How can educational leaders promote the professional development of teachers?   
A Review of one evidence-based research of instructional leadership

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Assignment One for Research, Theory, and Practice in Education Leadership

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# Introduction

The purpose of this paper is to find the “path” through which school leaders’ impact on teacher professional learning from a recent educational leadership study. In the background section, I will briefly trace the history of the issue of “how school leaders impact teacher professional learning”. In the study review section, I will summarize the strengths and limitations of this study in terms of theories, research methodologies, and findings. In the application section, I will summarize the takeaways that I learned from this study.

# Background

Teacher professional learning is a critical factor for sustainable school improvement (Barth, 1990; Elmore & Burney, 1997; Dinham, 2007; Shengnan & Philip, 2018). Stein & Spillane (2005) emphasized that it is important to investigate how teacher learns and how the principal could assist their teachers to learn. However, Prestine and Scott Nelson (2005) found that “we have not seemed more research in educational administration that examines how principals impact teacher learning” (Fireston & Riehl, 2005, P36). Thus, it is necessary to review how this research topic is developed in the recent studies.

Researchers in educational leadership first searched the **direct** **effects** of principals on learning (both for student learning and teacher learning; Bridges, 1982; Pitner 1988). These studies usually applied process-product or cross-sectional design, and found significant correlations between decontextualized behaviors and achievement (Stein & Splillane, 2005). However, there are four limitations:  (1) these studies are weak in terms of validity (Hallinger & Heck, 1998), (2) knowledge from these studies cannot explain mechanisms (Shulman, 1986), (3) the decontextualized nature of the findings limits their usefulness, and (4) there is a mismatch between the intention to establish causally relevant connections and the use of correlational methods (Stein & Splillane, 2005).

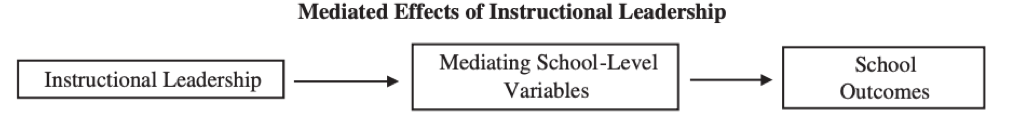
Then, researchers started using the **cognitive** **mediational** paradigm. Under this paradigm, studies focused more on few specific curricula unites, and documented classroom processes (Stein & Splillane, 2005). Hallinger & Heck (1998) proposed a **mediated-effect** model, which applied latent variable. This breakthrough allows researchers to measure the complex educational context with the evidence from data. Over the past four decades, many researchers that falls within the mediational paradigm, have established **indirect** relationships between principal leadership and learning (Hallinger & Heck, 1998; Leithwood, Patten, & Jantzi, 2010; Robinson, 2006; Zheng, Li, Chen, & Loeb 2017).

These findings have led scholars to refocus on finding the nature of the **path** through which school leaders influence learning, as well as validate this path with more empirical evidence. *Principal Instructional Leadership, Teacher Self-Efficacy, and Teacher Professional Learning in China: Testing a Mediated-Effects Model*is a new study, which paid attention to the teacher professional learning. And, this research proposes a new theory: **partial mediational model** to explain this path.

# Study Review

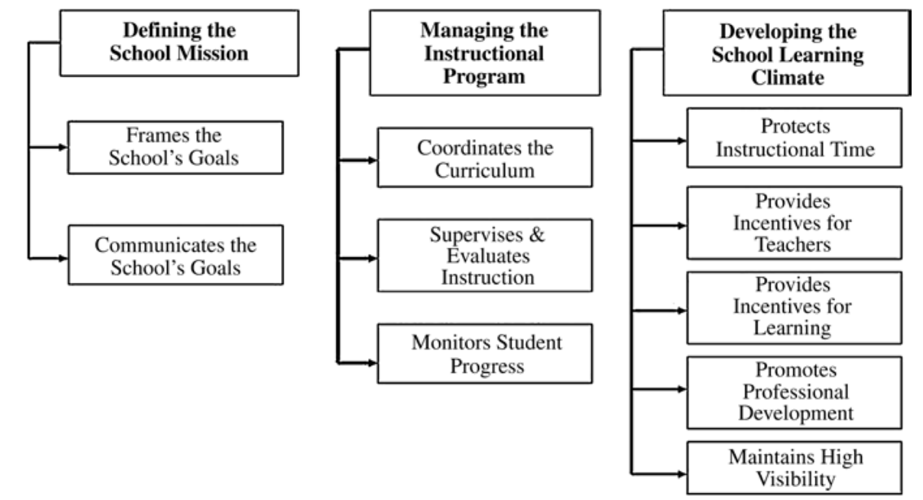
## Theory

Shengnan & Philip (2018) proposed a **partially mediated**-**effect** model. Under this framework, time management skill and self-efficacy of principal, self-efficacy of teachers, and instructional leadership are also incorporated.

Instead of using the predominant **fully mediational model** (Figure 3) proposed by Hallinger and Heck (1996), Shengnan & Philip (2018) assumes that principal leadership can have both **direct** and **indirect** effects on the professional learning of teachers. Since principals could have ongoing, one-on-one and group interactions (e.g., “teacher workplace” norms in China) with teachers, leaders have the opportunities to motivate and support teachers’ professional learning **directly**. This direct interaction would improve teachers’ self-efficacy. However, this direct interaction is ignored in the conventional fully mediational model. In terms of the mediational effect of instructional leadership on learning, there is no obvious distinguish between teacher learning and student learning in the full mediational model. ­­­­

*Figure 3.*  Conceptual models of leadership and learning (adapted from Hallinger and Heck 1996a, p. 16; Pitner 1988, pp. 105–108)

Time management skills and principal self-efficacy are two moderators. There are two reasons for incorporating them. Firstly, Shengnan & Philip (2018) pointed out that both “lack of time” and “lack of confidence” have been frequently cited as the main reasons why principals are slow to embrace the role of instructional leader (Grissom et al., 2012, 2015; Horng et al., 2010; Marshall, 1996; Sebastian et al., 2018). Secondly, previous studies suggested the potential roles of time management and self-efficacy in instructional leadership (Fancera & Bliss, 2011; Hallinger, Hosseingholizadeh, Hashemi, & Kouhsari, 2017; Horton, 2013; Miller, 2015; Grissom, Loeb, & Master, 2012; Hallinger & Murphy, 2012).

 Shengnan & Philip (2018) used the Principal Instructional Management Rating Scale (PIMRS; Hallinger, 1983/1990/2015; Figure 4) to measure the instrumental leadership. Based on the evidence from many previous studies both in Western and in China, this theoretical framework has been proven to have strong validity and reliability (Frost, 2006; Geijsel et al., 2009; Hallinger et al., 2014; Leithwood, 1992; Printy, 2008; Scribner, 1999; Smylie & Hart, 1999; Thoonen et al., 2012; Zheng et al., 2018).

*Figure 4*. PIMRS conceptual framework (Hallinger 1983; Hallinger and Murphy 1985, p. 221)

Admittedly, their research framework provides a well-defined assumption about how instructional leadership impacts teacher learning. However, I have two suggestions. Frist, many contextual factors (e.g., communities and school background, learning climate, and communities) are ignored. Even through, the participants in this study were coming from the same city in China, these contextual factors may be different, and play significant effects. Besides, the direct interaction between teachers and principals is assumed to be captured by teachers’ self-efficacy. However, direct interactions between principals and teachers could also help to promote the trustiness (Bryk & Schneider, 2003) and improve the affective relationship (Blasé & Blasé, 2000). How can we distinguish self-efficacy of teachers with other potential explanations? Although confirmatory factor analysis is used for testing the proposed theory instead of excluding other explanations, it will be helpful if the researchers could explore these potential factors in the future studies.

### Research Methodologies

* Data Source

This research used cross-sectional survey data, which is collected through a two-stage sampling procedure. The sampling procedure, which divided the schools into hierarchies based on school performance and location, improves the representativeness of data sources.

However, there are three limitations. Firstly, Prestin and Scott Nelson (2005) recommend to develop the experimental design. Alternatively, cognitive interviews, direct observation, or technology-enabled data collection applications can be used to improve data reliability and validity (Desimone and Le Floch 2004, Grissom et al., 2012, 2015; Sebastian et al., 2018). Secondly, sectional-across data has a limitation of causal inference. Instead, longitudinal data (e.g., repeated surveys and measure) would provide more power (e.g., able to test for reciprocity). Finally, it will be helpful if the researchers could distinguish teachers’ subject. Prestin and Scott Nelson (2005) recommend to take some specific education area (e.g., mathematics and science) since subject-specific learning opportunities are critical for the professional development of teachers.

* Instrument

Shengnan and Philip (2018) set up a good example of how to build the instruments. Firstly, Brislin’s (1970) *back translation method* is used to reduce the misunderstanding caused by language problems. Secondly, constructs (e.g., time management skill and instructional leadership) are measured by the framework proposed by previous studies. And, these frameworks usually have been proven to high reliability and validity. Finally, they check the survey items under the current Chinese school environment, and modified the items which challenge validity.

* Statistical Modeling

Shengnan and Philip (2018) use confirmatory factor analysis (CFA) in the structural equation model (SEM) to estimate the impact among the factors, and bootstrapping to create confidence interval. The use of SEM is commonly justified in the social sciences because of its ability to impute relationships between latent variables from observable variables (Hancock & Greogry, 2003). Bootstrapping is a measurement of model accuracy through random sampling with replacement. Model fit was evaluated using recommended indices (Hu & Bentler, 1998), including Standardized Root Mean Square Residual (SRMR), Root Mean Square Error of approximation (RMSEA), and comparative fit index (CFI). Besides, they compared the five latent factor model (original model) with four latent factor model (combine principal self-efficacy with teacher self-efficacy). According to fit statistics, the original five latent factor model is better. This indicates that there is a clear difference between principal and teacher in terms of self-efficacy.

The main limitation of the model design is the *level of analysis*. Shengnan and Philip (2018) recognized that there exists a multilevel (school and individual) structure of data. However, they claimed that it is impractical to use multilevel SEM. Given the large sample size in this study, I wonder whether multilevel structure model indeed has identification issue? Or, the improvement of the model fit using multilevel structure is not significant? This question is not mentioned by the authors.

#### Findings

This research reaffirmed the role of the principal in the professional learning of teachers. It provides data evidence of both the direct and indirect effects of instructional leadership on teacher learning. 70% of the effect comes directly from instructional leadership, and 30% comes through teacher self-efficacy. The instructional leadership directly explain most variation in teacher learning. Meanwhile, instructional leadership also helps to improve teachers’ self-efficacy which consequently improves teachers’ learning indirectly.

In terms of time management, it has a significant moderate effect on principal self-efficacy and small direct effect on instructional leadership. However, according to bootstrapping, these relationships are not robust. This result indicates that principals with high time management skills tend to have more confidence and ability in implementing instructional leadership.

In terms of self-efficacy, there is no significant effect between the self-efficacy of principals and teachers. Additionally, principals’ self-efficacy has an impact on instructional leadership. This means principals with more confidence generally have better performance in instructional leadership. Similarly, teachers’ self-efficacy has a noticeable effect on their learning. This means teachers, who are confident, generally have better performance on learning.

In summary, principals could make a difference in the professional learning of teachers. And, teacher self-efficacy represents a potential path through which this effect can be achieved. Meanwhile, through improving time management skills and self-efficacy, principals could improve their instructional leadership, which eventually could help to improve the whole learning community in the school.

# Applications and Takeaways

The biggest takeaway that I learned is how Shengnan & Philip (2018) provide the evidence of validity and reliability. They designed, measured, and analyzed their theory with the evidence from previous studies and empirical findings. In particular, they carefully checked every measurement and pointed out the different understanding of the same construct in different culture environment. In data science, this is called feature engineering, which relies on experience and innovation for each specific research area. In my previous project of applying the recommendation systems in academic digital libraries, I spend almost twice the time learning the knowledge about information management and library science than the algorithms of the recommendation system. The domain context indeed plays a critical role. For example, we need to figure out the digital agreements from different vendors and publishers before getting access to the metadata of these resources. We need to think about the difference between the recommendation system in education and entertainment (e.g., youtube and Netflix). We need to compare the learning behavior of reading a journal article and taking a MOOC course. All of these findings help us to identify which data is useful, and reduce the bias in algorithm.

Additionally, this research let me think about what is the best methodologies in social science. The study of Shengnan & Philip (2018) also has the problem of both **too practical and theoretical**. Statistical evidence from a large sample gives a general measurement of instructional leadership on teacher learning. However, it is still not clear how the principals could help the teachers learn in reality. Even though the workshop norms in China have been emphasized, we cannot tell whether the positive mediator effects really coming from the workshop. There is no interview or case study for the schools, which involved in this study. It would be much more helpful if they could pick up the schools, which have the highest and lowest mediator effect as an example, and compare their daily leadership practice. On the other hand, the finding from this study is a specific case based on the eighth-grade teachers in China. It will be risky to generate a broader context. It will be much better if they could take the repeat measurement and longitudinal analysis in the future. Similarly, for my recommendation system project, we also did AB testing among our users regularly. We pick up representative users and talk with them. Thus, we can know the reasons why they like or don’t like our recommendations. This idea is not unique in the industry. IT companies usually have teams of data scientists, engineers, product managers, and even researchers. Every product will be updated for each iteration, which includes researching, designing, testing, and improving. But in academics, researchers sometimes do not pay enough attention to complete their stories. Sometime, “too many” unsolved problems are left for the future.

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