, but not in the hypothesized direction; rather, deprivatized practice was a negative predictor of TSE outcomes. Teachers who stated that they were observed by colleagues reported lower levels of TSE in instruction, student engagement, and classroom management.

School mean PLC components and TSE. The third research question examined whether PLC components at the school level, rather than at the teacher level, impacted TSE in instruction, student engagement, and classroom management. This question was addressed by aggregating each of the five PLC components at the teacher level up to the school level, to determine whether the school level mean PLC components had similar effects on TSE and accounted for any of the between-school variance in the models. In other words, the average PLC components of teachers in the same school were entered as characteristics of the school. Furthermore, this model accounted for any potential source biases that are inherent in surveys of this nature. For instance, teachers with high self-efficacy could have more positive feelings about the organizational structures of their schools and may report higher levels of reflective dialogue or hold beliefs that they have higher senses of shared purpose with their colleagues (Williams & Vogt, 2011). In their study on the effects of leadership styles on PLCs, Vanblaere and Devos (2016a) acknowledged some of the limitations of using self-reported measures at the teacher level and recommended that quantitative studies on PLCs with sufficient sample sizes could mitigate these obstacles by combining perceptions of all teachers in a school into a school level aggregate score.

Prior to assessing these aggregate level-2 predictors, however, school level control variables, school SES and school enrollment, were assessed for each outcome variable. School enrollment was not a significant predictor in any of the models. Conversely, school SES was a significant and negative predictor of TSE in student engagement and classroom management, but

not in TSE in instruction. TSE scores in student engagement and classroom management were lower in schools reporting that 30% or more of their students came from economically disadvantaged homes compared to those that reported less than 30% of their students came from lower SES homes.

After controlling for school SES and school enrollment, three of the five school level PLC components were positive and significant predictors of TSE outcomes. Thus, hypothesis 3 was partially confirmed. Increases in the aggregates for reflective dialogue, collective focus on student learning, and collaborative professional activity were associated with higher TSE in instruction, student engagement, and classroom management. In a post-hoc analysis, each of the coefficients added a unique and significant contribution to the models, with collective focus on student learning having the largest effect, followed by reflective dialogue, and then by collaborative professional activities. Once aggregated to the school level, however, a shared sense of purpose and deprivatized practice were no longer significant predictors of TSE.

Vertical social capital and TSE. Despite the positive findings related to horizontal social capital in the teacher and school level models, the hypothesized relationship between principal observations and feedback and TSE outcomes was not supported. The frequency of principal observations and feedback did not impact TSE in instruction, student engagement, or classroom management. Although these findings are surprising given past research (Holland & Adams, 2002; Robinson et al., 2008), they make sense in the context of teachers' perceptions of the observation process. In TALIS 2013, nearly 50% of teachers indicated that observations had little impact on their teaching and that they were done largely for administrative purposes (OECD, 2014).

Country achievement and equity and TSE. The fourth research question assessed whether a country's achievement and equity impacted the relationship between school level PLC components and TSE in instruction, student engagement, and classroom management. Education expenditure as a percentage of national GDP was entered as a country level control variable. In all three models, it had a significant and positive impact on TSE. In other words, teachers in countries with higher educational spending as a proportion of GDP reported higher levels of TSE. Additionally, although there was no hypothesized relationship between country achievement and equity and TSE outcomes, a significant relationship was indicated. In all three models, higher achievement and equity were associated with lower reported levels of TSE.

To assess whether there was an interaction effect of achievement and equity, the first step in the multi-level model was to determine whether the relationships, or slopes, between PLC aggregates and TSE varied by country. For the TSE in instruction model, there was significant variance by country in the relationships between reflective dialogue, shared sense of purpose, deprivatized practice, and collaborative professional activity and TSE. The relationship between collective focus on student learning and TSE in instruction did not significantly vary by country. Thus, the variable achievement and equity was entered as an interaction effect on the slopes between the four PLC components and TSE outcomes. As hypothesized, a country's achievement and equity designation did not significantly impact the relationships between PLC components and TSE in instruction.

For the TSE in student engagement and TSE in classroom management models, only the relationships between aggregate reflective dialogue, shared sense of purpose, and collaborative professional activity and TSE varied by country. Country achievement and equity did not significantly impact the three slopes in the TSE in classroom management model. In the TSE in

student engagement model, however, it was a negative predictor on the slope between reflective dialogue and TSE. In other words, the strength of the relationship was diminished for countries designated as high achieving and high equity. It did not, however, have a significant impact on the slopes between shared sense of purpose and TSE, or between collaborative professional activity and TSE. In summary, the hypothesized nonsignificant impact of country achievement and equity on the slopes between school PLC components and TSE outcomes was partially confirmed. Achievement and equity had a nonsignificant effect on nine out of 10 slopes on which it was modeled. Achievement and equity was a significant and negative predictor only on the relationship between school level reflective dialogue and TSE in student engagement.

Conclusions and Implications

Although most of the early research on PLCs came from the U.S., improving teacher capacity through teacher collaboration and professional networks has been studied recently in countries and regions around the world, including sub-Saharan Africa (Hite, Hite, Mugima, & Nsubuga, 2010), Belgium (Vanblaere & Devos, 2016a), England (Webb et al., 2009), Australia (Hargreaves, 2007), and rural China (Sargent & Hannum, 2009). In fact, there has been an international call for schools to improve the quality of their teaching contexts by implementing PLC models (Lieberman, 2007; Vanblaere & Devos, 2016a, 2016b). Nevertheless, Vescio et al. (2008) found that few studies empirically examined changes in teacher outcomes resulting from their participation in PLCs. Therefore, the assumed potential of these social capital reforms needed to be confirmed empirically in an international setting (Vanblaere & Devos, 2016a).

This study attempted to fill this gap in the literature by examining potential trends in the relationships between social capital reforms and TSE outcomes in an international model of 31 countries. Findings suggest that global trends exist in the relationship between social capital

reforms and TSE in instruction, student engagement, and classroom management. Specifically, several PLC characteristics were related positively to TSE outcomes, both at the teacher and school levels. Before discussing the conclusions and implications of these results, the findings will be situated in world culture theory to explain how PLCs, as a social capital reform designed to improve teacher quality, have diffused globally.

Understanding the global diffusion of social capital reforms. World culture theorists suggest that education systems across countries are bound by global norms of rationality, which construct cognitive models and shared expectations that become normalized over time (Lechner & Boli, 2005). Scripts and models, such as PLCs and principal observation and feedback, emerge as manifestations of a larger discourse. For decades, education has been promoted as a human right, and nation-states have been expected to commit themselves to it on behalf of their citizens. Until recently, this meant providing infrastructure, including desks, books, and school buildings. Even though many countries still do not have universal primary education, a teacher quality discourse has emerged, compelling nations-states to expand this right, ensuring that children not only have access to school, but to quality teachers.

This discourse became further entrenched globally, given the normative link between educational achievement, educational equity, and economic development that is promoted by international organizations such as the OECD. The path to improved economic outcomes, for nations and individuals, is through a commitment to improving teacher quality. Acting as an arbiter of a global consultancy network, the OECD diffuses “best practices” to improve teacher quality through cross-national comparisons and international benchmarking initiatives. As a result, student achievement has become a global indicator of teacher quality, with lower performing nations legitimizing their policy initiatives by benchmarking themselves against their

higher performing peers. Reforms often emphasize improving the human capital of individual teachers through certifications, trainings, and accountability-based evaluations (Wiseman, Davidson, & Brereton, 2018), but increasingly promote social capital reforms such as PLCs and principal observation and feedback (Darling-Hammond et al., 2017).

Although the OECD, through its emphasis on country performance rankings, highlights the importance of student achievement in its benchmarking efforts, it places an emphasis on educational equity within the larger teacher quality discourse more than other international organizations (Mundy, Green, Lingard, & Verger, 2016). Equitable educational systems provide systemic supports to ensure that students' backgrounds and life circumstances do not limit their educational access and opportunities. These systems also mitigate achievement gaps between high and low performing students, and work to ensure that performance differentials are less of a function of student social and economic characteristics. Factors such as race, poverty, and gender that may impede equitable opportunities and outcomes, therefore, should be addressed through policy strategies designed to improve teacher quality. Nevertheless, educational equity is not just an end, as the OECD has coupled its equity agenda with the discourse linking teacher quality and economic competitiveness. For instance, because marginalized students are more likely to drop out, meeting their needs in school results in "better employment. . .resulting in greater contributions to public budgets and investments" (OECD, 2012, p. 23). Therefore, educational equity is about more than fairness for students; it is about national economic opportunity and efficiency.

In its policy papers on educational quality, the OECD suggests that quality and equity go hand-in-hand and offers strategies to ensure that students' social and economic circumstances do not hinder their educational potentials. As such, the OECD has highlighted international models,

such as Finland, Australia, and Canada, which are countries that have policy initiatives focused on early childhood education opportunities and systemic initiatives to educate migrant populations and indigenous groups (Mahon, 2016). Additionally, equitable countries create strong incentives to place qualified principals and teachers in high-need schools and provide additional resources and professional development to meet the needs of economically disadvantaged students (Darling-Hammond et al., 2017).

In their list of policy recommendations, the OECD suggests that principal and teacher quality are critical to providing equitable education to economically disadvantaged students (OECD, 2012). Specifically, they propose that quality and equity can be increased by improving working conditions for teachers in economically disadvantaged schools. Beyond additional compensation and training, the OECD proposes that increasing teachers' social capital by engaging them in reflective dialogue and professional collaboration with colleagues are effective strategies to equip them to handle the educational needs of economically disadvantaged students (OECD, 2012). Thus, countries increasingly adopt social capital reforms to address the issues raised by the economic- and equity-focused teacher quality discourse.

World culture research has been largely characterized by an emphasis on this isomorphism, but is also useful in explaining global diffusion of educational policies and practices that are not well explained by rational arguments of utility or efficiency (Bromley, 2016). For instance, evidence suggests that teacher evaluation models that focus on accountability measures do not improve student learning and, instead, have led to a narrowing of the curriculum, but they are still ubiquitous (OECD, 2014; Sahlberg, 2011). Their diffusion can be explained as the application of rationalistic and scientific thought embedded in the global teacher quality discourse. From a world culture perspective, monitoring and evaluation of

teachers' work are the result of the growing expectation that organizations engage in scientized activities to ensure greater alignment between policy and practice (Bromley, 2016; Wiseman et al., 2016). In other words, if educational policies designed to improve teacher quality are to be effective, there must be a concomitant rational and scientific means of evaluation.

At the same time, macro-level diffusion of teacher accountability measures is paralleled by a rise in supervision models to improve teachers' social capital, creating a tension that world culture theory can help explain. In recent years, world culture research has evolved to place more emphasis on agency, with the number of actors who exercise agency in many realms increasing (Bromley, 2016; Ramirez, 2012). These actors carry certain rights and responsibilities, and seek to influence normative scripts legitimized at the policy level. For instance, teachers are imbued with rights and exert influence on traditional forms of authority-based accountability. The rhetoric of teacher accountability reforms that focuses on improving individual teachers, therefore, may become problematic as teachers, trying to exert their professionalism and agency, may instead advocate school level collaborative initiatives (Ikoma, 2018).

Recent scholarship suggests that through this tension, the teacher quality environment is subsequently altered and "it becomes possible and necessary for individuals and organizations to attend to increasingly diverse concerns within the same formal structure" (Bromley, 2016, p. 473). Therefore, the OECD can promote teacher accountability and evaluation while simultaneously holding up countries like Finland, Canada, and Singapore, whose teachers are recognized for their agency and are less likely beholden to these accountability measures, as international models (Darling-Hammond et al., 2017).

Although an institutional lens has been particularly useful in explaining the diffusion of educational reforms across diverse settings regardless of their utility or efficiency, this study did expect to find positive trends in the relationships between social capital reforms and TSE, which might suggest a more functionalist approach. This study was designed to address the models and scripts that nations may adopt as they strive for global legitimization, but it did not address the significant gaps, or loose-coupling, that undoubtedly occur in implementation at various levels in the system. Studies examining the potential positive trends in educational reforms and world culture research are not mutually exclusive, however, as “at times the institutional lens complements rather than competes with functional views of global education policy” (Bromley, 2016, p. 481). In other words, the functional and cultural characterizations of policy diffusion can coexist. As such, the scripts and models that emerge from the teacher quality discourse need not be decoupled from their intent and, in fact, may provide effective benchmarking opportunities for countries and schools interested in implementing and adapting social capital reforms such as PLCs.

The next section will examine some of these significant global trends in the relationship between teachers’ perceived efficacy and social capital reforms, namely, PLC components and principal observation and feedback. It will highlight significant findings, contextualize these findings within the existing literature, and offer practical implications for policy and practice.

Contextual variables in the study. Contextual variables were entered at the three levels in each model to account for the variation not related to the social capital indicators in the study. Teacher characteristics accounted for some variation in TSE outcomes. There was a positive effect of being female on TSE in instruction, but not in student engagement or classroom management. Some studies have reported similar mixed results (Vanblaere & Devos, 2016b),

whereas others found that female teachers generally report higher TSE (Fackler & Malmberg, 2016). Years of teaching experience was also a positive predictor of TSE outcomes, which confirmed findings from previous studies (Fackler & Malmberg, 2016).

The school level contextual variables were school enrollment, school SES, and principal instructional leadership. School enrollment was not a significant predictor for TSE outcomes; however, teachers in schools with higher proportions of economically disadvantaged students reported lower TSE in student engagement and classroom management, confirming that teachers in lower SES schools face additional challenges, including lower levels of professional growth (Katz & Wykoff, 2018). Although principal instructional leadership typically has been found to have a positive association with TSE (OECD, 2016), there were no direct relationships in this study. Recent studies have found significant associations between various leadership styles and PLC components (OECD, 2016; Vanblaere & Devos, 2016a), indicating that instructional leadership could potentially have a mediating effect on TSE, an area that should be explored in future international studies.

Finally, teachers in countries with higher education expenditure as a percent of GDP believed they were more effective in instruction, student engagement, and classroom management. Although there is some evidence that educational investment is related to student achievement (Darling-Hammond, 2010), these findings could provide preliminary evidence that teachers feel more effective when countries invest in policy strategies related to their professional improvement. Future research should examine specific country level budget expenditures to determine the proportion of money that is spent on policies designed to improve teacher quality.

Reflective dialogue. Reflective dialogue encompasses instructionally focused conversations regarding the ways curriculum, instruction, and assessments serve to improve student learning (Stoll & Louis, 2007). At the teacher and school levels in this analysis, as teachers' engagement in reflective dialogue increased, so too did their self-efficacy in instruction, student engagement, and classroom management. This is an important finding, as it highlights the fact that teachers who engage in professional dialogue with their colleagues feel more confident in their abilities to provide meaningful and relevant instruction to meet the needs of their learners, and feel better equipped to handle disruptive behaviors. The importance of reflective dialogue for teacher outcomes has been highlighted in previous studies. Reflective dialogue and instructional conversations have been shown to be related to teachers' perceptions of changes in their classroom practices (Vanblaere & Devos, 2016b). Among the on-the-job professional development opportunities examined in their study of elementary school teachers, Parise and Spillane (2010) found that collaborative instructional conversations between teachers had the largest effect on changes in their instructional practices. Similarly, Andrews and Lewis (2007) found that successful PLCs connected teachers through conversations about pedagogy, which led to more sustained inquiry into professional practices.

Implications for policy and practice. As a form of developmental supervision, opportunities for teachers to engage in professional dialogue and to build upon one another's instructional expertise are powerful means to improve the teaching that occurs in schools. Therefore, policy and practices that promote professional conversations about student learning should be considered to support individual teacher and collaborative reflection. At the policy level, a system of teacher supervision and evaluation that involves a performance and development focus should include an iterative cycle of goal setting, professional learning,

feedback from multiple stakeholders, and opportunities for reflection. Goals should be monitored frequently and adjusted through an iterative process of reflective conversations with the principal about progress toward these goals.

Although reflective dialogue has been shown to lead to desirable outcomes, there is a need to look deeper into how school leaders or teams of teachers think and learn together (Stoll & Seashore Louis, 2007). Popp and Goldman (2016) suggested that reflective dialogue goes beyond description of practice and must include elaboration and negotiation of proposed strategies to facilitate collaborative knowledge building. Similarly, Little and Horn (2007) examined recorded teacher conversations to discern the characteristics of deep sustained conversations among teachers. They suggested that dialogue could lead to professional learning and instructional improvement only if that dialogue facilitated the sharing of teachers' instructional dilemmas with opportunities to reflect upon potential solutions to contextually specific problems. Therefore, school based PLCs, should provide formal structured opportunities for teachers to discuss the challenges they face in the classroom and to receive coaching and feedback from their colleagues. Additionally, dialogue skills should be taught explicitly and modeled as a form of teacher professional development.

Collective focus on student learning. A collective focus on student learning reflects the mutual obligations and collective responsibility teachers have for improving learning opportunities for all students. Although collaborative efforts are at the heart of an effective PLC, the focus of those efforts has been found to be equally important (Vescio et al., 2008). In this study, individual teachers who reported that their schools emphasized content and pedagogical competency and student performance and assessment strategies had higher levels of TSE in all three outcomes. The effect of having a collective focus was also significant when aggregated to

the school level and, in fact, had the most impact of the five PLC components on all three TSE outcomes. Although no studies analyzed the impact of a collective focus on student learning as an isolated PLC variable, research on principal instructional leadership has shown significant associations between developing a collective focus on improved instruction and student outcomes (Day & Sammons, 2013; Robinson et al., 2008). Additionally, Bolam, Stoll, and Greenwood (2007) found that the more a PLC focused on student learning, the stronger the associations were between PLCs and both student achievement and teacher professional learning.

Implications for policy and practice. Sustainable PLCs are characterized by the trust and collaboration between colleagues who are wholly committed to improved student learning (Hargreaves, 2007). In fact, the essence of a PLC is the focus and commitment of its members to ensure learning for all students (DuFour & Marzano, 2011). The fact that school level collective focus on student learning has the statistically largest impact on TSE outcomes is not surprising. Teachers' beliefs about their abilities to meet students' individual needs or to provide meaningful opportunities for student engagement, for instance, are likely to be high when there is tangible evidence of student success. Teachers who focus on student learning in schools identify what students should know, determine evidence for this learning, and identify strategies for students who need additional supports (DuFour & Marzano, 2011). Therefore, teachers need training on how to diagnose learning difficulties and on differentiated strategies to meet the individual needs of learners. School level collaborative initiatives might also include opportunities for teachers to participate in child study teams, for which collaborative efforts focus on identifying the needs of individual students or cohorts of students with the goal of articulating potential accommodations and strategies to best support them.

Shared sense of purpose. A shared sense of purpose was a positive predictor for all TSE outcomes at the teacher level, but not at the school level. In other words, individual teachers reported having higher levels of self-efficacy when they perceived their schools as having a culture of shared responsibility and mutual support. This is an interesting finding, given that one would expect teachers within a school to have a common understanding of the school's purpose. It is also possible that the variable used for this study was limiting, as it may not have captured the intended breadth of shared purpose, which, in the literature, typically encompasses the mission, vision, and shared values that guide the work of teachers in a school (Kruse & Louis, 1993; Wahlstrom & Louis, 2008). In one of the few studies that looked at distinct PLC variables, Vanblaere and Devos (2016a) suggested that a collective focus on student learning and a shared purpose are closely related and combined them into one outcome variable, collective responsibility. In a subsequent study, collective responsibility was studied as a predictor for changes in instructional practice, but no significant relationship was found between the two (Vanblaere & Devos, 2016b).

Implications for policy and practice. Although only significant at the teacher level, shared sense of purpose is a critical component of a successful PLC, as it guides any broad-based commitment to improvement and collective action in a school. In other words, without a well developed purpose as a target, PLCs can be left without clear direction or focus on improved teaching and learning (Hargreaves & Fullan, 2012). Andrews and Lewis (2007) found that, in successful school-based PLCs they studied, reflective dialogue and collaborative action were aligned with a broader vision of instructional success. Organizationally, the PLCs were successful to the extent that PLC activities paralleled a collective vision and mission based on mutually agreed upon tenets of best instructional practices. Based on these findings, school

based PLCs should consider developing a set of guiding principles or a vision statement to which all efforts to improve teaching and learning are linked. Additionally, norms of collaboration could be established to identify the PLC members' joint expectations regarding their views on children, their priorities, and their expectations for working with one another (Vescio et al., 2008).

Deprivatized practice. Teachers in the study who reported having the opportunity to observe in others' classrooms reported lower levels of TSE. This negative relationship was not, however, indicated once deprivatized practice was aggregated as a school level characteristic. Only 29% of teachers in this study reported engaging in deprivatized practice, indicating that, perhaps, it occurs too infrequently to have any positive effects. The negative relationship at the teacher level, however, was unexpected. In some countries, being observed by others is a form of accountability-based evaluation (OECD, 2014), which could account for the negative impact. Additionally, having peers observe and offer feedback could be a sign that the teacher being observed needs remedial coaching, which could be related to lower TSE.

Previous findings on deprivatized practice have been mixed. Bryk et al. (1999) suggested that when teachers engaged in peer observation and feedback, they learned about their colleagues' teaching practices and were, thus, more likely to reflect upon their own. Conversely, empirical research confirmed that deprivatized practice was not associated significantly with TSE (OECD, 2016). Parise and Spillane (2010) found that peer observation, as a form of job-embedded professional development, was not associated with changes in teachers' instructional practices. Vanblaere and Devos (2016b) also reported that deprivatized practice was not a significant predictor for perceived changes in instructional practice or competence.

Implications for policy and practice. Research has shown that deprivatized practice requires a significant cultural shift in schools as “the norms of the teacher as an autonomous individual within the walls of her classroom proves difficult to alter” (Vanblaere & Devos, 2016b, p. 220). Therefore, deprivatized practice should be expanded beyond its traditional meaning of strictly observing in peers’ classrooms. Opening classroom practice to peers might include opportunities for teachers to co-plan lessons and teach alongside one another. It should also include occasions to analyze lesson plans collaboratively, plan curriculum and assessments together, and observe and analyze students’ responses to instructional strategies.

Collaborative professional activity. Higher levels of collaborative professional activities at both the teacher and school levels, including exchanging materials and working with other teachers around instruction and assessment, were related positively to TSE outcomes. This is an important finding, in that it suggests that opportunities for teachers to learn from one another through PLCs could improve student learning. As teachers reported more opportunities to engage in professional collaboration, they reported higher levels of TSE in student engagement, which included motivating students to do well and getting them to believe in their abilities. These findings corroborate other studies that suggest participation in collaborative professional activities had positive effects on instructional practices, change in instruction, and teachers’ observed competencies (DuFour et al., 2016; Louis et al., 2010; Supovitz et al., 2009; Vanblaere & Devos, 2016b). Nolan and Molla (2017) found that teacher collaboration was influential in building teacher confidence and professional capital, and Zonoui et al. (2017) showed that the collaborative nature of a PLC was related to higher levels of TSE.

Implications for policy and practice. Collaborative professional activities within a PLC focus not solely on individual teacher learning but, more importantly, on the collective

knowledge and insights that are constructed through these collaborative initiatives (Stoll & Seashore Louis, 2007). In this way, individual professional knowledge can only be realized through the collaborative power, or social capital, of the group (Nolan & Milla, 2017; Stoll et al., 2006). Collaboration alone is not the goal in a well-functioning PLC; rather, it is the professional knowledge that accrues, making the type of collaboration an important variable that must be considered. This collective capacity must be directed toward improved learning opportunities for students. For instance, opportunities for collective analysis of student work in relation to predefined standards focuses collaboration on student learning outcomes. Various protocols for studying student work, analyzing lesson plans, and solving instructional dilemmas could be used to facilitate the deep and meaningful conversations that are requisite for a PLC (Easton, 2009).

In addition, job-embedded collaboration requires the organizational capacity and logistical support for teachers to engage in this work (DuFour & Marzano, 2011). McLauhlin and Tilbert (2007) identified structural impediments to PLC, including traditional scheduling, teacher managerial tasks and paperwork, and lack of administrative training. Therefore, policy makers and school leaders should ensure that time and space for collaboration are provided within the work day, that teachers are trained in the use of various protocols to efficiently guide their efforts, and that the capacity to lead effective PLCs is developed in principals and teacher leaders in school leadership programs (DuFour & Marzano, 2011).

In contrast, a paradox may exist in schools, in that the more closely linked teachers are, the less likely it is that they will be networked with other groups, which could pose a barrier to change (Stoll & Louis, 2007). Therefore, national or regional polices should focus on networking PLCs across schools, as these networks provide a mechanism for principals and

teachers to build knowledge beyond the walls of their schools (Darling-Hammond, Burns, Campbell, Goodwin, & Low, 2018) and ameliorate the lack of expertise that may exist in some schools (Lewis & Lee, 2018). Teacher leaders from each school could participate in regional PLCs and, in turn, work with the teachers in their own schools to build their capacities.

Principal observation and feedback. The frequency of principal observations and feedback did not impact TSE outcomes. Although these findings are surprising given past research (Holland & Adams, 2002; Robinson et al., 2008), they make sense in the context of teachers' perceptions of the observation process, as teachers often report that observations have little impact on their teaching (OECD, 2014). Policy research has found that specific feedback from the principal linked to a meaningful plan for professional improvement (Darling-Hammond, 2013; Marshall, 2005) has been perceived routinely by teachers as an effective form of supervision (Day & Sammons, 2013; Louis et al., 2010). In other words, the quantity of principal observations is far less important than the quality of the feedback and the impact that feedback has on teacher learning. In other studies, TSE was linked to the clarity and utility of the feedback they received (Delvaux, 2013).

Implications for policy and practice. These findings suggest the need for principal trainings in the observation process, with an emphasis on offering high impact feedback that results in meaningful instructional improvements. The same essential skills of a well-functioning PLC, including dialogue skills and a collective focus on student learning, should guide conversations around lesson quality. Such a shift could promote a more developmental approach to supervision as opposed to the prevailing mindset that teacher observation is about evaluation (Lewis & Lee, 2018). More importantly, even with high quality observations and feedback, the time principals spend on classroom observations to develop individual teacher

capacity may be better invested in developing PLCs. Classroom observation and feedback may be necessary for novice teachers or teachers in need of remediation, but for many other teachers, they have become an annual administrative requirement, with little impact on their teaching (Darling-Hammond, 2013; DuFour & Marzano, 2011; OECD, 2014). Shifting their focus from supervising individual teachers to developing the capacity of collaborative teams could be an important strategy for principals trying to improve teaching and learning in their schools.

Country achievement and equity. Teachers in countries designated as high achieving and high equity reported lower levels of self-efficacy in instruction, student engagement, and classroom management. Although there was no hypothesized relationship as part of this study, it is an interesting finding that warrants some consideration. Several countries designated as high in achievement and equity are collectivist cultures, including Japan, Korea, and Singapore. In their study of TSE across countries, Vieluf et al. (2013) found that TSE is linked strongly to the social environment, with collectivist cultures less likely to report higher TSE, given social values related to self-presentation. Furthermore, they suggested that if modesty and humility are more valued in collectivist cultures, it is possible that teachers in certain countries may report lower scores on TSE indicators. Further, high achieving and high equity countries are often promoted for the agency and professionalism afforded to their teachers. Jeon (2018) suggested that teachers in countries with stronger power disparities between supervisors and teachers—countries where teachers have less agency—may be more likely to report positive feelings about school reforms.

For the purposes of this study, country achievement and equity was not a significant predictor for most relationships between school level PLC components and TSE outcomes. In fact, the only significant effect was on the relationship between reflective dialogue and TSE in

student engagement. The fact that the relationship was lower in countries with high achievement and equity could signal that professional conversations between teachers are more focused on instructional improvement than motivating students and helping them to value learning. Perhaps what is most encouraging in these findings is that the positive relationships between school level PLCs components, including collective focus on student learning, reflective dialogue, and collaborative professional activity, are equally strong in countries with lower achievement and equity. Although no international studies confirm this finding, researchers in the U.S. found positive teacher perceptions of PLCs in a wide cross section of high and low performing schools, and that contextual factors such as race, SES, and academic background were not strong predictors of PLCs (Bryk, Camburn, & Louis, 1999).

Implications for policy and practice. These findings are encouraging for countries that may rely on international benchmarking strategies to improve their education systems. The OECD promotes high achieving and equity countries for their social capital strategies, including PLCs, to improve teacher quality. PLCs are not a program or strategy that can be borrowed and implemented, however. Rather, through embedding the PLC components into the ethos of schools and the daily work of teachers in a culturally relevant manner, diverse school cultures may begin building their collective capacities to improve student learning. Stoll and Louis (2007) suggested a systemic extension to PLC memberships to expand social capital and create networks with a greater knowledge base. International organizations could facilitate PLCs across country borders with a focus on the cultural and contextual adaptations that may be needed to implement PLCs successfully.

Combined impacts of significant PLC components. Despite the diffusion of social capital reforms such as PLCs and principal observations, there is already evidence in some

contexts that they are becoming decoupled from their original intents (DuFour & Marzano, 2011). Everything from grade level planning meetings to weekly faculty meetings to annual faculty retreats have been characterized as PLCs. To be clear, PLCs represent “an ongoing process in which educators work collaboratively in recurring cycles of collective inquiry and action research to achieve better results for the students they serve” (DuFour et al., 2016, p. 3). Therefore, a PLC as a singular concept belies the multidimensional constructs that allow for ongoing capacity building and sustained efforts on behalf of children.

PLCs were deconstructed in this study to determine how components outlined in the PLC literature may differentially impact TSE. The results of this study indicate that both at the teacher and school levels, PLC components have a significant impact on TSE outcomes. Therefore, instead of being combined into one all-inclusive behavior, results suggest that future research should continue to examine the unique impact of PLC characteristics, so that school structures in relation to PLCs are designed to have the greatest impact (Reeves et al., 2017). Once aggregated to the school level, three PLC components had significant impacts on TSE in instruction, student engagement, and classroom management. A collective focus on student learning had the strongest impact, followed by reflective dialogue and collaborative professional activity. Although the differential impacts are important, as they might help focus initial efforts to build collective capacity, it is also instructive to note how they serve to strengthen and support one another (Stoll & Louis, 2007). For instance, a collective focus on student learning provides the parameters for reflective dialogue that is meaningfully related to student learning. Well-honed dialogue skills may make the collaborative professional activities in which teachers engage more efficient and focused, and provide deeper insights among teachers working together.

Recognizing that these critical components of PLCs can have a significant impact on teachers' professional growth, schools in many countries are devising strategies to maximize the potential of their combined effects. For instance, there is a growing prevalence of lesson study around the world, whereby teachers collectively plan, analyze, teach, and revise specific lessons in relation to student learning outcomes. At its core, the lesson study model is designed to address three critical PLC components: collective focus, culture of collaboration, and connection to student learning outcomes (Lewis & Lee, 2018). In some countries, such as Japan and Singapore, once the lessons are fine-tuned, they become the joint property of the teaching community, including teachers from other schools. Lesson studies across international contexts combine the benefits of PLC components, including opportunities to plan and implement curricula collaboratively, to observe teaching and learning, to analyze and discuss data, and to network educators in a PLC (Lewis & Lee, 2018). Again, PLCs are a process rather than a particular set of strategies, but opportunities to engage in reflective dialogue, deprivatized practice, and collaborative activities can be facilitated initially through systematic protocols such as the lesson study model.

The fact that PLC components are linked to increases in TSE outcomes offers reason for optimism. Beyond space and time, PLCs do not require a significant investment in infrastructure in the same way outside consultants and trainers do. Additionally, developing the collective capacity of teachers within a school is more cost effective than teacher accountability models that rely on systems of reward and punishment, especially when merit-based pay is at stake. PLCs are also ideally suited to improve teacher capacity in an ongoing, viable manner. The cyclical nature of PLCs is inherently sustainable, as it relies upon, and continuously improves, the human and social capital that already exist in schools. In other words, the implementation of

PLCs provides a continuous feedback loop based upon a foundation of teacher reflection and collaborative learning.

Perhaps even more encouraging is that these relationships do not seem dependent on a country's level of achievement and equity. PLC reforms promoted in Finland, Singapore, and Canada, for instance, may be equally effective in countries struggling with low achievement and equity. Although a global diffusion of PLCs has been documented, policy implementation is rarely unidirectional or complete, as all initiatives are ultimately negotiated and contested at the national and local levels (Akiba & LeTendre, 2018). Therefore, although PLCs as policy strategies promoted by international organizations are gaining traction, the success of these reforms depend heavily on local perceptions among teachers and principals. Ikoma (2018) suggested that PLCs are context specific and require that principals and teachers operationalize collaboration in way that respects the unique cultures and needs of their school communities. Additionally, principals and policy makers need to focus on "teacher voices" to most effectively build and sustain collaborative cultures (Ikoma, 2018).

By nature, PLCs lend themselves to the consideration of contextual influences and are flexible enough to adapt to local conditions. For instance, a collective focus on student learning can be situated contextually with nations, districts, and schools deciding for themselves what counts as evidence of student learning. Reflective dialogue between teachers at different career levels may not be appropriate in certain cultural contexts, so local adaptations may need to be made. Teaching loads vary significantly by country (OECD, 2014); therefore, finding time within teachers' workdays for collaborative activities may require adaptations in schedules and common planning times. Despite some of these challenges, a PLC is a sustainable model of

supervision that relies on the collective capacity and social capital of a school's teachers to ensure quality learning opportunities for all children.

Limitations

Despite some of the positive findings in the study, especially in the relationships between PLC components as measures of horizontal social capital and TSE outcomes, there are limitations that are apparent. Because TALIS 2013 is a self-report survey and does not engage in direct observations of teacher practice, inferences about teacher quality are limited due to potential differences between what a teacher reports and what might occur at the classroom and school level.

Additionally, TALIS 2013 survey data are not linked directly with student achievement scores, the typical measure of teacher quality. Although TSE provides a lens into the perceptions of teachers, it is not possible to determine whether their perceptions of PLCs manifest themselves in improved teaching and learning. Therefore, TSE is not a direct measure of teacher quality and can only serve as a proxy indicator based on its empirical associations with classroom processes that have been found in other studies (Zee & Koomen, 2016).

The study used world culture theory to explain the global trends it found in the relationship between social capital indicators and TSE. TALIS 2013 surveyed teachers from 34 countries, all of whom were OECD members or partners. Therefore, generalizability of the findings in the international model is not completely possible, as, despite their geographical diversity, participants are mostly from middle- and high-income countries. Despite the anecdotal evidence of PLC diffusion in developing countries, the sample for this study does not truly represent a global model. Additionally, from a theoretical perspective, this study did not address

the three critical components of world culture theory, focusing on global scripts and models rather than the process of loose-coupling between policy intent and implementation.

Although the cross-national reliability and validity of the TALIS questionnaires were accounted for in the survey design, the study was limited to the available questions in constructing the PLC components. As an example, although deprivatized practice might mean the same thing across 34 countries—a colleague observed and provided feedback—it is impossible, based on one survey question, to account for differences in intent across contexts. For example, having someone observe a teacher because he or she is doing an expert demonstration lesson differs greatly from being observed by a colleague because he or she is on an improvement plan to remediate poor performance. Similarly, the measure for principal observation and feedback was based on the frequency of observations, but did not speak to the quality of the feedback teachers received. Therefore, the reliance on teacher perceptions indicates that the validity of predictor variables should still be interpreted with caution.

Finally, HLM is a statistical model of regression and does not allow for causal relationships to be determined. The significant relationships between PLC components and TSE outcomes could work both ways. In other words, the possibility exists that teachers who reported higher levels of TSE were more likely to engage in various components of PLCs and have positive perceptions about them.

Recommendations for Future Research

This study was situated within a world culture theoretical framework. Although it used theoretical components of scripts and models and legitimacy seeking behaviors to explain the isomorphic tendencies of social capital reforms, it did not address the third theoretical construct of world culture theory, loose-coupling. Therefore, the international model constructed for this

study could serve as a point of comparison for groups of countries within a region, for instance. Additional contextual variables could be included to explain deviations between individual country models and the international model.

The methodology for this study could be replicated easily and applied to individual countries who participated in TALIS, which might be of interest to national policy makers in determining whether similar effects are noted at the country level. It is also suggested that more single-country studies explore the impacts of individual PLC components. Slegers et al. (2013) found that a model in which distinct dimensions of PLCs were loaded on a single latent PLC construct did not result in a better fit than their multidimensional construct, concluding that it was more nuanced to describe PLCs as a multidimensional construct. This study also found that separate PLC components had unique and statistically significant impacts on TSE outcomes, especially as school level aggregates. The continued study of distinct PLC components could provide a sharper focus on the specific activities in which teachers in a specific context should engage to improve their collective capacities.

Given potential concerns with TSE indicators being used as a proxy for teacher quality, relationships between PLC components and more traditional measures of teacher quality, such as student achievement, are possible. The most recent administration of TALIS included a TALIS-PISA link, which, methodologically, would allow researchers to design cross-survey models for a limited number of countries. TSE has also been found to serve as a mediating variable between certain teacher constructs and student achievement. Future research linked to PISA could examine the potential mediating effects of TSE on student outcomes.

The country level variables in the study accounted for only about 30% of the between country variance in TSE outcomes. Therefore, additional variables should be added to future

models to account for this variance. Of interest might be country level variables that are more closely related to national policy, such as levels of centralization and decentralization. Also, given the impact of education expenditure as a percent of GDP on TSE outcomes, future studies should try to delineate the variable into more specific components to help explain its significant effects. As hypothesized, country achievement and equity did not significantly impact the relationship between most PLC variables and TSE. The results of the study indicate that there is still significant variance in those relationships that can be modeled, requiring the addition of potential interaction variables.

Similarly, there is variance that can be modeled in the relationship between teacher level PLC components and TSE outcomes. Although principal instructional leadership did not have a significant direct effect on TSE outcomes, it could potentially be modeled as an interaction term, especially given the key role principals play in implementing PLCs (DuFour & Marzano, 2011). Other studies have shown that perceived instructional leadership was related to teacher perceptions of PLCs (OECD, 2016). The PLC components could also be used as outcome variables in future studies to determine whether school and country level variables related to school or district leadership, for instance, are significant predictors of each.

Finally, future research could benefit from mixed designs to supplement quantitative findings. Of interest would be policy discourse analysis that more fully explicates country and school efforts to implement systemic PLC models. For instance, some countries have begun to include measures of collaborative dialogue and collaboration into their teacher standards (Darling-Hammond et al., 2017). Other countries have developed systemic supports to fully integrate the dual functions of accountability and developmental models of supervision. An

analysis of policy documents could more fully support the empirical relationships found in this study.

Conclusion

The purpose of this study was to examine global trends in the relationships between social capital reforms and TSE in instruction, student engagement, and classroom management, serving as proxy indicators of teacher quality. The diffusion of PLCs and principal observation and feedback, as a measure of horizontal and vertical social capital, respectively, were explained using a world culture theoretical approach. Relationships were empirically tested using HLM in an international model comprised of 31 countries. Results suggest that there is a significant and positive relationship between various PLC components and TSE, but that no relationship existed between principal observation and feedback and TSE outcomes. Furthermore, a country's designation as high achieving, high equity generally did not impact the relationships between PLC components and TSE outcomes. These are significant findings, as social capital reforms are routinely promoted by organizations such as the OECD, with little empirical evidence to support their effectiveness in a cross-national context. There is reason for optimism in the findings, because PLCs, as a process, are adaptable to local contextual factors and are a sustainable way to improve the collective capacity of teachers in their efforts to improve learning for their students.

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Appendix A

Table 12

Bivariate Correlations Between School Level PLC Components

PLC component	Dialog	Focus	Purpose	Depriv	Collab
Dialog		.55**	.26**	-.12**	-.14**
Focus			.24**	-.16**	-.09**
Purpose				.06**	.28**
Depriv					.07**
Collab					

Note. ** $p < .01$.

Appendix B

Table 13

Changes in Standard Errors with Addition of Individual PLC Variables: TSE in Instruction

PLC component	Model a	Model b	Model c	Model d	Model e
Dialog	.60 (.060)	.43 (.059)	.39 (.060)	.39 (.064)	.31 (.066)
Focus		.56 (.053)	.52 (.052)	.52 (.052)	.47 (.050)
Purpose			.15 (.042)	.14 (.043)	.05 (.040) ^{ns}
Depriv				.09 (.080) ^{ns}	.00 (.080) ^{ns}
Collab					.14 (.027)

Note. Standard errors are in parentheses; ^{ns}Point at which coefficients became nonsignificant in the model.

Table 14

Changes in Standard Errors with Addition of Individual PLC Variables: TSE in Engagement

PLC component	Model a	Model b	Model c	Model d	Model e
Dialog	.58 (.052)	.40 (.053)	.36 (.059)	.36 (.059)	.31 (.062)
Focus		.58 (.046)	.53 (.043)	.53 (.044)	.50 (.037)
Purpose			.15 (.043)	.15 (.044)	.08 (.041) ^{ns}
Depriv				.02 (.065) ^{ns}	-.04 (.067) ^{ns}
Collab					.11 (.020)

Note. Standard errors are in parentheses; ^{ns}Point at which coefficients became nonsignificant in the model.

Table 15

Changes in Standard Errors with Addition of Individual PLC Variables: TSE in Management

PLC component	Model a	Model b	Model c	Model d	Model e
Dialog	.51 (.061)	.32 (.062)	.29 (.062)	.28 (.070)	.24 (.073)
Focus		.60 (.043)	.56 (.050)	.56 (.050)	.53 (.046)
Purpose			.14 (.042)	.14 (.044)	.08 (.043) ^{ns}
Depriv				-.05 (.060) ^{ns}	-.11 (.063) ^{ns}
Collab					.10 (.022)

Note. Standard errors are in parentheses; ^{ns}Point at which coefficients became nonsignificant in the model.

Joseph P. Brereton
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**ADMINISTRATIVE
EXPERIENCE**

CENTRAL BUCKS SCHOOL DISTRICT, Doylestown, PA July 2005-Present
Named 2016 National Distinguished Principal for Pennsylvania by the National Association of Elementary School Principals. Joined winners from each state for three day conference and awards banquet in Washington, DC. As *elementary building principal*, lead and supervise a professional and support staff of 100. Utilize differentiated models of instructional supervision to maintain student-centered and standards-based classrooms. In collaboration with building leadership team, study and analyze data to inform and improve instruction. Maintain positive and effective relationships with parents and community. Develop and implement relevant, on-going professional development. Responsible for all aspects of facilities and fiscal management. Led or served on the following district committees since 2005:

- Strategic Plan Steering Committee
- Chair, Best Practices in Curriculum and Instruction Strategic Planning Committee
- Co-Chair, Best Practices in K-12 Curriculum and Instruction Implementation Committee
- Administrative liaison for elementary reading
- Comprehensive Planning Committee
- Public Relations Committee
- Writing Committee for Rigor, Relevance, and Relationships
- Co-led team that designed *Literacy Skills in the 21st Century* video
- Designed and presented Reading in the Content Areas Observation Template
- Designed and presented R/R/R Peer Review Protocol
- Served as principal-mentor to six aspiring Central Bucks principals, and mentor to two current elementary administrators
- Completed 200 hour central office internship under direction of the superintendent

SOUDERTON AREA SCHOOL DISTRICT, Souderton, PA July 2003-June 2005
As the *principal* of Franconia Elementary, participated in all aspects of instructional, operational, and public leadership in an ethnically diverse elementary school of 520 students. Significantly raised student achievement scores in reading and math, and developed model for small group reading interventions for primary students, which was effectively implemented in all seven elementary schools.

CENTRAL BUCKS SCHOOL DISTRICT, Doylestown, PA June 2002-June 2003
As the *assistant principal* of Cold Spring Elementary was responsible for opening school for over 1,000 students without a principal. Responsible for all aspects of instructional and organizational leadership from June-December, until a principal was appointed.

**TEACHING
EXPERIENCE**

SIMON BUTLER ELEMENTARY SCHOOL, Chalfont, PA August 1997-June 2002
As a fourth and sixth grade inclusive *classroom teacher*, planned and taught lessons in all subject areas. Planned and coordinated school-wide events, including Butler Spelling Bee, Earth Day, and Multicultural Day. Led a teacher study group on standards-based planning and the Understanding by Design model. Served on the following school and district committees: Principal's Advisory Committee, Instructional Support Team, School Safety Committee, Superintendent's Advisory Council, Report Card Committee, Reading/Language Arts Curriculum Committee, Steering Committee for Central Bucks Strategic Plan, Elementary Math Transition Team. Mentor to special education teacher. Cooperating teacher for Penn State student teacher program.

EDUCATION

LEHIGH UNIVERSITY, Bethlehem, PA Present
Ph.D. candidate in Comparative and International Education. Coursework in research methodology, cross-national data analysis, educational equity, international education policy, and the superintendency. Research interests include teacher supervision and evaluation in cross-national contexts, international

comparisons of principal behaviors and dispositions and their impact on literacy achievement, international teacher quality discourse, and social capital reforms. Conduct research and provide trainings to mentor teachers, principals, and NGO staff in Siem Reap, Cambodia. Expected completion date: May 2018. Current GPA: 4.0

UNIVERSITY OF PENNSYLVANIA, Philadelphia, PA August 2001
Educational Leadership program for Aspiring Principals. Completed inquiry-based projects and case studies on issues involving special education, school law, community relations, and standards-based reform. Under supervision of university and on-site mentor, completed 240 hours of internship activities based on ISLLC Standards for School Leaders. Internship activities included ongoing professional development for new teachers, formative observation cycles with novice and experienced teachers, scheduling and staff assignments, and fiscal and facilities management. Studied and observed educational system and reform models of Great Britain during two week study trip. Overall GPA: 4.0

UNIVERSITY OF PENNSYLVANIA, Philadelphia, PA May 1997
Master of Science in Elementary Education, PA Instructional II Certification.
Presented to national audience at Ethnography in Education Research Forum: *Controversial Issues in the Elementary Classroom*. Award for 1996-1997 Portfolio Distinction. Overall GPA: 3.93

THE COLLEGE OF NEW JERSEY, Ewing, NJ May 1995
Bachelor of Arts in History. Summa Cum Laude. Overall GPA: 4.0

CERTIFICATIONS

Elementary Instructional II, University of Pennsylvania, 1997; **Principal Certification**, University of Pennsylvania, 2002; **Pennsylvania Superintendent Letter of Eligibility**, Arcadia University, July 2011

RELATED EXPERIENCE

School Leadership Program, University of Pennsylvania, Instructor November 2002-Present
Currently teach modules on teacher supervision, best practices in social studies supervision, global competencies for school leaders, and effective professional development. Presented to current and aspiring administrators on standards-based unit planning, essential questions, and Understanding by Design. Mentored ten aspiring principals in the program. Served on Graduate School of Education's Educational Leadership Advisory Board, 2008-2010.

SILOAM Ministries, and ActionAIDS, Volunteer, Philadelphia, PA September 1995-2000
Assisted in coordinating programs for persons infected with and affected by HIV/AIDS.

Big Brothers/Big Sisters, Volunteer, Jamison, PA August 2014-Present
Serve as a one-one mentor for an eleven year old boy.

PROFESSIONAL DEVELOPMENT & AFFILIATIONS

Essential Elements of Instruction, Dimensions of Learning, Living Our Lives as Writers, The Writer's Workshop Approach, Authentic Assessment, School Safety and Survival Training, Planning in a Standards-Based Classroom, Understanding by Design, Teacher Effectiveness Training, School Law and Supervision. Member of ASCD and NAESP.

PERSONAL

Traveled extensively in the US, Europe, Latin America, and East Asia. Observed educational system in China during two-week study trip. Through University of Pennsylvania, worked with government officials and school leaders in Great Britain during their implementation of the Literacy and Numeracy Strategies. Graduate of Outward Bound and National Outdoor Leadership Schools. Personal interests include mountaineering and fly fishing.