Investigating a multiple mediated-effects model of instructional leadership and teacher professional learning in the Malaysian School Context: A partial least squares analysis

Lei Mee Thien, Shengnan Liu, Liu Qing Yee and Donnie Adams

Abstract
The poor student performance in the Programme for International Student Assessment has urged the Malaysian authorities to upskill teachers’ professional learning. However, little is known about how instructional leadership contributes to teacher professional learning, especially in the Malaysian context. This study seeks to investigate the direct relationship between principal instructional leadership and teacher professional learning through the mediating effects of teachers’ trust in the principal and self-efficacy in a multiple mediated-effects model. Data were collected from 335 primary and secondary school teachers in Penang, Malaysia. A partial least squares structural equation modelling approach was used for data analysis. The results found that the relationship between principal instructional leadership and teacher professional learning is mediated by teachers’ trust in the principal and self-efficacy. Implications for theory and knowledge are presented.

Keywords
Instructional leadership, partial least squares structural equation modelling (PLS-SEM), teacher professional learning, teacher self-efficacy, trust in the principal

Introduction
School effectiveness and school improvement has been a worldwide research topic of interest since the 1980s (Hallinger and Kovačević, 2019). Teacher professional learning is vital to sustain school effectiveness and school improvement (Karacabey et al., 2020; Li et al., 2016;
In response to this concern, investigating factors influencing teacher professional learning has gained considerable attention in educational leadership and management studies. Instructional leadership has been recognised as a crucial factor for teacher professional learning (e.g. Bellibas¸ et al., 2020; Hallinger and Liu, 2016; Hallinger et al., 2017a, 2017b; Karacabey et al., 2020; Liu and Hallinger, 2020). Although there exist empirical evidences on instructional leadership and teacher professional learning, the available literature has considerable areas that merit further research.

Literature witnesses the expansion of geographic scopes of empirical research on instructional leadership and teacher professional learning ranging from Western to Asian societies. In Asian societies, the current knowledge base in the field is mainly contextualised in Hong Kong (Li et al., 2016), Thailand (Piyaman et al., 2017), mainland China (Liu and Hallinger, 2018) and Turkey (Bellibas¸ et al., 2020; Karacabey et al., 2020). Relatively, research in this domain is far less explored in Malaysia.

Malaysia has experienced a massive education reform since 2013 due to students’ poor performance in the international large-scale assessments (ILSAs) such as the Programme for International Student Assessment (PISA) 2012. Malaysia was ranked in the bottom third and below the international average in mathematics, science and reading literacies in PISA 2012 (Thien, 2016). The Malaysian ranking in PISA 2015 and 2018 in these three literacies remained below the international average although a marginal improvement was observed. The poor performance in PISA has prompted the Malaysian government to reform the education system and upskill teacher professional learning as one of the important agendas (Abdullah et al., 2016). To support teacher capacities in professional learning, the education system has underscored principals’ instructional leadership practices as stated in the Malaysia Education Blueprint 2013–2015 (Shift 5) (Thien, 2020a). However, little is known about how instructional leadership contributes to teacher professional learning in Malaysia.

Inspired by the social exchange theory (SET) and social cognitive theory (SCT), previous researches suggest that the effect of instructional leadership on teacher professional learning could be either direct or indirect through teacher attitude variables including teacher agency, efficacy and trust (Li et al., 2016; Liu and Hallinger, 2018, 2020; Piyaman et al., 2017). Trust and teacher self-efficacy are two significant mediators that received a relatively large amount of attention through which instructional leadership impacts on teacher professional learning (Li et al., 2016; Liu and Hallinger, 2018; Ma and Marion, 2021). Investigating trust in both the principal and teacher self-efficacy as the mediators in a structural model could inform which teacher attitude variable has a larger contribution towards mediating the relationship between instructional leadership and teacher professional learning. The findings are useful to determine which kind of teacher attitude variable needs to be prioritised for bringing about school change and improvement in terms of teacher continuous professional development in learning. However, investigation into instructional leadership and teacher professional learning by incorporating the mediating effects of trust in principal and teacher self-efficacy is scarce in literature.

In addressing the preceding research gaps, this study seeks to investigate the relationship between principal instructional leadership and teacher professional learning through the mediating effects of teachers’ trust in principal and self-efficacy in a mediated-effects model in the Malaysian school context.

This study attempts to address four research questions as follows:
1. Is there any significant direct effect of principal instructional leadership on teacher professional learning?
2. Is there any significant indirect effect of instructional leadership on teacher professional learning through trust in the principal?
3. Is there any significant indirect effect of instructional leadership on teacher professional learning through teacher self-efficacy?
4. Do trust in the principal and teacher self-efficacy sequentially mediate the effects of instructional leadership and teacher professional learning?

The current study contributes to the existing knowledge base by addressing the call for localisation of educational leadership research (Bush, 2014; Hallinger et al., 2017b). Specifically, this study has its originality by investigating the nexus between principal instructional leadership and teacher professional learning via trust in the principal and teacher self-efficacy in a Southeast Asian society.

**Theoretical perspective**

Social interactions and relationships between the principal and teachers involve social exchange in the school community. The social interactions can be explained through the social exchange theory (Blau, 1964). In this study, both the principal and the teachers are situated in an exchange relationship when efforts from the instructional principal such as managing and monitoring instructional programmes as well as promoting a positive learning climate could exert influence on teacher participation in professional learning activities in return. Reciprocal social exchange fosters trust between the principal and teachers (Blau, 1964). Teacher trust in the principal can be built through supportive ties between the principal and teachers (Bryk and Schneider, 2002), which can lead to teacher engagement in professional learning. Bandura’s (1977) social cognitive theory explains that instructional leaders can promote teachers’ self-efficacy through vicarious experience (live modelling) and verbal persuasion (feedback and encouragement). For instance, the principal’s role modelling behaviours such as participating and providing support for the improvement of teaching practices are sources of vicarious experience.

Grounded with the theoretical support, this study seeks to investigate the relationship between instructional leadership and teacher professional learning with trust in the principal and teacher self-efficacy as mediators. The following sections present the conceptualisation of these four undertaken variables coupled with a discussion of the previous studies related to these four variables.

**Literature review and hypothesis development**

*Instructional leadership and teacher professional learning*

Instructional leadership, which was first derived from North America in the 1980s, has gained significant attention of researchers outside the United States since the turn of the millennium (Hallinger and Bryant, 2013). The most prominent and widely conceptual framework used in instructional leadership research was developed by Hallinger and Murphy (1985). Hallinger and Murphy’s (1985) instructional framework consists of three dimensions: (1) defining the school mission, (2) managing the instructional programme and (3) developing a positive school learning climate. These three dimensions were further delineated into 10 job functions.
On the other hand, teacher professional learning has been referred to as formal or informal learning undertaken by in-service teachers to improve their individual professional practice as new goals, curricula and teaching learning methods emerge over time (Lloyd and Davis, 2018). In this study, teacher professional learning is conceptualised as collegial collaboration among teachers to exchange instructional practices, study new concepts of teaching and learning, design new curriculum materials and provide support for one other, which can improve teachers’ instructional practice and student learning outcomes (Li et al., 2016).

A growing global literature highlights the importance of leadership in fostering teacher learning and school improvement (Bellibaş et al., 2020; Hallinger et al., 2017a, 2017b; Karacabey et al., 2020; Li et al., 2016; Liu and Hallinger, 2017, 2018, 2020; Qian et al., 2017). Leadership is vital in motivating teachers to learn, developing structures and systems to support their learning, and making certain there is consistency in the programme of teacher learning within schools (Qian et al., 2017; Wang, 2016). Principals have an ongoing interaction with teachers in schools that could motivate and support their engagement in professional learning (Qian et al., 2017; Wang, 2016). Indeed, principals’ support and involvement in teacher professional learning demonstrates a strong link between leadership and learning in schools (Li et al., 2016; Robinson et al., 2008). Previous studies have evidenced a positive effect of instructional leadership on teacher professional learning across different research contexts. For instance, in East Asian societies, Liu and Hallinger (2017, 2020) found that learning-centred leadership including instructional leadership has a moderate and direct effect on teacher professional learning in a Chinese school context. Similar findings were found in West Asian societies. A cross-sectional study conducted in Turkey by Karacabey and his associates (2020) has confirmed that instructional leadership is positively related to teacher professional learning.

These empirical findings explained the essential role of instructional leaders in motivating and inspiring teacher professional learning. In other words, instructional leaders who clearly articulate their attention in monitoring student progress and classroom teaching, as well as creating a positive learning climate in the school are likely to engage teachers in professional learning (Bellibaş et al., 2020). Such findings have convinced the current study to postulate Hypothesis 1 as follows.

**H1:** There is a positive and direct effect of principal instructional leadership on teacher professional learning.

**Trust in the principal as mediator**

In this study, trust in the principal refers to teachers’ willingness to risk vulnerability when their principals exhibit benevolence (demonstration of genuine care for the needs and interest of teachers), competence (ability to perform tasks that are required for the principals’ position according to appropriate standards), openness (willingness to share information with teachers), honesty (a sense of integrity and authenticity of behaviour) and reliability (consistency in behaviour) in their one-to-one relationships with teachers (Tschannen-Moran, 2014).

School effectiveness research has suggested the necessity to incorporate teacher–leader relationship such as trust in the principal into school leadership conceptual models (e.g. Day and Leithwood, 2007; Li et al., 2016; Marks and Printy, 2003). A possible reason for this highlight lies in the fact that the efficiency of a school depends upon the presence of trust in the principal–teacher relationship (Tschannen-Moran and Hoy, 1998).
School leadership has a significant effect on a trusting work environment (Whitener et al., 1998). Literature indicates that supportive leadership behaviours such as developing vision and coaching instructional programmes have significantly predicted trust in the principal in secondary schools (Tschannen-Moran, 2014). Ma and Marion (2021) reported that the three dimensions of instructional leadership (defining the school mission, managing the instructional programme and developing a positive school learning climate) were significantly related to trust in the principal based on teacher perspective of the Western Chinese.

It is worth highlighting that trust in the principal–teacher relationship is essential to create a collaborative school condition (Hallinger et al., 2019) that could facilitate teacher professional learning. Although there is limited empirical studies on trust in the principal and teacher professional learning in the literature, it makes sense to speculate that if teachers exhibit a high level of trust in principals, the school principals are able to promote professional learning among teachers. Thus, we propose that trust in the principal would mediate the relationship between instructional leadership and teacher professional learning. Hypothesis 2 is presented as follows.

H2: Trust in the principal mediates the relationship between instructional leadership and teacher professional learning.

Teacher self-efficacy as mediator

According to the social cognitive theory, teacher self-efficacy is conceptualised as teachers’ confidence and belief in their ability to persevere and complete instructional tasks successfully, which may influence student engagement in classroom learning (Tschannen-Moran and Woolfolk Hoy, 2001). Teachers with a high self-efficacy are perceived to be more open to new teaching methods to improve student learning outcomes. This study refers to teacher self-efficacy as a multidimensional construct with its three dimensions: (1) efficacy for instructional strategies, (2) efficacy for classroom management and (3) efficacy for student engagement (Tschannen-Moran and Woolfolk Hoy, 2001).

Teacher self-efficacy has been regarded as a significant mediator between principal instructional leadership and teacher professional learning. For instance, Liu and Hallinger’s (2018, 2020) studies found a significant indirect effect of principal instructional leadership on teacher professional learning through teacher self-efficacy based on middle school teacher perspective in mainland China. Another study in Turkey confirmed a significant indirect relationship between instructional leadership and teacher professional learning with teacher self-efficacy at school level as the mediator (Karacabey et al., 2020).

These previous findings suggest that principals influence teacher self-efficacy by articulating an inspiring vision of learning for the school, managing instructional programmes and creating a school learning climate. The salience of this finding reaffirmed the roles of instructional leaders to promote professional learning among teachers. Teacher self-efficacy represents a critical path through which the effect of instructional leadership on teacher professional learning is achieved. The previous empirical findings have prompted the current study to postulate Hypothesis 3.
H3: Teacher self-efficacy mediates the relationship between instructional leadership and teacher professional learning.

Trust in the principal and teacher self-efficacy as serial mediators

Instructional leaders are capable of revitalising teacher self-efficacy in terms of instructional strategy and classroom management when trust is evident in the relationship between the principal and teachers (Gibson and Dembo, 1984). Trust in the principal and teacher self-efficacy is both considered pivotal for teachers to achieve success in teaching and learning (Bryk and Schneider, 2002). A few empirical studies showed that a supportive principal who builds trust and a respectful relationship with teachers contributes to a strong sense of teacher self-efficacy (Hoy and Woolfolk, 1993; Skaalvik and Skaalvik, 2007). The reason for this is that teachers will feel more confident in their teaching capability and execute the assigned tasks with a strong trust in the principal (Ma and Marion, 2021).

Ma and Marion’s (2021) study has supported trust in the principal as a significant mediator between instructional leadership and teacher self-efficacy. Karacabey et al. (2020) has further explored the effect of teacher self-efficacy at school level on professional learning and the direct relationship was significant. Karacabey et al.’s (2020) findings were consistent with previous studies (see Liu and Hallinger, 2018, 2020) by which teacher self-efficacy is predictive of greater teacher professional learning.

The preceding discussion has suggested a direction to propose a sequential mediating effect of trust in the principal and teacher self-efficacy on the relationship between instructional leadership and teacher professional learning. Hypothesis 4 is presented as follows.

H4: Trust in the principal and teacher self-efficacy sequentially mediates the relationship between instructional leadership and teacher self-efficacy.

Figure 1 shows the research model of the study that depicted the four hypotheses postulated by the current study. The dotted lines indicate H4 that involve two mediators, namely trust in the principal and teacher self-efficacy.
principal and teacher self-efficacy on the relationship between instructional leadership and teacher professional learning.

Research context

Malaysia practices a bureaucratic and hierarchical education system coupled with a top-down administrative system. Principals have relatively little autonomy as most decision-making and accountability rest with authorities at the Ministry level (Ministry of Education Malaysia, 2013). This rigid management structure limits school principals’ autonomy to exercise instructional leadership to its maximum capacity (Gill and Berezina, 2020). The job functions of principals are bound to the rules and regulations provided by the local education authorities. The school principals have little autonomy over the decisions of staffing, teacher training and development (Ministry of Education Malaysia, 2013). Teacher recruitment is solely controlled by government authorities at the Ministry level (Gill and Berezina, 2020).

The decisions for effective professional development are not made at the school level. In fact, the Ministry authorities are fully responsible for identifying which areas teachers need professional support (Ministry of Education Malaysia, 2013). Teachers are required to complete a seven-day professional development programme at school level through in-house training annually. The facilitators are the school leaders or selected teachers who have attended the courses organised by the authorities either at district or state level. As Malaysia practices a cascading delivery system, there might be a substantial loss of information through the in-house trainings (Chua et al., 2020). This limitation could create ambiguities of understanding the content of professional learning among teachers (Hairon and Tan, 2017). As a result, teachers often perceived the professional development workshops and seminars organised by the local educational authorities as somewhat less meaningful and irrelevant to their professional needs (Kabilan and Veratharaju, 2013).

Methods

This study employed a quantitative cross-sectional survey research design. We used this quantitative research design because it is able to make inferences about a population of interest at one point in time (Cohen et al., 2013).

Sample

The targeted population in this study were the teachers from public primary and secondary schools in Penang, Malaysia. The selection of primary and secondary school teachers is because promoting teachers’ professional development is the most influential instructional leadership practice at both elementary and high school levels (Blase and Blasé, 2000: 11). We selected teachers as the research sample as teachers’ ratings of leadership could provide a more valid measurement of principal leadership compared with principal self-ratings (Hallinger and Wang, 2015). This is because principals have the tendency to overestimate their own leadership practices (Hallinger, 2011). For instance, Hosseingholizadeh et al. (2020) found that principals’ self-rating on their instructional leadership practices were higher than teachers’ rating across three dimensions of instructional leadership. It has been proven that principals’ self-reporting might not able to provide an objective view of their instructional leadership practices (see Bellibaş and Gümüş, 2021). The
contrasting pattern of rating principal instructional leadership practices between principals and teachers provides a rationale for the current study to use teacher-reported data.

This study utilised a convenience sampling technique. Convenience sampling is a type of non-probability sampling where participants are selected based on their willingness to participate and it is geographically accessible (Creswell, 2014). The number of primary and secondary school teachers in Penang are 10,886 and 9496, respectively (Prime Minister’s Department 2019, 2 June). Despite the limitation of convenience sampling in generalising the findings, this study has diversified the sample according to the North, Central, Northeast and Southwest districts in Penang. Next, we identified each five accessible primary and secondary schools from each district. These efforts were taken to ensure the representativeness of the data. We then selected 10 teachers from each school. This study followed McCoach and Adelson’s (2010) guideline to compute the average teacher sample size (see Thien, 2019). This made up a desired sample size of 400.

A sample totalling 335 teachers participated in the online survey from May to August 2020. The response rate was 83.75%. According to Neuman (2005), a response rate of 50% and above is considered acceptable. The appropriateness of the sample size was justified using Cohen’s guideline (1992). According to Cohen’s guideline (1992), the recommended size sample was 174 with a minimum \( \beta^2 \) of 10% for statistical power of 80% at a significance level of .05 (Cohen, 1992). The representativeness of the sample size of 335 is further confirmed, as the minimum sample size requirement is 160 based on the calculation of inverse square root method in partial least squares structural equation modelling (PLS-SEM) (Kock and Hadaya, 2018). This indicated that the sample size of 335 was sufficient to perform a PLS-SEM analysis in this study.

Table 1 shows the demographic profile of the teacher samples. The number of teachers from primary schools (167) and secondary schools (168) is almost equal. The dominant group was secondary school teachers (137) who are currently working in National Type Secondary Schools (dominated by Chinese teachers). Female teachers outnumber (282) the male teachers (53). About 43% of the teacher sample aged between 31 and 40. Teaching experience of above 20 years was the major group of the teacher sample.

**Instrumentation**

This study adopted Hallinger and Wang’s (2015) Principal Instructional Management Rating Scale (PIMRS) Teacher Short Form to measure principal instructional leadership. Hallinger and Wang’s (2015) PIMRS has been used extensively by Malaysian researchers in educational management and leadership (Hallinger et al., 2018a). In fact, about 90% of the Malaysian educational management and leadership studies have used PIMRS as an instrument since 2005 (Hallinger et al., 2018a). This is the main reason for the current study to use the PIMRS to measure principal instructional leadership.

A total of 22 items measured the dimensions of defining school mission (5 items), managing the instructional programme (7 items) and developing a positive school climate (10 items). Respondents rated on a five-point Likert scale ranging from 1 (almost never) to 5 (almost always). The current study reported a satisfactory reliability for each dimension: defining school mission (0.868), managing the instructional programme (0.882), and developing a positive school climate (0.935).

Li et al.’s (2016) scale was adopted to measure teacher professional learning. The scale contains eight items with a six-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). The scale measures teachers’ perceptions towards collegial collaboration aimed to deepen subject
matter knowledge and implement new instructional practices to achieve student learning outcomes in their respective schools (Li et al., 2016). One negative item (TP3) was recoded and termed as TP3_R. The teacher professional learning scale yielded a satisfactory reliability with a Cronbach’s alpha value of 0.883 in this study.

The instrument used to collect data for teachers’ trust in the principal was adapted from Omnibus T-scale developed by Hoy and Tschannen-Moran (2003). The instrument contains eight items with a six-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree) to assess teachers’ willingness to cooperate with their principals (Tschannen-Moran, 2014). In this study, the Cronbach’s alpha value of trust in the principal was at 0.904, indicating an excellent reliability.

Tschannen-Moran and Woolfolk Hoy’s (2001) Teacher Sense of Efficacy Scale Short Form was utilised to measure teacher self-efficacy. The instrument contains 12 items that evaluate teachers’ self-efficacy on three dimensions: efficacy for instructional strategies (4 items), classroom management (4 items) and student engagement (4 items). A nine-point Likert scale ranging from 1 (nothing) to 9 (a great deal) was used to assess teachers’ confidence and belief in their ability to manage the classroom and use different teaching strategies to complete their teaching tasks successfully (Tschannen-Moran and Woolfolk Hoy, 2001). The original scale reported a satisfactory reliability for each dimension: efficacy for instructional strategies (0.86), classroom management (0.86) and student engagement (0.81).

### Table 1. Demographic information of respondents.

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of teachers by school category</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td>167</td>
<td>49.9</td>
</tr>
<tr>
<td>Secondary school</td>
<td>168</td>
<td>50.1</td>
</tr>
<tr>
<td>Number of teachers by school types</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Primary School</td>
<td>97</td>
<td>29.0</td>
</tr>
<tr>
<td>National Type Primary School</td>
<td>70</td>
<td>20.9</td>
</tr>
<tr>
<td>National Secondary School</td>
<td>31</td>
<td>9.3</td>
</tr>
<tr>
<td>National Type Secondary School</td>
<td>137</td>
<td>40.9</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>53</td>
<td>15.8</td>
</tr>
<tr>
<td>Female</td>
<td>282</td>
<td>84.2</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 30 years</td>
<td>52</td>
<td>15.5</td>
</tr>
<tr>
<td>31–40 years</td>
<td>143</td>
<td>42.7</td>
</tr>
<tr>
<td>41–50 years</td>
<td>81</td>
<td>24.2</td>
</tr>
<tr>
<td>Above 51 years</td>
<td>59</td>
<td>17.6</td>
</tr>
<tr>
<td>Teaching experience (until January 2020)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 years and below</td>
<td>51</td>
<td>15.2</td>
</tr>
<tr>
<td>6–10 years</td>
<td>71</td>
<td>21.2</td>
</tr>
<tr>
<td>11–15 years</td>
<td>81</td>
<td>24.2</td>
</tr>
<tr>
<td>16–20 years</td>
<td>39</td>
<td>11.6</td>
</tr>
<tr>
<td>Above 20 years</td>
<td>93</td>
<td>27.8</td>
</tr>
</tbody>
</table>

*Note. National Primary and Secondary Schools are dominated by Malay ethnic group. National Type Primary and Secondary Schools are dominated by Chinese ethnic group.*
Following Hair et al.’s (2017) guideline, we developed three global or reflective items (DE_R, MA_R and PO_R) to measure the reflective instructional leadership construct. The purpose was to access the redundancy analysis of the formative instructional leadership construct. Similarly, three global items of teacher self-efficacy were developed.

**Instrument translation.** This study employed Douglas and Craig’s (2007) collaborative and iterative method to translate the original English version of the original scales into the Malay language. First, the adapted items were translated independently by two researchers and two language lecturers from a local university. Disparities in the feedback were resolved and finalised. Next, the translated version was field-tested on eight primary and secondary school teachers. These eight respondents were excluded from participating in the main study. Field-testing was carried out to ensure content validity of the items (Creswell, 2014). Issues identified in the pretesting were referred back to the team for revision. The process of re-translating, reviewing and testing was conducted for another round. A finalised and translated version of the items was obtained after the second round of field-testing.

The study continued with pretesting to ensure respondents could understand and interpret the questions the way it is intended (Memon et al., 2017). The survey questionnaire was pretested by 12 teachers and postgraduate students in the field of education administration and leadership. Errors in wording and grammar in the items were addressed accordingly.

**Data collection procedure**

This study had secured consent from the Ministry of Education and state education department authorities. The researchers administered an online questionnaire using Google Form. The cover page of the questionnaire notifies the participants of the research purpose and confidentiality of their responses. Participation in the study was strictly voluntary.

**Data analysis procedure**

This study utilised PLS-SEM for data analysis with Smart PLS 3.0 software (Ringle et al., 2015). PLS-SEM is a variance-based statistical analysis method that is used to examine the direct and indirect relationship between multiple variables in a structural model (Nitzl et al., 2016). PLS-SEM is appropriate for use in data analysis due to its superiority in handling complicated model that involves higher-order constructs (Hair et al., 2019, Sarstedt et al., 2019, Thien, 2020b). There are two second-order constructs in this study, namely instructional leadership and teacher self-efficacy. Instructional leadership consists of three first-order constructs: (1) defining school mission, (2) managing the instructional programme, (3) and developing a positive school climate. Meanwhile, teacher self-efficacy comprises three first-order constructs: (1) efficacy for instructional strategies, (2) efficacy for classroom management and (3) efficacy for student engagement.

The analysis involved a two-stage approach: (1) assessment of measurement model and (2) assessment of structural model (Anderson and Gerbing, 1988). At stage 1, the assessment of measurement model was used to examine the relationships between the four undertaken latent variables and its respective items. The statistic estimates include loadings, composite reliability, and average variance extracted (AVE) to ensure convergent reliability (Hair et al., 2019). This study used heterotrait-monotrait ratio (HTMT) of the correlations (Henseler et al., 2015) to examine the discriminant validity. Next, for the assessment of formative measurement model of second-
order constructs, we examined (1) redundancy analysis, (2) variance inflation factor (VIF) and (3) significance of outer weights of the first-order constructs to establish the convergent validity (Hair et al., 2017).

At stage 2, the structural model assessment included the direct and indirect effects (mediating effects). This study used bootstrapping for the significance of hypothesis testing with 5000 resampling (Nitzl et al., 2016). In this study, we have included teacher age as a control variable as prior research confirmed that age had an effect on teacher professional learning (Liu and Hallinger, 2020).

### Results

#### Preliminary analysis

Table 2 indicates that teachers perceived that school principals practised a high level of instructional leadership in two dimensions, namely defining the school mission ($M = 4.167$, $SD = 0.637$) and managing the instructional programme ($M = 4.016$, $SD = 0.663$), as well as a moderate level of promoting a positive school learning climate ($M = 3.832$, $SD = 0.784$). For the teacher self-efficacy, the dimension of classroom management had the highest mean ($M = 7.504$, $SD = 0.935$), followed by efficacy for instructional strategies ($M = 7.215$, $SD = 0.863$) and student engagement ($M = 7.092$, $SD = 0.995$). Each dimension of teacher self-efficacy was at a moderate level. These findings suggest that teachers have a relatively moderate level of confidence and ability to maintain classroom order and complete teaching tasks. Furthermore, teachers’ trust in the principal ($M = 4.247$, $SD = 0.963$) was perceived as moderate. Teacher professional learning ($M = 4.878$, $SD = 0.782$) was perceived as relatively moderate. The engagement of teachers in professional learning could be attributed to the various initiatives taken by the schools to encourage collaboration among teachers to improve instructional practices and materials through subject panels along with four meetings per year suggested by the local authorities. All the dimensions for all the undertaken variables were positively correlated at a significance level of .01.

#### Assessment of measurement model

Table 3 shows that loadings for all the items were above 0.70 except for five items (MA7, PC1, TP7, TPL6 and TPL8). However, we retained these five items as the composite reliability (CR) and
Table 3. Assessment of measurement model (first-order constructs).

<table>
<thead>
<tr>
<th>Construct</th>
<th>Item</th>
<th>Loading</th>
<th>Alpha</th>
<th>CR</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DE</td>
<td>DE1</td>
<td>0.835</td>
<td>0.900</td>
<td>0.920</td>
<td>0.714</td>
</tr>
<tr>
<td></td>
<td>DE2</td>
<td>0.818</td>
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<td></td>
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<tr>
<td></td>
<td>DE3</td>
<td>0.869</td>
<td></td>
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<tr>
<td></td>
<td>DE4</td>
<td>0.852</td>
<td></td>
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<tr>
<td></td>
<td>DE5</td>
<td>0.851</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA</td>
<td>MA1</td>
<td>0.837</td>
<td>0.855</td>
<td>0.910</td>
<td>0.718</td>
</tr>
<tr>
<td></td>
<td>MA2</td>
<td>0.714</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>MA3</td>
<td>0.805</td>
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<tr>
<td></td>
<td>MA4</td>
<td>0.720</td>
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<td>MA5</td>
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<td>0.782</td>
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<tr>
<td></td>
<td>MA7</td>
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<td>0.761</td>
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<tr>
<td></td>
<td>PC4</td>
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<td>PC10</td>
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<td></td>
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<tr>
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<td>CM4</td>
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<td>0.889</td>
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<td>0.751</td>
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<td>SG3</td>
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<td>0.713</td>
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<tr>
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<td></td>
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<tr>
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<td>TPL1</td>
<td>0.871</td>
<td>0.918</td>
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<td>0.653</td>
</tr>
<tr>
<td></td>
<td>TPL2</td>
<td>0.893</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TPL3</td>
<td>0.852</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>TPL4</td>
<td>0.884</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>TPL5</td>
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</tr>
<tr>
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<td>TPL6</td>
<td>0.659</td>
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<tr>
<td></td>
<td>TPL7</td>
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<td></td>
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<tr>
<td></td>
<td>TPL8</td>
<td>0.498</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: CR = composite reliability, AVE = average variance extracted.
Item TP2, TP3, TP4 and TP5 were excluded because of the loading values below the threshold of 0.50.
AVE values were found above the threshold of 0.70 and 0.50 for the four respective first-order constructs (managing the instructional programme [MA], promoting a positive school climate [PC], trust in the principal [TP] and teacher professional learning [TPL]). It was noticeable that CR and AVEs of the remaining first-order constructs exceeded the threshold of CR and AVE. As a result, the convergent validity of the first-order constructs was established.

Table 4 shows that the HTMT values for the first-order constructs were below 1.0, satisfying a more lenient threshold value suggested by Franke and Sarstedt (2019). The complete bootstrapping informed that 95% confidence interval between the first-order constructs did not contain the value of one (Franke and Sarstedt, 2019). The findings indicated that all the first-order constructs were empirically distinct. Discriminant validity of the first-order constructs was established.

For the second-order construct of formative measurement model assessment, Figure 2 shows that the path coefficient between a formatively measure and reflectively measure of instructional leadership was 0.922, which is above the threshold value of 0.70 as proposed by Hair et al. (2019). Similar finding was discovered for the formative teacher self-efficacy construct (see Figure 3).
Table 5. Results of assessment of measurement model for second-order constructs.

<table>
<thead>
<tr>
<th>Second-order construct</th>
<th>First-order construct</th>
<th>Outer weight</th>
<th>t value</th>
<th>Outer VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL</td>
<td>DE</td>
<td>0.111 (0.840)</td>
<td>0.867 (20.486)</td>
<td>3.080</td>
</tr>
<tr>
<td></td>
<td>MA</td>
<td>0.386</td>
<td>2.379</td>
<td>4.085</td>
</tr>
<tr>
<td></td>
<td>PC</td>
<td>0.568</td>
<td>4.880</td>
<td>3.015</td>
</tr>
<tr>
<td>TSE</td>
<td>IS</td>
<td>0.316 (0.831)</td>
<td>1.847 (12.376)</td>
<td>2.373</td>
</tr>
<tr>
<td></td>
<td>CM</td>
<td>-0.126 (0.685)</td>
<td>0.838 (8.840)</td>
<td>2.310</td>
</tr>
<tr>
<td></td>
<td>SG</td>
<td>0.842</td>
<td>5.325</td>
<td>2.480</td>
</tr>
</tbody>
</table>

Note: Parentheses in column 3 represents outer loadings. Parentheses in column 4 represents the t value of the respective outer loading.

Table 6. Hypothesis testing.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Beta</th>
<th>SD</th>
<th>t value</th>
<th>p values</th>
<th>LL</th>
<th>UL</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1: IL → TPL</td>
<td>0.096</td>
<td>0.091</td>
<td>1.052</td>
<td>0.293</td>
<td>-0.087</td>
<td>0.264</td>
<td>Not supported</td>
</tr>
<tr>
<td>H2: IL → TP → TPL</td>
<td>0.220</td>
<td>0.052</td>
<td>4.184</td>
<td>&lt; .001</td>
<td>0.127</td>
<td>0.334</td>
<td>Supported</td>
</tr>
<tr>
<td>H3: IL → TSE → TPL</td>
<td>0.125</td>
<td>0.030</td>
<td>4.186</td>
<td>&lt; .001</td>
<td>0.065</td>
<td>0.180</td>
<td>Supported</td>
</tr>
<tr>
<td>H4: IL → TP → TSE → TPL</td>
<td>-0.005</td>
<td>0.016</td>
<td>0.332</td>
<td>0.740</td>
<td>-0.040</td>
<td>0.026</td>
<td>Not supported</td>
</tr>
</tbody>
</table>

Note. p value < .001, LL indicates lower limit, UL indicates upper limit.

Table 5 shows that the VIF values for the second-order constructs were below the threshold value of 5.0. This finding suggests that there were no multicollinearity issues present for both the formative constructs in this study (Hair et al., 2019). All the outer weight and outer loadings of the first-order constructs with its respective second-order construct were significant at the 0.05 level with t values more than 1.96. Thus, the findings implied that convergent validity was established for both formative second-order constructs.

Assessment of structural model

To answer research question 1, Table 6 shows no significant direct effect of principal instructional leadership on teacher professional learning ($β = 0.096, t < 1.96$). Therefore, H1 was not supported. The non-significance finding has motivated the current study to conduct a post hoc analysis to examine whether there is a significant difference between instructional leadership and teacher professional learning across teaching experience, gender and school type respectively. No significant differences were found across teaching experience ($β = 0.247, t < 1.96$), gender ($β = 0.118, t < 1.96$) and school type ($β = 0.102, t < 1.96$). The findings indicated the homogeneity of the sample and, thus, providing an overall teacher perception on the relationship between principal instructional leadership and teacher professional learning.

To answer research question 2, finding indicates a significant indirect effect of principal instructional leadership on teacher professional learning through trust in the principal ($β = 0.220, t > 1.96$) at the significance level of .05. Thus, H2 was supported. To answer research question 3, Table 6 shows a statistically significant indirect effect of principal instructional leadership on teacher professional learning through teacher self-efficacy ($β = 0.125, t > 1.96$), with the
bootstrapping 95% bias-corrected confidence interval did not include zero at a significance level of .001. Therefore, H3 was supported. To answer research question 4, Table 6 shows that there is no significant indirect effect of principal instructional leadership on teacher self-efficacy through trust in the principal and teacher self-efficacy ($\beta = -0.005$, $t < 1.96$). Thus, H4 was not supported. Figure 4 shows that instructional leadership, trust in the principal and teacher self-efficacy contributed about 34% of variance explained on teacher professional learning.

**Discussion**

The scarcity of investigating the direct and indirect relationship between instructional leadership and teacher professional learning with trust in the principal and teacher self-efficacy as mediators in Malaysia as well as the lack of compilation of these two mediators in a structural model in the literature have prompted the emergence of the current study. The current study informed several salient points. First, results of this study confirm principal instructional leadership has no significant direct effect, but an indirect effect through teachers’ trust in the principal and self-efficacy on teacher professional learning. Specifically, the salience of this finding lies in the affirmation that teachers’ trust in the principal and self-efficacy represents high value “paths” in which principals make a difference in the professional learning of teachers.

The finding that principal instructional leadership had no direct effect on teacher professional learning refutes results reported in previous empirical studies (e.g. Hallinger et al., 2014; Li et al., 2016; Liu et al., 2016; Liu and Hallinger, 2018). In particular, the significant indirect effect of principal instructional leadership on teacher learning in this study reprises results reported in other non-Western societies (e.g. Karacabey et al., 2020; Li et al., 2016; Liu et al., 2016; Liu and
Hallinger, 2018; Piyaman et al., 2017; Tayag and Ayuyao, 2020) and in other distinct leadership constructs such as integrated leadership (e.g. Hallinger et al., 2014; Li et al., 2016), transformational leadership (e.g. Thoonen et al., 2012), and learning-centred leadership (Liu et al., 2016). In sum, these studies assert the importance of principal instructional leadership in creating environments that engage, motivate and sustain the professional learning of teachers (Hosseingholizadeh et al., 2020; Karacabey et al., 2020; Liu and Hallinger, 2018; Qian et al., 2017).

Second, our results highlight that trust in the principal and teacher self-efficacy mediate the relationship between instructional leadership and teacher professional learning respectively. This finding extends previous mediated model of leadership and teacher professional learning that involves a single significant mediator such as teacher trust (Hallinger et al., 2017; Li et al., 2016; Liu et al., 2016; Piyaman et al., 2017; Wang, 2016), teacher self-efficacy (Hallinger et al., 2018b), teacher motivation (Thoonen et al., 2012) and teacher agency (Bellibas¸ et al., 2020). All this knowledge emphasises the unequivocal role of teachers’ continuous learning towards sustainable school improvement (Karacabey et al., 2020; Li et al., 2016; Liu and Hallinger, 2017, 2018, 2020; Qian et al., 2017; Robinson et al., 2008; Thoonen et al., 2012).

It is worth highlighting that in comparing two mediating relationships with the path coefficient values, trust in the principal has an apparently stronger mediating effect on teacher professional learning compared with teacher self-efficacy (see beta values in Table 6). The current findings suggest that instructional leadership is more influential in developing trust in the principal compared with teacher self-efficacy in enhancing teacher professional learning.

In high-power distance societies, teachers accept their school leaders’ instruction without any disagreement (Liu and Hallinger, 2020). Subsequently, teachers are likely ‘to trust’ their leaders due to the limited autonomy afforded to them in decision-making. Malaysia is a high-power distance society. As such, trust in the principal has a significantly stronger mediating effect than teacher self-efficacy on the relationship between instructional leadership and teacher professional learning in Malaysian schools. Notably, leaders who doubt in their ability to make a positive difference in the quality of instructions in their schools are unlikely to engage in practices associated with instructional leadership (Karacabey et al., 2020; Liu and Hallinger, 2018, 2020). Findings from this study have implications for theories, practitioners, and leadership preparation and development.

**Implications**

A consensus has been reached among scholars that school leadership has an indirect effect on student achievement (Hallinger, 2011; Hallinger et al., 2018a; Harris et al., 2017; Robinson et al., 2008). In addition, our findings complement a growing body of evidence that confirms that school leadership also has indirect effects on the professional learning of teachers (Bellibaş et al., 2020; Hallinger and Liu, 2016; Hallinger et al., 2017a, 2017b; Karacabey et al., 2020; Liu and Hallinger, 2020). The findings of this study extended the international educational leadership literature by affirming a multiple mediated-effects model whereby instructional leadership exerted significant indirect effects on teacher professional learning via trust in the principal and teacher self-efficacy.

The study has several implications for practitioners. First, our findings indicate leadership that promotes teacher learning appears to incorporate elements that are associated with instructional and transformational leadership (Bellibaş et al., 2020; Karacabey et al., 2020; Thoonen et al., 2012). In particular, principals who intend to improve student learning should also motivate, support and sustain the professional learning of their teachers (Hosseingholizadeh et al., 2020;
Liu and Hallinger, 2018; Qian et al., 2017). Teacher professional learning must go beyond just ‘encouraging teachers to attend courses and workshops’. Principals should inculcate opportunities to foster teacher learning such as the practice of knowledge sharing on the job, collaborative planning, mentoring and joint problem solving (Liu and Hallinger, 2018; Wang, 2016).

Our research also emphasises the importance of ‘relationship in leadership’. Collaborative planning and learning in schools require support, trust and accountability (Liu and Hallinger, 2018). Thus, trust in the principal is essential to promote teacher professional learning (Hallinger et al., 2019). As such, school leaders should demonstrate personal interest, sincerity and a caring attitude to sustain a feeling of trust between leader and teacher (Li et al., 2016). The role of teacher self-efficacy reinforces the importance of school leadership that articulate an inspiring vision of learning for the school and one that creates a positive school learning climate for both students and teachers (Karacabey et al., 2020; Liu and Hallinger, 2018, 2020).

Our findings also have implications for leadership preparation and development programmes. First, an explicit goal to ‘make a difference’ in the learning of their teachers and students could be incorporated into the curriculum for current and future leaders. This reprises the role of effective instructional leaders in holding themselves personally responsible and accountable for the learning of their students (Hallinger, 2011). In many societies such as Malaysia, principals are not selected based on their expertise in teaching and learning (Ng, 2017). Therefore, instructional leaders must be capable of coaching teachers towards instructional success, inculcating models of teaching for active learning and drawing upon effective learning practices (Liu and Hallinger, 2018).

**Limitations and future studies**

This study has several limitations. First, data were collected only from one state using convenience sampling. As such, future studies could include more representative data to ensure generalisation of the findings by collecting data across the 13 states in Malaysia using probability random sampling. Owing to the limited sample size, the current findings should be cross-validated in different educational levels in order to ensure the stability of the findings in future studies.

In addition, the current non-significant findings could be attributed to cultural and contextual factors, which in turn provide direction for future studies. Future studies could employ qualitative research method such as interview or observation to gain deeper insights to explain the significant and non-significant findings by taking into consideration the cultural and contextual factors such as school types and gender. Specifically, future studies could examine how the Hofstede’s cultural orientation such as power distance moderates the relationships between instructional leadership, trust in the principal, teacher self-efficacy and teacher professional learning in a highly centralised education system. Finally, a possible reciprocal relationship between teacher self-efficacy and professional learning also provided directions for future studies.

**Conclusion**

This study has provided further support to the existing literature on the relationship between instructional leadership and teacher professional learning. The current study has extended previous studies in several distinct ways. First, this study provided empirical evidence in a developing society on the relationship between instructional leadership and teacher professional learning. Second, this study supports prior assertions that instructional principals are essential to engage teachers’ trust and self-efficacy prior to promoting teachers’ engagement in professional learning.
Third, the study provided rigorous empirical evidence in the literature to support teachers’ trust in the principal and teacher self-efficacy as two significant factors for teacher attitudes that are associated with instructional leadership and teacher professional learning in a multiple mediated-effects model.

**Declaration of conflicting interests**

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