frontiers | Frontiers in Education

TYPE Brief Research Report
PUBLISHED 28 February 2025
DOI 10.3389/feduc.2025.1503997

OPEN ACCESS

EDITED BY
Roya Pashmforoosh,
Texas A&M University, United States

REVIEWED BY
Gloria Gratacós,
Complutense University of Madrid, Spain
Corina Lusquinos,
Blas Pascal University, Argentina

*CORRESPONDENCE
Panya Akkaraputtapong
✉ panya.a@chula.ac.th

RECEIVED 30 September 2024
ACCEPTED 14 February 2025
PUBLISHED 28 February 2025

CITATION
Akkaraputtapong P, Nguyen HTM, Ngo HT and Ngo NTH (2025) A teacher leadership model validation for in-service teachers.
Front. Educ. 10:1503997.
doi: 10.3389/feduc.2025.1503997

A teacher leadership model validation for in-service teachers

Panya Akkaraputtapong[1]*, Hoa Thi Mai Nguyen[2], Ha Thanh Ngo[3] and Nga Thi Hang Ngo[4]

[1]Department of Educational Policy Management and Leadership, Chulalongkorn University, Bangkok, Thailand, [2]School of Education, University of New South Wales, Sydney, NSW, Australia, [3]Business School, University of New South Wales, Sydney, NSW, Australia, [4]Tay Bac University, Son La, Vietnam

Teachers as leaders in schools have been widely advocated, as they increasingly act as agents of change in education reforms and directly impact students' outcomes. Developing teacher leadership is critically important for both students and the school's development. However, teacher leadership is a complex and context-dependent concept and can result in a lack of common language to guide relevant policies and practices. This study aimed to validate a Western model of teacher leadership and develop a Teacher Leadership Scale (TLS) to capture teachers' leadership perceptions in a non-Western context. Data were collected via a questionnaire from 538 in-service teachers in an Asian context The EFA results (n = 260) yielded a five-factor scale structure, and the CFA results (n = 278) showed that the first-order model (CFI = 0.967, RMSEA = 0.062, SRMR = 0.044, X^2 / df =2.080) and second-order model (CFI = 0.959, RMSEA = 0.068, SRMR = 0.050, X^2 / df=2.287) of the five-factor TLS adequately fit the data. The Cronbach's alphas indicated strong reliability. The study provides empirical evidence that the TLS is valid for gaging teacher leadership among in-service teachers and suggests implications for using the scale as a guide for reflection and development. It also makes a theoretical contribution by unveiling that teacher leadership perceptions may differ between Western and non-Western contexts.

KEYWORDS

teacher professional development, educational leadership, Teacher Leader Model Standards (TLMS), scale development, model validation

1 Introduction

In the contemporary era of ambiguity, transition, and conflict, teachers face challenges beyond classroom teaching, including guiding school improvement, promoting equity, and supporting colleagues' professional development. Consequently, the high demand for teacher leadership is advocated as an effective strategy to manage these challenges (Fullan and Hargreaves, 2016). The critical role of teacher leadership in student learning is supported through research highlighting its positive effects on teacher leaders, colleagues, organizational aspects, and student outcomes (Schott et al., 2020).

Teacher leadership fosters a meaningful learning culture (Wieczorek and Lear, 2018), supports teacher learning (Nicholson et al., 2017), and enhances principals' leadership (Zhang and Henderson, 2018). Despite the evidence, the concept of teacher leadership remains ambiguous and lacks consensus. Current research often lacks rigorous, integrated, and transparent methodologies (Nguyen et al., 2020; Schott et al., 2020; Wenner and Campbell, 2017; York-Barr and Duke, 2004). Nguyen et al. (2020) call for more empirical studies on the implementation and impacts of teacher leadership, while Schott et al. (2020) urge researchers

to use transparent data collection and analysis methods in both quantitative and qualitative studies.

Systematic reviews indicate inconsistent definitions of teacher leadership (Nguyen et al., 2020; Wenner and Campbell, 2017; York-Barr and Duke, 2004; Schott et al., 2020). Most previous studies are qualitative and lack empirical evidence to substantiate the positive outcomes of teacher leadership (Schott et al., 2020), underscoring the need to develop and validate an instrument for measuring teacher leadership. Furthermore, there is no established measurement for teacher leadership in the global south, where the countries are still developing. A recent international study also highlights that teacher leaders are often defined by their social and political insight, values, and beliefs; and adopting Western teacher leadership frameworks may lead to misguided assumptions that overlook non-Western local contexts (Webber, 2023). Given that teacher leadership is context-dependent (Chen, 2022), it is crucial to develop a scale tailored to the specific context such as Vietnam where the culture is embedded in Confucian principles, valuing hierarchical structures. This aspect has been seen to impact the position and autonomy of influential actors such as teacher leaders in school setting (Truong and Hallinger, 2017). Developing such a scale would aid in clarifying the definition of "teacher leadership" and be applicable for empirical studies on its effects.

The following sections review literature defining teacher leadership, discuss the Teacher Leader Model Standards (TLMS) framework, present and discuss this study's findings, and conclude with potential implications for future research and practice.

1.1 Literature review

1.1.1 Definition of teacher leadership

Over the past 40 years, teacher leadership has expanded and received increasing attention (Nguyen et al., 2020; Schott et al., 2020; Wenner and Campbell, 2017; York-Barr and Duke, 2004). There has been a diverse range of definitions concerning teacher leadership (Wenner and Campbell, 2017). Systematic reviews on teacher leadership conclude that there are various definitions and interpretations of the term "teacher leadership" (Nguyen et al., 2020; Wenner and Campbell, 2017; York-Barr and Duke, 2004). This is recently supported by findings from a systematic review on teacher leadership from 2014 to 2018 which concluded that there were still undefined or defined in inconsistent ways of interpreting the term "teacher leadership" (Schott et al., 2020).

Teacher leadership is an influential issue which continues to drive research, policy and practice in different ways (Harris et al., 2017; Nguyen et al., 2020). In York-Barr and Duke's meta-analysis of teacher leadership, teacher leadership was defined as a "process by which teachers, individually or collectively, influence their colleagues, principals, and other members of school communities to improve teaching and learning practices with the aim of increased student learning and achievement" (2004, p. 288). Katzenmeyer and Moller (2009) add to this definition, observing that "teacher leaders lead within and beyond the classroom; identify with and contribute to a community of teacher learners and leaders; influence others toward improved educational practice; and accept responsibility for achieving the outcomes of their leadership" (p. 6).

Given that a wide variety of teacher leadership definitions were proposed in the literature review, there are a number of distinct models that help researchers and different stakeholders conceptualize this concept in more concrete ways. Previous research by Hunzicker (2022) sought to validate a teacher leadership model. However, the small sample size of 25 participants may have limited the potential for quantitative validation, and the findings appeared to rely primarily on qualitative data. There seems to be a lack of conceptual consensus on the definition of "teacher leadership" and a concrete understanding of the concept. This situation has resulted in a lack of a common language in the field to produce guidance for relevant policies and practices (Berg et al., 2014). This echoes the need for a more precise conception of teacher leadership including its sub-constructs or dimensions which are developed from empirical evidence (Hairon and Goh, 2015).

This conception gap has recently been addressed by the Teacher Leader Model Standards (TLMS) established by the Teacher Leadership Exploratory Consortium (2011) which proposes a set of professional standards supposed to "codify, promote, and support teacher leadership" (p. 8). Amid inconsistent conceptualizations of teacher leadership in literature, this study adopted the TLMS as an underlying framework to develop a scale for assessing teachers' leadership perceptions. Its applicability is supported by its comprehensive development process, emphasis on teachers' roles in student improvement, clearly defined components, and broad versatility. These arguments are elaborated upon in the following subsection.

1.1.2 Teacher Leader Model Standards (TLMS)

The TLMS was developed by a diverse group of stakeholders in America (Kajitani, 2015), brought together as the Teacher Leadership Exploratory Consortium (Wieczorek and Lear, 2018). This group conducted a comprehensive study of numerous interviews with teacher leaders (Berg et al., 2014), as well as a review of relevant literature on teacher leadership and current programs for teacher education, which resulted in the publication of the TLMS in 2011 (Cosenza, 2015).

As the TLMS focus on identifying specific teacher leadership competencies, actions, and behaviors at the individual level (Wenner and Campbell, 2017; Wieczorek and Lear, 2018), they continue the vein in previous literature (Barth, 1990; Danielson, 2006; Darling-Hammond et al., 1995; York-Barr and Duke, 2004) which steers away from the top-down model of leadership to accentuate the impact of teachers on student learning and school improvement through reflection, collaboration, professional development, and community engagement (Ado, 2016; Cosenza, 2015; Teacher Leadership Exploratory Consortium, 2011).

The TLMS outlines seven domains of leadership practice, each detailed with specific actions, resulting in 37 identified functions (Berg et al., 2014; Wieczorek and Lear, 2018). As proposed by Teacher Leadership Exploratory Consortium (2011), Domain 1 focuses on fostering a collaborative culture that supports professional growth and student learning. Domain 2 emphasizes the use of research and data to inform practices and improve outcomes. Domain 3 involves promoting professional learning through job-embedded, team-based development aligned with school improvement goals. Domain 4 centers on improving instruction and learning by modeling reflective practices and collaboration. Domain 5 highlights using assessments and data to drive school and district-level improvements. Domain 6 stresses building strong outreach and

collaboration with families and communities to enhance educational opportunities. Finally, Domain 7 focuses on advocacy for students and the profession, influencing policies, and securing resources to support teaching and learning.

The Teacher Leadership Exploratory Consortium (2011) developed the TLMS to codify, promote, and support teacher leadership, providing a framework for defining roles and competencies essential for school transformation. It has been argued to serve as a guide for teacher leadership roles (Harrison and Killion, 2007) and to foster dialog among stakeholders about key competencies (Cosenza, 2015). The model could also inform teacher preparation programs (Ado, 2016), support in-service teacher development (Nappi, 2014), and guide policy-making to promote teacher leadership (Berg et al., 2014). Some scholars claimed that the TLMS helped establish a consensus on teacher leadership competencies, making it more applicable to policy and practice (Berg et al., 2014; Kajitani, 2015). Others suggested that it would also be applicable across diverse contexts (Berg et al., 2014). However, Hunzicker (2022) raised concerns about the model's accessibility due to its highly detailed nature.

Researchers have since assessed its reliability and usefulness through qualitative (Ado, 2016; Berg et al., 2014; Bond, 2022; Cosenza, 2015; Lotter et al., 2020; Ngo et al., 2022) and quantitative (Dagen et al., 2017) methods. A review of these studies reveals that most studies focus on the individual level, particularly in-service teachers' perceptions of teacher leadership and their practices (Bond, 2022; Cosenza, 2015; Dagen et al., 2017; Lotter et al., 2020). Ado (2016), however, shifted the focus to pre-service teachers. Beyond the individual level, Berg et al. (2014) examined the institutional level to identify gaps between the TLMS and existing initial teacher education programs in the US, while Ngo et al. (2022) reviewed national teacher professional standards related to teacher leadership in Vietnam.

Research at the individual level affirms the validity of the TLMS. Cosenza (2015) finds that six of the seven domains in the TLMS appear in in-service teachers' responses, except for the domain promoting the use of assessments and data for school improvement, while participants in Bond's (2022) study engage in all of TLMS' leadership functions. Ado (2016) and Lotter et al. (2020) support the alignment of teacher leader professional programs with the TLMS, as it enhances leadership identities, especially in rural contexts. They argue, however, that developing discipline-specific content expertise is crucial for leadership identity development, a point neglected in the TLMS. This view supports Berg et al.'s (2014) proposal to include developing instructional expertise in the TLMS. Berg et al. (2014) also suggest cultivating a shared vision for improvement and change as part of the standards, as these are critical elements of well-established teacher leader preparation programs. They critique the TLMS for its lack of clear distinction between domains and inconsistent prioritization among them, highlighting the need for further exploration to address these issues.

To address these critiques, systematic validation of the TLMS using quantitative methods is necessary. However, only Dagen et al. (2017) have developed and tested a survey instrument based on the TLMS for reliability, which still requires further refinement of its psychometric properties. The lack of empirical evidence on the appropriateness and usefulness of the TLMS reflects a broader issue of an underdeveloped understanding of teacher leadership, resulting in a scarcity of rigorously tested instruments to measure this construct (Xie et al., 2021).

1.2 Purpose

This study had both empirical and theoretical purposes. The empirical purpose was to examine the reliability and factorial validity of the Teacher Leadership Scale (TLS), underpinned by the Teacher Leadership Exploratory Consortium's (2011) TLMS. The theoretical purpose was to determine whether the empirical results from a non-Western context, specifically Vietnam, supported the seven-domain conceptual framework of the TLMS established in a Western context. These purposes are essential to ensure that the TLS is a robust and reliable tool for measuring teacher leadership among non-Western teachers and to validate the universality and applicability of the TLMS framework beyond its original Western context.

2 Methods

2.1 Initial item development

The TLS item pool was generated and derived from Mosley's (2012) Teacher Leader Model Standards Domain instrument, framed under the TLMS. The TLMS was built through extensive literature reviews and interviews with teacher leaders (Berg et al., 2014). All items were translated into Vietnamese and reviewed by experts in Vietnam's teacher professional development for relevance and clarity. Revisions were made to ensure that the items accurately captured the intended constructs. The initial set comprised 42 items divided into seven domains: Collaborative Culture (9 items), Using Research (4 items), Professional Learning (8 items), Improving Instruction (6 items), Use of Assessments and Data (4 items), Improving Outreach (5 items), and Advocates of Learning (6 items). Each item included a statement inviting respondents to rate their perception on a four-point Likert scale (1 = Not Prepared, 4 = Highly Prepared).

2.2 Sample and procedure

Ethics approval for this study was obtained from the Human Research Ethics committee of the authors' institution. All participants gave their informed consent before the study. Data were collected by questionnaire from a sample of 538 in-service teachers in Vietnam. The respondents included 417 females (77.5%) and 121 males (22.5%) with a mean of 38 years old (SD = 7.0), ranging from 22 to 63. Most were between 41–45 (25.5%) and 36–40 (24.2%) years old.

The sample was randomly split into two subsamples of 260 and 278 teachers. The former subsample was used for EFA to explore to scale construct, while the latter was for CFA to validate the final construct resulted from EFA. The EFA and CFA were operated via IBM SPSS Statistics 29.0 and IBM SPSS Amos 28.0, respectively.

3 Results

3.1 Exploratory factor analysis (EFA)

EFA is typically utilized to assess the dimensionality of an item set, allowing researchers to "group a large item set into meaningful subsets that measure different factors" (Worthington and Whittaker, 2006, p. 807). Thus, EFA was performed to explore the conceptual structure

of the initial 42 items of TLS based on the TLMS in relation to the participant in-service teachers' perception.

The sample size for EFA must be large enough to avoid sample-specific factor derivation with low generalizability (Hair et al., 2019). The study's sample size of 260 was sufficient for EFA, which desires a ratio of 5 cases per item (Hair et al., 2019). The Kaiser-Meyer-Oklin value was 0.97, revealing the meritoriously adequate samplings (Hair et al., 2019). The statistically significant Barlett's test of sphericity at $p < 0.001$ level also indicates sufficient correlations among all items (Hair et al., 2019). The corrected item-total correlation coefficients of all items ranged from 0.57 to 0.77, which were well above the cut-off point of 0.30 (Ebrahimi et al., 2013), suggesting suitable correlations among the items for measurement. These results ensure that the items were intercorrelated and capable of producing representative factors (Hair et al., 2019).

Principal axis factoring was performed as this study focused on scale validation (Hair et al., 2019), and promax oblique rotation was employed because the factors were expected to be correlated (Hair et al., 2019). The number of plausible factors was determined as seven based upon the theoretical foundation (Watkins, 2018). Upon the factor extraction, the author removed the items with factor loading less than ±0.40 (Hair et al., 2019), cross-loading items with less than 0.15 difference from its highest factor loading, and items having communalities less than 40 (Worthington and Whittaker, 2006). Factor extraction and rotation were rerun after the removal of each item, and a total of 21 items were removed along the process. The rerun seven-factor solution revealed that two factors obtaining less than two items, which would not yield a meaningful interpretation (Williams et al., 2010). These factors and their items were thus deleted (Worthington and Whittaker, 2006), and a five-factor solution was administrated. Three more items were also then removed based on the theoretical relevance.

The final rotated solution (see Table 1) revealed five factors with 16 items retained. These factors collectively explained 76.56% of the variance, which was above 60.00% and considered acceptable for social science research (Hair et al., 2019). Almost all items were practically significant as their factor loadings exceeded ±0.50 (Hair et al., 2019), except for items 3 and 5 which loadings were just under 0.50. The Cattel's scree test corroborated the five-factor structure, since there were two elbows suggesting either two or five plausible extracted factors. The correlation matrix (see Table 2) also indicated positively significant correlations among the five factors ranging from 0.562 to 0.746 ($p < 0.01$).

3.2 Confirmatory factor analysis (CFA)

CFA allows researchers to examine "how well the measured variables represent a set of theoretical latent construct" (Hair et al., 2019, p. 658). Hence. CFA was conducted to assess the latent structure of the TSL construct derived from the EFA process.

The first-order measurement model of TLS comprising five factors and 16 items was formulated and examined its fit to a new data set from 278 in-service teachers. The sample size of 278 well satisfied the CFA requirement of at least 5 respondents per measured item (Hair et al., 2019), by which the stability of model parameter estimates can be produced (Bentler, 1995, as cited in Worthington and Whittaker, 2006). The overall goodness of fit is evaluated using several indices to determine how well the proposed model aligns with the observed data (Hair et al., 2019). These indices included the normed chi-square (X^2 / df) ≤ 3.0, the root mean-square error of approximation (RMSEA) ≤ 0.08 (Hair et al., 2019), the standardized root mean-square residual (SRMR) < 0.10 (Worthington and Whittaker, 2006), and the comparative fit index (CFI) ≥ 0.95 (Hair et al., 2019). The Teacher Leadership factor was then added to the first-order model for a second-order CFA. The chi-square difference (ΔX^2) (Hair et al., 2019) and the CFI difference or ΔCFI (Cheung and Rensvold, 2002) between the first-order and second-order models were assessed to provide more support for the nomological validity.

As demonstrated in Table 3, the first-order model and second-order model of TLS (see Figures 1, 2) achieved the goodness-of-fit criteria. This suggests both TLS models adequately fit the data. The chi-square difference test resulted in the chi-square of first-order model being significantly lower than that of the second-order model ($\Delta X^2 = 30.91$, $p < 0.001$). However, a ΔX^2 test is sensitive to a large sample, and the ΔCFI was under 0.01 suggesting an insignificant difference between the models (Cheung and Rensvold, 2002). Thus, our findings supported the first-order five-factor model and the second-order single-factor model. Table 4 illustrates the standardized regression weights (SRW) of the first and second-order factors with their related descriptive statistics and Cronbach's alphas. The Cronbach's alphas of the overall scale and subscales of TLS ranged from 0.824 to 0.947, indicating the scale's exemplary reliability (Robinson et al., 1991). The SRWs also suggest that Teacher Leadership could be best represented by the Improving Outreach factor and least reflected by the Collaborative Culture factor.

4 Discussion

The study's findings provide insightful contributions to the field of teacher leadership, particularly in validating the Teacher Leadership Scale (TLS) within a non-Western context. The EFA and CFA results indicate that the TLS is a reliable and valid instrument for assessing teacher leadership among in-service teachers in Vietnam. The five-factor model, encompassing Collaborative Culture (four items), Improving Outreach (three items), Advocates of Learning (three items), Using Research (three items), and Use of Assessments and Data (three items), mostly aligns with theoretical expectations derived from the Teacher Leader Model Standards (TLMS). This model offers a reliable and valid framework for understanding and evaluating teacher leadership within the given context and potentially in other similar settings.

The original TLMS domains of Professional Learning and Improving Instruction were deemed less applicable to the context of this study. This implies a possible contextual difference in how these domains are perceived and enacted among Vietnamese teachers compared to the American context where the TLMS was originally developed. Vietnamese teachers may view professional learning and instructional improvement as inherent to their roles rather than distinct leadership activities (Pham et al., 2024). This aligns with other studies indicating that in many Asian educational systems, professional development and instructional practices are intertwined (Kim and Lee, 2020; Setiawan and Kuswandono, 2020).

The Improving Outreach domain showed the highest SRW, indicating a more explicit and active form of leadership, such as

10.3389/feduc.2025.1503997

TABLE 1 Items, factor loading, and communality estimates for the five-factor TLS (n = 260).

Items	Factor loading					h^2
	1	2	3	4	5	
Factor 1: Collaborative Culture						
2. I am… to implement group processes to help colleagues work collaboratively in making decisions. (CC02)	**0.89**	−0.04	−0.06	−0.04	0.03	0.55
1. I am… to implement group processes to help colleagues work collaboratively in solving problems. (CC01)	**0.83**	0.08	0.06	−0.13	−0.05	0.62
3. I am… to implement group processes to help colleagues work collaboratively in managing conflict. (CC03)	**0.48**	0.21	0.08	0.24	−0.16	0.60
5. In order to advance shared goals and professional learning at my school, I am… to listen, identify and clarify the needs of self and others. (CC05)	**0.48**	−0.18	−0.06	0.29	0.24	0.62
Factor 2:Improving Outreach						
34. I am… to facilitate colleagues' self-examination of their own understandings of community culture and diversity and the development of culturally responsive strategies. (IO03)	0.05	**0.83**	0.00	−0.01	0.02	0.56
35. I am… to develop a shared understanding among my colleagues of the diverse educational needs of our families and the community. (IO04)	−0.09	**0.77**	−0.01	0.22	0.02	0.61
33. I am… to model and teach effective communication and collaboration skills with families and other stakeholders focused on attaining equitable achievement for students of all backgrounds and circumstances. (IO02)	0.07	**0.63**	0.01	−0.04	0.19	0.64
Factor 3: Advocates of Learning						
40. I am… to secure additional resources within the school/district that support student learning. (AL04)	−0.07	−0.06	**0.81**	0.21	−0.04	0.57
41. I am… to advocate for access to professional resources, including financial support and human and other material resources; that allow colleagues to spend significant time learning about effective practices and developing a professional learning community focused on school improvement goals. (AL05)	−0.01	−0.02	**0.79**	−0.06	0.10	0.57
42. I am… to represent and advocate for the profession in contexts outside the classroom. (AL06)	0.16	0.17	**0.57**	−0.08	0.04	0.67
Factor 4: Using Research						
12. In order to improve teaching and learning, I am… to support my colleagues in collaboration with higher education institutions and other organizations engaged in researching critical educational issues. (UR03)	−0.12	0.09	0.08	**0.85**	−0.06	0.71
10. I am… to assist colleagues in selecting appropriate strategies to improve student learning. (UR01)	0.24	−0.05	0.04	**0.57**	0.05	0.62
13. I am… to facilitate the work of my colleagues in turning data into action to improve teaching and learning. (UR04)	0.03	0.25	−0.03	**0.55**	0.07	0.56
Factor 5: Use of Assessment and Data						
29. I am… to collaborate with my colleagues in the design, implementation, scoring and interpretation of student data to improve educational practice and student learning. (UA02)	0.04	0.19	0.02	−0.11	**0.68**	0.56
31. I am… to work with my colleagues in using assessment and data findings to promote changes in instructional practices or organizational structures to improve student learning. (UA04)	−0.03	0.03	0.17	0.13	**0.58**	0.53
30. I am… to help create a climate of trust and critical reflection in order to engage my colleagues in challenging conversations about student learning data that lead to solutions to identified issues. (UA03)	−0.03	0.12	0.13	0.07	**0.57**	0.47
% variance explained	54.85	8.16	4.92	4.63	4.00	

The boldface values represent the highest factor loadings for each item.

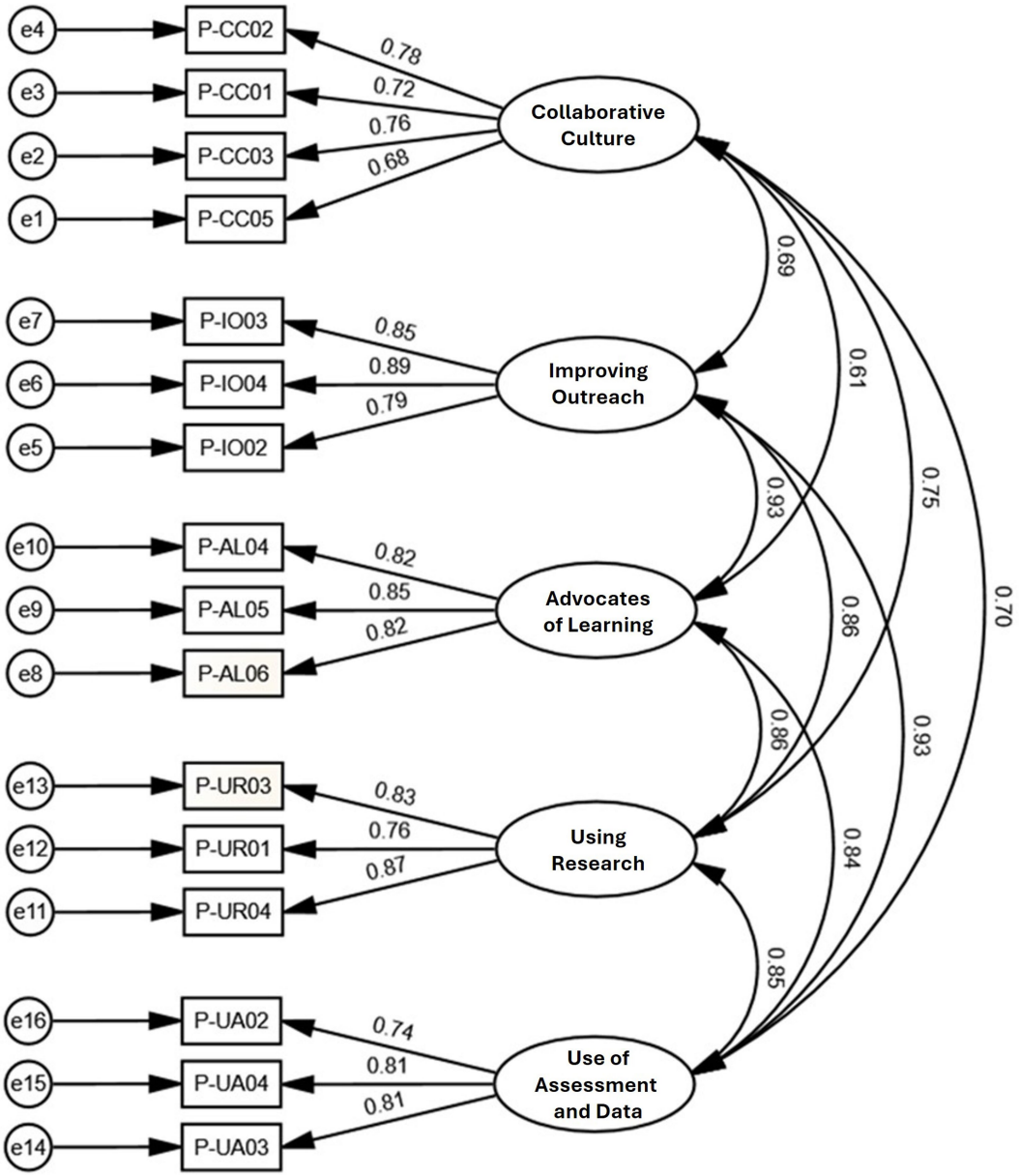

FIGURE 1
The first-order TLS model.

TABLE 2 Means, standard deviations, and correlations matrix of the five-factor TLS.

Factors	*M*	*SD*	1	2	3	4	5
1. Collaborative Culture	3.03	0.56	–	0.614**	0.562**	0.639**	0.600**
2. Improving Outreach	2.85	0.67	0.614**	–	0.680**	0.732**	0.746**
3. Advocates of Learning	2.81	0.65	0.562**	0.680**	–	0.690**	0.724**
4. Using Research	2.79	0.67	0.639**	0.732**	0.690**	–	0.710**
5. Use of Assessment and Data	2.95	0.62	0.600**	0.746**	0.724**	0.710**	–

**$p < 0.01$.

engaging with parents and the community. This outreach resonates with the emphasis on building relationships with external stakeholders noted by Hallinger et al. (2017), that Vietnamese principals prioritize engaging with parents for school development and fostering a supportive environment. In contrast, Collaborative Culture had the lowest SRW, indicating it may

TABLE 3 Fit indices for TLS models and their comparison.

Model	X^2	df	X^2 / df	RMSEA	SRMR	CFI	$\Delta X^2_{(2-1)}$	$\Delta df_{(2-1)}$	ΔCFI
1. First-order model	195.505**	94	2.080	0.062	0.044	0.967	–	–	–
2. Second-order model	226.415**	99	2.287	0.068	0.050	0.959	30.91**	5	0.008

**$p < 0.01$.

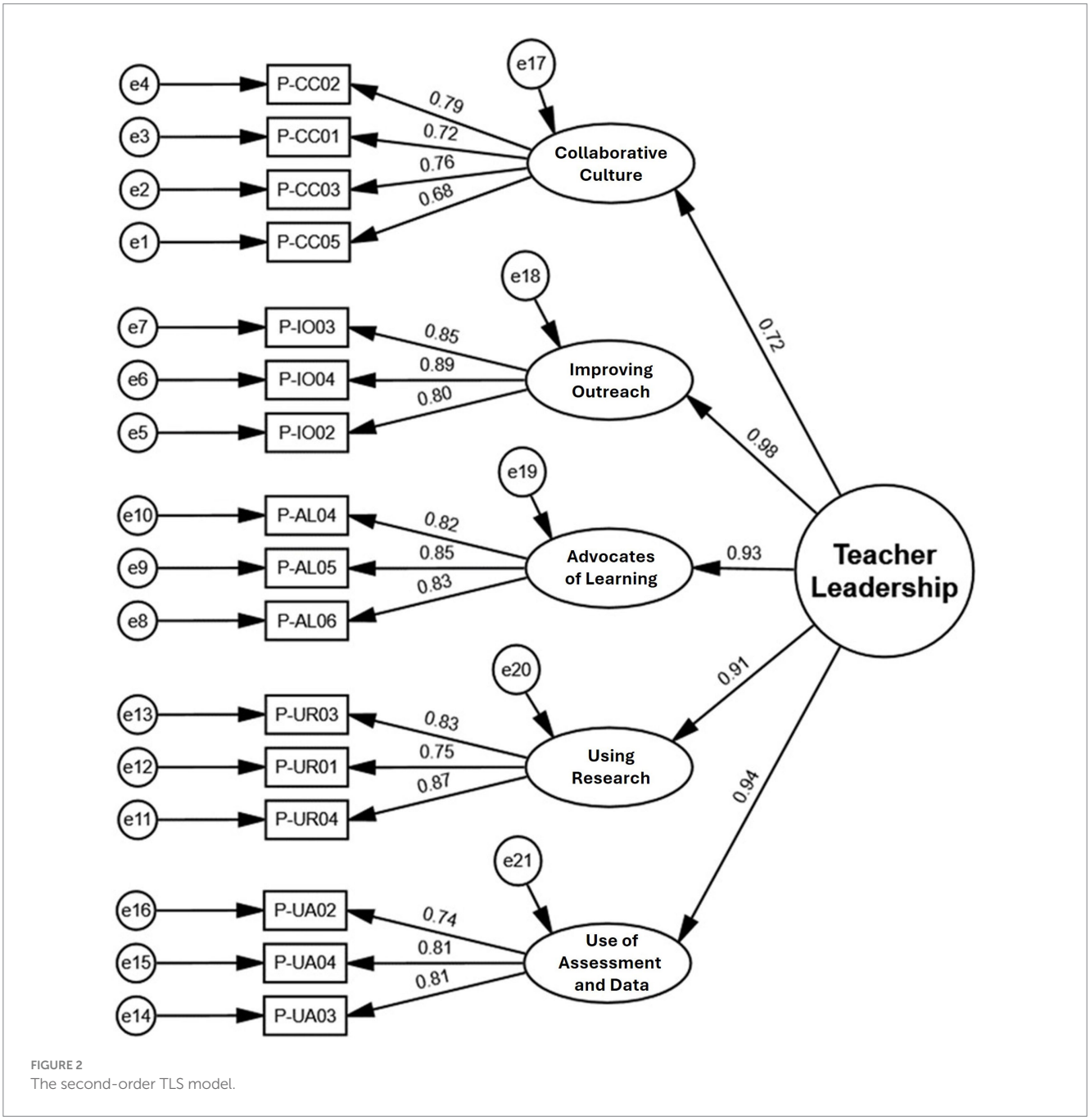

FIGURE 2
The second-order TLS model.

be an implicit aspect of leadership in Vietnam. Teachers may collaborate and share resources naturally without explicitly recognizing it as leadership behavior, aligning with Vietnamese cultural values of collectivism and collaboration (Truong et al., 2017).

The findings showed that the first-order TLS model is as valid as its second-order form. A valid second-order model can offer more evidence that the scale reflects the relationships indicated by its theoretical foundation (Hair et al., 2019). Thus, the five subscales and the overall TLS scale can represent teacher leadership in Vietnamese

TABLE 4 Descriptive and reliability statistics of the TLS subscales with standardized regression weights from the first and second-order CFAs (n = 278).

Second-order factor	First-order factor/ item	SRW	*M*	*SD*	Cronbach's alpha
Teacher Leadership			2.87	0.56	0.947
	Collaborative Culture	0.723**	3.03	0.56	0.824
	CC02	0.783**	3.05	0.69	
	CC01	0.719**	3.01	0.71	
	CC03	0.758**	2.93	0.74	
	CC05	0.684**	3.12	0.62	
	Improving Outreach	0.979**	2.84	0.68	0.881
	IO03	0.851**	2.79	0.74	
	IO04	0.895**	2.80	0.79	
	IO02	0.794**	2.92	0.74	
	Advocates of Learning	0.928**	2.81	0.72	0.871
	AL04	0.824**	2.79	0.79	
	AL05	0.854**	2.78	0.82	
	AL06	0.820**	2.87	0.80	
	Using Research	0.906**	2.74	0.68	0.857
	UR03	0.833**	2.62	0.83	
	UR01	0.756**	2.89	0.68	
	UR04	0.869**	2.73	0.80	
	Use of Assessment and Data	0.937**	2.92	0.61	0.831
	UA02	0.744**	2.96	0.69	
	UA04	0.812**	2.94	0.69	
	UA03	0.810**	2.86	0.72	

**$p < 0.001$.

in-service teachers. However, various samples from different cultures, teaching experiences, and roles should be further examined to confirm its broader relevance. For example, teachers in different cultures may have varying perceptions of teacher leadership due to differing acceptance and expectations of power distribution within organizations (Hofstede et al., 2010). Previous research also indicates that veteran and novice teachers may have distinct views on teacher leadership (Eshchar-Netz et al., 2023; Sinha and Hanuscin, 2017), and that position can influence educational individuals' perspectives on leadership (Angelle and DeHart, 2011; De Villiers, 2010).

The five-factor TLS is a valid and reliable tool for measuring teacher leadership among Vietnamese in-service teachers. It may also be applicable in cultures similar to Vietnam, particularly in terms of the Power Distance Index (PDI). Hofstede et al. (2010) reported Vietnam's PDI as 70, and countries with similar PDIs include Morocco and Bulgaria (70), Slovenia (71), Croatia (73), Singapore (74), Brazil (69), France (68), Turkey (66), and Thailand (64). However, utilizing the TLS in these countries might require a CFA to ensure validity.

Some limitations, however, should be acknowledged regarding the TLS's applicability and effectiveness. First, response bias might occur as participants may have overrated themselves due to social desirability (Podsakoff et al., 2003). This challenges the validity of self-assessments, even under conditions of anonymity, potentially resulting in data that does not fully reflect their true perceptions. Second, the scale's generalizability is limited, as it has been primarily validated with in-service teachers from a specific region. This specific population and context may restrict its applicability to teachers at different career stages, such as pre-service teachers, and to other educational settings. Finally, while the TLS demonstrates good reliability, it may not capture all facets of teacher leadership, necessitating further exploration of additional constructs and qualitative insights.

5 Conclusion

This study empirically validates the Teacher Leadership Scale (TLS) for in-service teachers in a non-Western context, specifically Vietnam. It identifies a five-factor model that includes Collaborative Culture, Improving Outreach, Advocates of Learning, Using Research, and Use of Assessment and Data. It emphasizes the significance of context in understanding teacher leadership, particularly highlighting the collaborative, community-oriented culture and the teachers' perspectives on professional learning and instructional improvement in non-Western settings.

The findings provide both empirical and theoretical contributions. Empirically, the TLS offers a reliable and valid instrument for measuring teacher leadership, addressing the need for quantitative studies highlighted by Wenner and Campbell (2017). Through a rigorous validation process, the instrument provides insights into test–retest reliability, facilitating future research on teacher leadership behaviors. Theoretically, this study demonstrates the applicability of the Teacher

Leader Model Standards (TLMS) in a non-Western context. It suggests that while the broad domains of teacher leadership are universally relevant, specific manifestations and priorities may differ across settings, particularly between Western and non-Western contexts.

Furthermore, the study's findings provide valuable insights for stakeholders involved in the preparation and evaluation of teacher leaders. Educational policymakers and school administrators can utilize the TLS as a diagnostic tool to identify and support the development of teacher leaders. Future teacher leadership programs could also incorporate the components of the TLS as a framework for reflection and professional development. Additional studies, however, are needed to explore the suitability and feasibility of these applications.

Future research should replicate this study in different educational settings and with varying teacher demographics to further validate the TLS and explore cultural variations in teacher leadership. Longitudinal studies could also provide deeper insights into the evolution of teacher leadership and the impact of development initiatives. The TLS potentially offers a valuable tool for advancing the understanding and support of teacher leadership.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by the Human Research Ethics Committee of the University of New South Wales. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

PA: Data curation, Formal analysis, Methodology, Resources, Validation, Writing – original draft, Writing – review & editing, Software, Visualization. HTMN: Data curation, Formal analysis, Methodology, Resources, Validation, Writing – original draft, Writing – review & editing, Conceptualization, Funding acquisition, Investigation, Project administration, Supervision. HTN: Conceptualization, Data curation, Investigation, Methodology, Resources, Software, Writing – review & editing. NN: Data curation, Investigation, Resources, Writing – review & editing, Funding acquisition.

Funding

The author(s) declare that financial support was received for the research, authorship, and/or publication of this article. This research is funded by Vietnam National Foundation for Science and Technology Development (NAFOSTED) (grant no. 503.01-2020.310).

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declare that no Gen AI was used in the creation of this manuscript.

Publisher's note

References

Ado, K. (2016). From pre-service to teacher leader: the early development of teacher leaders. *Issues Teach. Educ.* 25, 3–22.

Angelle, P. S., and DeHart, C. A. (2011). Teacher perceptions of teacher leadership: examining differences by experience, degree, and position. *NASSP Bull.* 95, 141–160. doi: 10.1177/0192636511415397

Barth, R. S. (1990). Improving schools from within: Teachers, parents, and principals can make the difference. Hoboken, NJ: Jossey-Bass.

Berg, J. H., Carver, C. L., and Mangin, M. M. (2014). Teacher Leader Model Standards: implications for preparation, policy, and practice. *J. Res. Leadership Educ.* 9, 195–217. doi: 10.1177/1942775113507714

Bond, N. (2022). Case studies: teacher leaders as instructional support specialists. *Kappa Delta Pi Rec.* 58, 20–25. doi: 10.1080/00228958.2022.2005429

Chen, J. (2022). Understanding teacher leaders' behaviours: development and validation of the teacher leadership inventory. *Educ. Manage. Admin. Leadership* 50, 630–648. doi: 10.1177/1741143220945704

Cheung, G. W., and Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Struct. Equ. Model. Multidiscip. J.* 9, 233–255. doi: 10.1207/S15328007SEM0902_5

Cosenza, M. N. (2015). Defining teacher leadership: affirming the teacher leader model standards. *Issues Teacher Educ.* 24, 79–99.

Dagen, A. S., Morewood, A., and Smith, M. L. (2017). Teacher leader model standards and the functions assumed by National Board Certified Teachers. *Educ. Forum* 81, 322–338. doi: 10.1080/00131725.2017.1314572

Danielson, C. (2006). Teacher leadership that strengthens professional practice. Alexandria, VA: Association for Supervision and Curriculum Development.

Darling-Hammond, L., Bullmaster, M. L., and Cobb, V. L. (1995). Rethinking teacher leadership through professional development schools. *Elem. Sch. J.* 96, 87–106. doi: 10.1086/461816

De Villiers, E. (2010). Teacher leadership: perspectives, perception and readiness of educators on the Eden and Central Karoo education district in the Western cape province [doctoral dissertation]. Pretoria: University of South Africa.

Ebrahimi, A., Samouei, R., Mousavii, S. G., and Bornamanesh, A. R. (2013). Development and validation of 26-item dysfunctional attitude scale. *Asia Pac. Psychiatry* 5, 101–107. doi: 10.1111/appy.12020

Eshchar-Netz, L., Lefstein, A., and Vedder-Weiss, D. (2023). Too old to learn? The ambivalence of teaching experience in an Israeli teacher leadership initiative. *Teach. Teach. Educ.* 130:104186. doi: 10.1016/j.tate.2023.104186

Fullan, M., and Hargreaves, A. (2016). Bringing the profession Back in: Call to action. *Learning Forward*.

Hair, J. F., Black, W. C., Babin, B. J., and Anderson, R. E. (2019). Multivariate data analysis. *8th* Edn. Boston, MA: Cengage.

Hairon, S., and Goh, J. W. (2015). Pursuing the elusive construct of distributed leadership: is the search over? *Educ. Manage. Admin. Leadership* 43, 693–718. doi: 10.1177/1741143214535745

Hallinger, P., Walker, A., Nguyen, D. T. H., Truong, T., and Nguyen, T. T. (2017). Perspectives on principal instructional leadership in Vietnam: a preliminary model. *J. Educ. Adm.* 55, 222–239. doi: 10.1108/JEA-11-2015-0106

Harris, A., Jones, M. S., and Huffman, J. B. (2017). Teachers leading educational reform: The power of professional learning communities. London: Routledge.

Harrison, C., and Killion, J. (2007). Ten roles for teacher leaders. *Educ. Leadersh.* 65:74.

Hofstede, G., Hofstede, G. J., and Minkov, M. (2010). Cultures and organizations: Software of the mind. New York, NY: McGraw Hill.

Hunzicker, J. L. (2022). Is it teacher leadership? Validation of the five features of teacher leadership framework and self-determination guide. *Int. J. Teacher Leadership* 11, 5–28.

Kajitani, A. (2015). How do you know whether you're a teacher leader? *Kappa Delta Pi Rec.* 51, 121–125. doi: 10.1080/00228958.2015.1056663

Katzenmeyer, M., and Moller, G. (2009). Awakening the sleeping giant: Helping teachers develop as leaders. London: Corwin Press.

Kim, T., and Lee, Y. (2020). Principal instructional leadership for teacher participation in professional development: evidence from Japan, Singapore, and South Korea. *Asia Pac. Educ. Rev.* 21, 261–278. doi: 10.1007/s12564-019-09616-x

Lotter, C., Yow, J. A., Lee, M., Zeis, J. G., and Irvin, M. J. (2020). Rural teacher leadership in science and mathematics. *Sch. Sci. Math.* 120, 29–44. doi: 10.1111/ssm.12383

Mosley, A. M. (2012). Perceptions of California middle school teacher leaders regarding preparedness to execute functions of teacher leader model standards (publication number 3518834) [doctoral dissertation]. Los Angeles, CA: California State University, Fresno.

Nappi, J. S. (2014). The teacher leader: improving schools by building social capital through shared leadership. *Delta Kappa Gamma Bulletin* 80, 29–34.

Ngo, N. T. H., Nguyen, H. T. M., Ngo, H. T., Nguyen, L. T., and Phan, V. T. (2022). The manifestation of teacher leadership in Vietnamese national educational policy documents. Vietnam. *J. Educ.* 6, 79–92. doi: 10.52296/vje.2022.181

Nguyen, D., Harris, A., and Ng, D. (2020). A review of the empirical research on teacher leadership (2003–2017): evidence, patterns and implications. *J. Educ. Adm.* 58, 60–80. doi: 10.1108/JEA-02-2018-0023

Nicholson, J., Capitelli, S., Richert, A., Wilson, C., and Bove, C. (2017). Teacher leaders building foundations for data-informed teacher learning in one urban elementary school. *New Educ.* 13, 170–189. doi: 10.1080/1547688X.2016.1140856

Pham, K. T., Thi Do, L.-H., Dinh, H.-V. T., Nguyen, Q. A. T., Phan, Q.-N., and Ha, X. V. (2024). Professional development of primary school teachers in Vietnamese educational reform context: an analysis from a sociocultural perspective. *Education* 52, 428–443. doi: 10.1080/03004279.2023.2168502

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., and Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J. Appl. Psychol.* 88, 879–903. doi: 10.1037/0021-9010.88.5.879

Robinson, J. P., Shaver, P. R., and Wrightsman, L. S. (1991). "Criteria for scale selection and evaluation" in Measures of personality and social psychological attitudes. eds. J. P. Robinson, P. R. Shaver and L. S. Wrightsman (New York, NY: Academic Press), 1–16.

Schott, C., van Roekel, H., and Tummers, L. G. (2020). Teacher leadership: a systematic review, methodological quality assessment and conceptual framework. *Educ. Res. Rev.* 31:100352. doi: 10.1016/j.edurev.2020.100352

Setiawan, W. A., and Kuswandono, P. (2020). Review of teachers professional development research studies in South East Asia. *Int. J. Pedagogy Teacher Education* 4, 19–32. doi: 10.20961/ijpte.v4i1.33686

Sinha, S., and Hanuscin, D. L. (2017). Development of teacher leadership identity: a multiple case study. *Teach. Teach. Educ.* 63, 356–371. doi: 10.1016/j.tate.2017.01.004

Teacher Leadership Exploratory Consortium. (2011). Teacher Leader Model Standards. Available online at: https://www.nea.org/sites/default/files/2020-07/teacher_leader_model_standards.pdf (Accessed August 15, 2024).

Truong, T. D., and Hallinger, P. (2017). Exploring cultural context and school leadership: Conceptualising an indigenous model of có uy school leadership in Vietnam. *Int. J. Leadersh. Educ.* 20, 539–561. doi: 10.1080/13603124.2015.1105388

Truong, T. D., Hallinger, P., and Sanga, K. (2017). Confucian values and school leadership in Vietnam: exploring the influence of culture on principal decision making. *Educ. Manage. Admin. Leadership* 45, 77–100. doi: 10.1177/1741143215607877

Watkins, M. W. (2018). Exploratory factor analysis: a guide to best practice. *J. Black Psychol.* 44, 219–246. doi: 10.1177/0095798418771807

Webber, C. F. (2023). Teacher leadership in international contexts. Cham: Springer International Publishing.

Wenner, J. A., and Campbell, T. (2017). The theoretical and empirical basis of teacher leadership: a review of the literature. *Rev. Educ. Res.* 87, 134–171. doi: 10.3102/0034654316653478

Wieczorek, D., and Lear, J. (2018). Building the "bridge": teacher leadership for learning and distributed organizational capacity for instructional improvement. *Int. J. Teacher Leadership* 9, 22–47.

Williams, B., Onsman, A., and Brown, T. (2010). Exploratory factor analysis: a five-step guide for novices. *Austr. J. Paramed.* 8, 1–13. doi: 10.33151/ajp.8.3.93

Worthington, R. L., and Whittaker, T. A. (2006). Scale development research: a content analysis and recommendations for best practices. *Couns. Psychol.* 34, 806–838. doi: 10.1177/0011000006288127

Xie, C., Song, P., and Hu, H. (2021). Measuring teacher leadership in different domains of practice: development and validation of the teacher leadership scale. *Asia Pac. Educ. Res.* 30, 409–419. doi: 10.1007/s40299-020-00527-9

York-Barr, J., and Duke, K. (2004). What do we know about teacher leadership? Findings from two decades of scholarship. *Rev. Educ. Res.* 74, 255–316. doi: 10.3102/00346543074003255

Zhang, Y., and Henderson, D. (2018). Interactions between principals and teacher leaders in the context of Chinese curriculum reform: a micropolitical perspective. *Aust. Educ. Res.* 45, 603–624. doi: 10.1007/s13384-018-0275-x