*Environment and Social Psychology (2025) Volume 10 Issue 4* ISSN: 2424-8975 (O)
doi: 10.59429/esp.v10i4.3522 2424-7979 (P)

# RESEARCH ARTICLE

# The mediating role of teacher self-efficacy in relationship between professional learning community and collective teacher efficacy in Sarawak primary schools, Malaysia

**Zuraidah Abdullah[1,*], Victor Jibson Anthony[2], Zuliana Mohd Zabidi[3], Husaina Banu Kenayathulla[1]**

[1] *Universiti of Malaya, Kuala Lumpur, 55100, Malaysia*

[2] *Ministry of Education, Sarikei Sarawak, 96100, Malaysia*

[3] *Majlis Amanah Rakyat (MARA), Kuala Lumpur, 55100, Malaysia*

*** Corresponding author:** Zuraidah Abdullah, zuraidahab@um.edu.my

## ABSTRACT

The purpose of this study is to provide an in-depth analysis of how Professional Learning Community (PLC) dimensions were practiced by primary school teachers in Sarawak, Malaysia and impacted on teacher self-efficacy (TSE) and collective teacher efficacy (CTE). In this study, questionnaires were distributed to 450 respondents from 68 primary schools in Sarawak, Malaysia. This study used Structural Equation Modelling (SEM) to investigate the causal relationship between PLC and CTE with a focus on the mediating role of TSE. The findings indicate that five PLC's dimensions (collaborative culture, supportive condition (structure), supportive condition (relationship), result orientation and dialogue reflective have effects on CTE. In addition, TSE is found to mediate the effect of five PLC's dimensions (shared and supportive leadership, result oriented, collective learning and application, dialogue reflective and supportive condition (structure)) on CTE. The study provides new insight into PLC's literature by examining the effects of PLC on teachers' CTE. However, future research may integrate qualitative approach to triangulate the relationship between PLC and CTE for more comprehensive understanding of the subject matter. This study is one of the few to examine the effects of PLC towards teachers' collective efficacy especially in Asian context. This study also highlights the role of TSE as mediator in the school setting. Moreover, this study also examines the interrelationship between PLC's dimensions, TSE and CTE in a holistic manner.

***Keywords:*** professional learning community; Malaysia; teacher self-efficacy; collective teacher efficacy; primary schools

## 1. Introduction

In recent years, educational accountability has come under public scrutiny, and expectations for schools have come to transcend merely educational attainment. The public pins their hopes for schools to fulfil their expectations and this creates the need for diverse teaching and schooling goals[1]. However, the snail's pace of educational reform makes addressing this need more challenging and inevitably adds stress to school leaders and teachers in providing the required services effectively[2]. To avoid this, school leaders and teachers should

**ARTICLE INFO**
Received: 10 March 2025| Accepted: 8 April 2025 | Available online: 23 April 2025

**CITATION**
Abdullah Z, Anthony VJ, Zabidi ZM, et al. The mediating role of teacher self-efficacy in relationship between professional learning community and collective teacher efficacy in Sarawak primary schools, Malaysia. *Environment and Social Psychology* 2025; 10(4): 3522.
doi: 10.59429/esp.v10i4.3522

learn from effective, research-based practices linked to school improvement. They should also study how successful educational systems address challenges to improve their processes.

A study by[3] noted that the variability in human development results in the unique trajectory for growth for every child whose ability to learn is different. They argue that because of this fact, "effective teachers seek to personalize supports for different children" (p.vi). They further emphasize that positive school climate can improve school overall academic achievement through "organized classroom instruction, effective leadership, and teachers who are efficacious" (p.vi). This is in line with[4] who affirm that teachers who are highly efficacious are teachers who believe in "their capability to teach their subject matter even to difficult students" (p.774) and "show effective classroom management" (p.775). However, they caution that these teachers' level of efficacy may change in response to the sources of their efficacy such as the output of their classrooms, how their colleagues behave and their level of exhaustion (Ross, 1998, as cited in[5]). Therefore, it is important that school leaders to focus on building a positive school climate as it does not occur on its own.

Correspondingly, schools that achieve sustainable change through collaboration are clearly finding ways to improve their performance. Based on evidence in the past five decades, effective teachers and school leaders are improving their efficacy through continuous cycle of collective inquiry and this process takes place in a professional learning community (PLC)[6-9]. There is growing evidence that when teachers work together and participate in Professional Learning Communities (PLCs), student achievement improves. This aligns with the ideas of both Bandura[14] and Donahoo[10], who describe collective efficacy as a group's shared belief in their ability to achieve desired outcomes (p. 65). In the educational landscape, Donohoo[15] defines Collective Teacher Efficacy (CTE) as "the perceptions and judgements of a group of educators regarding their ability to positively influence student outcomes" (p. 102). Furthermore, this belief is supported by Hattie's[16] meta-analysis of over 1,500 studies on student achievement, which identifies CTE—with an effect size of 1.57—as one of the most powerful and reliable predictors of student success. In the words of Donahoo,[14] "when teams of educators believe they can make a difference, exciting things can happen in a school" (p. 41).

School's concerted efforts necessitate the process of developing and establishing effective professional learning structures that fosters CTE[17] and this happened most predominantly in western school context. A study on 13 empirical studies of PLC conducted in Malaysian schools found very little about which contextual construct of PLC that contribute to the stability of the efficacy sources of the teachers in the Malaysian school context[18]. Hence, there is still much to be understood so that effective PLC can be clearly and specifically implemented to create sustainable change in the schools.

# 2. Literature review

## 2.1. Teacher quality and student achievement

A review of fifty state policy evidence by[19] has found the link between teacher quality and student achievement. Findings from the review suggested that "student learning should be enhanced by the efforts of teachers who are more knowledgeable in their field and are skilful at teaching it to others" (p. 32). A finding like that was found by[20] who explored twenty-five education systems around the world, including ten most performing education systems in the world to find out why some schools succeed while others not. In their report, they succinctly summed up, "Above all, the top performing systems demonstrate that the quality of an education system depends ultimately on the quality of its teacher" (p.23). In summary, schools tend to achieve better academic outcomes when teachers believe in their teaching competence, as they more effectively improve students' learning.

## 2.2. Teacher self-efficacy (TSE)

When teachers believe they can perform their teaching task successfully, their students are more likely to experience improved learning[21,22]. According to some of RAND earliest studies on teacher efficacy, teachers indicated higher confidence in overcoming teaching obstacles when they believed they have adequate experience and training. They not only facilitated their student learning, but also motivated and shared academic goals with them. In turn, this increased the level of improved student learning[22].

This establishes the impact of a strong sense of teacher efficacy. However, in a study of 95 urban schools, Leana and Pil[23] found that "the structure and content of relationships among teachers (social capital) significantly predicted school-level student achievement" (Leana & Pil, 2006, as cited in[24], p. 1102). They pointed to leveraging social capital among teachers within context as a strategy to yield benefits for students in the form of achievement gains. The implication is, when teachers discuss specific teaching experience that unique to their setting, they may exhibit positive effects on student learning. Hargreaves[25] suggested that factors such as classroom empathy, critical reflection, knowledge and skills must be considered by teachers and school leaders for meaningful teacher collaboration.

## 2.3. Why PLC matters

Evidence on effective teacher collaboration can be traced back to RosenHoltz's study on characteristics of effective schools that involved seventy-eight elementary schools. Rosenholtz[26] found out that teachers in schools that performed academically, communicated about their classroom practices with colleagues to continuously improve their instructions. Dufour and Eaker[27] argued that "the most promising strategy for sustained substantive school improvement is developing the ability of school personnel to function as professional learning communities" (p.xi).

Empirically[28] affirmed the link between teacher collaboration and student achievement through a survey conducted in 47 elementary schools, involving 452 teachers and 2,536 fourth-grade students in the Midwestern United States. They stated that "schools with greater levels of teacher collaboration did indeed have significantly higher levels of student achievement" ([13], p.893).

In addition, Jensen and Bennet [29] conducted an analysis on four high-performing systems that scored near the top for Program for International Student Assessment (PISA). The four contexts with high-performing education systems were 1) British Columbia (Canada), 2) Hong Kong, 3) Shanghai (China) and 4) Singapore. The findings of their qualitative study showed that while the structures of teacher professional development were different, all four high-performing systems emphasized on collaborative professional learning as a driver for improved student achievement.

Furthermore, findings in TALIS 2018 report highlight that any attempt to improve the quality of education must start with improving the quality of instructional and professional practices of teachers and school leaders. In fact, 44% of the teacher respondents reported that their impactful professional development was based on peer learning and collaborative approaches. These teachers were also reported to exhibit higher levels of self-efficacy and job satisfaction[30].

The key take-aways of collaboration are, teachers not only acquired the instructional knowledge and skills they required, but they also harnessed the necessary energy and support to attend to their student learning needs[31-33].

## 2.4. The effective PLC attributes

This section brings together the definitions, dimensional concepts and models of PLC discussed by several experienced educational researchers who share a passion to improved teacher practices that make a positive difference to their students' learning. However, there is no one definition of PLC that is agreed by all.

Earlier scholar like[34] had defined PLC as "an inclusive group of people, motivated by a shared learning vision, who support and work with each other to inquire on their practice and together learn new and better approaches to enhance student learning" (p.230). Conversely, Fullan expressed a positive impact of PLC towards the school organisation. Fullan termed PLC as a structure "to change the culture of school systems" that eventually "change practice on a large scale" (2006, p.11). Meanwhile, Hord[35] defines a simpler term of PLC that an intentional way of educators working together toward a shared purpose of improving student learning. Jones and Harris[36] identified PLC as a disciplined professional collaboration that deliberately ensures impact on improving student learning outcomes. Dufour and associates[37] have related the process of learning in PLC such as cycle of collective learning and action research. They defined PLC as "an ongoing process in which educators work collaboratively in recurring cycles of collective inquiry and action research to achieve better results for the students they serve" (p.10).

In line with the definitions, most of the PLC scholars agree that the concept is multifaceted, comprising several dimensions that collectively form a PLC model. For example, Hord's[38] Five Dimensions of Professional Learning Community consists of five dimensions. This model describes what learning communities should look like in a school and how they should operate. The strength of this model lies in its suggestion on building a powerful culture that has two pronged methods. School culture shapes leaders into key figures who promote a safe environment and encourage teachers to in reflective dialogue to improve teaching and learning.

Next, Dufour and associates[39] added four essential questions based on their PLC model that teachers must always reflect on. Upon reflecting the four questions, teachers set the standard that they want their students to achieve to ensure their students are learning, teachers collaborate to develop common assessments, teachers use results from the assessments and then decide which student does or does not meet the standard and provide intervention accordingly.

An extensive review of the PLC literature led to the emergence of practices that offered commonality rather than differences. Some of the common practices are sharing the same school vision, shared leadership, working collaboratively as a team with focus on student learning, engaging in cycles of collective inquiry and using student data to identify areas for improvement and to design intervention[38-40]. Despite the many definitions and dimensional to form PLCs' models taken together, the one thing agreed by all PLC researchers is that the focus of PLC is to improve student learning[27,38,40-43].

## 2.5. Implications of a well-supported PLC

The idea of a proverbial saying, "it takes a village to raise a child" emphasizes on preparing our children for unprecedented challenges as a shared responsibility by all community members. Within an education context, members of school community must work collaboratively to equip all learners with "agency and a sense of purpose, and the competencies they need, to shape their own lives and contribute to the lives of others"[44]. OECD Learning Framework 2030 offers a vision of a new ecosystem of learning in which, "everyone should be considered a learner, not only students but also teachers, school managers, parents and communities"[44].

Argued[45] that successful school leaders built and sustained standards of teaching and learning in their schools by progressively shaping and layering the improvement culture in their schools. First, the school leaders diagnosed their school's needs and then "they layered context-sensitive strategies within and across school development phases" (p. 2). Interestingly, despite the differences in context of schools, their findings showed some common strategies implemented by school leaders. School leaders used school data to plan strategies, building trust between them and staff. They also placed emphasis on learning opportunities for students and teachers. In a similar vein, Dogan and Adams[43] reported that one of the main factors behind the significant changes to teachers practice and students' outcome from the PLC practices was the involvement of their school leaders in providing resources and actively promoting discussion among them. In summary, school leaders play a pivotal role in supporting the PLC implementation and sustainability in schools as PLC is a thoughtful collective effort for teacher learning.

### 2.6. TSE, CTE and PLC in Malaysia

Until recently, the research and literature on PLC have predominantly been focusing on the works of PLC in the western settings. A major shift in education systems in the Asia-Pacific region such as Singapore, China (Shanghai), Hong Kong and Malaysia are showing incremental interest in PLC. Both Singapore and Shanghai, being the two most competitive education systems in the Asia-Pacific region and in the world, have shown herculean efforts to promote quality teaching through their robust-designed PLC[42,46] and one of the main contributions to their excellent achievement in TIMMS and PISA.

Malaysia, on the other hand, shows less profound strategy in implementing effective PLC in schools although it has been the aspiration of the Malaysia Ministry of Education (MoE) to transform the national education system into a high performing education system (Malaysia. No doubt, MOE has laid the foundation for the implementation of PLC in Malaysian public schools since 2011 by introducing *Modul Komuniti Pembelajaran Profesional* (PLC module) to 274 secondary schools and 15 primary schools across the nation. Early empirical studies on PLCs have shown positive findings from teacher participation in PLCs, such as increased teacher professionalism[47] and student learning[43]. However, many of these studies originated from Western context, while PLC research in Malaysia was still at the early stages. For example, researchers in Malaysia were still focusing on the processes and development of PLCs[48-51] and haven't examining the effects of PLC especially towards CTE of school organisation intensively. According to[52]and[53], understanding the factors contributing to CTE will help to obtain educations goals in the school and achieve student's academic success.

Evidence from past western research have indicate that only in collaboration environment that teachers CTE will be develop in the school organisation. Recent research by[52] suggested five factors similar with PLC characteristics that can be enabling factor to CTE. Such assertation suggest PLC is a potential variable to develop CTE in the school. However not all PLCs dimensions have been identified to have positive effect to CTE. Past quantitative studies indicated only PLCs' dimension such as collective learning and application, shared and supportive leadership and shared personal practices have positive effects on CTE[54-56]. Hence there are still a need to understand more the effects from other PLCs' dimension towards CTE.

Conversely, findings from a qualitative study on PLCs in three high performing secondary schools by[17] proposed that when teachers felt that their PLCs were well supported by their school leaders and community, they believe that their strong collective efficacy can positively influence their student learning. Zuliana et al.[17] also highlighted that teacher in the three schools they visited deliberately engaged in their PLCs to achieve their schools' desirable outcomes. Drawing from said literature, the hypothesis is developed as follows:

H1 Shared vision, goal and value has positive effect on collective teachers' efficacy

H2 Shared and supportive leadership has positive effect on collective teachers' efficacy

H3 Collective culture has positive effect on collective teachers' efficacy

H4 Result orientation has positive effect on collective teachers' efficacy

H5 Shared personal practices has positive effect on collective teachers' efficacy

H6 Collective learning and application has positive effect on collective teachers' efficacy

H7 Dialogue reflective has positive effect on collective teachers' efficacy

H8 Supportive condition (structure) has positive effect on collective teachers' efficacy

H9 Supportive condition (relationship) has positive effect on collective teachers' efficacy.

There is a need to understand the relationship between PLC, TSE and CTE. Evidence from past qualitative studies reveals teachers' involvement in PLC can improve teachers TSE and develop their CTE in the long term[57,58]. In addition, past evidence also suggested TSE have a mediating effect between leadership and CTE[59,62]. All this research reaches a similar consensus on the roles of school leader to develop a culture and nature for collaboration to enhance the school organisation's CTE. Hence it also provides a theoretical ground to propose TSE could mediate the relationship between PLCs' dimension and CTE. Thus, the hypothesis is developed as below:

H10 Teachers' self-efficacy mediates the relationship between result orientation and collective teachers' efficacy

H11 Teachers' self-efficacy mediates the relationship between collaborative culture and collective teachers' efficacy

H12 Teachers' self-efficacy mediates the relationship between dialogue reflective and collective teachers' efficacy

H13 Teachers' self-efficacy mediates the relationship between supportive condition (relationship) and collective teachers' efficacy

H14 Teachers' self-efficacy mediates the relationship between supportive condition (structure) and collective teachers' efficacy

H15 Teachers' self-efficacy mediates the relationship between shared personal practices and collective teachers' efficacy

H16 Teachers' self-efficacy mediates the relationship between shared collective learning and application and collective teachers' efficacy

H17 Teachers' self-efficacy mediates the relationship between shared and supportive leadership and collective teachers' efficacy

H18 Teachers' self-efficacy mediates the relationship between shared vision, goal and value and collective teachers' efficacy

As previous discussion in the PLC field reveals various dimensions to form PLC, thus there is a need to find which dimensions of PLC can improve TSE and CTE in the school. These findings also can ensure stake holders especially school leadership to understand dan focus on which dimensions of PLC that will help to improve their teachers' sense of CTE in the school organisation. This statement is also supported by[63] who

stated that evidence of PLC dimensions having a positive influence will help school leaders develop authentic PLCs thus improving students' academic performance in the classroom.

# 3. Methodology

## 3.1. Sampling and procedure

The state of Sarawak consists of 1,279 primary schools and 26,313 primary school teachers. The teachers selected as respondents for this research have at least 2 years or more teaching experience. Sarawak is divided into 31 districts under Malaysia Ministry of Education jurisdiction. 450 teachers from 68 primary schools were selected as respondents using proportion sample to ensure respondents were selected from all 31 districts. using random cluster sampling. The sample of 450 was based on the sampling technique by[64] with confidence level of 95%[65]. The questionnaires were distributed via internet because of Sarawak's vast geographical size. The response rate was 100% with all 450 teachers responded the questionnaires. Out of 450 respondents, 38.9% of them were Sarawak indigenous people,79.3% with bachelor's degree and 39.6% with more than 15 years of teaching experience.

## 3.2. Instrument and measurement

The questionnaire consists of four parts: Demographic with 8 items, PLC with 57 items, Teacher Self-Efficacy with 12 items and Collective Teacher Efficacy with 12 items.

PLC. This instrument consists of nine dimensions taken from recent literature. Items for five dimensions, shared goal, value and mission, shared and supportive leadership, shared personal practices, supportive condition-(structure) and supportive condition-(relationship) were originally from PLC-R instrument by[66]that have been adapted by[67] in Malay language. Second, items for dimension collaborative culture, result orientation, dialogue reflective and collective learning and application refer to instrument by [68] also in Malay language. All items used five points scale ranged from "strongly disagree (1)" to "strongly agree (5)".

TSE. Items were adapted from Teacher Sense of Efficacy Scale (TSES) developed by[69]based on Bandura's theory. Their model consisted of three factors, efficacy for student engagement, instructional strategies, and classroom management[70]. All items used nine points scale which ranges from "none at all (1)" to "a great deal (9)".

CTE. This study adapted the items from Collective Teacher Belief Scale (CTES) by [71] These 12-items instruments consist of two factors, instructional strategies and student discipline. All items also used nine points scale ranges from "none at all (1)" to "a great deal (9)". It was also developed in response to another measurement of teacher collective efficacy by[72] that other researchers frequently used by other researchers which they believe were not suitable and drove down the scores for more challenging schools.

Next was the content validity of the instrument. For this study, we refer to the content validity index (CVI) proposed by[73] for the content validity of the instrument on a 4-point scale from "irrelevant (1)" to "extremely relevant (4)" and is rated by experts. Seven experts have been selected consist of university lecturers, Aminuddin Baki Director and schools' principal. We figured the average scale-level CVI (S-CVI) of all the items was 1 and the value was more than 0.9 as recommended by [74] after two rounds of CVI with the experts. Thus, we can conclude that overall instruments have achieved content validity.

After achieving content validity, we conducted a pre-testing consisting of six respondents (teachers) identical to the population studied. We completed the pre-test with the respondents to gain clarity, feedback, ambiguities and time taken of the items of the questionnaire[75,76]. Finally, we revised once based on comments and feedback from the respondents for the final version of the instrument.

We also administered a pilot study to obtain the internal consistency reliability of the instrument using Cronbach's alpha. It was administered to a sample of 120 respondents from six schools from the population been studied. Sekaran and Bougie[77] stated that reliabilities less than 0.6 are poor, 0.7 range is acceptable and more than 0.8 are good. The Cronbach's alpha values of this pilot test range were from 0.709 to 0.963.

### 3.3. Data analysis procedures

This study used Partial least structural equation modeling (PLS-SEM) method to test the proposed hypothesis. PLS-SEM was chosen because we want to explore simultaneously the direct and indirect relationship between PLC, TSE and CTE. Subsequently, PLS-SEM also have the capability to balance between explanation and prediction[78,79]. Based on[79], the data were analyzed and interpreted based on two staged approached. The two staged approached were assessment measurement model and assessment structural model.

## 4. Data analysis and findings

### 4.1. Common method bias test

According to[80,81], common method bias (CMB) can threaten construct validity, vague relationship between construct by increasing the reliability, convergent validity value or decrease the relationship between constructs. Thus, we analysed CMB using Harmon-Single Factor Test. The result showed the largest variance explained was 36.06% less than 50%[82]. Thus, CMB is not a threat for this research.

### 4.2. Reflective measurement model

For this assessment of reflective measurement model, three main results are reported, and they are construct reliability, convergent validity and discriminant validity[79]. Based on **Table 1**, all the constructs are reliable and consistent as the value of Cronbach's alpha (CA), composite reliability (CR) and Dijkstra Henseler (rho_A) is above 0.70 and met the threshold value[79,83].

For convergent validity, not all factors loading has obtained the threshold value of 0.708. Thus, we followed the recommendation by[79] for the indicators that don't achieve the threshold value of 0.708. Based on the recommendation, we deleted item SCS6 with the loading 0.597 and increased the AVE value from 0.493 to 0.526. As for teachers' collective efficacy, we deleted item CTE11 with the loading 0.277 and the AVE value increased from 0.698 to 0.754. As a result, all AVE values of these constructs exceed the threshold value of 0.5[79] and obtained convergent validity.

**Table 1.** Reflective measurement model assessment.

| Construct | Items | Loading | CA | CR | Rho_A | AVE |
|---|---|---|---|---|---|---|
| Shared and supportive leadership | SSL1 | 0.775 | 0.91 | 0.92 | 0.91 | 0.605 |
| (SSL) | SSL2 | 0.815 | | | | |
| | SSL3 | 0.720 | | | | |
| | SSL4 | 0.838 | | | | |
| | SSL5 | 0.728 | | | | |
| | SSL6 | 0.810 | | | | |
| | SSL7 | 0.779 | | | | |
| | SSL8 | 0.752 | | | | |
| Shared vision, goal and value | SVGV 1 | 0.778 | 0.90 | 0.92 | 0.90 | 0.576 |
| (SVGV) | SVGV 2 | 0.825 | | | | |

| Construct | Items | Loading | CA | CR | Rho_A | AVE |
|---|---|---|---|---|---|---|
| | SVGV 3 | 0.771 | | | | |
| | SVGV 4 | 0.829 | | | | |
| | SVGV 5 | 0.713 | | | | |
| | SVGV 6 | 0.668 | | | | |
| | SVGV 7 | 0.825 | | | | |
| Collaborative culture (CC) | CC1 | 0.797 | 0.87 | 0.90 | 0.87 | 0.651 |
| | CC2 | 0.804 | | | | |
| | CC3 | 0.871 | | | | |
| | CC4 | 0.800 | | | | |
| | CC5 | 0.758 | | | | |
| Result orientation (RO) | RO1 | 0.740 | 0.82 | 0.88 | 0.83 | 0.583 |
| | RO2 | 0.793 | | | | |
| | RO3 | 0.766 | | | | |
| | RO4 | 0.773 | | | | |
| | RO5 | 0.745 | | | | |
| Shared personal practices (SPP) | SPP1 | 0.797 | 0.84 | 0.89 | 0.87 | 0.615 |
| | SPP2 | 0.842 | | | | |
| | SPP3 | 0.802 | | | | |
| | SPP4 | 0.809 | | | | |
| | SPP5 | 0.658 | | | | |
| Collective learning and application (CLA) | CLA1 | 0.805 | 0.85 | 0.90 | 0.85 | 0.628 |
| | CLA2 | 0.859 | | | | |
| | CLA3 | 0.794 | | | | |
| | CLA4 | 0.704 | | | | |
| | CLA5 | 0.793 | | | | |
| Dialogue reflective (DR) | DR1 | 0.831 | 0.86 | 0.90 | 0.86 | 0.643 |
| | DR2 | 0.837 | | | | |
| | DR3 | 0.779 | | | | |
| | DR4 | 0.728 | | | | |
| | DR5 | 0.828 | | | | |
| Supportive condition-(structure) (SCS) | SCS1 | 0.741 | 0.85 | 0.89 | 0.85 | 0.523 |
| | SCS2 | 0.703 | | | | |
| | SCS3 | 0.765 | | | | |
| | SCS4 | 0.776 | | | | |
| | SCS5 | 0.647 | | | | |
| | SCS7 | 0.685 | | | | |
| | SCS8 | 0.736 | | | | |

| Construct | Items | Loading | CA | CR | Rho_A | AVE |
|---|---|---|---|---|---|---|
| Supportive condition-(relationship) (SCR) | SCR1 | 0.754 | 0.87 | 0.91 | 0.88 | 0.659 |
| | SCR2 | 0.825 | | | | |
| | SCR3 | 0.761 | | | | |
| | SCR4 | 0.870 | | | | |
| | SCR5 | 0.843 | | | | |
| Teacher self-efficacy (TSE) | TSE1 | 0.761 | 0.96 | 0.96 | 0.96 | 0.674 |
| | TSE2 | 0.774 | | | | |
| | TSE3 | 0.795 | | | | |
| | TSE4 | 0.837 | | | | |
| | TSE5 | 0.838 | | | | |
| | TSE6 | 0.851 | | | | |
| | TSE7 | 0.857 | | | | |
| | TSE8 | 0.673 | | | | |
| | TSE9 | 0.841 | | | | |
| | TSE10 | 0.869 | | | | |
| | TSE11 | 0.862 | | | | |
| | TSE12 | 0.868 | | | | |
| Teacher collective efficacy (CTE) | CTE1 | 0.837 | 0.97 | 0.97 | 0.97 | 0.754 |
| | CTE2 | 0.862 | | | | |
| | CTE3 | 0.885 | | | | |
| | CTE4 | 0.905 | | | | |
| | CTE5 | 0.862 | | | | |
| | CTE6 | 0.863 | | | | |
| | CTE7 | 0.871 | | | | |
| | CTE8 | 0.892 | | | | |
| | CTE9 | 0.876 | | | | |
| | CTE10 | 0.87 | | | | |
| | CTE12 | 0.828 | | | | |

**Table 1.** (*Continued*)

***Notes:*** *CA: Cronbach's alpha; rho A: Dijkstra-Henseler's rho; CR: composite reliability; AVE: average variance extracted*

Next, this study continued to assess the discriminant validity using heterotrait-monotrait (HTMT) ratio correlation criteria. Based on **Table 2**, all constructs show satisfactory discriminant validity except for two constructs collective learning and application and shared goal, value and mission that exceed the rules of thumb 0.85 and 0.9[84]. Thus, the study proceeds to analyze the discriminant validity with bootstrapping procedure to obtain the value of HTMT inference and confidence interval 97.50% with the value that cannot exceed 1 to obtain discriminant validity. Based on **Table 3**, all constructs have achieved satisfactory discriminant validity[84].

**Table 2.** Discriminant validity HTMT assessment.

| | RO | CC | DR | TSE | CTE | SCR | SCS | SPP | CLA | SSL | SVGV |
|---|---|---|---|---|---|---|---|---|---|---|---|
| RO | | | | | | | | | | | |
| CC | 0.656 | | | | | | | | | | |
| DR | 0.691 | 0.718 | | | | | | | | | |
| TSE | 0.511 | 0.447 | 0.541 | | | | | | | | |
| CTE | 0.449 | 0.502 | 0.527 | 0.835 | | | | | | | |
| SCR | 0.541 | 0.648 | 0.73 | 0.439 | 0.583 | | | | | | |
| SCS | 0.615 | 0.666 | 0.795 | 0.529 | 0.597 | 0.756 | | | | | |
| SPP | 0.681 | 0.764 | 0.791 | 0.494 | 0.479 | 0.609 | 0.696 | | | | |
| CLA | 0.64 | 0.742 | 0.879 | 0.546 | 0.551 | 0.683 | 0.766 | 0.913 | | | |
| SSL | 0.500 | 0.658 | 0.636 | 0.332 | 0.402 | 0.660 | 0.662 | 0.566 | 0.615 | | |
| SVGV | 0.578 | 0.767 | 0.689 | 0.431 | 0.504 | 0.718 | 0.748 | 0.668 | 0.703 | 0.870 | |

***Notes:*** *SSL: Shared and supports leadership; SVGV: Shared vision, goal and value; CC: Collaborative culture; RO: Result orientation; SPP: Shared personal practices; CLA: Collective learning and application; DR: Dialogue reflective; SCS: Supportive condition-(structure); SCR: Supportive condition-(relationship); TSE: Teacher self-efficacy; CTE: Teacher collective efficacy*

**Table 3.** HTMT inference assessment.

| | Original Sample (O) | Bias | 2.50% | 97.50% |
|---|---|---|---|---|
| CC -> RO | 0.656 | 0.001 | 0.577 | 0.723 |
| DR -> RO | 0.691 | 0.000 | 0.614 | 0.760 |
| DR -> CC | 0.718 | 0.000 | 0.642 | 0.782 |
| TSE -> RO | 0.511 | 0.000 | 0.417 | 0.593 |
| TSE -> RO | 0.447 | -0.001 | 0.359 | 0.531 |
| TSE -> DR | 0.541 | 0.000 | 0.455 | 0.622 |
| CTE -> RO | 0.449 | -0.001 | 0.353 | 0.534 |
| CTE -> RO | 0.502 | -0.001 | 0.412 | 0.578 |
| CTE -> DR | 0.527 | -0.001 | 0.444 | 0.605 |
| CTE -> TSE | 0.835 | -0.001 | 0.794 | 0.869 |
| SCR -> RO | 0.541 | -0.001 | 0.455 | 0.626 |
| SCR -> RO | 0.648 | 0.001 | 0.567 | 0.718 |
| SCR -> DR | 0.730 | -0.001 | 0.655 | 0.796 |
| SCR -> TSE | 0.439 | -0.002 | 0.344 | 0.527 |
| SCR -> CTE | 0.583 | -0.001 | 0.496 | 0.655 |
| SCS -> RO | 0.615 | 0.000 | 0.535 | 0.689 |
| SCS -> RO | 0.666 | 0.001 | 0.573 | 0.744 |
| SCS -> DR | 0.795 | 0.000 | 0.726 | 0.851 |
| SCS -> TSE | 0.529 | 0.000 | 0.429 | 0.613 |
| SCS -> CTE | 0.597 | 0.000 | 0.506 | 0.675 |
| SCS -> SCR | 0.756 | -0.001 | 0.674 | 0.822 |
| SPP -> RO | 0.681 | 0.001 | 0.612 | 0.740 |

| | Original Sample (O) | Bias | 2.50% | 97.50% |
|---|---|---|---|---|
| SPP -> RO | 0.764 | -0.001 | 0.693 | 0.825 |
| SPP -> DR | 0.791 | 0.000 | 0.722 | 0.854 |
| SPP -> TSE | 0.494 | -0.001 | 0.404 | 0.573 |
| SPP -> CTE | 0.479 | -0.001 | 0.387 | 0.560 |
| SPP -> SCR | 0.609 | -0.001 | 0.514 | 0.693 |
| SPP -> SCS | 0.696 | 0.000 | 0.616 | 0.767 |
| CLA -> RO | 0.640 | 0.000 | 0.564 | 0.706 |
| CLA -> RO | 0.742 | 0.000 | 0.665 | 0.805 |
| CLA -> DR | 0.879 | 0.000 | 0.835 | 0.917 |
| CLA -> TSE | 0.546 | 0.000 | 0.451 | 0.625 |
| CLA -> CTE | 0.551 | 0.000 | 0.458 | 0.630 |
| CLA -> SCR | 0.683 | -0.001 | 0.602 | 0.753 |
| CLA -> SCS | 0.766 | 0.000 | 0.700 | 0.826 |
| CLA -> PAP | 0.913 | 0.000 | 0.869 | 0.951 |
| SSL -> RO | 0.500 | 0.000 | 0.408 | 0.584 |
| SSL -> RO | 0.658 | 0.000 | 0.588 | 0.721 |
| SSL -> DR | 0.636 | -0.001 | 0.555 | 0.715 |
| SSL -> TSE | 0.332 | 0.000 | 0.233 | 0.420 |
| SSL -> CTE | 0.402 | 0.000 | 0.308 | 0.482 |
| SSL -> SCR | 0.660 | 0.000 | 0.582 | 0.726 |
| SSL -> SCS | 0.662 | 0.000 | 0.585 | 0.728 |
| SSL -> SPP | 0.566 | 0.000 | 0.476 | 0.648 |
| SSL ->CLA | 0.615 | 0.000 | 0.527 | 0.688 |
| SVGV -> RO | 0.578 | 0.000 | 0.494 | 0.653 |
| SVGV -> CC | 0.767 | 0.000 | 0.701 | 0.822 |
| SVGV -> DR | 0.689 | -0.001 | 0.614 | 0.752 |
| SVGV -> TSE | 0.431 | -0.001 | 0.335 | 0.517 |
| SVGV -> CTE | 0.504 | -0.001 | 0.416 | 0.579 |
| SVGV -> SCR | 0.718 | 0.000 | 0.648 | 0.779 |
| SVGV -> SCS | 0.748 | -0.001 | 0.685 | 0.800 |
| SVGV -> SPP | 0.668 | 0 | 0.596 | 0.73 |
| SVGV -> CLA | 0.703 | 0 | 0.636 | 0.764 |
| SVGV -> SSL | 0.872 | 0 | 0.836 | 0.905 |

**Table 3.** (*Continued*)

***Notes:*** *SSL: Shared and supports leadership; SVGV: Shared vision, goal and value; CC: Collaborative culture; RO: Result orientation; SPP: Shared personal practices; CLA: Collective learning and application; DR: Dialogue reflective; SCS: Supportive condition-(structure); SCR: Supportive condition-(relationship); TSE: Teacher self-efficacy; CTE: Teacher collective efficacy.*

### 4.3. Structural model assessment

After the study has established reliability and validity, we proceed with the assessment of structural model. We examined the collinearity issue by using inner VIF. **Table 4** shows VIF values less than 0.5 and concluded this model does not have collinearity issue. Then, the hypothesis testing been conducted with a bootstrapping technique with 5000 resampling.

**Table 4** shows three constructs collaborative culture (CC) ( β = 0.074 , t = 2.032 ), Supportive condition-(structure) (SCS) ( β = 0.109 , t = 2.032 ) and Supportive condition-(relationship) (SCR) ( β = 0.223 , t = 5.526 ) have positive effect while two constructs result orientation (RO) ( β = -0.072 , t = 2.097 ) and dialogue reflective (DR) ( β = -0.086 , t = 2.01 ) have negative effect on teachers' collective efficacy. Conversely, the path for share vision, goal and value (SVGV) (β = 0.04, t = 0.797), shared and supportive leadership (SSL) (β = 0.016, t = 0.326), shared personal practices (SPP) (β = -0.028, t = 0.616) and collective learning and application (CLA) (β = 0.016, t = 0.326) on teachers' collective efficacy are rejected. Meanwhile, four constructs result orientation (RO) ( β = 0.191 , t = 3.541 ) , collective learning and application (CLA) (β = 0.162 , t = 2.008 ) , dialogue reflective (DR) ( β = 0.119 , t = 1.857) and Supportive condition-(structure) (SCS) ( β = 0.168 , t = 2.566 ) have positive effect while Shared and supportive leadership (SSL) ( β = -0.13 , t = 2.233 ) have negative effect on teachers' self-efficacy. On the contrary, share vision, goal and value (SVGV) (β = 0.073, t = 0.947), collaborative culture (CC) (β = 0.011, t = 0.167), shared personal practices (SPP) (β = 0.023, t = 0.374) and Supportive condition-(relationship) (SCR) (β = 0.048, t = 0.812) are rejected.

Then, the effect size ($f^2$) was calculated to determine the effect size of each path. According to[85], effect size can be divided to three levels: small (0.02), medium (0.15) and 0.35 (large). Based on findings in **Table 4**, one predictor: collective learning and application ($f^2 = 0.00$) shows no effect size, 5 predictors: share value, goal and mission ($f^2 = 0.002$), Shared and supportive leadership ($f^2 = 0.001$), collaborative culture ($f^2 = 0.008$), shared personal practices ($f^2 = 0.001$) and dialogue reflective ($f^2 = 0.008$) have weak effect on teachers' collective efficacy with $R^2$ value 0.533. Meanwhile, only three predictors: result orientation ($f^2 = 0.01$), Supportive condition-(structure) ($f^2 = 0.016$) and Supportive condition-(relationship) ($f^2 = 0.077$) have small effect on teachers' collective efficacy.

Finally, predictive relevance ($Q^2$) was analysis by applying blindfold procedure. Based on **Table 5**, $Q^2$ values for the structural model is 0.5333 and is greater from 0 thus indicating the model possesses a predictive quality[79].

### 4.4 Assessment of Mediation Effect

The mediation effect is tested by bootstrapping the indirect effect[86-89]. For this bootstrapping, 5000 sub sample have been use from the original data set. The results in **Table 5** indicate teachers' self-efficacy mediates the relationship between result orientation (RO) ( β = 0.134 , t = 3.546 ), dialogue reflective (DR) ( β = 0.084 , t = 1.833 ), supportive condition-(structure) (SCS) ( β = 0.118 , t = 2.531 ), collective learning and application (CLA) ( β = 0.114 , t = 2.001 ) and shared and supportive leadership (SSL) ( β = -0.091 , t = 2.234 ) with teacher collective efficacy. However, the results demonstrate teachers' self-efficacy mediates the relationship between collaborative culture (CC) ( β = 0.008 , t = 0.166 ), supportive condition-(relationship) (SCR) ( β = 0.034 , t = 0.815 ), shared personal practices (SPP) ( β = 0.016 , t = 0.364 ) and shared vision, goal and value(SVGV) ( β = 0.051 , t = 0.953 ) with teacher collective efficacy are rejected.

**Table 4.** Assessment of structural model (direct relationship).

| Hypothesis | Relationship | VIF | Std Beta | Std Error | T-value | P-value | $R^2$ | $f^2$ | $Q^2$ | 95%CL LL | 95%CL UL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| H1 | SVGV -> CTE | 3.69 | 0.04 | 0.05 | 0.797 | 0.213 | 0.714 | 0.002 | 0.533 | -0.042 | 0.125 |
| H2 | SSL ->CTE | 2.86 | 0.016 | 0.048 | 0.326 | 0.372 | | 0.001 | | -0.062 | 0.097 |
| H3 | CC -> CTE | 2.46 | 0.074 | 0.037 | 2.032* | 0.021 | | 0.008 | | 0.015 | 0.134 |
| H4 | RO -> CTE | 1.86 | -0.072 | 0.034 | 2.097* | 0.018 | | 0.01 | | -0.128 | -0.012 |
| H5 | SPP -> CTE | 3.09 | -0.028 | 0.045 | 0.616 | 0.269 | | 0.001 | | -0.102 | 0.046 |
| H6 | CLA -> CTE | 3.55 | 0.016 | 0.048 | 0.326 | 0.372 | | 0.00 | | -0.062 | 0.097 |
| H7 | DR -> CTE | 3.10 | -0.086 | 0.043 | 2.01* | 0.022 | | 0.008 | | -0.158 | -0.017 |
| H8 | SCS -> CTE | 2.60 | 0.109 | 0.043 | 2.514** | 0.006 | | 0.016 | | 0.036 | 0.177 |
| H9 | SCR -> CTE | 2.25 | 0.223 | 0.04 | 5.526 | 0.000 | | 0.077 | | 0.157 | 0.289 |

***Notes:*** **** p < 0.001, ** p < 0.01, * p < 0.05, SSL: Shared and supportive leadership; SVGV: Shared vision, goal and value; CC: Collaborative culture; RO: Result orientation; SPP: Shared personal practices; CLA: Collective learning and application; DR: Dialogue reflective; SCS: Supportive condition-(structure); SCR: Supportive condition-(relationship); TSE: Teacher self-efficacy; CTE: Teacher collective efficacy*

**Table 5.** Assessment of mediating effect.

| Hypothesis | Relationship | Std Beta | SD | t- value | p-value | 5% CL ll | 95% CL UL |
|---|---|---|---|---|---|---|---|
| H10 | RO -> TSE -> CTE | 0.134 | 0.038 | 3.546*** | 0.00 | 0.073 | 0.197 |
| H11 | CC -> TSE -> CTE | 0.008 | 0.048 | 0.166 | 0.868 | -0.066 | 0.095 |
| H12 | DR -> TSE -> CTE | 0.084 | 0.046 | 1.833 | 0.067 | 0.011 | 0.161 |
| H13 | SCR -> TSE -> CTE | 0.034 | 0.041 | 0.815 | 0.415 | -0.035 | 0.101 |
| H14 | SCS -> TSE -> CTE | 0.118 | 0.047 | 2.531* | 0.011 | 0.039 | 0.194 |
| H15 | SPP -> TSE -> CTE | 0.016 | 0.045 | 0.364 | 0.716 | -0.061 | 0.087 |
| H16 | CLA -> TSE -> CTE | 0.114 | 0.057 | 2.001* | 0.045 | 0.022 | 0.206 |
| H17 | SSL -> TSE -> CTE | -0.091 | 0.041 | 2.234* | 0.026 | -0.159 | -0.024 |
| H18 | SVGV -> TSE -> CTE | 0.051 | 0.054 | 0.953 | 0.341 | -0.038 | 0.137 |

***Notes:*** **** p < 0.001, ** p < 0.001, * p < 0.005, PKS: Shared and supportive leadership; PNMV: Shared vision, goal and value; BUK: Collaborative culture; BKPTSN: Result orientation; PAP: Shared personal practices; PKA: Collective learning and application; DR: Dialogue reflective; KMS: Supportive condition-(structure); KMH: Supportive condition-(relationship); TSE: Teacher self-efficacy; CTE: Teacher collective efficacy*

# 5. Discussion

## 5.1. PLC Dimensions that influence teachers' collective efficacy

Past research shows there is a need for school leaders to develop collaborative environment in a formal way for teachers to work together in the school[90-93]. The present study proposed PLC can influence teachers' collective efficacy in Malaysia context, however not all PLCs' dimension have significant effect on CTE. Compared to past studies, findings of this study suggested five PLCs' dimensions (collaborative culture, supportive condition (structure), supportive condition (relationship), result orientation and dialogue reflective) have effects on CTE. Meanwhile four other PLCs' dimensions (share vision, goal and value, shared and supportive leadership, share personal practices and collective learning and application) are not statistically significant on CTE. The findings of this study support to previous findings by[52] that also suggested five factors:

empower teachers, embedded reflective practices, cohesive teacher knowledge, goal consensus and supportive leadership as the enabling factor for CTE. Thus, this study has suggested PLC dimensions as a potential antecedent that can improve teacher sense of collective efficacy. These findings were also in line with Social Cognitive theory as[94] explained collaboration among team members will enhance CTE resulting from the development of shared and social systems within the school.

Meanwhile, it's also worth mentioning that PLC's dimensions such as result orientation and dialogue reflective have negative effects towards CTE. It means that the more teachers in this study involved in result orientation and dialogue reflective, the lesser the teacher's belief on their collective ability in the classroom. One possible explanation is the teachers at the school level might face abundance pressure from all the stakeholders (parents, school administration, District Education Office) that maybe only prioritize on students' academic achievement solely based on formal examination results. Discussions centered on students' data from formal examination year by year have instilled negative perception among all teachers in the school. Consequently, confidence in the collective abilities of teachers diminishes when academic performance of the students declines or fails to show desired results. This statement is supported by findings of[95] which explained Malaysia teachers face constant pressure from the ministry, school leaders and parents to enhance students' academic performance based on formal examination and to maintain their school reputation.

A second explanation is that the senior team leader and middle team leader still haven't played their roles in developing an environment that supports the teachers to interact more openly and wouldn't decrease their credibility while conducting reflective dialogue. This statement is supported by findings from[96] which explain the importance roles played by middle leader teams to motivate and support their teachers besides only giving instructions. A more open environment will help the teachers to open during interaction in reflective dialogue which can help them to share ideas and experience to solve any student issues arise in the school.

Besides that, school leaders have an important role in guiding and providing support to the teachers based on the student's data to identify the strengths, weaknesses and plan together the intervention to be applied in the classroom. Based on the findings of this study, school leaders must first instill vision, goal and value with their teachers or with the whole school community as shared vision, goal and value still don't have a significant effect on CTE. Vision created together will serve as a guide on what the school community wants to achieve related to the students' performance. Therefore, school leaders can start with developing small achievable goals with the teachers based on current and expected achievement based on the students' data to build their CTE[53,97]. When teachers start achieving small goals, they will be more confident in their abilities.

The findings of this study also have contributed to the current field of PLC literature especially in Malaysia which suggests five PLCs' dimension that have effect on CTE. This study also reprises results from other recent quantitative studies from the western: collective learning and application[54], Asian: Shared leadership and supportive leadership[55] and Malaysia: Shared vision, collective learning and application and shared personal practices[56] findings while supports the current qualitative findings from[17]. These findings reveal that the culture of the community itself can influence how the teachers collaborate among themselves. Even in Malaysia context itself, these findings were contrast from previous local researcher. As local researcher such as[98] and[99] stated Malaysia teachers intend to refrain from expressing their true opinions on certain matters during discussions due to Malaysia culture which tends to be more reserved and apprehensive of criticism compared to western communities which they intend to be more open and candid in sharing their opinions.

Of all the five PLC's dimension, this study proposed three PLCs dimension (collaborative culture, supportive condition (structure) and supportive condition (relationship)) have positive effect on CTE. One

possible explanation is teachers in this study felt more comfortable and actively involved in collaborative activities that evolve around teaching and learning materials for the classroom. Currently, schools in Malaysia have provide supportive condition (structure) thus enables teachers to collaborate among themselves. Now they have more time to gather and learn together, have a better communication system among themselves and a conducive school environment. These findings prove that school support for PLC is a school process that can help and increase the interpretation and evaluation by the teachers as a source of 'analysis of teaching tasks in increasing CTE[100]. As[101] stated supportive condition (structure) enables teachers' collaboration to happen consistently. Thus, support condition (structure) is the first thing that must be develop by school leadership to develop PLC in the schools[102,103] while collectively building vision, mission and value with the teachers in PLC.

This finding also explains the teachers in the study began to trust each other within the school as an organization. This relationship has influenced the CTE through emotional dan physical state sources. According to[104], the development of trust among the teachers will encourage them to share ideas on instructional practices and truly collaborating among themselves. Furthermore, findings by[105] have emphasize the role of school leaders in enhancing teacher relationship in professional learning by fostering supportive relationship, recognizing teachers as learners within PLC, showing respect and empathy and providing support to enhance trust. In addition, improved teachers' relationship will also reduce teacher isolation and help to enhance sense of belonging among teachers within the school organization[101].

## 5.2. The mediating role of teachers' self-efficacy

In this study, five PLC dimensions (shared and supportive leadership, result oriented, collective learning and application, dialogue reflective and supportive condition (structure)) were associated with CTE through TSE. This supports our assumption that PLCs' dimension had direct and indirect effect on CTE. These findings reinforce TSE as a mediator between the relationship between PLC and CTE although previous scholars[59-62,106,107] who had used variety of other variables such as leadership. As suggested by previous researchers, this finding proves school leaders can develop PLC to improve TSE and cultivate group efficacy. Thus, these findings are in line with Banduras' social cognitive theory which explained enhancing individual self-efficacy will also improve collective efficacy as a group[94]. This finding also supports results reported by recent qualitative study's findings by[57] and[58]. Moreover, this study extends the work of[108] and[106] by showing that PLCs dimension had direct and indirect effects on CTE through TSE. On the other note, it can be said that teachers with higher self-efficacy can influence other teachers when they are involved in interaction or collaborating in PLC activities in the school. Thus, these findings suggest school leaders should recognize TSE as an important mediator between PLC dimensions and CTE.

More specifically, our result shows two PLC dimensions: shared and supports leadership and collective learning and application dimension only had indirect effect on CTE through TSE. While three PLC dimensions, result orientation, dialogue reflective and supportive condition (structure) had direct and indirect effects on CTE through TSE. These results indicate teachers' involvement in PLC can improve beliefs on their ability as an organization by through their TSE. School leaders that develop school structures to support PLC will create a comfortable environment thus maximizing more interaction between teachers in PLC related activities. As mentioned by Bandura, fostering a positive environment especially regarding student learning will enhance teachers' self-efficacy and cultivate confidence in the school's ability as a system. As such PLC is one of the positive environments that school leaders can develop regarding student learning. Although CTE is one of the important variables mentions by[109] that can impact student achievement, still TSE plays an important role in developing CTE in the school through PLC.

Despite the emphasize of current literature on the importance of PLC towards CTE, this result shows the active role by TSE between the relationship of collective learning and application and CTE. It can be explained by the involvement of individual teachers in PLC activities, especially the roles of senior teachers. For example, current findings by researchers such as[110] and[111] highlighted collective learning helps teachers in their professional development. For example, PLC provides social spaces for the teachers to conduct activities such as frequent interrogation, understanding students' habits, construct new learning and teaching methods and teacher observation that can enhance their pedagogical content knowledge and sense of belonging thus also improving their TSE[111,112]. It is also worth mentioning the importance of PLC to the novice teachers as they can gain confidence in teaching by observing their senior teacher when conducting their activities together. Collective learning also gave the opportunity to teachers with higher self-efficacy to guide novice teachers in improving their teaching practices and student learning in the classroom. Thus, in the long run it will also affect the CTE in the school. This result is like past qualitative research from[58] and[57,113] also explained that collective learning will also instill responsibility among the teachers for students learning and address their needs better.

Our research also showed a negative and significant effect between shared and supportive leadership on CTE though TSE. It means when the teachers perceive shared and supportive leadership from their school leaders, their TSE decreases and will also affect their CTE as an organization. One possible explanation is that the gap between leadership and teachers was still quite high. Although leadership in the school have started to shared and supportive leadership with the teachers involved, it seems teachers' leadership capacity haven't been developed in the respective schools. This finding might also be related to the culture in Malaysia. Hierarchy structure and high-power distance of teachers especially in Asian countries schools[17,114-116,60] explained there is difference between status and rank in the relationship between teacher and school leaders in a power distance society. Teachers in these societies were used to receiving orders by their leaders without giving any feedback or even giving disagreement. As such, while school leaders develop PLC, they should also emphasize teachers taking control of their own learning and giving more autonomy in PLC thus developing teacher leadership among the teachers. Asian scholar such as[112] emphasis on the role of leaders in school had led to neglect on teacher leadership development. This may result in teachers only following directives and continuing to belief school leaders have full authority over all decisions being made. Thus, these findings highlight the importance in developing teacher leadership within PLC at the individual teacher level alongside formal leadership positions within the school thus enhancing TSE and subsequently the collective efficacy of the school as an organization.

# 6. Conclusion

"Teacher efficacy has proved to be powerfully related to many meaningful educational outcomes such as teachers' persistence, enthusiasm, commitment and instructional behavior, as well as student outcomes such as achievement, motivation, and self-efficacy beliefs"[69]. In addition, Donohoo[10] argued that "when efficacy is present in a school culture, educators' efforts are enhanced" (p. 42) and a growing body of research shows that one model that supports this culture is professional learning communities[7,12,15,117]. Furthermore, Vescio et al.[118] after reviewing eleven studies on the impact of PLCs affirmed that "well-developed PLCs have positive impact on both teaching practice and student achievement" (p. 80).

However, it is not without obstacles for schools to sustain their effective PLCs. Poorly supported PLC is incapable to deliver its promising results. Hence, this study highlights that school leaders approaches to instructional effectiveness in the schools are instrumental. It is then suggested that school leaders play their role effectively in optimizing the resources to support the professional learning development of their teachers.

This embodies several tasks such as sharing a clear vision with school stakeholders, dedicating collaborative time for teachers to have their reflective dialogues and nurturing the structures and conditions to foster positive school climate. This clearly shows the indirect impact of an effective principal onto student academic excellence. As a matter of fact, it is concluded by[119] and[120] that school leadership strongly influences school-related factors that contribute to student learning. As also stated by (Jennifer Donohoo et al., 2020), understanding factors contributing to CTE will help school leaders to understand how they instill a better sense of collective efficacy among their teachers in respective schools.

## Conflict of interest

The authors declare no conflict of interest.

## References

1. OECD, Education at glance 2021: OECD indicators. Paris: OECD Publishing, 2021. doi: 10.1787/bcc79d57-en.
2. J. Jerrim and S. Sims, "When is high workload bad for teacher wellbeing? Accounting for the non-linear contribution of specific teaching tasks," Teach Teach Educ, p. 105, 2021.
3. L. Darling-Hammond and C. Cook-Harvey, "Educating the whole child: Improving school climate to support student success," Palo Alto, CA, 2018. [Online]. Available: https://learningpolicyinstitute.org/product/educating-whole-child
4. D. Holzberger, A. Philipp, and M. Kunter, "How teachers' self-efficacy is related to instructional quality: A longitudinal analysis," J Educ Psychol, vol. 105, no. 3, pp. 774–786, 2013, doi: 10.1037/a0032198.
5. D. Holzberger, A. Philipp, and M. Kunter, "How teachers' self-efficacy is related to instructional quality: A longitudinal analysis," J Educ Psychol, vol. 105, no. 3, pp. 774–786, 2013, doi: 10.1037/a0032198.
6. L. Darling-Hammond, "The quiet revolution: Rethinking teacher development," Educational leadership, vol. 53, no. 6, pp. 4–10, 1996.
7. R. Dufour and R. Eaker, Professional learning communities at work: Best practices for enchancing student achievement. Alexandria, VA: Association For Supervision and Curriculum Development, 1998.
8. P. Graham, "Improving teacher effectiveness through structured collaboration: A case study of a profesional learning community," RMLE Online, vol. 31, no. 1, pp. 1–17, 2007, doi: 10.1080/19404476.2007.11462044.
9. S. M. Hord, "Professional learning communities: Communities of continuous inquiry and improvement," Austin, TX, 1997.
10. J. Donohoo, "Collective teacher efficacy research: Productive patterns of behaviour and other positive consequences," Journal of Educational Change, vol. 19, no. 3, pp. 323–345, 2018, doi: 10.1007/s10833-018-9319-2.
11. R. Dufour, R. Dufour, R. Eaker, T. W. Many, and M. Mattos, Learning by doing: A handbook for professional learning communities at work, 3rd ed. Blomington, IN: Solution Tree Press, 2016.
12. Zuliana Mohd Zabidi, Zuraidah Abdullah, and Bambang Sumintono, "Exploring teacher collaboration: What's inside the Malaysian PLC black box?," Journal of Professional Capital and Community, 2023, doi: 10.1108/JPCC-03-2023-0020.
13. Y. L. Goddard, R. D. Goddard, and M. Tschannen-Moran, "A theoretical and empirical investigation of teacher collaboration for school improvement and student achievement in public elementary schools," The Teachers College Record, vol. 109, no. 4, pp. 877–896, 2007, [Online]. Available: http://www.tcrecord.org/Content.asp?ContentId=12871
14. A. Bandura, "Personal and collective efficacy in human adaptation and change," in Advances in psychological science: Vol. 1. personal, sosial and cultural aspects, J. G. Adair, D. Belanger, and K. L. Dion, Eds., Hove, UK: Psychology Press, 1998, pp. 51–71.
15. J. Donohoo, "Collective teacher efficacy research: implications for professional learning," Journal of Professional Capital and Community, vol. 2, no. 2, pp. 101–116, 2017, doi: 10.1108/jpcc-10-2016-0027.
16. J. Hattie, Visible learning: A synthesis of over 800 meta-analyses relating to achievement. Oxon: Routledge, 2009. doi: 10.4324/9780203887332.
17. Zuliana Mohd Zabidi, Zuraidah Abdullah, and Bambang Sumintono, "Exploring teacher collaboration: What's inside the Malaysian PLC black box?," Journal of Professional Capital and Community, 2023, doi: 10.1108/JPCC-03-2023-0020.
18. Victor Jibson Anthony Idi, Zuraidah Abdullah, and Husaina Banu Kenayathulla, "Tinjauan kajian empirikal mengenai komuniti pembelajaran profesional di Malaysia ( 2010-2020 ): Dapatan dan tema," Goegrafia Malaysia Journal of Society and Space, vol. 2, no. 2, pp. 176–190, 2021.

19. L. Darling-Hammond, "Teacher quality and student achievement: A review of state policy evidence," Journals in Education, vol. 8, no. 1, pp. 1–44, 2000.
20. M. Barber and M. Mourshed, "How the world's best-performing school systems come out on top," 2007.
21. R. M. Klassen and V. M. C. Tze, "Teachers' self-efficacy, personality, and teaching effectiveness: A meta-analysis," Educ Res Rev, vol. 12, pp. 59–76, 2014, doi: 10.1016/j.edurev.2014.06.001.
22. M. Tschannen-Moran, A. W. Hoy, and W. K. Hoy, "Teacher efficacy: Its meaning and measure," Rev Educ Res, vol. 68, no. 2, pp. 202–248, 1998, doi: 10.3102/00346543068002202.
23. F. Pil and C. Leana, "The effects of teacher human and social capital on student performance," Academy of Management Journal, vol. 52, no. 6, 2009, doi: 10.5465/ambpp.2008.33716571.
24. F. Pil and C. Leana, "The effects of teacher human and social capital on student performance," Academy of Management Journal, vol. 52, no. 6, 2009, doi: 10.5465/ambpp.2008.33716571.
25. A. Hargreaves, "Teacher collaboration: 30 years of research on its nature, forms, limitations and effects," Teachers and Teaching: Theory and Practice, vol. 25, no. 5, pp. 603–621, 2019, doi: 10.1080/13540602.2019.1639499.
26. S. Rosenholtz, "Effective schools: Interpreting the evidence," American Journal of Education, vol. 93, no. 3, pp. 352–388, 1985, doi: 10.1086/443805.
27. R. Dufour and R. Eaker, Professional learning communities at work: Best practices for enchancing student achievement. Alexandria, VA: Association For Supervision and Curriculum Development, 1998.
28. Y. L. Goddard, R. D. Goddard, and M. Tschannen-Moran, "A theoretical and empirical investigation of teacher collaboration for school improvement and student achievement in public elementary schools," The Teachers College Record, vol. 109, no. 4, pp. 877–896, 2007.
29. K. Jensen and L. Bennett, "Enchancing teaching and learning through dialogue: A student and staff partnership model," International Journal of Academic Development, vol. 21, no. 1, pp. 41–53, 2016.
30. OECD, "TALIS 2018 survey," Paris, 2018.
31. L. Darling-Hammond and M. W. McLaughlin, "Policies that support professional development in an era of reform," Phi Delta Kappan, vol. 76, no. 6, pp. 597–604, 1995, doi: 10.1177/003172171109200622.
32. K. S. Louis and S. D. Kruse, "Professionalism and community: Perspectives on reforming urban schools," Washington, DC, 1994.
33. K. Leithwood and K. S. Louis, Organizational learning in schools. Taylor & Francis, 1999. [Online]. Available: https://doi.org/10.1201/9781003077459
34. L. Stoll, R. Bolam, A. McMahon, M. Wallace, and S. Thomas, "Professional learning communities: A review of the literature," Journal of Educational Change, vol. 7, no. 4, pp. 221–258, 2006, doi: 10.1007/s10833-006-0001-8.
35. S. M. Hord, "Evolution of the professional learning community: Revolutionary concept is based on intentional collegial learning," Journal of Staff Development, vol. 29, no. 3, pp. 10–13, 2008.
36. M. Jones and A. Harris, "Principals leading successful organisational change: Building social capital through disciplined professional collaboration," Journal of Organizational Change Management, vol. 27, no. 3, pp. 473–485, 2014, doi: 10.1108/JOCM-07-2013-0116.
37. R. Dufour, R. Dufour, R. Eaker, T. W. Many, and M. Mattos, Concise answers to frequently asked questions about profesional learning communities at work. Blomington, IN: Solution Tree Press, 2016.
38. S. M. Hord, "Professional learning communities: Communities of continuous inquiry and improvement," Austin, TX, 1997.
39. R. Dufour, R. Dufour, R. Eaker, and T. W. Many, Learning by doing: A handbook for professional learning communities at work, 1st ed. Blomington, IN: Solution Tree Press, 2006.
40. A. Harris and M. S. Jones, "Disciplined collaboration and inquiry: evaluating the impact of professional learning," Journal of Professional Capital and Community, vol. 2, no. 4, pp. 200–214, 2017, doi: 10.1108/jpcc-05-2017-0011.
41. R. Bolam et al., "Creating and sustaining effective professional learning communities," London, United Kingdom, 2005. doi: 10.1016/j.jcis.2007.12.029.
42. N. S. K. Pang and T. Wang, "Professional learning communities: Research and practices across six educational systems in the Asia-Pacific region," Asia Pacific Journal of Education, vol. 36, no. 2, pp. 193–201, 2016, doi: 10.1080/02188791.2016.1148848.
43. S. Dogan and A. Adams, "Effect of professional learning communities on teachers and students: reporting updated results and raising questions about research design," School Effectiveness and School Improvement, vol. 29, no. 4, pp. 634–659, 2018, doi: 10.1080/09243453.2018.1500921.
44. Organisation for Economic Co-Operation and Development (OECD), "The future of eduation and skills: Education 2030," 2018.
45. C. Day, Q. Gu, and P. Sammons, "The impact of leadership on student outcomes: How sucessful school leaders use transformational and instructional strategies to make a difference," Educational Administration Quarterly, vol. 52, no. 2, pp. 221–258, 2016.

46. Hairon Salleh and C. Tan, "Professional learning communities in Singapore and Shanghai :Implications for teacher collaboration Professional learning communities in Singapore and Shanghai :," Compare: A Journal of Comparative and International Education, 2016, doi: 10.1080/03057925.2016.1153408.
47. S. Alhanachi, L. A. L. de Meijer, and S. E. Severiens, "Improving culturally responsive teaching through professional learning communities: A qualitative study in Dutch pre-vocational schools," Int J Educ Res, vol. 105, no. July 2020, p. 101698, 2021, doi: 10.1016/j.ijer.2020.101698.
48. Mohd Aizat Abu Hassan, Kamarudin Musa, Zahari Hashim, and Nurul Fadly Habidin, "Implementation of professional learning community among teachers in Malaysia," International Journal of Education, Psychology and Counseling, vol. 5, no. 34, pp. 137–146, 2020, doi: 10.35631/ijepc.5340011.
49. Siti Nafsiah Ismail, Zuraidah Abdullah, and Abdul Jalil Othman, "Komuniti pembelajaran profesional guru bahasa melayu Malaysia," Jurnal Kepimpinan Pendidikan, vol. 7, no. 1, pp. 1–27, 2020.
50. M. K. Tai and Omar Abdull Karem, "Professional learning communities: A comparison study between day secondary school and fully residential secondary school in Malaysia," International Journal of Academic Research in Progressive Education and Development, vol. 8, no. 2, pp. 87–101, 2019, doi: 10.6007/IJARPED/v8-i2/5680.
51. Zalina Zakaria and Siti Noor Ismail, "The relationship between organizational readiness to change and professional learning community (PLC) practices in Kelantan residental school," International Journal of Management and Humanities, vol. 4, no. 6, pp. 73–77, 2020, doi: 10.35940/ijmh.F0611.024620.
52. J. Donohoo, Ti. O'leary, and J. Hattie, "The design and validation of the enabling conditions for collective teacher efficacy scale (EC-CTES)," Journal of Professional Capital and Community, vol. 5, no. 2, pp. 147–166, 2020, doi: 10.1108/JPCC-08-2019-0020.
53. T. J. Hoogsteen, "Collective efficacy: Toward a new narrative of its development and role in achievement," Palgrave Commun, vol. 6, no. 1, pp. 1–7, 2020, doi: 10.1057/s41599-019-0381-z.
54. R. H. Voelkel, "Causal relationship among transformational leadership, professional learning communities and teacher collective efficacy," International Journal of Leadership in Education, pp. 1–22, 2019, doi: 10.1080/13603124.2019.1690699.
55. J. C. Lee, Z. Zhang, and H. Yin, "A multilevel analysis of the impact of a professional learning community, faculty trust in colleagues and collective efficacy on teacher commitment to students," Teach Teach Educ, vol. 27, no. 5, pp. 820–830, 2011, doi: 10.1016/j.tate.2011.01.006.
56. Abdul Ghani Kanesan Abdullah, Ekerim Din Chen, and Y.-L. Ling, "Pengaruh moderator bagi komuniti pembelajaran professional terhadap kepimpinan instruksional pengetua dan efikasi kolektif guru," Jurnal Kepimpinan Pendidikan, vol. 6, no. 3, pp. 1–16, 2019.
57. J. D. Visone, "What teachers never have time to do: Peer observation as professional learning," Professional Development in Education, pp. 1–15, 2019, doi: 10.1080/19415257.2019.1694054.
58. R. Zonoubi, A. Eslami Rasekh, and M. Tavakoli, "EFL teacher self-efficacy development in professional learning communities," System, vol. 66, pp. 1–12, 2017, doi: 10.1016/j.system.2017.03.003.
59. T. Calik, F. Sezgin, H. Kavgaci, and A. C. Kilinc, "Examination of relationships between instructional leadership of school principals and self efficacy of teachers and collective teacher efficacy.," Educational Sciences: Theory & Practice, vol. 12, no. 4, pp. 2498–2504, 2012.
60. L. Shengnan and P. Hallinger, "Unpacking the effects of culture on school leadership and teacher learning in China," Educational Management Administration and Leadership, pp. 1–20, 2020, doi: 10.1177/1741143219896042.
61. W. Luo, D. F. S. Ng, N. Dong, P. T. Ng, and Hairon Salleh, "Transformational leadership and its relations to teacher outcomes in Singapore: Mastery goals and self-efficacy as mediators," Leadersh Policy Sch, 2020, doi: 10.1080/15700763.2020.1811879.
62. G. Guidetti, S. Viotti, A. Bruno, and D. Converso, "Teachers' work ability: A study of relationships between collective efficacy and self-efficacy beliefs," Psychol Res Behav Manag, vol. 11, pp. 197–206, 2018, doi: 10.2147/PRBM.S157850.
63. A. Harris and M. Jones, "Teacher leadership and educational change," School Leadership and Management, vol. 39, no. 2, pp. 123–126, 2019, doi: 10.1080/13632434.2019.1574964.
64. R. V. Krejcie and D. W. Morgan, "Determining sample size for research activities," Education and Psychological Measurement, vol. 30, pp. 607–610, 1970, doi: 10.1261/rna.2763111.
65. L. Cohen, L. Manion, and K. Morrison, Research methods in education, 6th ed. Madison Avenue, New York: Routledge, 2007. doi: 10.1111/j.1467-8527.2007.00388_4.x.
66. et. al. Olivier, Dianne F, "Assessing schools as Professional Learning Communities," in Annual Meeting of the Louisiana Education Research Association Lafayette, 2009, p. 14.
67. Zuraidah Abdullah, "Profil komuniti pembelajaran profesional sekolah menengah Di Malaysia [Disertasi ijazah kedoktoran yang tidak diterbitkan]," Universiti Malaya, 2010.

68. Siti Nafsiah Ismail, Zuraidah Abdullah, Abdul Jalil Othman, and Salwati Shafie, "Amalan komuniti pembelajaran profesional dalam kalangan guru bahasa Melayu di Selangor," Jurnal Kepimpinan Pendidikan, vol. 5, no. 4, pp. 1–19, 2018, doi: 10.1093/jnci/djw029.
69. M. Tschannen-Moran and A. W. Hoy, "Teacher efficacy: Capturing an elusive construct," Teach Teach Educ, vol. 17, no. 2001, pp. 783–805, 2001.
70. M. Tschannen-Moran, A. W. Hoy, and W. K. Hoy, "Teacher efficacy: Its meaning and measure," Rev Educ Res, vol. 68, no. 2, pp. 202–248, 1998, doi: 10.3102/00346543068002202.
71. M. Tschannen-Moran and M. Barr, "Fostering student learning: The relationship of collective teacher efficacy and student achievement," Leadersh Policy Sch, vol. 3, no. 3, pp. 189–209, 2004, doi: 10.1080/15700760490503706.
72. R. D. Goddard, W. K. Hoy, and A. W. Hoy, "Collective teacher efficacy: Its meaning, measure, and impact on student achievement," Am Educ Res J, vol. 37, no. 2, pp. 479–507, 2000, doi: 10.1111/j.1151-2916.1996.tb08600.x.
73. M. R. Lynn, "Determination and quantification of content validity," Nurs Res, vol. 35, no. 6, pp. 382–386, 1986, doi: 10.1161/CIRCULATIONAHA.112.092098.
74. D. F. Polit, C. T. Beck, and S. V. Owen, "Focus on research methods: Is the CVI an acceptable indicator of content validity? Appraisal and recommendations," Res Nurs Health, vol. 30, pp. 459–467, 2007, doi: 10.1002/nur.20199.
75. L. Cohen, L. Manion, and K. Morrison, Research methods in education, 6th ed. Madison Avenue, New York: Routledge, 2007. doi: 10.1111/j.1467-8527.2007.00388_4.x.
76. J. W. Creswell, Research design: Qualitative, quantitative and mixed methods approaches, 4th ed. Thousand Oaks, California: Sage Publication, Inc., 2014.
77. U. Sekaran and R. Bougie, Research methods for business: A skill building approach, 7th ed. West Sussex, United Kingdom: John Wiley & Sons Ltd, 2016. doi: 10.1007/978-94-007-0753-5_102084.
78. M. Sarstedt, C. M. Ringle, and J. F. Hair, "Partial least squares structural equation modeling," in Handbook of Market Research, V. A. Homburg C., Klarmann M., Ed., Cham.: Springer International Publishing, 2017, pp. 2–34.
79. J. F. Jr. Hair, G. T. M. Hult, C. M. Ringle, and M. Sarstedt, A primer on partial least squares structural equation modelling (PLS-SEM), 2nd ed. Los Angeles: Sage Publication, Inc., 2017. doi: 10.1108/EBR-10-2013-0128.
80. P. M. Podsakoff, S. B. MacKenzie, and N. P. Podsakoff, "Sources of method bias in social science research and recommendations on how to control it," Annu Rev Psychol, vol. 63, no. 1, pp. 539–569, 2012, doi: 10.1146/annurev-psych-120710-100452.
81. J. P. Green, S. Tonidandel, and J. M. Cortina, "Getting through the gate: Statistical and methodological issues raised in the reviewing process," Organ Res Methods, vol. 19, no. 3, pp. 402–432, 2016, doi: 10.1177/1094428116631417.
82. J. F. Jr. Hair., W. C. Black, B. J. Babin, and R. E. Anderson, Multivariate data analysis, 8th ed. Hampshire, United Kingdom: Cengage Learning EMEA, 2019. doi: 10.1002/9781119409137.ch4.
83. J. C. Nunnally and I. H. Bernstein, Psychometric theory, 3rd ed. New York: McGraw-Hill Inc., 1994.
84. J. Henseler, C. M. Ringle, and M. Sarstedt, "A new criterion for assessing discriminant validity in variance-based structural equation modeling," J Acad Mark Sci, vol. 43, no. 1, pp. 115–135, 2015, doi: 10.1007/s11747-014-0403-8.
85. J. Cohen, Statistical power analysis for the behavioral sciences, 2nd ed. Lawrence Erlbaum Associates, 1988.
86. H. Aguinis, J. R. Edwards, and K. J. Bradley, "Improving our understanding of moderation and mediation in strategic management research," Organ Res Methods, vol. 20, no. 4, pp. 665–685, 2017, doi: 10.1177/1094428115627498.
87. A. F. Hayes, "Beyond Baron and Kenny: Statistical mediation analysis in the new millennium," Commun Monogr, vol. 76, no. 4, pp. 408–420, 2009, doi: 10.1080/03637750903310360.
88. X. Zhao, J. G. Lynch, and Q. Chen, "Reconsidering Baron and Kenny: Myths and truths about mediation analysis," Journal of Consumer Research, vol. 37, no. 2, pp. 197–206, 2010, doi: 10.1086/651257.
89. A. F. Hayes, Introduction to mediation, moderation, and conditional process analysis: A regression-based approach, Second Edi. New York: The Guilford Press, 2018.
90. R. Cansoy, H. Parlar, and M. Polatcan, "Collective teacher efficacy as a mediator in the relationship between instructional leadership and teacher commitment," International Journal of Leadership in Education, vol. 00, no. 00, pp. 1–19, 2020, doi: 10.1080/13603124.2019.1708470.
91. M. Tschannen-Moran, S. J. Salloum, and R. D. Goddard, "Context matters.The influence of collective beliefs and shared norms.," International Handbook of Teacher's Beliefs, no. April, pp. 301–316, 2015, doi: http://dx.doi.org/10.4324/9780203108437.
92. D. F. Olivier and K. K. Hipp, "Leadership capasity and collective efficacy: Interacting to sustain student learning in a professional learning community," J Sch Leadersh, vol. 16, no. 5, pp. 505–519, 2006, doi: 10.1177/105268460601600504.

93. M. Qadach, C. Schechter, and R. Da'as, "Instructional leadership and teachers' intent to leave: The mediating role of collective teacher efficacy and shared vision," Educational Management Administration and Leadership, vol. 48, no. 4, pp. 617–634, 2020, doi: 10.1177/1741143219836683.
94. A. Bandura, "Exercise of human agency through collective efficacy," Curr Dir Psychol Sci, vol. 9, no. 3, pp. 75–78, 2000.
95. J. M. Velarde, Muhammad Faizal A. Ghani, and D. Adams, "Leadership practices in a conducive multicultural learning environment: Insights from national secondary school teachers," Malaysia Online Journal of Education Management, vol. 8, no. 3, pp. 48–63, 2020.
96. J. Valckx, R. Vanderlinde, and G. Devos, "Departmental PLCs in secondary schools: The importance of transformational leadership, teacher autonomy, and teachers' self-efficacy," Educ Stud, vol. 46, no. 3, pp. 282–301, 2020, doi: 10.1080/03055698.2019.1584851.
97. R. H. Voelkel and J. H. Chrispeels, "Understanding the link between professional learning communities and teacher collective efficacy," School Effectiveness and School Improvement, vol. 28, no. 4, pp. 505–526, 2017, doi: 10.1080/09243453.2017.1299015.
98. W. C. Chua, L. M. Thien, S. Y. Lim, C. S. Tan, and T. E. Guan, "Unveiling the practices and challenges of professional learning community in a Malaysian chinese secondary school," Sage Open, vol. 10, no. 2, pp. 1–11, 2020, doi: 10.1177/2158244020925516.
99. Fariza Khalid, G. Joyes, L. Ellison, and Md Yusoof Daud, "Factors influencing teachers' level of participation in online communities," International Education Studies, vol. 7, no. 13, pp. 23–32, 2014, doi: 10.5539/ies.v7n13p23.
100. R. D. Goddard, W. K. Hoy, and A. W. Hoy, "Collective teacher efficacy: Its meaning, measure, and impact on student achievement," Am Educ Res J, vol. 37, no. 2, pp. 479–507, 2000, doi: 10.1111/j.1151-2916.1996.tb08600.x.
101. J. Zhang and R. Yuan, "How can professional learning communities influence teachers' job satisfaction? A mixed-method study in China," Teachers and Teaching: Theory and Practice, vol. 26, no. 3–4, pp. 229–247, 2020, doi: 10.1080/13540602.2020.1806049.
102. H. Y. Qian and A. Walker, "Creating conditions for professional learning communities (PLCs) in schools in China: The role of school principals," Professional Development in Education, pp. 1–13, 2020, doi: 10.1080/19415257.2020.1770839.
103. K. L. Wahlstrom and K. S. Louis, "How teachers experience principal leadership: The roles of professional community, trust, efficacy, and shared responsibility," Educational Administration Quarterly, vol. 44, no. 4, pp. 458–495, 2008, doi: 10.1177/0013161X08321502.
104. J. A. Gray and R. Summers, "International professional learning communities: The role of enabling school structures, trust, and collective efficacy," The International Education Journal: Comparative Perspectives, vol. 14, no. 3, pp. 1–30, 2015.
105. K. Twyford and D. Le Fevre, "Leadership, uncertainty and risk: How leaders influence teachers," Journal of Professional Capital and Community, vol. 4, no. 4, pp. 309–324, 2019, doi: 10.1108/JPCC-02-2019-0002.
106. R. Cansoy and H. Parlar, "Examining the relationship between school principals' instructional leadership behaviors, teacher self- efficacy, and collective teacher efficacy," International Journal of Educational Management, 2017, doi: 10.1108/IJEM-04-2017-0089.
107. S. Liu and P. Hallinger, "Principal instructional leadership, teacher self efficacy and teacher professional learning in China: Testing a mediated effects model," Educational Administration Quarterly, vol. 54, no. 4, pp. 501–528, 2018, doi: 10.1177/0013161X18769048.
108. T. A. Mathews, "The relationship between elementary teachers' perceived self efficacy and principals' facilitation of professional learning communities," Doctoral dissertation, College of Saint Mary, 2017.
109. J. Hattie, "The applicability of visible learning to higher education," Scholarsh Teach Learn Psychol, vol. 1, no. 1, pp. 79–91, 2015, doi: 10.1037/stl0000021.
110. N. Wang and B. G. An, "Improving teachers' professional development through professional learning community: Voices from secondary school teachers at Malaysian Chinese independent schools," Heliyon, vol. 9, no. 6, 2023, doi: 10.1016/j.heliyon.2023.e17515.
111. R. Cansoy and H. Parlar, "Examining the relationships between the level of schools for being professional learning communities and teacher professionalism," Malaysian Online Journal of Educational Sciences, vol. 5, no. 3, 2017.
112. Salleh Hairon, J. W. P. Goh, and C. S. K. Chua, "Teacher leadership enactment in professional learning community contexts: Towards a better understanding of the phenomenon," School Leadership & Management, vol. 35, no. 2, pp. 163–182, 2015, doi: http://dx.doi.org/10.1080/13632434.2014.992776.
113. M. Muckenthaler, T. Tillmann, S. Weiß, and E. Kiel, "Teacher collaboration as a core objective of school development," School Effectiveness and School Improvement, vol. 31, no. 3, pp. 486–504, 2020, doi: 10.1080/09243453.2020.1747501.
114. S. Liu and P. Hallinger, "Unpacking the effects of culture on school leadership and teacher learning in China," Educational Management Administration and Leadership, pp. 1–20, 2020, doi: 10.1177/1741143219896042.

115. X. Zheng, H. Yin, and Z. Li, "Exploring the relationships among instructional leadership , professional learning communities and teacher self-efficacy in China," Education Management Administration & Leadership, pp. 1–17, 2018, doi: 10.1177/1741143218764176.
116. J. Ho, M. Ong, and L. S. Tan, "Leadership of professional learning communities in Singapore schools: The tight–loose balance," Educational Management Administration and Leadership, 2019, doi: 10.1177/1741143219833698.
117. A. Harris and M. Jones, "Professional learning communities and system improvement," Improving Schools, vol. 13, no. 2, pp. 172–181, 2010, doi: 10.1177/1365480210376487.
118. V. Vescio, D. Ross, and A. Adams, "A review of research on the impact of professional learning communities on teaching practice and student learning," Teach Teach Educ, vol. 24, no. 1, pp. 80–91, 2008, doi: 10.1016/j.tate.2007.01.004.
119. J. A. Grissom, A. J. Egalite, and C. A. Lindsay, "How principals affect students and schools," New York, 2021.
120. K. A. Leithwood, S. K. Louis, S. Anderson, and K. Wahlstrom, "How leadership influences student learning: A review of research from the Learning for Leadership project," 2004. doi: 10.1007/978-90-481-2660-6.
121. J. Donohoo, Ti. O'leary, and J. Hattie, "The design and validation of the enabling conditions for collective teacher efficacy scale (EC-CTES)," Journal of Professional Capital and Community, vol. 5, no. 2, pp. 147–166, 2020, doi: 10.1108/JPCC-08-2019-0020.