The Relationship between Instructional Leadership Practices, Teachers Self-Efficacy and Teachers Performance at Schools in Shanghai, Post Covid-19 Pandemic

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A R T I C L E   I N F O

A B S T R A C T

Aim: The epidemic has significantly affected educational systems worldwide, necessitating the rapid adoption of new teaching strategies and online learning environments by educational institutions and their staff. Schools in Shanghai, similar to those across the globe, have faced considerable challenges and transformations due to the pandemic. The post-COVID-19 history of schools in Shanghai includes a period of adjustment to a new educational norm and transition. **Method:** This quantitative study examines the relationships between instructional leadership practices namely, professional development, leadership support, and school workload and teachers' self-efficacy, collaboration, and performance within schools across Shanghai, China. **Results:** Drawing on the concepts of social cognitive theory, the study explores how instructional leadership practices influence teachers' collaboration and performance. Convenience sampling employed in the research design to select teachers from Shanghai schools for the cross-sectional study. Data analysis, particularly regarding the examination of mediating effects, conducted using SPSS process macros. **Conclusion:** The findings of this study provide practical recommendations for enhancing teacher development and improving student outcomes. Furthermore, they offer insights into the effects of instructional leadership practices, self-efficacy, and collaboration on teacher performance within the unique context of Shanghai's educational landscape.

Introduction

Teachers in Shanghai, recognised as one of China's premier educational hubs, have faced unprecedented challenges due to the pandemic. As schools transitioned to online or hybrid learning models, the importance of teachers' self-efficacy and instructional leadership strategies has become increasingly evident in shaping teachers' performance and overall educational outcomes (Li, Chan, & Hu, 2023). Like many educational

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institutions globally, schools in Shanghai were compelled to temporarily close their physical campuses and move to remote learning during the height of the pandemic. This abrupt shift posed significant challenges for teachers, students, and parents alike (Jentsch et al., 2023). Educators were required to rapidly adapt their teaching strategies and effectively deliver education through digital platforms, while students grappled with navigating virtual classrooms and adjusting to new learning environments. Meanwhile, parents had to balance their support for their children's education at home with their own responsibilities (Hajovsky, Chesnut, & Jensen, 2020; Pham et al., 2023).

Instructional leadership practices, defined as the actions and strategies employed by school administrators to enhance teaching and learning environments are crucial in this context (Kilag & Sasan, 2023). Key components of effective instructional leadership include setting clear objectives, providing constructive feedback, promoting professional growth, and fostering a supportive environment for teachers. Research has demonstrated that these practices positively affect both student achievement and teacher effectiveness (Hallinger & Hosseingholizadeh, 2020). Professional development is essential to ensure that teachers continue to evolve and adapt to changing educational landscapes. Such programmes equip educators with the necessary technical skills, pedagogical knowledge, and instructional methodologies to meet the specific demands of classrooms in the aftermath of COVID-19 (Salendab, 2023). Effective instructional leaders recognise the importance of tailored professional development programmes that address the unique needs of teachers in Shanghai, promoting a culture of continuous learning and development (Abdelrahman, 2022).

Another vital element of instructional leadership practices is leadership support. When school administrators demonstrate a genuine concern for teachers' professional development, wellbeing, and instructional effectiveness, educators are more inclined to collaborate, take risks, and innovate (Hallinger, Gümüş, & Bellibaş, 2020; Ma & Marion, 2021). During the post-pandemic recovery period, teachers in Shanghai require leadership support and guidance to navigate uncertainties and adapt to new teaching methodologies. Instructional leaders who provide resources, mentorship, and clear communication enhance teachers' self-efficacy, which in turn positively influences student achievement (Wang et al., 2024). Furthermore, school workload constitutes a critical factor in instructional leadership practices. Achieving a balance between teaching demands, administrative duties, and the challenges of the post-pandemic environment is imperative for the health of teachers and the quality of education (Granziera & Perera, 2019; Salendab, 2023).

School administrators play a pivotal role in ensuring that teachers have a manageable workload, allowing them to focus on delivering high-quality instruction. By addressing workload issues and providing necessary support, instructional leaders can cultivate an environment that bolsters teachers' self-efficacy and overall performance (Abdelrahman, 2022). Teachers' self-efficacy refers to their confidence in their ability to meet challenges and achieve desired educational outcomes (Gözüm et al., 2023). Even amidst extraordinary circumstances like the COVID-19 pandemic, teachers with high self-efficacy are better equipped to motivate their students, adapt to new teaching methods, and manage disruptions effectively. Conversely, low self-efficacy can hinder teachers' ability to adjust and perform at their best (Yang et al., 2022). Collaboration is also essential in fostering a positive school atmosphere and culture. When educators collaborate, they establish a sense

of shared accountability and common goals (Poole & Bunnell, 2022). This collaborative culture encourages openness, honesty, and mutual respect, creating an environment conducive to professional development. Instructional leaders in Shanghai schools can promote a culture that values collaboration, nurtures creativity, and supports collective excellence through collaborative practices (Hallinger & Hosseingholizadeh, 2020).

The aim of this study is to examine the relationships between instructional leadership practices, teachers' self-efficacy, and teachers' performance in schools throughout Shanghai. By gathering data from a diverse sample of teachers, administrators, and students, the research seeks to provide valuable insights into the effectiveness of instructional leadership practices, the levels of self-efficacy among teachers, and their consequent impacts on performance. The findings will offer evidence-based recommendations for enhancing instructional practices, promoting teacher efficacy, and improving overall educational outcomes in a post-pandemic context, thereby benefiting policymakers, school administrators, and educators in Shanghai. The specific objectives of the current study are to investigate several key relationships within the educational framework of Shanghai's schools.

Firstly, the study aims to examine whether teachers' self-efficacy mediates the relationship between professional development and its significant impact on teachers' self-efficacy. Secondly, it seeks to explore whether teachers' self-efficacy mediates the relationship between leadership support and teachers' collaboration. Additionally, the research will assess whether teachers' self-efficacy mediates the relationship between school workload and teachers' collaboration. Another objective is to determine whether teachers' self-efficacy has a significant impact on teachers' collaboration. Furthermore, the study intends to examine if teachers' collaboration mediates the relationship between teachers' self-efficacy and their performance during the COVID-19 pandemic. Lastly, it aims to ascertain whether teachers' collaboration has a significant impact on teachers' performance during this challenging period. Through these objectives, the study seeks to provide a comprehensive understanding of the interconnected dynamics influencing educational outcomes in Shanghai.

Literature Review

The current study investigates the relationships among instructional leadership practices, teachers' self-efficacy, teachers' collaboration, and teachers' performance in schools throughout Shanghai. Grounded in social cognitive theory, this research posits that human behaviour shaped not only by internal factors such as thoughts, beliefs, and emotions but also by external influences, including the social environment and knowledge acquired from others. In the context of this theory, Bandura introduced the term "self-efficacy," which refers to an individual's belief in their ability to organise and execute specific tasks (Calkins et al., 2024). The concept of self-efficacy has gained widespread relevance across various professions, driven by advancements in social psychology (Li et al., 2022). Extensive research has conducted on the relationship between self-efficacy and online learning (Al-Awidi & Al-Furaih, 2023). As online learning tools rely on internet technologies, both students and teachers must possess proficiency in specific ICT skills fully leverage these resources.

According to social cognitive theory, instructional leadership practices serve as a source of observational learning for teachers (Thessin, 2019). Educators can learn from the actions, attitudes, and outcomes of instructional leaders who model effective teaching practices, provide constructive feedback, and foster a supportive environment. Through this modelling, teachers

can integrate effective teaching techniques into their own strategies, thereby enhancing their instructional performance (Lochmiller & Mancinelli, 2019). The significance of self-efficacy in influencing teachers' motivation, effort, and resilience also underscored by social cognitive theory. Teachers' self-efficacy is likely to increase when they perceive support from instructional leaders who acknowledge their achievements and promote a collaborative environment (Calkins et al., 2024). Instructional leaders who encourage teacher collaboration create opportunities for educators to share experiences, resources, and best practices. Such collaboration allows teachers to witness and learn from the successes of their colleagues, enhancing their confidence in their own abilities.

This increased self-efficacy can positively affect teachers' motivation, instructional performance, and adaptability in the post-COVID-19 educational landscape (Seneviratne et al., 2019). The principle of reciprocal determinism within social cognitive theory highlights the dynamic relationships among instructional leadership practices, teachers' performance, self-efficacy, and collaboration (Hallinger et al., 2020). Effective instructional leadership fosters a collaborative environment, where peer feedback, encouragement, and validation contribute positively to teachers' self-efficacy beliefs. Through these mutually reinforcing interactions, collaboration can enhance self-efficacy, which in turn promotes further collaboration and improved instructional performance (Yang et al., 2022). Social cognitive theory also emphasises the critical role of self-regulation in managing behaviour. Self-regulatory processes are essential for teachers' performance and collaboration (Kelley et al., 2020).

Educators who have mastered effective self-regulation techniques can set goals, monitor their progress, manage their thoughts and emotions, and adjust their lesson plans accordingly. Instructional leadership strategies that emphasise self-regulation empower teachers to take charge of their professional development, engage in collaborative problem solving, and adapt their instructional approaches to meet the unique demands of the post-COVID-19 environment (Song et al., 2021). By prioritising professional development opportunities, instructional leadership strategies can enhance teachers' self-efficacy. Instructional leaders can boost educators' confidence in navigating the post-pandemic educational landscape by providing specialised training, workshops, and resources aimed at enhancing pedagogical skills and adapting to new teaching methods (Salendab, 2023). As teachers acquire new knowledge and skills through professional development, their self-efficacy beliefs strengthened, thereby improving their instructional performance. Similarly, leadership support significantly affects teachers' perceptions of their own efficacy. When instructional leaders provide support, encouragement, and recognition for their efforts, teachers are more likely to develop confidence in their abilities. Instructional leaders who offer mentorship and constructive criticism can empower teachers, enhancing their confidence in their teaching skills (Tumkaya & Miller, 2020).

Consequently, teachers who receive leadership support are more likely to exhibit higher levels of self-efficacy, which in turn improves their performance (Granziera & Perera, 2019). Another critical aspect of instructional leadership practices is the management of teachers' workload. Heavy workloads and unrealistic demands can negatively affect teachers' self-efficacy, diminishing their motivation and performance (Li et al., 2023). However, instructional leaders can alleviate stress on teachers by effectively managing workload through adequate resources, realistic expectations, and support networks (Jentsch et al.,

2023). Understanding the role of self-efficacy in mediating the relationship between instructional leadership practices and student achievement is essential for designing effective interventions and strategies (Abdelrahman, 2022; Seneviratne et al., 2019). By prioritising professional development, leadership support, and workload management, instructional leaders can enhance teachers' self-efficacy beliefs, ultimately improving instructional performance and collaboration in Shanghai schools in the post-COVID-19 context. Perera and John (2020) explored the relationship between instructional leadership practices and teachers' performance, focusing on the mediating effect of self-efficacy. Their study included measures of professional development, leadership support, workload management, and teachers' self-efficacy. The findings indicated that instructional leadership practices significantly affected teachers' self-efficacy, which subsequently influenced their instructional performance.

Similarly, research by Ma and Marion (2021), involving 341 teachers, found that instructional leadership practices, particularly those offering opportunities for professional growth and supportive leadership, strongly affected teachers' self-efficacy beliefs. The results highlighted the importance of instructional leaders in creating a motivating atmosphere that fosters teachers' self-efficacy. Pham et al. (2023) suggested that instructional leadership practices have both direct and indirect impacts on teachers' self-efficacy through job satisfaction. Their study included measures of leadership support, professional growth, and school climate, underscoring the interconnectedness between instructional leadership, teachers' self-efficacy, and job satisfaction (Hallinger et al., 2020). Teachers with high self-efficacy are more inclined to collaborate with colleagues (Ma & Marion, 2021). Confident educators are more eager to share their skills and knowledge, believing in their capacity to offer valuable advice and encouragement, which fosters improved communication and knowledge sharing within professional learning communities (Perera & John, 2020).

Such teachers are also more likely to seek and provide peer support and feedback, contributing to a collaborative culture of ongoing professional development by being receptive to constructive criticism and willing to assist colleagues. High self-efficacy among teachers increase their likelihood of engaging in-group initiatives aimed at developing and implementing new teaching methods (Li et al., 2022). They are motivated to collaborate in overcoming learning obstacles and enhancing student achievement, believing they can significantly contribute to problem-solving efforts. This collaboration engenders a sense of trust, support, and shared responsibility, which further reinforces these dynamics. Teachers with strong self-efficacy typically exhibit greater confidence in their colleagues' abilities, cultivating a collaborative environment (Ma et al., 2023). Gratacós, Mena and Ciesielkiewicz (2023) investigated the relationship between teachers' self-efficacy and teamwork. Toropova, Myrberg and Johansson (2021) also identified a correlation between teamwork and teachers' self-efficacy. Hargreaves (2019) examined this relationship within the context of professional learning communities, finding that teachers' self-efficacy beliefs were positively associated with their engagement in collaborative practices, such as sharing instructional ideas, discussing student data, and collectively addressing challenges. Hallinger and Hosseingholizadeh (2020) found that teachers participating in collaborative projects demonstrated higher levels of self-efficacy.

Numerous studies have established a positive relationship between self-efficacy and

teachers' performance (Berkovich, 2023; Cansoy, Parlar, & Polatcan, 2022; El Afi, 2019). Higher self-efficacy among teachers correlates with increased student engagement, instructional effectiveness, and overall job performance. Kilag and Sasan (2023) identified a strong link between teacher self-efficacy and student achievement. Collaboration among educators has been associated with improved teaching strategies and student outcomes. According to Lochmiller and Mancinelli (2019), teachers who collaborated on projects reported higher instructional quality and greater improvements in student achievement. Collaborative practices, such as sharing teaching ideas, resources, and feedback, can enhance teachers' overall efficacy and performance. Thessin (2019) discovered a positive correlation between teacher collaboration and self-efficacy perceptions. During the pandemic, collaborative efforts among educators contributed to improved teaching effectiveness, as teachers shared materials, strategies, and best practices for online or hybrid instruction.

Through collaboration, educators can enhance their instructional effectiveness and student outcomes by developing innovative approaches and addressing instructional challenges (Kartini et al., 2020). Collaborative efforts can also focus on promoting teachers' mental health and resilience during the pandemic. Virtual collaboration platforms allow teachers to communicate their challenges, share experiences, and provide emotional support to one another (Poole & Bunnell, 2022). Davis and Boudreaux (2019) examined how teacher collaboration affected student achievement, revealing a correlation between collaborative cultures and enhanced teacher performance, including effective instruction and student progress. Calkins et al. (2024) explored the effects of collaboration on teacher performance, finding that it positively influenced instructional strategies and student achievement. Al-Awidi and Al-Furaih (2023) suggested that collaboration among teachers positively affected both job satisfaction and performance, leading to improved instructional practices and overall teacher effectiveness. The literature reviewed supports the following hypotheses.

H1: *Teachers Self-Efficacy has mediating impact between Professional Development has significant impact on Teacher's Self-Efficacy.*
H2: *Teachers Self-Efficacy has mediating impact between Leadership Support and Teacher's Collaboration.*
H3: *Teachers Self-Efficacy has mediating impact between School Workload and Teacher's Collaboration.*
H4: *Teachers Self-Efficacy has significant impact on Teacher's Collaboration.*
H5: *Teachers Collaboration has mediating impact between Teacher's Self-Efficacy and Teacher's Performance during COVID-19.*
H6: *Teachers Collaboration has significant impact on Teacher's Performance during COVID-19.*
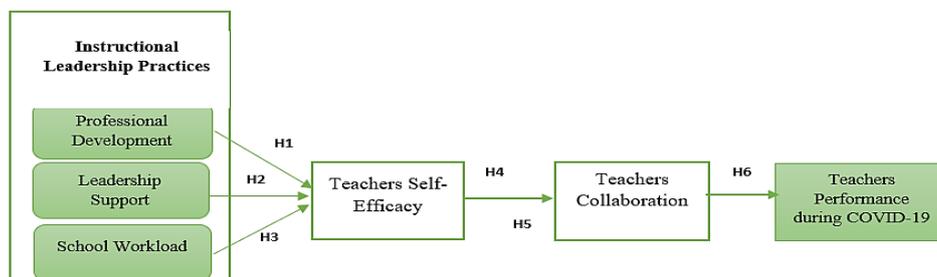

Figure 1: *Framework.*

Methodology

The primary objective of this research was to evaluate teachers' performance during the COVID-19 pandemic, with a focus on the influences of professional development, leadership support, and school workload. Additionally, the study explored the mediating roles of teachers' self-efficacy and collaboration in these relationships. Given the objectives of the study, a quantitative and descriptive research design employed. Primary data collected using a survey method, employing an adapted questionnaire within a cross-sectional period. The instrument utilised a five-point Likert scale, providing closed-ended options to respondents to facilitate efficient data collection. As the population comprised teachers from schools in Shanghai, non-probability sampling deemed appropriate due to the unavailability of precise population data. Specifically, a convenience sampling method applied. Total 375 responses collected after distributing 400 questionnaires to test the hypotheses. Data analysis conducted using SPSS, with the MACROS method applied to assess direct and indirect paths within the research model (Abu-Bader & Jones, 2021).

Instruments

Data gathered through a survey method using an adapted questionnaire structured around a five-point Likert scale. The questionnaire comprised three sections, each clearly explained to facilitate understanding and encourage accurate responses from participants. The first section addressed general information related to the research topic, while the second gathered demographic details such as gender, age, education, and experience of the participants. The final section consisted of items pertaining to the study's key variables. The first dimension of instructional leadership practices professional development assessed with three items adapted from García Torres (2019). The second dimension, leadership support, measured using three items from the scale developed by Novitasari et al. (2020). The third dimension, school workload, included five items adapted from the scale of Toropova et al. (2021). Teachers' self-efficacy, serving as a mediating variable, evaluated using five items from the scale developed by Li et al. (2022). The second mediating variable, teachers' collaboration, measured using five items adapted from Hargreaves (2019). The dependent variable, teachers' performance during COVID-19, included four items from the scale of El Afi (2019). Each item rated on a five-point Likert scale, where 05 indicated strong agreement and 01 indicated strong disagreement. Upon collecting the data, reliability analysis performed to validate the instrument, with Cronbach's alpha values evaluated for all items across the various variables. All adapted items yielded Cronbach's alpha values exceeding 0.70, indicating satisfactory reliability. Following instrument validation, statistical tests conducted using SPSS, and structural equation modelling executed employing the MACROS process.

Analysis

The findings of the present study reveal a significant relationship among instructional leadership practices, teachers' self-efficacy, teachers' collaboration, and teachers' performance in Shanghai schools, with consideration given to social cognitive theory.

Demographics

Table 1 presents demographic data, highlighting how the socioeconomic context conceptualised through the lens of social cognitive theory affects instructional leadership practices, teachers' self-efficacy, teachers' collaboration, and teachers' performance in Shanghai schools. A distinct hierarchy of importance emerged among gender, age, education, and experience among the schoolteachers surveyed. Sample demographic details provided in Tables 1, 2, 3, and 4. Table 1 shows that the total number of participants was 375, with male teachers constituting 78.4% and female teachers 21.6%.

Table 1

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
	Male	294	78.4	78.4	78.4
Valid	**Female**	81	21.6	21.6	100.0
	Total	375	100.0	100.0	

Table 2 indicates that among the participants, 21.8% were aged 20-30, 34.4% were aged 30-40, 30.1% were aged 40-50, and 13.6% were over 50.

Table 2

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
	20-30	82	21.8	20.0	20.0
	30-40	129	34.4	34.4	54.4
Valid	**40-50**	113	30.1	30.1	84.5
	More than 50	51	13.6	13.6	98.1
	Total	375	100.0	100.0	

Table 3 reveals that the experience of the schoolteachers included 22.2% with 1-2 years of experience, 46.7% with 2-3 years, 18.1% with 3-4 years, and 13.1% with over 5 years.

Table 3

Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
	1-2 Years	83	22.2	21.9	21.9
	2-3 Years	175	46.7	46.7	68.5
Valid	**3-4 Years**	68	18.1	18.1	86.7
	More than 5 Years	49	13.1	13.1	99.7
	Total	375	100.0	100.0	

Finally, Table 4 details the educational background of the teachers, showing that 6.4% held a Bachelor's degree, 26.1% a PhD, 46.4% a Master's degree, and 21.1% reported 'other' qualifications.

Table 4

Education

		Frequency	Percent	Valid Percent	Cumulative Percent
	BS	24	6.4	6.1	6.1
	Master	174	46.4	46.4	174
Valid	**PhD**	98	26.1	26.1	32.3
	Others	79	21.1	21.1	99.7
	Total	375	100.0	100.0	

Descriptive Statistics

The descriptive statistics provide a summary of the primary trends in the data and offer insights into typical values. It is important to note that extreme values can significantly influence the mean, rendering it sensitive to outliers. Skewness measures the asymmetry of a distribution, indicating whether the data leans to the left or right of the mean. A perfectly symmetrical distribution has a skewness value of zero. Kurtosis, on the other hand, assesses the size and shape of a distribution's tails (Purwanto, Asbari, & Santoso, 2021). Positive kurtosis values indicate leptokurtic distributions, characterised by longer tails and a sharper peak, whereas negative kurtosis values signify platykurtic distributions, which have shorter tails and a flatter peak. A kurtosis value near zero is acceptable. The descriptive statistics for the study variables presented in Table 5.

Table 5

Descriptive Statistics

	N	Mini	Maxi	Mean	SD	Skewness	Kurtosis
PD	375	1.00	4.33	1.7849	.74213	.795	.156
LS	375	1.00	3.33	1.3120	.52577	1.902	2.981
SW	375	2.80	5.00	4.5573	.54202	-1.013	.175
TSE	375	1.00	3.80	1.4432	.55822	1.210	.852
TC	375	1.00	3.40	1.3936	.54110	1.436	1.630
TP	375	1.00	3.50	1.5160	.59975	1.229	.625

Note: "*PD= Professional Development, LS= Leadership Support, SW= School Workload, TSE= Teaches Self-Efficacy, TC= Teachers Collaboration, TP= Teachers Performance during COVID-19*".

Reliability Test

Reliability testing, specifically through Cronbach's alpha, is a statistical method used to assess the internal consistency of an instrument. This technique evaluates how closely related the items on a scale or questionnaire are in measuring the same underlying concept. Cronbach's alpha is derived from the inter-item correlations among the items within the

scale, with values ranging from 0 to 1; higher values indicate stronger internal consistency. As noted by Yang (2013), Cronbach's alpha values above 0.7 are acceptable, reflecting a high degree of internal consistency, suggesting that the components of the scale effectively measure the same construct. Conversely, values below 0.7 indicate lower internal consistency, which may necessitate the modification or removal of certain items to enhance reliability. Additionally, the number of items on the scale can influence the Cronbach's alpha; generally, a greater number of items allows for a more comprehensive measurement of the construct, often resulting in higher alpha values. The Cronbach's alpha values for the study presented in Table 6.

Table 6

Reliability Test

	N of Items	Cronbach Alpha
Professional Development	3	0.814
Leadership Support	3	0.747
School Workload	5	0.870
Teachers Self-Efficacy	5	0.886
Teachers Collaboration	5	0.870
Teachers Performance	4	0.763

Missing Value Analysis

The results of the missing value analysis presented in Table 7. Missing value analysis employed to examine and manage absent data within a dataset. In real-world scenarios, encountering missing values is common, arising from various factors such as erroneous data entry, participant non-responses, or technical complications. Effectively addressing missing data is crucial for ensuring the accuracy and reliability of analytical outcomes (Purwanto et al., 2021). The method chosen for missing data analysis depends on the specific dataset, the nature of the missing values, and the study's objectives. To determine the most suitable technique for a given dataset, one may consult statistical literature or seek advice from experts in the field.

Table 7

Missing Value Analysis

		PD	LS	SW	TSE	TC	TP
N	Valid	375	375	375	375	375	375
	Missing	0	0	0	0	0	0

Note: ""*PD= Professional Development, LS= Leadership Support, SW= School Workload, TSE= Teaches Self-Efficacy, TC= Teachers Collaboration, TP= Teachers Performance during COVID-19"*.

Correlation Test

Correlation is a statistical tool used to measure the magnitude and direction of the relationship between two variables. It helps determine the extent of dependence or similarity between the variables (Galindo-Domínguez, 2019). The correlation coefficient,

denoted as "r," ranges from -1 to +1. A positive correlation indicates that as one variable increases, the other tends to increase as well. The correlation between the study variables illustrated in Table 8.

Table 8

Correlations Test

		DP	LS	SW	TSE	TC	TP
DP	**Pearson Correlation**	1	.589**	-.601**	.611**	.638**	.727**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	Sum of Squares and Cross-Products	205.981	85.946	-90.442	94.618	95.750	121.041
	Covariance	.551	.230	-.242	.253	.256	.324
	N	375	375	375	375	375	375
LS	**Pearson Correlation**	.589**	1	-.510**	.637**	.615**	.614**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	Sum of Squares and Cross-Products	85.946	103.385	-54.408	69.879	65.482	72.378
	Covariance	.230	.276	-.145	.187	.175	.194
	N	375	375	375	375	375	375
SW	**Pearson Correlation**	-.601**	-.510**	1	-.756**	-.654**	-.434**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	Sum of Squares and Cross-Products	-90.442	-54.408	109.877	-85.589	-71.702	-52.794
	Covariance	-.242	-.145	.294	-.229	-.192	-.141
	N	375	375	375	375	375	375
TSE	**Pearson Correlation**	.611**	.637**	-.756**	1	.809**	.529**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	Sum of Squares and Cross-Products	94.618	69.879	-85.589	116.540	91.384	66.191
	Covariance	.253	.187	-.229	.312	.244	.177
	N	375	375	375	375	375	375
TC	**Pearson Correlation**	.638**	.615**	-.654**	.809**	1	.556**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	Sum of Squares and Cross-Products	95.750	65.482	-71.702	91.384	109.505	67.438
	Covariance	.256	.175	-.192	.244	.293	.180
	N	375	375	375	375	375	375
TP	**Pearson Correlation**	.727**	.614**	-.434**	.529**	.556**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	Sum of Squares and Cross-Products	121.041	72.378	-52.794	66.191	67.438	134.529
	Covariance	.324	.194	-.141	.177	.180	.360

Note: *"AI= Artificial Intelligence, TA= Technology Adoption, ETC= Employee Collaboration Team, SEE= Socio-economic Environment, TA= Technological Innovation".*

KMO and Bartlett's Test

The Kaiser-Meyer-Olkin (KMO) test is a statistical tool used to evaluate the appropriateness of sampling and the analytical application of data in factor analysis and structural equation modelling. This test determines whether the observed variables in a dataset are suitable for factor analysis (Purwanto et al., 2021). Specifically, the KMO test calculates the proportion of variance among variables that may explain by underlying factors. The KMO value ranges from 0 to 1, with higher values indicating greater suitability

for factor analysis. The KMO test considers both inter-correlations between variables and partial correlations, excluding the influence of other variables. Generally, values above 0.7 or 0.8 suggest that a dataset is acceptable for factor analysis, indicating that the variables share a significant amount of variance, thus enhancing the likelihood of obtaining meaningful results. Conversely, values below 0.5 indicate that the dataset may not be suitable for factor analysis. In such cases, it is advisable to reassess the selected variables, modify the measurement techniques, or collect new data (Purwanto et al., 2021). Table 9 presents an exemplary KMO value, underscoring its importance in validating the dataset for factor analysis.

Table 9

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.846
Bartlett's Test of Sphericity	**Approx. Chi-Square**	1520.711
	Sig.	**0.000**

Direct Analysis

The average distribution function of the inverse average distribution frequently employed to facilitate direct analysis. Once the regression model has fitted, the discrepancies between the observed values and those predicted by the model, known as residuals, can be examined (Purwanto et al., 2021). If these residuals are normally distributed, it is indicative that the original data also follows a normal distribution. Table 10 demonstrates a significant relationship between teachers' self-efficacy and their performance. Additionally, the results reveal a significant correlation between teachers' collaboration and their performance. Therefore, the hypothesis is accepted.

Table 10

Direct Analysis

	B	Std. Error	T Value	P Value
Teachers Self-Efficacy->Teachers Performance	.784	.030	26.575	**.000**
Teachers Collaboration->Teachers Performance	.616	.048	12.907	**.000**

Mediation Analysis

In mediation analysis, the mediator variable elucidates how and why the relationship between the independent and dependent variables exists. It determines whether the effect of the independent variable on the dependent variable fully or partially mediated by the mediator variable (Abu-Bader & Jones, 2021). This analysis aids researchers in understanding the underlying mechanisms connecting the variables and offers insights into how interventions or approaches can influence outcomes through specific mediators. Table 11 indicates that teachers' self-efficacy has a mediating effect between professional development and teachers' collaboration, leading to the acceptance of the hypothesis. Furthermore, teachers' self-efficacy also mediates the relationship between leadership support and teachers' collaboration, as well as between school workload and teachers'

collaboration. Additionally, Table 11 demonstrates that teachers' collaboration mediates the relationship between teachers' self-efficacy and teachers' performance, thereby supporting the hypothesis.

Table 11

Mediating Effect

Model 4	Coefficient	T Value	P Value	ULCI	LLCI
PD->TSE->TC	0.1669	6.2511	**0.0000**	0.1144	0.2194
LS->TSE->TC	0.1738	4.3824	**0.0000**	0.0958	0.2518
SW->TSE->TC	-0.0976	2.1106	**0.0035**	0.1885	0.2067
TSE->TC->TP	0.2461	3.1655	**0.0017**	0.0932	0.3990

Note: "*PD= Professional Development, LS= Leadership Support, SW= School Workload, TSE= Teaches Self-Efficacy, TC= Teachers Collaboration, TP= Teachers Performance during COVID-19*".

Discussion

The current study investigates the relationships between instructional leadership practices, teachers' self-efficacy, teachers' collaboration, and teachers' performance in schools across Shanghai, underpinned by social cognitive theory. All hypotheses were accepted. The results indicate that teachers' self-efficacy mediates the impact of instructional leadership practices including professional development, leadership support, and workload management on teachers' self-efficacy. Given its influence on teachers' motivation, teaching strategies, and overall classroom performance, self-efficacy is crucial to the educational process. Various factors contribute to understanding the mediating role of teachers' self-efficacy in relation to instructional leadership practices. Professional development initiatives offer teachers opportunities to acquire new knowledge, skills, and teaching strategies. When participating in these events, teachers develop greater self-confidence and belief in their ability to implement effective teaching methods.

Similarly, leadership support acts as a catalyst, fostering a receptive and nurturing environment where teachers feel valued, inspired, and empowered (Novitasari et al., 2020). By alleviating excessive workloads, instructional leaders enable teachers to focus on their professional development, thereby enhancing their self-efficacy. Ultimately, teachers' self-efficacy, which reflects their belief in their skills, influences their efforts and accomplishments, serving as a mediator between instructional leadership practices and their significant effects on teachers. Moreover, the findings reveal that teachers' self-efficacy significantly affects collaboration among teachers. High self-efficacy motivates educators to assume leadership roles, initiate discussions, and propose innovative ideas to enhance teaching and learning. Confident teachers are more open to learning from their peers, viewing collaboration as an opportunity for personal and professional growth (Woodcock et al., 2023).

They actively engage in multidisciplinary initiatives, team teaching, and collaborative professional development, thereby promoting a culture of shared knowledge and expertise. This cooperation leads to improved teaching methods, enhanced student achievement, and a positive learning environment. Overall, teachers' self-efficacy cultivates a sense of confidence, openness, and willingness to collaborate, ultimately benefiting the entire school community. Additionally, the results indicate that teachers' collaboration mediates the relationship between self-efficacy and performance, particularly

during the COVID-19 pandemic. When combined with effective collaboration, the impact of teachers' self-efficacy on their performance during this challenging period further amplified. Collaboration provides a platform for teachers to share knowledge, ideas, and resources, enabling them to navigate the complexities of distance learning more effectively.

By collaborating with their peers, teachers can access a collective pool of knowledge, creativity, and support. They can exchange best practices, collaboratively solve problems, and co-create innovative solutions tailored to the specific needs of their students. Through mutual learning and the pooling of skills, teachers can enhance their self-efficacy (Toropova et al., 2021). This collaborative synergy fosters a supportive and stimulating environment, empowering teachers to refine their instructional methods. Consequently, their performance in virtual or hybrid classrooms improves, leading to enhanced student engagement, learning outcomes, and overall academic achievement. The study also demonstrates that teachers' collaboration significantly influences their performance during COVID-19. Educators face unprecedented demands and challenges due to the sudden transition to remote or hybrid learning modalities. In these uncertain times, collaboration among teachers proves invaluable. By pooling their skills, knowledge, and resources, teachers can develop innovative solutions and effective teaching strategies for online or blended learning.

Collaboration creates a space for educators to share their experiences, achievements, and challenges, fostering a community of support and mutual learning. By tapping into the diverse expertise within their professional community, teachers can develop a wider range of instructional tactics, adapt to the unique needs of their students, and effectively address the challenges posed by online learning environments (Lambrecht et al., 2022). This collaborative approach enables teachers to enhance their pedagogical strategies by sharing best practices and educational resources. Observing and learning from colleagues allows educators to discover cutting-edge methodologies and refine their teaching approaches. Ultimately, this collaborative learning process enhances the overall quality of instruction while supporting ongoing professional development.

Practical Implications

This study underscores the importance of effective instructional leadership practices, which include providing robust leadership support, high-quality professional development opportunities, and efficient workload management within schools. Educational administrators and policymakers can utilise these findings to allocate more attention and resources to these practices, thereby fostering an environment conducive to teacher growth, collaboration, and performance. Recognising the mediating role of teachers' self-efficacy highlights the necessity of enhancing educators' confidence and belief in their capabilities. School leaders can increase self-efficacy through targeted interventions, such as offering personalised support, recognising achievements, and providing opportunities for professional advancement. Such initiatives are likely to enhance both collaboration and performance. To facilitate effective teacher collaboration, schools can establish platforms and processes that encourage collective planning, sharing of best practices, and opportunities for peer observation and feedback. By fostering and supporting a collaborative environment, schools can harness the collective knowledge and experience of their educators, which in turn can enhance instructional strategies and improve student outcomes. The findings stress the significance of instructional leadership

strategies, teacher self-efficacy, and collaboration in enhancing teacher effectiveness. Schools should focus on creating a culture that promotes continuous professional development, supports leadership initiatives, and maintains manageable workloads. By addressing these key factors, schools can improve teacher performance and ultimately enhance student achievement.

Theoretical Implications

The results corroborate the foundational concepts of social cognitive theory, which emphasises the interplay between an individual's personality, environment, and behaviour. In this context, instructional leadership practices influence teachers' self-efficacy, which subsequently affects their collaborative abilities and performance. These findings provide empirical support for the theoretical framework of social cognitive theory in educational settings. The study illustrates that teachers' self-efficacy mediates the relationship between instructional leadership practices and both collaboration and performance. This insight advances our understanding of the mechanisms that link instructional leadership practices to positive educational outcomes. It underscores the critical role of self-efficacy beliefs in elucidating how leadership strategies shape teachers' behaviours and performance.

Limitations

Addressing the limitations of this study and exploring future research directions can lead to a deeper understanding of the relationships between instructional leadership practices, self-efficacy, collaboration, and teacher performance, ultimately enhancing educational practices and outcomes. The findings of this study are specific to schools in Shanghai, which may possess unique contextual characteristics that differentiate them from schools in other regions or countries. Thus, caution warranted when generalising these results to different educational settings. Additionally, the reliance on a quantitative research methodology limits the ability fully grasp the intricate relationships among instructional leadership practices, self-efficacy, collaboration, and teacher effectiveness. Employing qualitative research methods, such as focus groups or interviews, could provide richer insights into teachers' experiences and perceptions. The use of convenient sampling, wherein participants are selected based on accessibility and willingness, may introduce bias. Consequently, the sample may not be representative of the broader population of teachers in Shanghai, as those who opted to participate might differ in characteristics or motivations from those who did not. Furthermore, the study's cross-sectional design presents challenges in establishing causality or identifying trends over time. Longitudinal research designs would offer stronger evidence by tracking changes in instructional leadership practices, self-efficacy, collaboration, and teacher performance over time. While SPSS process macros employed for analysing mediation effects, it is important to recognise that statistical analyses cannot fully capture the complexity of the relationships under investigation. Incorporating additional qualitative techniques may yield a more comprehensive understanding of the underlying mechanisms and processes.

Future Research

Future studies should aim to replicate this research in diverse contexts to assess the generalisability of the findings. A broader sample of teachers from various geographical locations and educational levels would provide a deeper understanding of the relationships studied. Utilising a mixed-methods approach would further enrich the understanding of the variables influencing instructional leadership practices, self-efficacy, collaboration, and teacher effectiveness, offering a more holistic perspective on teachers' experiences and viewpoints. Research with a longitudinal focus would facilitate the assessment of changes in instructional leadership practices, self-efficacy, collaboration, and teacher performance over time, thereby allowing for a better understanding of the dynamic nature of these relationships. Future studies might also explore additional mediating factors that influence the connections between instructional leadership practices, self-efficacy, collaboration, and teacher effectiveness. Variables such as teacher motivation, job satisfaction, or organisational culture could provide further insights. To enhance representativeness and diversity, future research could employ a combination of random and purposive sampling, moving beyond reliance on convenience sampling.

Conclusion

The challenges posed by the pandemic prompted schools in Shanghai to implement various measures to ensure the continuity of education. These efforts focused on leveraging technology for online education, providing training and professional development for teachers in remote teaching methods, and enhancing communication with students and parents. Schools also addressed equity issues by providing devices and internet access to students lacking resources. The findings underscore the critical role of instructional leadership practices in shaping teachers' self-efficacy, specifically through leadership support, professional development, and workload management. The study reveals that the relationship between instructional leadership practices, teacher collaboration, and performance mediated by teachers' self-efficacy. Furthermore, it supports the principles of social cognitive theory, highlighting the interplay of environmental influences, personal characteristics, and behaviour. This framework elucidates how instructional leadership strategies affect teachers' perceptions of their own efficacy, which, in turn, affects their willingness to collaborate and their overall performance. The research carries practical implications for educational stakeholders, emphasising the necessity of prioritising effective instructional leadership practices to foster professional growth opportunities, provide robust leadership support, and manage workloads efficiently. Such strategies enhance teachers' self-efficacy, thereby promoting collaboration among educators. Collaborative efforts lead to improved teaching methods, increased student engagement, and enhanced overall teacher performance. However, it is crucial to acknowledge the study's limitations. The findings are specific to the educational context of Shanghai, China, and caution needed when extrapolating them to other settings. The use of convenience sampling and a cross-sectional design restricts generalisability and the establishment of causality. Future research should explore longitudinal designs, mixed-methods approaches, and diverse samples to provide a more comprehensive understanding of the relationships examined. This study contributes to the growing body of knowledge on instructional leadership, teacher

efficacy, collaboration, and performance. By emphasising the significance of instructional leadership practices and teachers' self-efficacy in fostering collaboration and enhancing performance, educational stakeholders can create supportive environments that empower teachers and positively influence student outcomes. Understanding the complex interactions among instructional leadership, teacher beliefs, collaboration, and performance through the lens of social cognitive theory offers a valuable framework for future research and practice in the field of education.

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