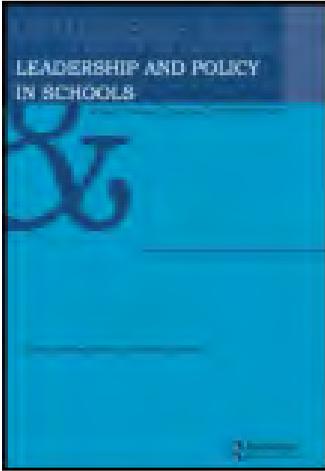


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Exploring the Impact of School Principals on Teacher Professional Communities in Hong Kong

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Since the mid-1990s, teacher professional community has achieved increasing influence as a strategy for facilitating productive change in schools. This study investigates the impact of principal quality and leadership on the development of teacher professional community in Hong Kong primary schools. More specifically, we examine the means by which principal quality, leadership, and organizational trust impact the strength of teacher professional community. Using survey data from 32 Hong Kong primary schools, we found that principals are crucial for the development of teacher professional community. Implications of the major finding are discussed in terms of research, policy, and practice.

Over the last twenty years, the role of school principals in shaping teaching and learning has been increasingly emphasized in school policy and practice (Day, 2009; Hallinger, 2003, 2011; Leithwood, 2001; Leithwood, Patten, & Jantzi, 2010; Thoonen, Slegers, Oorta, & Peetsmaa, 2012; Wiley, 2001). This focus on principal leadership emerged in North America during the 1980s (Hallinger, 2011; Leithwood, 2001). However, over the succeeding decades, a similar policy trend has since become evident in Europe (e.g., Day, 2009;

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Huber, 2004; Wildy & Loudon, 2000; Witziers, Bosker, & Kruger, 2003) and Asia (e.g., Dimmock & Walker, 2005; Hallinger & Lee, 2011, 2013; Hao & Wu, 2012; E. H. F. Law, 2011; Pan & Chen, 2011; Walker, Hu, & Qian, 2012).

In Hong Kong, for example, scholars (Y. C. Cheng, 2009; M. Lee, Walker, & Chui, 2012; Walker & Ko, 2011) have documented change in the education policy environment from *laissez faire* to high accountability for results. Since the turn of the millennium a complex array of government policy initiatives aimed at school improvement has changed the context in which school principals work (Y. C. Cheng, 2009, 2010; Y. C. Cheng & Walker, 2008; Education Department, 2002; Pang, 2010). Although policies such as school-based management were adopted with the goal of increasing school-level innovation, Hong Kong's education reforms have simultaneously increased the accountability of principals and their schools to central school authorities (Y. C. Cheng, 2009; Y. C. Cheng & Walker, 2008; Chui, Sharpe, & McCormick, 1996; E. H. F. Law, 2011; Pang, 2010; Walker & Ko, 2011). Thus, Hong Kong's principals find themselves in a fluid policy context, with conflicting expectations for leadership that are often difficult to interpret and navigate (Walker, 2012; Walker & Dimmock, 2000; Walker & Ko, 2011; E. O. W. Wong, 2003).

Scholars and practitioners alike recognize that principals can only achieve their school goals by enabling the efforts of teachers to improve teaching and learning in classrooms (Hallinger & Heck, 1998, 2011; Leithwood et al., 2010; Sebastian & Allensworth, 2012; Yu, Leithwood, & Jantzi, 2002). A. Hargreaves and Fink (2006) have asserted that "The ultimate goal for sustainable leadership in a complex, knowledge-sharing society is for schools to become professional learning communities" (p. 125). Indeed, school improvement is increasingly conceptualized as a "collaborative effort" that both engages and depends upon the motivation and collective capacity of principals and teachers (Bain, Walker, & Chan, 2011; Geijsel, Slegers, & Van den Berg, 1999; Hallinger & Heck, 2010, 2011; Leithwood & Jantzi, 2000; Leithwood & Sun, 2012; Murphy, 2013; Spillane, 2006). Therefore, even in "high-accountability contexts," the concept of teacher professional community (TPC) has emerged as an "intermediate target" (Kyriakides, Creemers, Antoniou, & Demetriou, 2009) for sustaining the momentum of education reforms (Bain et al., 2011; Ko, Hallinger, & Walker, 2012; E. H. F. Law, 2011; Walker & Ko, 2011). In sum, the idea of TPC has gained increasing traction and acceptance as a policy measure aimed at improving teaching and learning quality (McKinsey, 2007).

Nonetheless, validation of the TPC construct is largely based on empirical research conducted in "Western" education contexts (Leithwood, Louis, Anderson, & Wahlstrom, 2004; Stoll, Bolam, McMahon, Wallace, & Thomas, 2006; Vescio, Ross, & Adams, 2008). A broader research on TPC is needed in order to understand if and how this policy intervention achieves its objectives across different education contexts (Dimmock & Walker, 2005; J. C. K. Lee, Zhang, & Yin, 2011; Sargent & Hannum, 2009; J. L. Wong, 2010a, 2010b). We note, for example, that the role of principals in nurturing TPC is largely

unexplored in East Asian contexts (Lam, 2004; J. C. K. Lee et al., 2011; Pan & Chen, 2011; Sargent & Hannum, 2009; Walker, Hu, & Qian, 2012; Walker, Lee, & Bryant, 2014).

This article examines how principals contribute to the formation of teacher professional communities in the context of primary schools in Hong Kong. We surveyed 559 teachers in 32 Hong Kong primary schools in an effort to explore the means by which principals influence organizational conditions that are associated with school improvement and student learning (Hallinger & Heck, 1998, 2010; Leithwood et al., 2004, 2010). By locating the research in Hong Kong, we hope to contribute to global policy discourse on leadership and school improvement.

THEORETICAL PERSPECTIVES

In this section of the article we present the conceptual framework that guided this empirical study. Our review focuses on specifically on the variables of interest in this study: principal quality, principal leadership, organizational trust, teacher professional community, and teacher commitment.

The Role of Principals in School Improvement

Beginning with the seminal work of Steven Bossert and colleagues at the Far West Lab in the USA (Bossert, Dwyer, Rowan, & Lee, 1982), scholars have focused on exploring the means by which leadership impacts school outcomes (Hallinger, 2011; Hallinger & Heck, 1998; Leithwood, Begley, & Cousins, 1990). The Far West Lab conceptualization has led researchers to examine ways in which school principals influence a range of “mediating organizational conditions” that are posited to directly impact student learning (Hallinger, 2011; Hallinger & Heck, 1998; Leithwood et al., 2004, 2010; Witziers et al., 2003). At the same time, scholars have also recognized that the principal’s leadership is shaped by personal characteristics as well as features of the organizational context (Belchetz & Leithwood, 2007; Bossert et al., 1982; Goldring, Huff, May, & Camburn, 2008; Hallinger, 2011). Personal characteristics of principals that have been investigated include values, gender, teaching and administrative experience, preparation experiences, emotional intelligence, and self-efficacy (Hallinger & Heck, 1998; Leithwood et al., 1990, 2004, 2010). Context factors include social culture, organizational size and level, community characteristics, and district organization (Belchetz & Leithwood, 2007; Bossert et al., 1982; Bridges, 1977; Dimmock & Walker, 2005; Goldring et al., 2008; Hallinger & Heck, 1998; Leithwood et al., 1990, 2004).

This broad perspective on school improvement leadership shaped the selection of conceptual foci for this study. More specifically, as indicated in

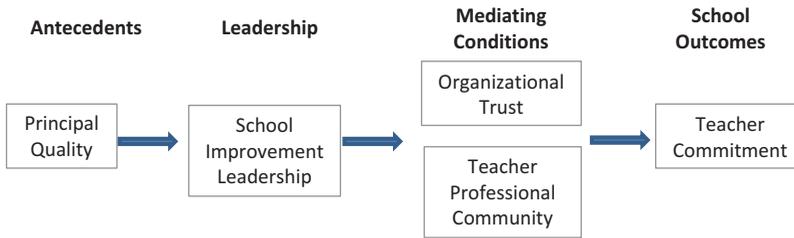


FIGURE 1 Basic model of leadership and school improvement.

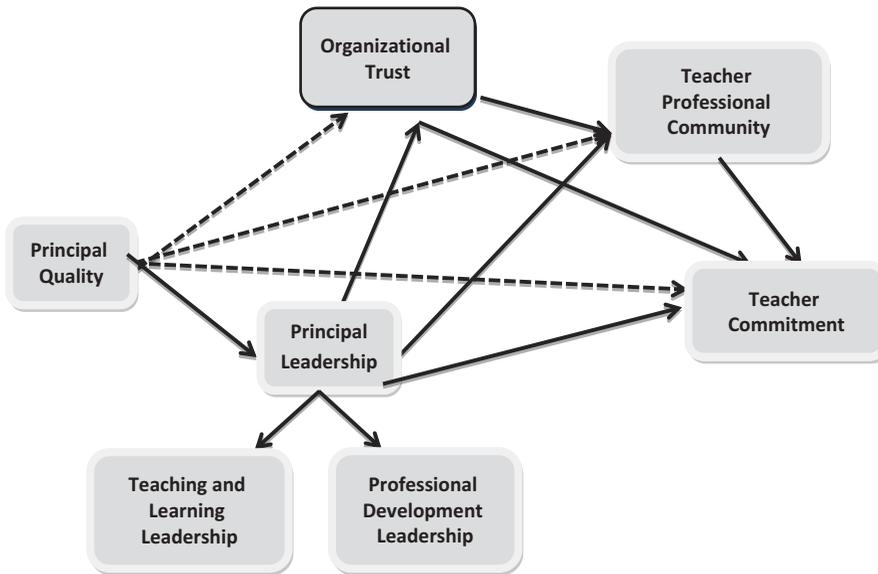


FIGURE 2 Conceptual framework for relationship among variables.

Figure 2, we focus on several constructs that are proposed to impact school improvement: Principal Quality, Principal Leadership, Teacher Professional Community, Organizational Trust, and Teacher Commitment. In this section, we examine literature related to each of these constructs.

Principal Quality

The linkage between leader qualities, leadership styles, and organizational outcomes has been reported in both the general leadership (e.g., Bono & Judge, 2004; Goleman, 2004; Judge, Bono, Ilies, & Gerhardt, 2002) and educational leadership literatures (e.g., Dimmock & Hattie, 1996; Leithwood & Beatty, 2008; Leithwood & Jantzi, 2008; Wahlstrom & Louis, 2008). For example, Day, Hadfield, Tolley, Beresford, and Harris (2000) reported that selected personal qualities of principals shaped their approach to leadership. Leithwood and Jantzi (2008) emphasized the importance of emotional

stability, self-confidence, self-efficacy, and openness as foundations for successful principal leadership. Yamamoto (2010) described how the capacity of secondary school leaders to manage emotions both varied across individuals and contributed to goal achievement in their schools.

Findings from this global literature as well as from local studies conducted in Hong Kong (e.g., Begley & Wong, 2001; Y. C. Cheng, 2010; Y. C. Cheng & Cheung, 2003; Cheung & Walker, 2006; Chui et al., 1996; Hallinger, Lee, & Szeto, 2013; Kwan & Walker, 2008; L. Y. S. Law & Walker, 2003; Pang & Pisapia, 2012; Tam, 2010; Walker & Kwan, 2009; C. Wong, Wong, & Peng, 2010) have influenced policy developments in Hong Kong over the past two decades. The Hong Kong Education Department employs a locally developed “leadership framework” to guide policy and practice in school leadership preparation, selection, development, and evaluation (Education Department, 2002). The framework seeks to “equip and develop school principals with the necessary knowledge, skills and attitude to become competent leaders to lead schools” (Education Department, 1999, p. 3; see also Walker & Kwan, 2009).

Within this framework, Principal Quality is conceived as comprised of clusters of values, knowledge, skills, and personal attributes. Examples include vision for improvement, persistently working for high academic achievement, being passionate about the well-being and achievement of all staff and students, and encouraging staff to continually evaluate, refine, and improve organizational structure and culture. These features of Principal Quality that are embedded in Hong Kong school system policies and processes were included in this study.

Principal Leadership

Over the past 20 years, two competing theoretical perspectives have dominated global discourse on principal leadership: instructional leadership and transformational leadership (Hallinger & Heck, 1998; Leithwood & Jantzi, 2000; Robinson, 2006). Recently, however, scholars have increasingly emphasized the overlapping constructs that comprise these perspectives on principal leadership (Hallinger 2003; Leithwood et al., 2010; Marks & Printy, 2003; Mulford & Silins, 2003). Thus, in this study we included leadership dimensions that figure prominently in both models: Teaching and Learning Leadership and Professional Development Leadership. We propose that these dimensions of Principal Leadership will impact levels of Organizational Trust, Teacher Professional Community, and Teacher Commitment in schools (see Figure 2).

We define Teaching and Learning Leadership in terms of practices that focus on stimulating innovative instructional practices and instructional design; articulating links between teaching and learning, and encouraging the use of effective instructional approaches to improve student achievement

(see Appendix A). Prior research found that these instructional leadership behaviors were positively associated with student academic achievement in Hong Kong (e.g., M. Lee, Walker, et al., 2012).

Scholars have also studied the role that school leaders play in fostering teacher professional learning in Hong Kong (E. Cheng, 2012; Y. C. Cheng, 2005; Lam, 2004; E. H. F. Law, 2011). For example, Y. C. Cheng (2005) highlighted the impact of leadership that supports teachers' professional development related to Hong Kong's education reforms (ACTEQ, 2003). This framework echoes our own measure of Professional Development Leadership (see Appendix A).

Organizational Trust

Stoll and colleagues (2006) asserted that "the nature and quality of the leadership provided by the principal . . . has a significant influence on the nature of school culture" (p. 235). School cultures that foster openness and capacity for change have, in turn, been identified as a key "path" for school improvement (e.g., Hallinger & Heck, 1998, 2010, 2011; Leithwood et al., 2004, 2010). More specifically, "trust" among the stakeholders responsible for school improvement appears to play an important role in shaping productive school cultures (Bryk & Schneider, 2002, 2003).

In a review of this body of research, Wahlstrom and Louis (2008) drew two conclusions relevant to the current investigation. First, principals build collegial trust through supportive behavior aimed at meeting the professional needs of teachers. Second, trust in relationships between the principal and teachers, as well as among teachers, is conducive to development of teacher professional community.

In this study, we conceptualized "organizational trust" as the degree to which school members perceive that they can freely discuss their feelings, worries, and frustrations about their working conditions, and whether they have confidence in the competence of their colleagues. This conceptualization is in line with Bryk and Schneider's (2002, 2003) conceptual subcategories of relational trust (e.g., respect, competence, integrity).¹ Within our model (see Figure 2), Organizational Trust is located as a mediator of the influence that principals have on the formation of TPC (Bryk et al., 2010; Cosner, 2009; Hoy & Tschannen-Moran, 1999; Hoy, Tarter, & Kottkamp, 1991; Tschannen-Moran, 2001, 2009).

Teacher Professional Community

There is no one generally accepted definition of Teacher Professional Community (DuFour & Eaker, 1998; Feger & Arruda, 2008; D. H. Hargreaves, 2007; A. Hargreaves & Fink, 2006; Hord, 1997; Stoll & Louis, 2007; Toole & Louis, 2002; Westheimer, 1998). The evolution of the idea of TPC can be

traced from the concepts of “teacher collegiality” (Little, 1982, 1990; Saphier & King, 1985), “teacher collaboration” (Rosenholtz, 1991), “communities of practice” (Wenger, McDermott, & Snyder, 2002), and “learning organizations” (Senge, 1996). Through application in practice (Dufour, 2004; Dufour & Eaker, 1994) as well as scholarship (e.g., Feger & Arruda, 2008; Hamos et al., 2009; Hord, 1997), these constructs gradually morphed into a blended construct that is often referred to as Teacher Professional Community (Louis, 2006a; Louis, Kruse, & Bryk, 1995; McLaughlin & Talbert, 2001; Sargent & Hannum, 2009).

Emerging quantitative research has contributed to a more precise conceptualization of TPC. Kruse, Louis, and Bryk (1995), for example, conceptualized TPC with five interconnected variables: reflective dialogue, deprivation of practice, collaborative activity, shared sense of purpose and, collective focus on student learning. M. Lee, Louis, and Anderson (2012) further distilled these constructs into shared responsibility (teachers’ collective sense of feeling responsibility for learning effective or new teaching practices), reflective dialogue (teachers’ deeper conversations about what works for improving student learning), and deprivatized practice (teachers’ opening classroom teaching practices through observation and feedback).

In this study, the measure of TPC largely overlaps with those used by Leithwood and Jantzi (2000) as well as M. Lee, Louis, et al. (2012). However, our measure of TPC did not include the dimension of deprivatized practice. Prior research had suggested that this is a rare practice in Hong Kong’s schools (Choi & Tang, 2009; Ho, 2010; Lam, 2004; E. H. F. Law, 2011; Walker & Dimmock, 2000).

Teacher Commitment

The construct of Teacher Commitment has its roots in the more broadly studied construct of Organizational Commitment (Alper, Tjosvold, & Law, 1998). It refers to individual teacher’s psychological attachment to their profession and their school (Fresko, Kfir, & Nasser, 1997; Leithwood & Jantzi, 2002; OECD, 2005). Consistent with this view, our measure of Teacher Commitment centered on attitudinal dimensions of teachers’ commitment and attachment to the school (Louis, 2006b).²

To date, only a handful of studies focusing on teacher commitment have been conducted in Hong Kong schools (e.g., Y. C. Cheng, 1990; Choi & Tang, 2009; Yu et al., 2002). Among those studies, Yu et al.’s study (2002) showed how principal leadership contributed to shaping teacher commitment. Choi and Tang (2009) supported this finding that commitment of mid-career teachers is substantially promoted by admirable principal leadership. They further added that favorable workplace conditions, such as recognition of achievement and support from colleague teachers, are important for enhancing teacher commitment.

While informative, still few systematic studies on the linkage between TPC and teachers' commitment have been conducted in the context of Hong Kong. Beyond Hong Kong, we also note that relatively little attention has been paid to investigating the empirical linkage between TPC and teacher commitment (cf. Stoll et al., 2006; Stoll & Louis, 2007). Since we know that teacher commitment is also influenced by other factors such as leadership and trust (Choi & Tang, 2009; M. Lee, 2006; Yu et al., 2002), we incorporated these into the full model examined in this study.

RESEARCH HYPOTHESES

Based on this literature review we proposed three hypotheses that reflect the model proposed in [Figure 2](#).

1. First, we propose that Principal Quality will have a direct effect on Principal Leadership and TPC, and an indirect effect on TPC through Principal Leadership and Organizational Trust, respectively.
2. Second, we hypothesize that Principal Leadership will have both direct and indirect effects on TPC. The indirect effect of Principal Leadership is assumed to be mediated by Organizational Trust.
3. Third, we hypothesize that Organizational Trust will have a direct effect on TPC, which in turn will influence Teacher Commitment directly.

In [Figures 2](#) and [3](#), dotted and solid arrows (i.e., paths) describe the proposed relationships among the variables included in this study. We tested two models including solid and dotted arrows (proposed model) vs. model including only solid arrows (competing model).

METHODOLOGY

The current study was conducted as part of a longitudinal survey study of leadership in 32 Hong Kong primary schools. The current report focuses on data collected in the first year of the study.

Data Collection

We invited primary schools from the larger school sponsoring bodies (i.e., local school authorities) in Hong Kong in 2011–2012. Thirty-two schools agreed to participate. These represented 6% of Hong Kong's primary schools. The low rate of school participation rate is not atypical of the response rate in Hong Kong (see M. Lee, Walker, et al., 2012). From the participating schools,

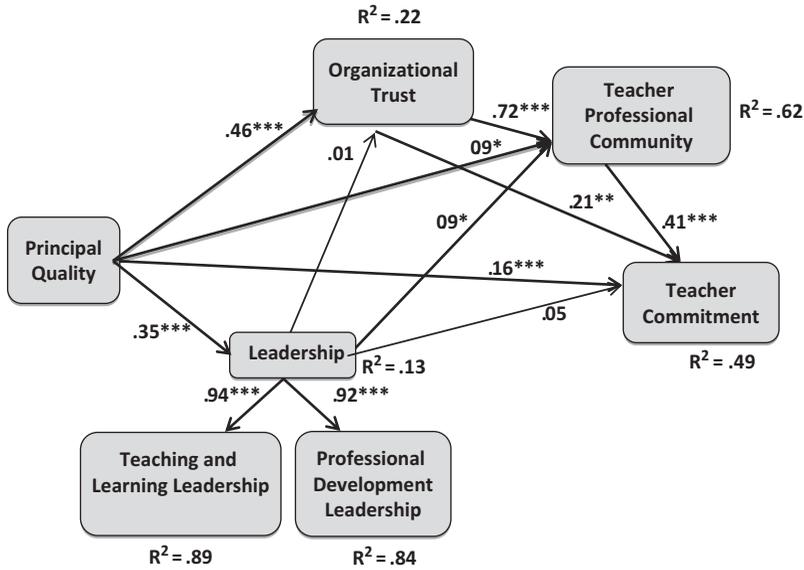


FIGURE 3 Structural equation modeling examining leadership effects on TPC. $N = 559$ teachers. $***p < .001$, $**p < .01$, $*p < .05$. For a simplified illustration, factor loadings of indicator variables and error terms were omitted.

we gathered teacher data through an online survey. In total, 559 teachers from 32 schools responded to our survey questionnaire: the response rate was 72.5%.

The data gathered in the study was representative in terms of school location by Hong Kong’s education districts. The 32 schools were located across all the 18 districts in Hong Kong. In other words, our data included at least one school from each district in Hong Kong. Given that school location by district is a proxy indicator of school socioeconomic status (SES) in Hong Kong (Yuen & Lee, 2013), it can be said that our data had a reasonably good representativeness of school SES. Indeed, the average of the median household incomes of school districts in our data was HKD\$20,943 per month, which was almost equal to the average of the 18 districts’ median income, i.e., HKD\$20,500 per month in 2011 (Population Census, 2011).

The data also indicated a good representativeness in terms of the type of school (private schools and public schools including government, aided, and direct subsidy scheme). The proportions of school types in our data were similar as those of school types in the entire schools.³ In sum, we note that although the selection of schools was not based on random sampling, characteristics of the data set indicate a reasonable degree of representation on two of the most important school characteristics in Hong Kong.

Measures

We used existing survey instruments to understand the effect of principals on TPC. Specifically, to obtain content validity of each survey item, we adopted widely used survey items from studies conducted in Hong Kong schools and elsewhere: Principal Quality (i.e., Walker & Ko, 2011), principal leadership (i.e., M. Lee, Walker, et al., 2012; Walker & Ko, 2011), Organizational Trust (i.e., Walker & Ko, 2011), TPC (i.e., Leithwood & Jantzi, 2000) and organizational commitment (i.e., Alper et al., 1998).

Initially, the instrument was checked with four pilot schools in terms of validity, and revalidated with the current data from the 32 schools. Specifically, using the current data, a CFA measurement model including the aforementioned constructs indicated the soundness of the proposed factor-structure (see Appendix B for details). Notably, the CFA measurement model indicated an acceptable overall model fit: CFI = .922, TLI = .913, RMSEA = .072, SRMR = .066, and $X^2 = 1747.9$, $df = 449$. In other words, the six-factor structure was fully supported by the data.⁴ Specifically, six latent constructs were as follow. The construct of Principal Quality was developed using six items on teachers' perceptions of their principals' characteristics such as encouragement, self-reflection, passion, persistent work, being optimistic, etc. (see Appendix A for details on survey items). Higher values mean higher levels of such characteristics (6-point Likert scale).

Two dimensions of Principal Leadership (i.e., Professional Development and Teaching and Learning) were included, given their conceptual linkages with TPC. Higher values mean higher levels of these characteristics (6-point Likert scale). The construct of Organizational Trust was built by four items around trustworthy relationships among school members. Teacher Professional Community (TPC) was based on individual teachers' responses on six items (6-point Likert scale). Teacher Commitment was measured as a teacher-level organizational variable. The items are shown in Appendix A.

Next, convergent validity was first examined. The factor loadings (i.e., standardized regression weights) were both substantial and statistically significant (see Appendix B). As presented in Appendix B, most of the indicator variables showed excellent factor loadings (i.e., higher than .70; Tabachnick & Fidell, 2007). Although two out of six indicators of Teacher Commitment showed relatively lower factor loadings, overall the construct showed solid factor loadings.

We also investigated another main aspect of construct validity (i.e., discriminant validity). Due to high correlations between the two leadership constructs in the measurement model (i.e., .865), we scrutinized whether the pair of constructs were still distinguishable factors from each other (see Table 2). In other words, because a correlation above .85 may signal poor discriminant validity (Kenny, 2011), we used multiple approaches to investigate the discriminant validity of the two constructs. These included:

(1) average variance extracted (AVE) > the square of correlation, (2) chi-square comparison (Kenny, 2011), (3) standardized model fit comparison (Kenny, 2011), and (4) Anderson and Gerbing's (1988) test.

First, we examined whether the AVE values of Professional Development Leadership and Teaching and Learning Leadership were greater than the square of their correlation (Fornell & Larcker, 1981; Netemeyer, Johnston, & Burton, 1990). The result indicated that the AVE of Professional Development Leadership (.77) was greater than the square of the two constructs' correlation (i.e., .75), while the AVE of Teaching and Learning Leadership was not (.73).⁵

Subsequently, we cross-checked this result by comparing a competing model, which constrained the correlation of the two constructs to one with the proposed model (Kenny, 2011). The model fit of the competing model (i.e., constraining correlation coefficient) was also acceptable: CFI = .921, TLI = .913, RMSEA = .072, SRMR = .067, and $X^2 = 1753.2$, $df = 450$. However, the chi-square test indicated that the two models were significantly different ($\Delta X^2 = 5.3$, $df = 1$) and the original model indicated better model fit. That is, the model comparison suggested discriminant validity between the two constructs.

Given these results, we compared another competing model, which collapsed the two leadership constructs into one construct, with the original model (Kenny, 2011). We used standardized model fit indices instead of chi-square statistics, since the two models are not nested. The result indicated that the original model maintained better model fit (CFI = .922, TLI = .913, RMSEA = .072, SRMR = .066, and $X^2 = 1747.9$, $df = 449$) than the competing model (CFI = .888, TLI = .878, RMSEA = .085, SRMR = .068, and $X^2 = 1747.9$, $df = 449$). This supported discriminant validity of the two leadership constructs.

Finally, we employed another complementary assessment using the correlation coefficient (.865) and standard error (.064) between the two constructs. According to Anderson and Gerbing (1988), if "the confidence interval of (+ two standard errors) around the correlation estimate between the two factors" does not include 1, then discriminant validity exists between the constructs (p. 416). The result suggested differences between the two leadership dimensions ($.865 + 2 \times .0464 = .737 \sim .993$).

As presented in Appendix B, all constructs met a reliability standard of at least .75, which we deemed sufficient for this research. In conclusion, our measures showed strong psychometric properties related to construct validity (i.e., convergent and discriminant validity) and measurement reliability.

Data Analysis

The complexity of the proposed model required analytical methods capable of measuring both indirect and direct effects among several variables. The

data were analyzed using structural equation modeling (SEM), developed from a CFA measurement model. We employed Sobel's formula (1982) in order to examine evidence of indirect effects among the relevant constructs in the model.

Before the main analysis, we checked kurtosis and skewness of all the variables in the model, based on a widely used guideline of normality (Curran, West, & Finch, 1996). Consequently, a bootstrap approach was used for addressing the issue of non-normality (see Appendix A). The bootstrapping involved resampling and replacing the original dataset 1,000 times for CFA and SEM. The online system for survey data collection had required respondents not to answer all questions. Therefore, there were no missing responses on the survey.

Several key indices were used to assess model fit. These included the chi-square test statistic, root-mean-square-error of approximation (RMSEA), standardized root mean square residual (SRMR), comparative fit index (CFI), and Tucker-Lewis Index (TLI). We used standard cutoff recommendations for the RMSEA, SRMR, CFI, and TLI (Hu & Bentler, 1999; Fan & Sivo, 2007) rather than chi-square statistic, which is sensitive to sample size (Bentler, 1990). For the RMSEA and SRMR, values less than .05 and .08 suggest a good model fit and an acceptable model fit, respectively. For the CFI and TLI, values greater than .95 and .90 indicate goodness of fit and acceptable fit, respectively.

Consistent with our conceptual framework, we employed both exogenous and endogenous latent constructs in the final SEM analysis. Principal Quality was the exogenous construct, whereas the other constructs were treated as endogenous latent constructs. The two leadership constructs were modeled as a second-order factor structure. Finally, we examined competing models using chi-square tests. The details of the model comparison are described in the following section.

Table 1 presents descriptive statistics of the six constructs. The mean of the constructs ranged from 3.68 (*SD* 1.06) to 4.63 (*SD* 0.74). Notably, teachers' ratings of the two constructs of Principal Leadership were the lowest: 3.68 (Teaching and Learning) and 3.69 (Professional Development). Given that they were measured on a 6-point Likert scale (i.e., 3 means "agree little" and 4 means "agree partially"), the level of Principal Leadership perceived by the teachers can be described as "moderate". At the same time, the mean

TABLE 1 Descriptive Statistics for the Six Constructs (*N* = 559 Teachers).

	Min.	Max.	<i>M</i>	<i>SD</i>
Principal Quality	1	6	4.33	1.06
Professional Development	1	6	3.69	1.06
Teaching and Learning	1	6	3.68	1.06
Organizational Trust	1	6	4.63	0.74
Teacher Professional Community	1	6	4.45	0.75
Teacher Commitment	1	6	4.17	0.93

TABLE 2 Correlation Matrix for Factors ($N = 559$ Teachers).

	Principal Quality	Leadership: Professional Development	Leadership: Teaching and Learning	Organization Trust	Teacher Commitment
TPC	.456	.215	.236	.775	.660
Principal Quality		.313	.343	.463	.460
Professional Development			.865	.176	.197
Teaching and Learning				.140	.253
Organizational Trust					.610

Note. All correlation coefficients were significant at $p < .001$ while the correlation between Organizational Trust and Teaching and Learning was $p = .002$. Bias was corrected through bootstrapping.

of Principal Quality was 4.33. Thus, perceptions of principals' leadership on these instructional leadership dimensions were less positive than their more general perception of the principals on the "quality" dimensions. Unlike the two leadership variables, the constructs of Organizational Trust, TPC, and Teacher Commitment were higher than 4.00.

Table 2 provides a correlation matrix among the latent constructs included in the analysis. Notably, all of the constructs had significantly positive correlations with one another at the level of $p < .001$. The consistently positive correlations are understandable given the meanings embedded in each of the constructs that are related to school improvement. In addition, given the consistently positive correlations among the six constructs in the table, it can be said that the survey instrument has nomological validity as well, a part of construct validity. At the same time, however, as some pairs of constructs showed very high correlations, which may signal poor discriminant validity, we ensured the discriminant validity issue (see the section of measures above). Specifically, after checking the discriminant validity between the two leadership constructs, they were modeled as a second-order factor in our final analysis.

RESULTS

The results are presented in two parts. First we present the model comparison that sought to determine which of the models described above offered the best fit our data. Then we examine each of the hypotheses.

Model Comparison

To determine the final analytical model, we tested differences between our proposed model and alternative models using chi-statistics. Specifically,

we investigated an alternative model by adding three paths from Principal Quality to Organizational Trust, TPC, and Teacher Commitment (see dotted paths in Figure 2). This was because one may argue that teachers' perceptions of Principal Quality may influence teachers' perceptions of Organizational Trust, TPC, and Teacher Commitment. Notably, these tests were conducted not for exploring a sequence of models based on model-modification indices, but for examining the validity of our proposed model (MacCallum, Roznowski, & Necowitz, 1992). Chi-square statistics indicated a significant difference between the proposed model ($X^2 = 1762.1$, $df = 453$) and the competing model ($X^2 = 1890.9$, $df = 456$): $\Delta X^2 = 128.9$, $\Delta df = 3$, $p < .001$. This suggests that the proposed model demonstrated a better model fit. As such, the proposed model was further analyzed.

The proposed model showed acceptable model fit: CFI = .921, TLI = .913, RMSEA = .072, SRMR = .066, and $X^2 = 1762.1$, $df = 453$). Figure 3 presents SEM results of the proposed model with standardized beta coefficients and r -squares, adjusted by bootstrapping. As illustrated in Figure 3, all the standardized coefficients were statistically significant ($p < .05$), except the two paths from Principal Leadership to Organizational Trust and Teacher Commitment, respectively.

Hypothesis Testing

Our three hypotheses sought to explore relationships among variables within the proposed model.

TEST OF HYPOTHESIS 1: PRINCIPAL QUALITY EFFECTS ON TPC

Principal Quality showed a direct effect on TPC (significant at .09*). Principal Quality influenced TPC through Organizational Trust (.46***), which in turn had a significantly positive effect on TPC (.72***). Using Sobel's formula, the indirect effect of Principal Quality on TPC through Organizational Trust was confirmed (Sobel, 1982).

$$Z = a \times b / \sqrt{(b^2 Sa^2 + a^2 Sb^2)},$$

In this formula, a is the unstandardized path coefficient from Principal Quality to Organizational Trust (.328), Sa^2 is the standard error of a (.033), b is the unstandardized path coefficient from Organizational Trust to TPC (.683), and Sb^2 is the standard error of b (.044). Sobel's test supported the indirect effect of Principal Quality on TPC: $z = 8.37$, $p < .001$. This suggests that the association between Principal Quality and TPC was significantly mediated by Organizational Trust. It should also be noted that the

magnitude of the indirect effect of Principal Quality on TPC is very high ($z = 8.37$), given that $z = \pm 1.96$ are the cut-off values of the test for significance.

Using the same test, the indirect effect of Principal Quality on TPC through Principal Leadership was also confirmed ($z = 2.46$, $p < .05$). However, the magnitude of the indirect effect through Principal Leadership was approximately only one third of the indirect effect of Principal Quality through Organizational Trust. This suggests that teacher perceptions of the implementation of TPC is more strongly shaped by the level of Organizational Trust. In addition, Principal Quality had a direct effect on Principal Leadership (.35***), suggesting that personal qualities of principals are significantly associated with shaping principals' approaches to leadership. That is, teachers' perceptions of high levels of principal values and attributes are positively associated with teachers' evaluations of principals' leadership practices that aim to support teaching, instruction, and professional development.

TEST OF HYPOTHESIS 2: PRINCIPAL LEADERSHIP EFFECTS ON TPC

In our analysis Principal Leadership was constructed with the two-factor structure: Teaching & Learning and Professional Development. The sub-factors loaded onto the higher order construct of Principal Leadership that had a small but significant direct effect on TPC (.09*). The magnitude of the direct effect of Principal Leadership on TPC was the same as that of the direct effect of Principal Quality on TPC (.09*). This further indicates that both principals' attitudinal features (i.e., Principal Quality) and behavioral characteristics (i.e., Leadership) contribute to the formation of TPC. Unlike Principal Quality, however, the indirect effect of Principal Leadership on TPC through Organizational Trust was not supported in the model. This could be interpreted that principal leadership practices contribute to school improvement but not necessarily by boosting trust among school staff in Hong Kong. Somewhat surprisingly, we also found no significant direct relationship between Principal Leadership and Teacher Commitment. This is an unexpected finding when compared to the finding that Principal Quality had a significant direct effect on Teacher Commitment (.16***).

TEST OF HYPOTHESIS 3: ORGANIZATIONAL TRUST AND TPC EFFECTS ON TEACHER COMMITMENT

Organizational Trust had a significant direct effect on TPC. Notably, the standardized coefficient of Organizational Trust on TPC was much higher (.72***) than that of Principal Quality (.09*) and Principal Leadership (.09*). This suggests that Organizational Trust could be crucial in forging TPC. Taken together, these three variables (i.e., Principal Quality, Principal Leadership, and Organizational Trust) explained 62% of variance in TPC across the

32 schools. As predicted, TPC also had a significant effect on Teacher Commitment (.41***). Organizational Trust was also an important factor influencing Teacher Commitment (.21**).

DISCUSSION

This study was conducted within the context of global research that seeks to understand how principals contribute to school improvement (Hallinger & Heck, 1998; M. Lee, Hallinger, & Walker, 2012; Leithwood et al., 2004, 2010; Thoonen et al., 2012; Walker et al., 2014). Research in this domain has identified a number of promising “mediating variables” consisting of school conditions that impact school capacity for innovation as well as teaching and learning. This study focused on how school principals impact teacher professional community and commitment.

The research was conducted in Hong Kong, where structural efforts at education reform and school improvement have been ongoing for the past two decades (Y. C. Cheng & Walker, 2008). Two potentially conflicting lines of strategic policy enactment have been observed in regard to Hong Kong’s efforts at education reform: system policies that increase school-level accountability and policies intended to promote teacher professional community. In this section of the article we first highlight limitations of the study. Next we review the main findings. Finally, we offer our interpretation of the findings and their implications for policy and practice.

Limitations

Although the model tested in this study demonstrated solid explanatory power (e.g., 62% of the variance in TPC was explained by the model) and is based on robust measures and analytical procedures, several limitations should be noted. First, as Stoll and colleagues (2006) point out, the development of teacher professional community in schools is an ongoing process.⁶ This suggests that longitudinal approaches are needed to study how TPC emerges, is developed, and is sustained. The current study employed a cross-sectional survey that is unable to offer a time-based perspective on this process.

Second, although our model included key variables that appear to influence the implementation of TPC, it is possible that the model omitted other relevant mediators of TPC. Third, as noted earlier, the sample of primary schools was not randomly selected. Therefore, the generalizability of our findings is limited, and requires further verification. Finally, the model tested in this report did not include student learning outcomes. Future studies should seek to verify the relationship between teacher commitment and student learning outcomes.

Interpretation and Implications of the Findings

Teacher Professional Community has been proposed as a proxy measure of the “quality of day-to-day teachers’ life in schools” (Furman-Brown, 1999). This has stimulated interest in understand how TPC forms, and other school-level conditions that impact its development. In this study, we found

- Principal Quality proved to be a more significant determinant in our model than did measures of Principal Leadership. Principal Quality influenced TPC directly and indirectly, and also contributed to positive perceptions of Principal Leadership and Organizational Trust.
- Principal Leadership had a small direct effect on TPC, but surprisingly no significant effect on levels of Organizational Trust and Teacher Commitment.
- Organizational Trust had a substantial and significant effect on teacher perceptions of TPC in their schools.
- Organizational Trust and TPC both demonstrated direct effects on Teacher Commitment.

These findings refocus attention on the role that “indirect leadership” (Hallinger & Heck, 1998; Kleine-Kracht, 1993; Leithwood et al., 2010) plays in enhancing organizational capacities associated with school improvement (e.g., Hallinger & Heck, 2010, 2011; Thoonen et al., 2012; Walker & Ko, 2011). Our findings are quite consistent those of Bryk and Schneider (2002), who reported that principals were key agents in forging and fostering relational trust in schools. Our finding also offers support for Cherkowski’s (2012) qualitative findings in Canada:

Fostering a sustainable learning community depends in part on the leader’s ability to create conditions in which teachers learn to recognize and challenge the usefulness of their existing beliefs and practices in order to improve their students’ education. This level of change demands much of teachers and requires an environment of trust and support in which teachers feel free to try out new beliefs and practices, make mistakes, learn from these mistakes and try again—a positive and supportive emotional climate is critical. Principals will need to create conditions that evoke a desire for leadership and commitment from others in the community to contribute to developing and sustaining shared visions, goals and purposes. (p. 59)

Moreover, the findings related to Principal Quality affirm Leithwood’s (see Leithwood et al., 2006; Leithwood & Jantzi, 2008) distinction between principal characteristics and leadership. Our findings suggest that the personal characteristics of school leaders represent a potentially viable target for leadership recruitment, selection, and development efforts in school systems

(see Walker & Kwan, 2006). At the same time, the results prompt us to ask “Why did Principal Quality have a stronger relationship to Organizational Trust and Teacher Commitment than the measures of Principal Leadership?” The results also lead us to raise a parallel question, “Why didn’t Principal Leadership have a stronger relationship to Organizational Trust and Teacher Commitment?”

We provide several possible answers to the questions. First, even though Principal Quality and Principal Leadership are conceptually interdependent, they could have differential effects on outcomes such as Teacher Commitment. Desirable personal qualities of the principal may be recognized as they stand in daily school life, whereas principals’ influence on teachers (i.e., Principal Leadership) is conditioned by organizational contexts or constraints. For example, a principal could be respected by teachers because of qualities such as self-reflection, passion, or optimism (see our measures in Appendix A). At the same time, however, teachers’ interpretations of the principal’s leadership practices (e.g., giving advice, mentoring, coaching, training) intended to enhance teaching and learning may be shaped by features of the policy environment (e.g., pressure to achieve results on tests). Thus, although Hong Kong’s primary school principals are expected to act as “instructional leaders,” the system’s accountability framework places them in the position of implementing numerous policies and programs that potentially conflict with building trust and professional community.

In a related fashion, one could argue that the instructional leadership practices incorporated into our definition of Principal Leadership have differential effects. On the one hand, they could contribute to quality teaching and learning. At the same time, however, the same practices could, at times, negatively impact teacher trust and commitment. This suggests the need to examine additional dimensions of Principal Leadership in order to understand how leadership contributes to trust and commitment and relevant tradeoffs.

Given the high proportion of the variance in TPC explained by the parsimonious model, we believe that principals do contribute to the formation of TPC in Hong Kong schools. Nonetheless, the study also highlights the importance of the policy context for understanding how principals achieve results through people. As indicated in the words of government policy, the hierarchical culture of Hong Kong schools remains a persistent and relevant issue:

There is a widespread perception that many principals are insufficiently experienced and inadequately trained for their tasks. Because proper management structures and processes are lacking, some principals are insufficiently accountable for their actions and see their post as an opportunity to become “little emperors” with dictatorial powers in the school. (Education and Manpower Branch Department, 1991, p. 14)

This old but persistent issue implies system-level distrust of principals (Cheung & Walker, 2006; Walker & Ko, 2011). It should be noted that in Hong Kong the Education Department has traditionally exercised relatively little direct control over principals. Principals have been hired, evaluated, and fired by local school authorities (i.e., School Sponsoring Bodies). Thus, a central strategic aim embedded in the government's accountability framework implemented over the past decade has been to gain greater control over the system's principals. Ironically, in Hong Kong the implementation of school-based management, generally associated with decentralization of decision making, has been employed as tool for centralizing the Education Department's authority over principals and schools. The conflicting messages embedded in this policy context may explain the contrasting effects of Principal Quality and Principal (Instructional) Leadership on Teacher Trust and Commitment.

In line with this emerging literature, our study adds an empirical support of the important role of Principal Quality in shaping key organizational features such as trust, commitment, and TPC. Our study resonates with that Stoll et al. (2006, p. 237) called "the human side of leadership" that seems to be an important factor in leading TPC where the meaning and quality of day-to-day teachers' lives are substantially determined.

NOTES

1. Trust research can be traced from post-Cold War origins in the context of trust between unfamiliar individuals and this later developed in the organization setting to become "institutional trust," which is the expectation of appropriate behavior based on the norms of that institution (Louis, 2006a). Following from this, Tschannen-Moran's (2001) measure of faculty trust is the primary measure of trust used in educational research and extensively applied in empirical study of public school in the United States. The construct of faculty trust includes teachers' trust in their colleagues, in their clients (students and parents), and notably in their principals.

2. Note that another important dimension of teacher commitment is commitment to students and student learning (Louis, 1998). Given that it is one of the core parts in teacher commitment, we note that our measure for teacher commitment is somewhat limited in terms of incorporating such a dimension.

3. Specifically, here are the comparisons of the school types between our data and the entire schools: Aided (88% of our data vs. 82% of the entire schools), Government (3% of our data vs. 7% of the entire schools), DSS (3% in our data vs. 4% in the entire schools), and Private (6% of our data vs. 7% of the entire schools). We wish to note that due to the issue of data accessibility we used the 2013 primary school profile data (Committee on Home-School Cooperation, 2013) while our data collection was completed in 2012 for these comparisons. However, we do not think that there was a dramatic change of school type during the period between 2012 and 2013.

4. Several serious cross-factor loadings were identified in the process of CFA. As such, they were eliminated from the CFA model to enhance discriminant validity (Kline, 2005). Additionally, a bootstrapping was employed in conducting CFA to adjust the issue of non-normality.

5. AVE was computed as follow: $AVE = (\sum \text{square standardized loadings}) / [(\sum \text{square standardized loadings}) + (\sum \text{measurement error})]$. Higher AVE values suggest that indicator variables are more representative of each construct. Both Professional Development (.77) and Teaching and Learning (.73) obtained solid convergent validity (i.e., higher than .5).

6. Again, we note that Stoll et al.'s (2004) review focused on professional learning community (PLC) whereas this study centers on TPC (see note 5 for details).

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APPENDIX A

TABLE A1 Survey Items and Normality.

Construct	Variable Number	Survey Item	Skewness	Critical Ratios	Kurtosis	Critical Ratios
Principal Quality	B6	Encourage staff to evaluate, refine and improve their practice as needed	-1.01	-9.76	1.40	6.78
	B5	Courageous in all circumstances	-0.96	-9.24	0.91	4.41
	B4	Being self-reflective	-0.87	-8.36	0.60	2.90
	B3	Being always hopeful about improvement	-0.97	-9.39	1.05	5.09
	B2	Passionate about the well-being and achievement of all staff and students	-0.89	-8.56	0.46	2.22
	B1	Persistently working for high academic achievement	-0.90	-8.69	0.76	3.68
Teaching and Learning	A30_L7	Initiate school-based instructional projects	-0.53	-5.14	-0.02	-0.08
	A31_L7	Encourage staff to consider new ideas for their teaching	-0.45	-4.30	-0.15	-0.72
	A32_L7	Design measures to improve student learning	-0.47	-4.50	-0.08	-0.40
	A33_L7	Articulate high expectations for student academic achievement	-0.55	-5.34	0.14	0.69
Professional Development	A10_L2	Align staff professional development activities with school development needs	-0.53	-5.09	0.27	1.28
	A9_L2	Encourage staff to think of learning beyond the academic curriculum	-0.58	-5.55	0.17	0.84
	A8_L2	Use coaching and mentoring to improve teaching quality	-0.54	-5.19	0.10	0.46
	A7_L2	Promote a range of continuous professional development experiences for all staff	-0.45	-4.36	0.03	0.13

(Continued)

TABLE A1 (Continued)

Construct	Variable Number	Survey Item	Skewness	Critical Ratios	Kurtosis	Critical Ratios	
TPC	A6_L2	Develop leaders among the teachers	-0.50	-4.82	-0.12	-0.60	
	A5_L2	Help train the school management team	-0.47	-4.58	-0.02	-0.08	
	E15_SC3	There is ongoing collaboration among teachers in different subject panels	-0.58	-5.59	0.34	1.62	
	E14_SC3	We can accomplish more through working in small teams	-0.95	-9.12	2.16	10.42	
	E13_SC3	There is ongoing collaboration among teachers in the same subject panel	-0.83	-8.06	1.50	7.23	
	E12_SC3	We share our best practices with other colleagues	-0.85	-8.22	1.67	8.08	
	E11_SC3	Teachers are encouraged to develop and implement new practices	-0.90	-8.65	1.56	7.53	
	E10_SC3	Teachers regularly discuss about possible ways to improve student performance	-0.97	-9.35	2.21	10.69	
	Organizational Trust	E4_SC1	We can freely discuss our feelings, worries, and frustrations	-0.67	-6.49	-0.04	-0.19
		E3_SC1	We do not try to gain an advantage by deceiving others.	-1.45	-13.97	2.84	13.72
E2_SC1		We approach our work professionally	-0.84	-8.12	1.93	9.31	
E1_SC1		We handle our work with competence and confidence	-0.93	-8.95	1.93	9.33	
Teacher Commitment	D6_R	I do not feel a strong sense of belonging to my organization	-0.21	-2.04	-0.83	-4.01	
	D1	I would be very happy to spend the rest of my career with this organization	-0.81	-7.85	0.30	1.43	

(Continued)

TABLE A1 (Continued)

Construct	Variable Number	Survey Item	Skewness	Critical Ratios	Kurtosis	Critical Ratios
	D2	I really feel as if this organization's problems are my own	-1.05	-10.16	1.10	5.29
	D3_R	I do not feel like "part of the family" at my organization	-0.08	-0.82	-1.02	-4.94
	D4_R	I do not feel "emotionally attached" to this organization	-0.56	-5.36	-0.41	-1.97
	D5	This organization has a great deal of personal meaning for me	-0.53	-5.09	-0.06	-0.29

Note. $N = 559$ teachers. The non-normality of the data was detected through critical ratios.

APPENDIX B

TABLE B1 Factor Loadings (Standardized Regression Coefficients) and Reliability.

	Indicator Variable	Factor Loadings	Cronbach's Alpha
TPC	E10_SC3	.808	.922
	E11_SC3	.831	
	E12_SC3	.875	
	E13_SC3	.835	
	E14_SC3	.837	
	E15_SC3	.715	
Principal Quality	B1	.901	.961
	B2	.888	
	B3	.883	
	B4	.913	
	B5	.909	
	B6	.883	
Professional Development	A5_L2	.896	.963
	A6_L2	.868	
	A7_L2	.910	
	A8_L2	.932	
	A9_L2	.886	
	A10_L2	.911	

(Continued)

TABLE B1 (Continued)

	Indicator Variable	Factor Loadings	Cronbach's Alpha
Teaching and Learning	A33_L7	.790	.935
	A32_L7	.932	
	A31_L7	.924	
	A30_L7	.893	
Organizational Trust	E1_SC1	.886	.760
	E2_SC1	.877	
	E3_SC1	.633	
	E4_SC1	.500	
Teacher Commitment	D5	.726	.813
	D4_R	.530	
	D3_R	.324	
	D2	.802	
	D1	.881	
	D6_R	.426	

Note. $N = 559$ teachers. All factor loadings were significant at $p < .001$. Bias was corrected through bootstrapping. Three of the six indicator variables in Teacher Commitment were reversely coded.