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Testing the factor structure of the teacher efficacy scale for in-service teachers

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Abstract

In recent years, the factor structure of the teacher efficacy scale for in-service teachers has been validated and the significant impacts of the teacher efficacy on both teachers' outcomes (organizational commitment and job satisfaction) and students' outcomes (academic achievement and motivation) have been documented in different contexts of education. However, the present literature shows that there has been relatively little research on this field in the system of Vietnamese education. Therefore, the current study investigates the factor structure of the 24-item Vietnamese translation of the teachers' sense of efficacy scale (TSES) for 397 in-service high school teachers. Factorial analysis revealed an adequate fit for the original TSES's three-factor structure, which included efficacy for instructional techniques, efficacy for classroom management and efficacy for student involvement. Cronbach's alpha coefficients showed good internal consistency for the overall scale and three subscales. The findings support the use of the TSES to measure teachers' efficacy in the context of Vietnam's educational system. Future research on teacher efficacy with subject expertise in Vietnamese schools should include teachers from primary, secondary and even tertiary universities.

Keywords: Classroom management, factor structure, in-service teachers, instructional techniques, student involvement, teacher efficacy.

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1. Introduction

One of the most significant aspects of teacher professionalism is efficacy (Cocca & Cocca, 2022). It is essential in the daily lives of teachers and students who are dealing with growing workloads, altering regulations and expectations, and shifting societal structures (Klassen et al., 2009; Tschannen-Moran & Hoy, 2001). Recently, the Vietnamese government has established new standards and competencies for general education teaching staff in order to comprehensively improve learners' qualities and skills in the context of socio-economic development and the demands of comprehensive educational reform (Nguyen et al., 2020). As a result, high school teachers must have appropriate professional competence as well as efficacy. Teacher efficacy, the foundation for evaluating teacher quality, must be evaluated on a regular basis to assist teachers in improving their abilities and, as a result, assisting learners in achieving better learning outcomes in their learning (Ha, 2020; Hien & Loan, 2018). Teachers in Vietnam must believe they are competent of controlling their instructional activities in order to provide suitable training for professional progress. However, no scale to assess teacher efficacy has been devised in the Vietnamese schools. Despite the fact that teachers' sense of efficacy has significant influences on both teachers and students, little research has examined the factor structure of teachers' sense of efficacy scale (TSES) among groups of teachers from diverse educational environments. Therefore, this study investigates the factor structure of a teachers' self-efficacy scale in the Vietnamese educational context.

1.1. Theoretical framework

1.1.1. Teachers' self-efficacy

Self-efficacy refers to 'beliefs in one's capabilities to organise and execute the courses of action required to produce given attainments' (Bandura, 1977, p. 3). In educational contexts, self-efficacy for teachers, or teacher efficacy, refers to 'teachers' beliefs or convictions that influence how well students learn, even those who may be unmotivated' (Guskey & Passaro, 1994, p. 4) or 'teachers' capabilities to organise and execute courses of action required to successfully accomplish a specific teaching task in a particular context' (Tschannen-Moran et al., 1998, p. 233). Teacher efficacy can alternatively be defined as 'a judgment of his or her capabilities to bring about desired outcomes of student engagement (SE) and learning' (Tschannen-Moran & Hoy, 2001, p. 783). Teachers' self-efficacy, in general, relates to their capacity to perform teaching activities that influence their students' achievement (Htang, 2018; Skaalvik & Skaalvik, 2010; Thompson & Woodman, 2019), or their capacity to successfully execute a variety of teaching tasks through a number of actions. It has been proven that efficacy beliefs are related to favourable outcomes for students, teachers and schools (Usher & Pajares, 2008; Zee & Koomen, 2016). Tschannen-Moran et al. (1998) suggested an integrated model of teacher efficacy based on Bandura's (1977) self-efficacy concept. In this paradigm, teacher efficacy is a function of analysing and evaluating both the 'teaching task and its context' and the 'self-perception of teaching competence' (Tschannen-Moran et al., 1998, p. 228).

Teachers' efficacy is connected with a variety of behaviours displayed by both teachers and students (Cocca & Cocca, 2022; Tsui & Kennedy, 2009; Usher & Pajares, 2008). Several studies have proven that the higher teachers' sense of effectiveness, the greater the use of effective teaching approaches (Ho & Hau, 2004), the better classroom management (CM) strategies (Goddard et al., 2000; Tschannen-Moran & Hoy, 2007) and the stronger SE in learning (Egyed & Short, 2006). Teachers that have strong self-efficacy have a favourable effect on their dedication to teaching, desire to innovate and investment in the process of teaching and learning (Chesnut & Burley, 2015; Donnell &

Gettinger, 2015). Teachers who have a strong sense of self-efficacy are more positive and happy with their professions (Moè et al., 2010), have lower levels of burnout (Schwarzer & Hallum, 2008), and are more enthusiastic about teaching (Zee & Koomen, 2016). Teachers with low self-efficacy, in contrast, have more difficulty dealing with student misbehaviour (SM), as well as more job-related stress and lower job satisfaction (JS) (Caprara et al., 2006; Malinen & Savolainen, 2016). Furthermore, students who have highly efficious teachers achieve high levels of academic achievement, autonomy and motivation (Klassen et al., 2009; Usher & Pajares, 2008).

1.1.2. Teacher's sense of efficacy scales

Although various instruments created by researchers (e.g., Armor et al., 1976; Ashton et al., 1984; Guskey & Passaro, 1994; Rose & Medway, 1981) have been employed to examine teachers' efficacy over the years, there have been some issues with their validity and reliability, particularly their conceptual and methodological shortcomings (Guskey & Passaro, 1994). Therefore, Tschannen-Moran and Hoy (2001) examined these issues and developed the TSES to assess teachers' sense of efficacy. The TSES is consistent with Tschannen-Moran et al.'s (1998) integrated model of teacher efficacy and Bandura's (1986) theories on perceived self-efficacy precursors. The TSES evaluates teachers' perceptions of their capacity to perform a wide range of activities and tasks related to various aspects of teaching. Tschannen-Moran and Hoy (2001) indicates that schools often use tests of these qualities and capacities to figure out how well a teacher thinks he or she can get students to learn and be engaged. The TSES assesses three aspects of teachers' self-efficacy: 'efficacy for instructional strategies (ISs), which assesses teachers' perceptions of their abilities to develop and use ISs to meet students' needs; efficacy for CM, which assesses teachers' perceptions of their abilities to keep the classroom in order and have students follow classroom rules; and efficacy for SE, which assesses teachers' perceptions of their abilities to engage students in learning activities' (Karami et al., 2021, p. 2681). The TSES is one of the most promising instruments for evaluating the illusive structure of teachers' efficacy in several domains of education (Morris et al., 2017).

1.1.3. Examining the factor structure of the TSES

Since it 'assesses a broad range of qualities that instructors believe crucial to excellent teaching' (Tschannen-Moran & Hoy, 2001, pp. 801–802) the TSES has been widely employed in both Western and non-Western educational contexts. In many repeated investigations, the TSES came up with both a one-dimensional and a two-dimensional structure as its original factor structure (Caprara et al., 2006; Cocca & Cocca, 2022; Duffin et al., 2012; Fives & Buehl, 2009; Karami et al., 2021; Nie et al., 2012; Tsigilis et al., 2010).

Caprara et al. (2006) explored the factor structure of the TSES through the use of confirmatory factor analysis (CFA) and Rasch measurement. Data was collected from 628 teachers in 6 different universities in 4 major cities in Turkey. A CFA method based on the data set collected from 628 students was conducted to establish the three-factor solution of the model. Three factors of the TSES with 24 observed variables (SE, CM and IS) were confirmed. The results from the structural equation model show that the statistical indicators are consistent between the hypothetical model and the data set (Comparative fit index [CFI] = 0.99, Tucker-Lewis index [TLI] = 0.99, Root mean square error of approximation [RMSEA] = 0.06). The values of TLI and CFI higher than 0.95 indicate that the three-factor model of the TSES fits the data set perfectly. The model fit was confirmed to be moderate with an RMSEA of 0.06 and a 90% confidence interval. It should be noted that all parameters were found to be statistically significant, while showing a significant contribution of each observed variable to the

respective factors. The total reliability coefficient of the TSES is at 0.93. The reliability coefficients for the three components are 0.82 for SE, 0.86 for IS and 0.84 for CM, respectively. These findings provide a proof of the validity of the three-factor structure of TSES with the sample, and at the same time show that the TSES is a valid and reliable tool to assess the beliefs about the TSES in Turkey.

Cocca and Cocca (2022) investigated the 24-variable TSES for 775 Mexican teachers. Participants ranged in age from 18 to 69, with a mean of 13.24 years of teaching experience (Mean = 13.24, SD = 9.69). The exploratory factor analysis (EFA) results revealed a four-factor structure. The factors explained 67.01% of the total extracted variance. Factor 1 consists of eight variables with loading coefficients ranging from 0.41 to 0.61, factor 2 consists of eight variables with loading coefficients ranging from 0.46 to 0.76, factor 3 consists of four variables with loading coefficients ranging from 0.46 to 0.68, and factor 4 consists of four variables with loading coefficients ranging from 0.49 to 0.55. The CFA findings showed that the model's fit indexes were excellent after deleting unsuitable variables and having low loading coefficients (χ^2 = 369.79, df = 164, chi square/degrees of freedom ratio [χ^2/df] = 2.25, adjusted goodness of fit index [AGFI] = 0.92, normed fit index [NFI] = 0.93, TLI = 0.95, CFI = 0.96 and RMSEA = 0.04). The final TSES model is made up of four components (SE, EIS, CM and effectiveness on SM). The loading coefficients of the model variables ranged from 0.63 to 0.80. Cronbach's alpha and Omega reliability values were excellent for each factor (α: SE = 0.88, IS = 0.88, CM = 0.86, SM = 0.83; Ω: SE = 0.88, IS = 0.85, CM = 0.80, SM = 0.84).

Duffin et al. (2012) carried out a study with teachers in the United States to verify the factor structure of the 24-variable TSES. The participants (Sample 1) were 272 pre-college teachers in the early stages of a teacher training program at a Midwestern Research University in the United States. The participants (Sample 2) were 180 pre-college teachers who were in the early stages of a teacher training program at a major South Central university in the United States. The authors carried out CFA with maximum likelihood estimation on each study sample using LISREL 8 software to check two models of the structure of the TSES. In model 1, the 24-variable TSES represents a single factor on teacher effectiveness (χ^2 = 1,184.21, df = 252, CFI = 0.96, Akaike information criterion [AIC] = 1,151.96, Standardised root mean square residual [SRMR] = 0.06 [Sample 1], χ^2 = 1,185.10, df = 252, CFI = 0.95, AIC = 1,672.77, SRMR = 0.06 [Sample 2]). In model 2, the 24-variable TSES represents three independent but correlated factors: SE, CM and IS (χ^2 = 1,023.69, df = 249, CFI = 0.97, AIC = 1,367.28, SRMR = 0.06 [Sample 1]; χ^2 = 1,155.39, df = 249, CFI = 0.96, AIC = 1,667.75, SRMR = 0.06 [Sample 2]). The findings added to the evidence that the TSES is unidirectional for teachers. Comparing the scores of the three variables and the total score of the TSES to scores from other studies shows that reliability coefficients are consistent with each other.

Fives and Buehl (2009) investigated the factor structure of the 24-variable and 12-variable TSES for 102 teachers and 270 students. They found the three-factor structure, which included CM, IS and SE, to be appropriate for teachers, but the one-factor structure to be more appropriate for students. The three-factor solution explained 57.09% of the total variance extracted for the scale of 24 observed variables, whereas the 12-variable scale recommended a three-factor solution, explaining 64.99% of the total extracted variation in the data set for teachers. Even though the eigenvalues of all three factors are greater than one on a scale of 24 observed variables, the parallel analysis and slope graph supported the extraction of a single factor for students, with the total variance extracted accounting for 47.98% of the data set. The data analysis for the 12-variable scale showed similar results for the students, with a single factor accounting for 52.80% of the total variance extracted from the data set. The mean value, standard deviation and reliability coefficients of the scale of 24 observed variables

are M = 7.12, SD = 0.85, α = 0.83, while the scale of 12 observed variables is M = 7.11, SD = 0.84, α = 0.86. Mean, standard deviation and reliability coefficients were determined for CM (M = 7.39, SD = 0.95, α = 0.89 [24 variables], M = 7.51, SD = 1.02, α = 0.85 [12 variables]); IS (M = 7.16, SD = 0.97, α = 0.89 [24 variables], M = 7.26, SD = 1.01, α = 0.74 [12 variables]; and SE (M = 6.54, SD = 1.10, α = 0.81 [24 variables]), M = 6.60, SD = 1.26, α = 0.78 [12 variables]). The means and reliability coefficients of the 24-variable and 12-variable TSES are identical, indicating that either version is appropriate for both students and teachers.

Karami et al. (2021) examined the factor structure of the 24-variable version of the TSES for teachers in Iran. The CFA findings demonstrate that the model fit indexes for the TSES three-factor structure are generally excellent (χ^2 = 493 [p < 0.0001], RMSEA = 0.04, SRMR = 0.05, CFI = 0.91 and TLI = 0.90). Meanwhile, the model's fit index for the TSES's one-factor structure is less acceptable (χ^2 = 590 [p < 0.0001], RMSEA = 0.05, SRMR = 0.05, CFI = 0.87 and TLI = 0.86). In terms of measurement accuracy, both the reliability coefficients and the Rasch-specific indices of fit demonstrate that the fine-tuned scale is extremely close to the TSES. The whole scale's reliability coefficient is 0.97; the reliability coefficients of the three components are SE = 0.96, IS = 0.96 and CM = 0.90, respectively.

Nie et al. (2012) aimed to investigate the factor structure of the TSES in the setting of Singaporean general education. Data was collected from 109 teachers using the 24-variable TSES. On the basis of expression, the authors employed the English version of the TSES and modified the observed variables to meet the research sample. Only 12 of the original 24 observed variables were maintained, with four observed variables for each factor. The principal component analysis method and the Kaiser-Meyer-Olkin Measure (KMO) values were applied, resulting in a three-factor solution. Based on the results of the EFA and CFA, three factors of the 12-variable TSES (SE, CM, and IS) were verified in an educational context in Singapore. The CFA findings suggest that the three-factor model's fit indexes are suitable (χ^2 = 79.34, df = 51, p = 0.007, TLI = 0.96, CFI = 0.97, RMSEA = 0.70). The modified version of the TSES's 12 observed variables from the 24 observed variables exhibits strong internal consistency and satisfactory reliability coefficients. Each factor is quite reliable (α = 0.91 for SE, α = 0.91 for CM, and α = 0.83 for IS). The correlation coefficient (r) between the scale factors ranges from 0.60 to 0.68. The factor analysis results also suggest that perceptions regarding teachers' unique efficacy can be reduced to a general factor. The convergent validity satisfied the criteria, but not the discriminant validity.

Tsigilis et al. (2010) investigated the psychometric properties of the 24-variable TSES among 405 Greek high school teachers. The CFA results for the single factor model (c^2 = 1,596.60, df = 252, CFI = 0.81, RMSEA = 0.11, SRMR = 0.06, AIC = 1,692.60) and the three-factor model (c^2 = 102.60, df = 249, CFI = 0.89, RMSEA = 0.08, SRMR = 0.05, AIC = 1,114.60) show that the three-factor model better matches the empirical data set. For the current data set, the hypothesis of a unidimensional structure of the TSES was rejected. Although the SRMR and RMSEA values agree with the data, the CFI value is less than 0.90. As a result, the authors decided to examine the model for any errors. As a result of the low factor loading, two observable variables were deleted, and the three-factor model was re-analysed. The CFA findings demonstrate that the amended model's fit indicators are satisfactory. This indicates that the tested model fits well (c^2 = 686.20, df = 206, CFI = 0.92, RMSEA = 0.07, SRMR = 0.05, AIC = 780.20). The findings indicate the TSES's applicability for assessing teacher effectiveness in the Greek educational system. The intra-group correlation coefficient (Intra-class correlation coefficient) was 0.96 (95% CI = 0.92–0.98) for IS, 0.99 (95% CI = 0.98–0.99) for CM, and 0.98 (95% CI = 0.97–0.99) for SE.

1.1.4. Purpose of the study

Even though TSES is a conceptually sound measure for measuring teachers' efficacy, its factor structure should be validated in different educational environments (Cocca & Cocca, 2022). Furthermore, cross-cultural research has consistently demonstrated that notions presented in one culture are not always meaningful in another (Ruan et al., 2015), the concept of teachers' efficacy may not be universal across cultures (Lin et al., 2002; Lin & Gorrell, 2001). Similarly, because the TSES was designed and tested in North America, it remains an empirical question for other cultures. Furthermore, Bandura (1997) considered self-efficacy as a universal construct in certain cultural situations. On the other hand, the TSES is a context-specific instrument (Tschannen-Moran & Hoy, 2007). As a result, concerns have been expressed about the measure's factor structure and 'the extent to which teacher efficacy is specific to given contexts and to what extent efficacy beliefs are transferable across contexts' (Tschannen-Moran & Hoy, 2001, p. 784). Previous research findings frequently show that the TSES has a complex structure with three potentially associated elements. Without prior assessment of the usage of the TSES tools by teachers in Vietnam, past research findings on teachers' efficacy utilisation may be limited in their interpretation. Therefore, the purpose of this study is to examine the factor structure of the TSES to see if the same three factors emerge for Vietnamese teachers. The present study will be extremely beneficial to Vietnamese researchers that employ effective teaching techniques in their research.

2. Methods

2.1. Research design

The present study utilised a quantitative design to the factor structure of the TSES for in-service high school teachers in the context of Vietnam's educational system. The TSES was utilised to collect data. Both EFA and CFA were performed to explore the factor structure of the TSES.

2.2. Participants

All of 397 Vietnamese in-service teachers (218 women [54.9%] and 179 males [45.1%]) from 9 junior high schools made up the convenience sample. The participants' collective teaching experience spanned 6.72 years on average (SD = 2.59). The participants' average ages were 32.16 years (SD = 6.96), 31.14 years (SD = 6.07), and 34.37 years (SD = 7.71) for men and 31.14 years (SD = 6.07) for women. Two sub-samples were created by randomly dividing the original sample. The EFA was performed on the first sub-sample of 198 participants (102 women and 96 men), while CFA was performed on the second sub-sample of 199 individuals (106 women and 93 men). Participants came from a variety of academic fields. The survey was given out willingly to participants. Over 87% of respondents responded, which is a high percentage. The TSES survey's replies were all entirely anonymous and confidential.

2.3. Instruments

2.3.1. Teachers' sense of efficacy scale

The 24-item version of the TSES (Tschannen-Moran & Hoy, 2001) is a prominent scale that has been used in many past investigations. As a result, this scale was chosen for the current study. The TSES translated into Vietnamese and in paper-and-pencil format was used to collect data from participants. Two multilingual translators who were familiar with teaching terms were recruited to independently translate the instrument from English to Vietnamese to construct the Vietnamese

version of the TSES. The translation showed that the instrument's original and translated forms shared a high degree of linguistic and cultural similarity. The 397 participants were given the Vietnamese version of the TSES and given 45 minutes to complete it. The scale was made up of 24 items that were used to assess three subscales of teaching efficacy: CM (e.g., 'How much can you do to control disruptive behaviour in the classroom?'), SE (e.g., 'How much can you do to foster student creativity?'), and IS (e.g., 'How much can you use a variety of assessment strategies?'). Each subscale had eight items, and participants rated them on a five-point Likert scale ranging from 1 (never) to 5 (very frequently).

2.3.2. The JS scale

To determine how satisfied the teachers were with their jobs, the JS measure developed by Taylor and Tashakkori (1995) was applied. The scale was modified with four items (e.g., 'Teacher is happy just to get through the day'). The scale was a five-point Likert scale ranging from 1 (very unsatisfied) to 5 (very satisfied). Internal consistency was calculated to be 0.71. The results of EFA showed a one-factor solution that accounted for 61.22% of the overall variation. The range of factor loadings was between 0.65 and 0.87. The CFA results verified the one-factor model, which yielded the following suitable fit indices: χ^2 = 6.20, df = 2, p = 0.007, TLI = 0.96, CFI = 0.98, and RMSEA = 0.07.

2.3. Data analysis

This study aimed to explore the factor structure of the TSES; therefore, both EFA and CFA were performed. In the first phase of EFA, principal-axis factoring and varimax rotation were employed to analyse the probable factor structure of the TSES. The values of Bartlett's test, factor loading, eigenvalue, and KMO were all estimated. In the second phase, CFA was employed to assess the underlying structural validity of the model. The maximum likelihood estimation approach was employed to calculate model fit. The model's fit was further evaluated using the following goodness-of-fit indices: TLI, RMSEA, χ^2/df, GFI, and CFI. The internal consistency of the TSES was assessed using the Cronbach's alpha coefficient, which was separately applied to each of the three subscales. The Cronbach's alpha coefficient and the corrected item-total correlation were inspected.

3. Results

EFA was used to explore the potential factor structure of the 24-item scale. The KMO value confirmed the study's sample adequacy (KMO = 0.91), and the Bartlett's test of sphericity ($\chi^2_{(253)}$ = 5,392.32, p < 0.000) showed the suitability of factor analysis. The EFA results revealed a three-factor structure with eigenvalues greater than one, accounting for 58.40% of the total variance. Each item was allocated to one of the three original subscales. Items 2, 7, 12, 16, and 23 were eliminated because they had low communities and loadings of less than 0.40 in all three factors. On the remaining 19 items, principal-axis factoring with varimax rotation verified the same three factors, with factor loadings ranging from 0.56 to 0.89. The three variables explained 61.99% of the variance in the teachers' answers. The factor 1 contained seven items with factor loadings ranging from 0.56 to 0.84, the factor 2 contained six items with factor loadings ranging from 0.65 to 0.89, and the factor 3 contained six items with factor loadings ranging from 0.67 to 0.89. The factors in the EFA are summarised in Table 1.

Table 1

EFA of the Teacher Self-Efficacy Scale

	Items	Factor loading		
		CM	IS	SE
8.	'Establish routines to keep activities running smoothly? (CM3)	0.84		
13.	Do to get children to follow classroom rules? (CM4)	0.82		
19.	Keep a few problem students form ruining an entire lesson? (CM7)	0.76		
3.	Do to control disruptive behaviour in the classroom? (CM1)	0.73		
5.	Make your expectations clear about student behaviour? (CM2)	0.71		
15.	Do to calm a student who is disruptive or noisy? (CM5)	0.71		
21.	Respond to defiant students? (CM6)	0.56		
10.	Gauge student comprehension of what you have taught? (IS2)		0.89	
18.	Use a variety of assessment strategies? (IS5)		0.86	
20.	Provide an alternative explanation or example when students are confused? (IS6)		0.84	
11.	Craft good questions for your students? (IS3)		0.80	
24.	Provide appropriate challenges for very capable students? (IS7)		0.73	
17.	Do to adjust your lessons to the proper level for individual students? (IS1)		0.65	
1.	Do to get through to the most difficult students? (SE1)			0.89
4.	Do to motivate students who show low interest in school work? (SE3)			0.87
9.	Do to help your students value learning? (SE2)			0.85
14.	Do to improve the understanding of a student who is failing? (SE7)			0.80
22.	Assist families in helping their children do well in school? (SE8)			0.73
6.	Do to get students to believe they can do well in school work?' (SE4)			0.67
	Eigenvalue	8.08	2.62	2.17
	Cum %	40.72	52.41	61.99

Factor loadings <0.40 were omitted.

CM = efficacy for classroom management, IS = efficacy for instructional strategies, SE = efficacy for student engagement.

The CFA results show that the one-factor solution was not acceptable for teachers, as all indices were found to be below the accepted thresholds (χ^2 = 1,576.91, df = 152, χ^2/df = 10.37, p = 0.07, TLI = 0.58, CFI = 0.63, and RMSEA = 0.18). The findings confirmed the identical three-factor structure. The model's fit indices were excellent: χ^2 = 356.80, df = 149, χ^2/df = 2.39, p = 0.000, TLI = 0.93, CFI = 0.94, and RMSEA = 0.07. For all three subscales, the factor loadings varied from 0.62 to 0.96. The results showed that the model fit the data well and that the three-factor solution was appropriate for explaining the factor structure of teacher efficacy. Figure 1 displays the TSES's best-fit model.

Figure 1

The Best Fit Model of the TSES

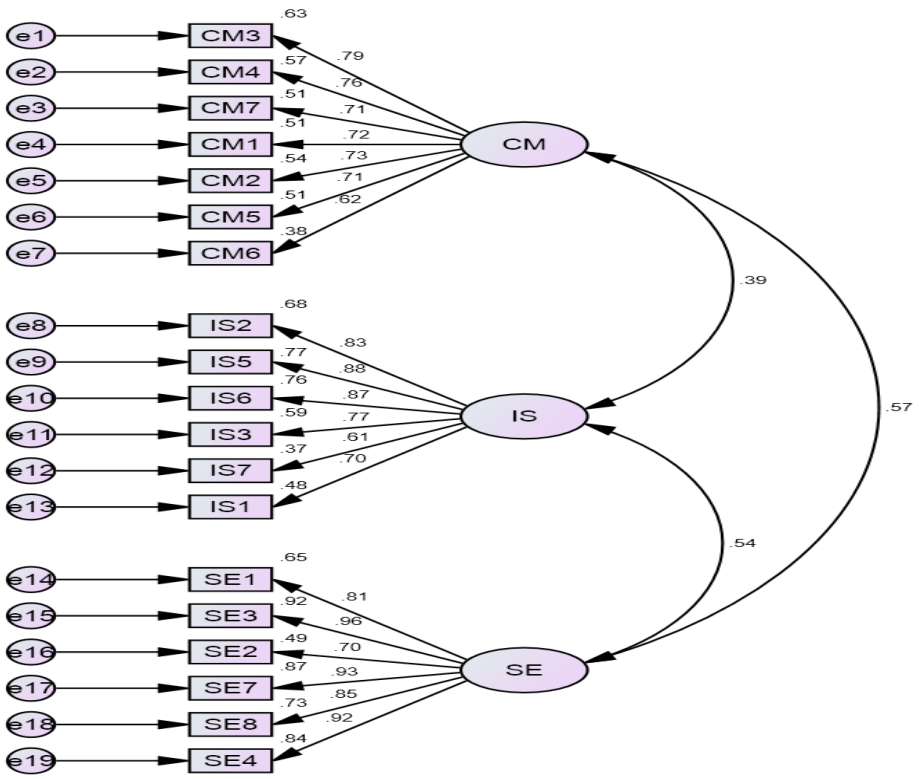

Table 2 shows that the means and standard deviations of the three subscales varied from 3.33 (0.73) to 3.73. (0.87). The adjusted item-total correlation values for all items are greater than 0.30, indicating that each item exhibits discriminant ability. Furthermore, all values of Cronbach's alpha are above 0.70 (α = 0.88 for CM, α = 0.90 for IS, and α = 0.92 for SE).

Table 2

Means, Standard Deviations, Cronbach's Alpha (α) and Inter-Factor Correlations

	No. of items	M	SD	α	TSES	CM	IS	SE	JS
TSES	19	3.37	0.74	0.92	-				
CM	7	3.07	0.89	0.88	0.79**	-			
SE	6	3.33	0.73	0.90	0.84**	0.51**	-		
IS	6	3.73	0.87	0.92	0.74**	0.35**	0.49**	-	
JS	4	3.68	0.80	0.71	0.41**	0.26**	0.35**	0.37**	-

* $p < 0.05$.

** $p < 0.01$.

n = 387.

CM = efficacy for classroom management, IS = efficacy for instructional strategies, SE = efficacy for student engagement, JS = job satisfaction.

Table 2 shows the correlations between the measures. The TSES (general) and the three task-specific subscales of management, instruction, and involvement had excellent correlations of 0.79, 0.84, and 0.74, respectively ($p < 0.01$). This indicates a strong convergent validity for the TSES. The moderate correlation coefficients between the three subscales varied from 0.35 to 0.51, indicating that the variables are distinct and supporting the original three-factor structure of the TSES for Vietnamese in-service teachers. Teachers' JS was shown to be linked to greater levels of overall teacher efficacy ($r = 0.41$, p 0.01). There were moderately favourable correlations reported between the three efficacy subscales and JS. More precisely, JS correlated with CM efficacy ($r = 0.26$, p 0.01), IS efficacy ($r = 0.35$, p 0.01), and SE efficacy ($r = 0.37$, p 0.01). The correlations between task-specific teacher efficacy subscales were slightly larger than the correlations with JS. The results show that the general TSES and its subscales are predictive.

4. Discussion

The objective of this research is to examine the factor structure of the revised TSES in the Vietnamese setting. The EFA findings indicate a three-factor structure: efficacy for CM, IS, and SE. The findings support the TSES's configural equivalence in the context of Vietnamese education. Despite the fact that the factorial validity of the 24-item TSES is consistent and consistent with previous findings, this study found that factor loadings and communities of five items were low (<0.30). Items 2 and 12 ('How much can you do to encourage students to think critically?' and 'How much can you do to encourage student creativity?') fall under SE efficacy, items 7 and 23 ('How well can you respond to difficult questions from your students?' and 'How well can you implement alternative strategies in your classroom?', respectively) fall under IS efficacy, and item 16 ('How well can you establish a CM system with each group of students?') fall under IS efficacy. EFA offered empirical evidence to support the low loadings of items 2 and 12 in this subscale (e.g., Cocca & Cocca, 2022; Duffin et al., 2012; Fives & Buehl, 2009).

Furthermore, items relating to the development of students' critical thinking and creativity may be considered components of IS. Indeed, it appears that teachers regard higher-order thinking processes as characteristics of IS efficacy rather than SE efficacy (Ruan et al., 2015). Furthermore, items 7 and 23 under efficacy for IS ('How well can you respond to difficult questions from your students?' and 'How well can you implement alternative strategies in your classroom?', respectively) indicate a student-centered approach to teaching. According to The Organization for Economic Cooperation and Development (2019), Vietnamese teachers mostly use teacher-led education in the classroom (Hang & Van, 2020). Similarly, these investigations supported Tran's (2019) conclusions that Vietnamese teachers employ strong traditional teaching approaches. This could be due to the structure and subject matter of the Vietnamese educational curriculum for teachers who mostly utilise traditional methods (Ha, 2020; Hien & Loan, 2018; Tran et al., 2019).

Moreover, item 16 under efficacy for CM ('How successfully can you establish a CM system with each group of students?') was not appropriate. Probably, this item is about teachers developing a system of CM that works with each student group. Due to cultural differences and large class sizes, passive teacher-student interactions via lecture-based instruction are still widespread in Asian education contexts such as China, Japan, and Korea (Galton et al., 2019; Harman & Bich, 2010). Similarly, classroom instruction in Vietnam is still one-size-fits-all. It signifies that in the current teaching context, the classroom comprises a principal lecturer who directs and gives speech to the entire class, which is improper and ineffective (Hien & Loan, 2018; Tran et al., 2019). It follows that it

makes sense that this item does not fit adequately. In other words, due to the large class numbers in Vietnam, it is ineffective to group students for differentiated instruction, and it is not a common practice (Htang, 2018; Morris et al., 2017; Ruan et al., 2015). As a result, the five items listed above were removed from the final suggested scale because they did not correspond to the empirical data. Then, from the 24-item version of the TSES, a structure of three components with 19 items was chosen.

The CFA results validate the three-factor model of the TSES. Despite the fact that the TSES utilised in this study included five less items than the original, it was still adequate. The fit index values indicate that the fit indices of the one-factor model were insufficient; however, the three-factor model fit well for the sample of Vietnamese teachers. Tschannen-Moran and Hoy's (2001) conceptual framework, which indicated the three factors of the TSES for in-service teachers in North America, and the findings of other relatively empirical studies conducted in different countries and among different cultures, informed the tridimensional factorial structure of the TSES (Klassen et al., 2009; Nie et al., 2012; Ruan et al., 2015). The findings supported Bandura's (1997) viewpoint, as this researcher considered self-efficacy as a universal phenomenon applicable across cultures. According to Ruan et al. (2015), cultural factors cannot be ignored when examining teacher efficacy, therefore it is necessary to investigate teacher efficacy from a larger range of perspectives, such as cross-cultural and international. Furthermore, an examination of the correlation coefficients between scales and subscales reveals that the TSES's predictive and convergent validity were adequate. The moderate correlations between the three TSES subscales support a three-factor model for teachers in Vietnam. The general TSES demonstrated good discriminant validity, and the TSES subscales had greater correlation coefficients with JS. The overall teacher efficacy outperformed the task-specific efficacy in terms of predictive power. Thus, the findings suggest that both general teacher efficacy and task-specific teacher efficacy should be employed to predict teacher outcomes (e.g., JS, commitment, and job stress).

5. Conclusion

With adequate data fit, the current investigation confirms the stability of the TSES's three-factor structure. This was the first time a teacher efficacy scale was validated with Vietnamese instructors. The findings revealed that a three-factor TSES model comprised of self-efficacy for SE, IS, and CM may be employed for assessment in the Vietnamese schools. Despite the fact that little research has been conducted into how the TSES performs in diverse contexts, this study discovered that the 19 TSES questions chosen demonstrated great internal consistency in the context of Vietnam. The findings revealed that some cultural behaviours and educational beliefs are shared among groups of Vietnamese teachers. The study offered validity evidence to support the TSES's usefulness for measuring teacher efficacy in Vietnam. The study responds to the request for more TSES testing in new situations (Valls et al., 2020). Even if 'the concept of teacher efficacy might be culturally oriented and thus may be carefully specified and examined' (Lin & Gorrell, 2001, p. 631), teachers' perception of efficacy as assessed by the TSES in the current study may be culturally independent (Tsigilis et al., 2010).

6. Recommendations

Even though the three-factor structure of the TSES was found, certain limitations should be addressed. First, the current study's sample was chosen utilising the non-probability sampling technique, with individuals picked based on their ease of access. Although the sample was taken from

a range of schools, it is possible that it does not represent the whole teaching population. Randomised samples should be employed in future studies to improve generalisability. Second, since the current study only included in-service teachers, future research should examine the structural model of the TSES for a sample of pre-service teachers in Vietnam to see how teachers' levels of expertise relate to the three efficacy factors discussed in this study. To investigate the efficacy of teachers with knowledge in various disciplines in Vietnamese schools, the research setting might be enlarged to include primary and secondary school teachers, and even teachers at university institutions.

Third, given that the average scores of each five-point subscale were larger than 3, the results revealed that instructors' evaluations of their efficacy remained moderate. Thus, theoretical and practical professional development programs for teachers, particularly those relevant to CM, IS, and SE, should be established to improve their abilities and knowledge of the learning process. Fourth, the current study was carried out in a specific context, where cultural factors influence the development of teacher efficacy. Thus, the factor structure of the TSES should be investigated across schools, educational levels, and nations. Moreover, future research should account for statistically external factors (such as personal and cultural factors, as well as environmental and social conditions). Finally, the moderate connections between the three components of teachers' efficacy and JS revealed that more efficacious teachers have greater satisfaction with their jobs. In light of this, it follows that task-specific teacher efficacy opinions need to be taken into consideration when making predictions. Several prior studies have found that teachers' efficacy is related to behaviours of teachers. To corroborate the considerable benefits of teachers' self-efficacy, it is important to investigate the connections that exist between the TSES and teachers' outcomes such as JS, level of commitment, and stress.

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Appendix

Teachers' Sense of Efficacy Scale

(Long form)

1. How much can you do to get through to the most difficult students?
2. How much can you do to help your students think critically?
3. How much can you do to control disruptive behavior in the classroom?
4. How much can you do to motivate students who show low interest in school work?
5. To what extent can you make your expectations clear about student behavior?
6. How much can you do to get students to believe they can do well in school work?
7. How well can you respond to difficult questions from your students ?
8. How well can you establish routines to keep activities running smoothly?
9. How much can you do to help your students value learning?
10. How much can you gauge student comprehension of what you have taught?
11. To what extent can you craft good questions for your students?
12. How much can you do to foster student creativity?
13. How much can you do to get children to follow classroom rules?
14. How much can you do to improve the understanding of a student who is failing?
15. How much can you do to calm a student who is disruptive or noisy?
16. How well can you establish a classroom management system with each group of students?
17. How much can you do to adjust your lessons to the proper level for individual students?
18. How much can you use a variety of assessment strategies?
19. How well can you keep a few problem students form ruining an entire lesson?
20. Tp what extent can you provide an alternative explanation or example when students are confused?
21. How well can you respond to defiant students?
22. How much can you assist families in helping their children do well in school?
23. How well can you implement alternative strategies in your classroom?
24. How well can you provide appropriate challenges for very capable students?

(Tschannen-Moran & Hoy, 2001).