Developing and validating a scale to measure teachers' emotional labor strategy in classrooms

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Abstract

Teachers' emotional labor is essential to teachers' instructional quality, psychological health, and students' learning effectiveness in classrooms. To assess how teachers manage their emotions to match the display rules of classrooms, this study developed and validated a self-report scale—the Teachers' Emotional Labor Strategy in Classrooms (TELSC)—through three rounds of investigation with secondary school teachers. First, strategies and item statements were collected through existing scales, an open-ended questionnaire, and interviews. Second, the pilot study was conducted, and the results of content validity and exploratory factor analysis confirmed the 17-item formal scale with four dimensions: surface acting, deep acting, expression of naturally felt emotions, and emotion termination. The third round investigated 491 teachers and validated the scale: confirmatory factor analyses verified the four-factor structure; correlations among the four subscales and average variance extracted indicated good discriminant validity; correlations between subscales and emotional exhaustion, teacher efficacy, and years of teaching showed good criterion validity; and Cronbach's α showed good reliability. Overall, the TELSC scale is an efficient instrument to measure the strategies that teachers use to manage their emotions in classrooms, and it can be applied to understand and improve teachers' professional competence in teaching and emotional interaction.

Keywords Emotional labor strategy · Teacher · Classroom · Scale development · Scale validation

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1 Introduction

The classroom is an emotional space, and teachers' emotions occupy the heart of teaching (Agudo, 2018; Hargreaves, 2000). In classrooms, teachers are encouraged to display positive emotions (e.g., enthusiasm) to benefit students' learning outcomes, such as motivation (Frenzel et al., 2019; Frommelt et al., 2021), memory performance (Moè, 2016), and academic achievements (Moè et al., 2021). However, chronically presenting inauthentic emotions may cause strain or even emotional exhaustion for teachers (Carroll et al., 2022; Lee, 2019; Taxer & Frenzel, 2018). To examine how teachers manage their emotions to present beneficial emotions and reduce their emotional pressure in work, teachers' emotional labor (TEL) has been studied as a research perspective of teacher emotions (Hargreaves, 2000; Zembylas, 2007). Since the 1990s, TEL and factors related to it have drawn increasing attention from scholars (Burić & Frenzel, 2021; Hargreaves, 2000; Yin & Lee, 2012; Zembylas, 2004). However, prior research explored TEL in teachers' broader settings, while studies on TEL in classrooms (TELC), the fundamental teaching setting, are limited (Wang et al., 2020).

As the "working environment does influence display rules" (Grandey & Gabriel 2015, p. 328), in classrooms teachers are required to perform the expected or desirable emotions according to classrooms' display rules that besides displaying positive emotions and hiding negative ones, teachers also instrumentalize emotions to achieve teaching goals (Waldbuesser et al., 2021; Yin & Lee, 2012). Moreover, teachers face emotional events among teachers, students, and teaching in classrooms where TELC is mainly used to assist their class instructions (e.g., teachers apply emotional labor to combine their teaching beliefs with curriculum requirements; Loh & Liew, 2016; Miller & Gkonou, 2018), support students' learning (e.g., teachers' faking of emotions is positively related to students' academic engagement; Burić & Frenzel, 2021; Nyanjom & Naylor, 2021; Zembylas, 2004), and deal with their own emotions (Isenbarger & Zembylas, 2006; Wang et al., 2020). Changes in environment, display rules, purpose, and other factors can impact how teachers apply emotional labor strategies (Brotheridge & Lee, 2003; Trougakos et al., 2011). However, existing scales that measure TEL strategies rarely take classrooms as an independent setting. To reveal exactly how teachers adjust their emotions to ensure efficient classroom teaching, assist administrators to take targeted measures, and optimize students' emotional experiences and learning outcomes (Barksdale et al., 2021; Burić & Frenzel, 2021; Loh & Liew, 2016), an instrument to assess TEL strategies in classrooms is necessary but still lacking. To overcome this limitation, this study constructed the TEL Strategy in Classrooms (TELSC) scale by collecting the strategies from teachers and previous scales.

2 Theoretical framework

2.1 Emotional labor

Emotions are an essential part of an individual, and well-managed emotions can be beneficial to individuals' personal and professional lives (Grandey, 2000; Lee et al., 2016). *Emotion management*, referring to the ability "to induce or suppress feeling to sustain the outward countenance that produces the proper state of mind in others" (Hochschild, 1983, p. 7), involves the management of emotions in private life and professional settings (Lee et al., 2016; Svendsen & Koch, 2011). The management of feeling to "create a publicly observable facial and bodily display" for a wage is *emotional labor* (Hochschild, 1983, p. 7). In emotional labor, employees are required to display emotions consistent with certain institutional norms, called *display rules*, regarding which emotions are appropriate in particular situations and how these emotions should be expressed (Diefendorff & Gosserand, 2003). Display rules can reflect "cultural expectations, social standards, or professional norms" of organizations (Yin & Lee, 2012, p. 58), guide employees in "establishing the sense of entitlement or obligation that governs emotional exchanges" (Hochschild, 1983, p. 56), and drive them to apply *emotional labor strategies* (Stark & Bettini, 2021)—the methods or skills that employees use to manage their emotions (Li & Liu, 2021). For instance, when the felt emotions are inconsistent with display rules, individuals may use strategies of *surface acting* (hereafter SA, in which one regulates emotions through faking unfelt emotions and/or hiding felt emotions) and *deep acting* (hereafter DA, in which one consciously modifies feelings to express the desired emotions, Brotheridge & Lee, 2003; Grandey, 2000; Hochschild, 1983). In empirical studies, emotional labor strategies can be measured to reflect individuals' emotional labor (Grandey & Gabriel, 2015; Wang et al., 2020).

Regarded as "an integrated process represented by display rules (environmental stimulus), emotion regulation (intrapsychic response), and emotion performance (interpersonal behavior)" (Grandey & Gabriel, 2015, p. 327), emotional labor can be understood from the three components. Any changes to them would influence how an individual performs emotional labor strategies. Some studies have provided evidence. First, display rules affect the using of strategies (Grandey, 2000; Stark & Bettini, 2021). For instance, display rules can predict SA and DA (Trougakos et al., 2011). Second, emotion regulation, referred to as "attempts to influence which emotions one has, when one has them, and how one experiences or expresses these emotions" (Gross, 2015, pp. 4–5), can be related to emotional labor strategies as response-focused emotion regulation relates to SA, and antecedent-focused emotion regulation relates to DA (Grandey, 2000). Third, emotion performance is the "observable expressions" in emotional labor (Grandey & Gabriel, 2015, p. 326), which is found related to DA (Kammeyer-Mueller et al., 2013) and SA (Webb et al., 2012).

2.2 TELC

When applied to TEL, the three components may differ. First, studies show that display rules require teachers to generally express positive emotions and suppress nega-

tive ones (Lee et al., 2016; Stark & Bettini, 2021; Zembylas, 2004), unlike the need to display negative or neutral emotions in certain occupations (e.g., judges, bill collectors; Grandey & Gabriel, 2015). Second, for teachers, emotional labor strategies relate more closely to emotions which teachers regulate rather than to emotion regulation strategies (Lee et al., 2016). Third, teachers tend to display positive emotions in interactions with students and parents (Frenzel et al., 2019; Kim & Kim, 2018) and sometimes express their frustrations and complaints to administrators (Kim & Kim, 2018). Corresponding with these findings, several scales (Çukur, 2009; Li & Liu, 2021; Yin, 2012) to measure TEL strategies have been developed. However, these scales do not concentrate on classrooms, in which TEL may impact learning immensely and the three components may be discrepant.

Classrooms, the main focal point in formal education systems at all learning levels (UNESCO, 2015), are essential in translating the curriculum (Remillard & Heck 2014), delivering academic knowledge (Pekrun et al., 2017), and promoting students' social competence (Frenzel et al., 2009). In classroom settings, teachers "engage in complex emotional labor" (Wang et al., 2020, p. 10) and verify their identity as learning supporters that prevail over others (e.g., colleagues, school employees, De Costa et al., 2018), which may endow TEL with more pedagogical features. First, display rules of classrooms require teachers to maintain positive emotions, repress negative emotions and use emotions as a teaching tool (Waldbuesser et al., 2021; Yin & Lee, 2012). Specifically, in classrooms, TEL should be intertwined into the dynamic everyday teaching (Miller & Gkonou, 2018; Yin & Lee, 2012) and contribute to students' learning (Nyanjom & Naylor, 2021; Yin, 2016). Second, the content of emotion regulation mainly includes dealing with teachers' internal conflicts (e.g., between teachers' teaching beliefs and curriculum requirements) and conflicts among teachers and students (Loh & Liew, 2016; Miller & Gkonou, 2018) rather than those with people outside classrooms. Third, teachers' emotion performance tends to be greatly restrained in class. For instance, in some situations, teachers may share fewer emotions (Isenbarger & Zembylas 2006) or inhibit their emotions temporarily (Gregersen, 2007) to maintain their "micro-politically superior position" (Hargreaves, 2000, p. 819).

These changes may impact emotional labor strategies. To take advantage of TEL's pedagogical functions, it becomes necessary to study TELC independently from teachers' broader professional settings. Based on the existing studies, this study conceptualizes TELC as the management of feelings to create a publicly observable facial and bodily display that caters to all teaching and learning needs in a classroom setting.

2.3 Dimensionality of the TEL strategy in classrooms

To measure how teachers manage their emotions to fit their professional contexts and provide appropriate suggestions to improve TEL, several scales have been developed (Çukur, 2009; Li & Liu, 2021; Yin, 2012). Adapted from Emotional labor Strategy Scale (Diefendorff et al., 2005), TEL Strategy Scale consists of three dimensions: SA, DA and *expression of naturally felt emotions* (ENFE) (Yin, 2012). When felt emotions and display rules are inconsistent, to conform to display rules, teachers apply

SA by changing their emotion display or DA by changing their felt emotions. When felt emotions "coincide with display rules", teachers use ENFE where they "put forth conscious effort to ensure that" (Diefendorff et al., 2005, p. 340). Some researchers argued that teachers may apply strategies of emotional deviance (Çukur, 2009) or negative consonance (Li & Liu, 2021), in which they express their felt emotions that are incongruent with display rules.

However, in classrooms, instead of violating display rules, teachers may tend to use emotion termination, in which they "take efforts to stop conveying their internal and external emotions, especially when it comes to conflicts" (Yang et al., 2019, p. 6). Emotion termination is regarded as "a smart way… to achieve organizational goals", in which individuals revise their interpretations to display rules from showing positive emotions to displaying no emotions, and "consciously modify their displays by no emotional displays and inner feelings" (Yang et al., 2019, p. 6). Compared with SA where individuals suppress their true feelings to express required emotions, and DA where individuals modify their emotions to conform to display rules (Brotheridge & Lee, 2003; Grandey, 2000), emotion termination involves the cease of emotion display and a change in cognition of display rules, making it the fourth strategy along with SA, DA, and ENFE (Yang et al., 2019).

Since teachers' understanding of display rules impact their use of TEL strategies (Stark & Bettini, 2021; Yin & Lee, 2012), and that instrumentalizing emotions to achieve teaching goals is one display rule in classrooms (Waldbuesser et al., 2021; Yin & Lee, 2012), teachers may use emotion termination in TELC. This can be true for three reasons. First, some teachers may prefer to use emotion termination to maintain rationality and objectivity in teaching (Zembylas, 2004), as they believe that "pure, personal emotions are useless in classroom teaching if they have no function in helping student learning" (Yin, 2016, p. 11). Second, in classrooms, time is limited and completing teaching tasks is the focus. When conflicts arise or some students are inattentive, teachers may stop their internal and external emotions to show authority (Gregersen 2007), neutrally ease conflicts (Yang et al., 2019), and focus students and themselves on teaching (Yin, 2016). Third, emotion termination provides a new way for some teachers to deal with complex or depressing incidents. For instance, the online classes during the COVID-19 pandemic were found to heighten teachers' emotional stress (Carroll et al., 2022; Zang et al., 2022) by occupying teachers' private life, amplifying and recording their facial and bodily displays, and involving more social factors into class. Teachers became more cautious to prevent their emotion displays from violating display rules. By using emotion termination, teachers can lower the display rules to reduce pressure (Yang et al., 2019) and stop expressing emotions to avoid making mistakes.

Overall, this study argues that SA, DA, ENFE, and emotion termination constitute TEL strategy in classrooms.

2.4 Emotional exhaustion, teaching efficacy, years of teaching, and TEL strategy in classrooms

To validate the four dimensions, emotional exhaustion, teacher efficacy, and years of teaching are chosen as related factors to TELC.

Emotional exhaustion, "feelings of being overextended and depleted of one's emotional and physical resources" (Maslach et al., 2001, p. 399), represents individuals' emotional stress resulting from the TEL strategy (Yang et al., 2019; Yin et al., 2017). The conservation of resources (COR) theory argues that emotional labor strategies can gain, conserve, and use resources. Once resources are drained without timely replenishment, one may experience emotional exhaustion (Grandey & Gabriel, 2015; Yao et al., 2015). Previous studies have found that SA could result in teachers' emotional exhaustion (Lee, 2019; Yao et al., 2015). In this study, the correlation was applied to examine whether the resource consumption is consistent with previous studies.

Teacher efficacy is a teacher's belief and judgment of their capability to bring about desired outcomes of teaching and students' learning (Yin et al., 2017). TEL studies show that DA and ENFE are positively related to teacher efficacy (Han et al., 2021; Yin et al., 2017). That is because DA requires the individual to modify their feelings to fulfill the organizational emotional requirements (Diefendorff et al., 2005), which complies with social expectation (Yin et al., 2017). Therefore, as an indicator reflecting teachers' cognition to their task achievement and positively impacting students' academic achievements (Tschannen-Moran and Hoy 2001; Yin et al., 2017), teacher efficacy is used to represent TELC's impact on teachers' classroom performance.

Years of teaching represents teachers' job experience and is positively related to TEL strategies in general (Kinman et al., 2011) and specifically with ENFE (Zhu et al., 2021). Two reasons can explain the relation. First, the "desensitizing" effect argues that with increasing job experience, employees might develop more effective coping strategies and be desensitized to display rules in work (Kinman et al., 2011). Second, teachers may hold the value of "teaching-as-caring" that TEL can be constituted "in the interrelationship among emotions, agency, and discourses of good teaching" (Miller & Gkonou, 2018, p. 56). These viewpoints indicate that as years of teaching increase, teachers may apply more coping strategies and perform better TELC. In this study, correlation between years of teaching and TELC is explored.

2.5 This study

Referring to the existing scales and class teaching practices, this study promotes four strategies (SA, DA, ENFE, and emotion termination) as dimensions of the TELSC scale. To test its appropriateness, three research questions were proposed (Table 1).

3 Materials and methods

3.1 Participants and procedure

We conducted three rounds of investigation from June 5 to November 24, 2021. Owing to the COVID-19 pandemic, the first round was done in schools; while the last two rounds were completed online through the platform, *Wenjuanxing.* An information letter was provided to all participants for consent before each investigation.

Table 1 Research questions, data sources, and analysis methods

Research questions	Data sources	Analysis
1. What aspects of TELC are measured?	Round 1 (open-ended questionnaire and interviews) Round 2 (the pilot study)	Exploratory factor analysis, content validity (an expert panel scoring and item-total correlation analysis)
2. How reliable is the TELSC scale?	Round 2 (the pilot study), Round 3 (TELC survey)	Cronbach's α
3. How valid are the constructs measured by the TELSC scale?	Round 3 (TELC survey)	Confirmatory factor analysis, discriminant validity, criterion validity

Note: TELSC = teachers' emotional labor strategy in classrooms; TELC = teachers' emotional labor in classrooms

In the first round, an initial questionnaire of 24 items were formed via collecting items and dimensions from existing scales, an open-ended questionnaire ($n = 109$) and interviews ($n = 10$). In the second round, a pilot study ($N = 171$) was conducted, and a 17-item four-dimensional formal scale was obtained. In the third round, to validate the scale, 491 valid answers (107 men and 384 women) were collected from participants with an average age of 37.6 years ($SD = 8.90$) and an average of 14.71 years ($SD = 10.08$) of teaching.

3.2 Instruments

Teachers' emotional exhaustion was measured using the Chinese Primary and Secondary School Teachers' Job Burnout Questionnaire (Wu et al., 2016). The emotional exhaustion section (eight items) has a good reliability of 0.93.

Teacher efficacy was measured using Teacher Sense of Efficacy Scale (short-form) designed by Tschannen-Moran and Hoy (2001). The 12-item scale has a good reliability of 0.90.

TELC was measured using the self-developed TELSC scale, which comprises 17 items with a good reliability of 0.84. The four factors are SA, DA, ENFE, and emotion termination.

3.3 Data analysis

In the first round, a 24-item initial questionnaire was obtained (Table 2). First, items that fit the classroom setting were collected from the existing scales (Brotheridge & Lee, 2003; Çukur, 2009; Diefendorff et al., 2005; Li & Liu, 2021; Yang et al., 2019; Yin, 2012). Second, three questions in the open-ended questionnaire and three questions in interviews were asked for more items (Appendix 1). In the questionnaire, Question 1 investigates the existence of TELC. Answers to Questions 2 and 3, as well as Questions 1 and 2 in interviews, were coded, classified, and revised into six items for emotion termination and three items for DA and ENFE. Question 3 in interviews investigated teachers' feelings concerning emotion termination. Three language teachers edited the wording for briefness and accuracy.

Table 2 Dimensions, items, sources, and results of content validity index of the first version

Dimensions and items	Sources/frequency	I-CVI
Surface acting		
P1. I just pretend to have the emotions I need to display in class.	Diefendorff et al. (2005), Yin (2012)	1
P2. I put on a mask to display the emotions I need for teaching in class.	Diefendorff et al. (2005), Yin (2012)	1
P3. The emotions I display to the students in class are not what I feel internally.	Diefendorff et al. (2005), Brotheridge and Lee (2003)	0.86
P4. I fake a good emotion when interacting with students in class.	Diefendorff et al. (2005)	0.86
P5. I hide my real feelings during class teaching.	Brotheridge and Lee (2003)	1
P6. I put on a "show" or "performance" when interacting with students in class.	Diefendorff et al. (2005), Yin (2012)	0.43
Emotion termination		
P7. When students misbehave, I just stop them calmly and continue teaching, feeling nothing.	Open-ended questionnaire (*24*)	1
P8. When conflicts arise with students, I will remain calm internally and only perform my basic duties without displaying any emotions.	Open-ended questionnaire (*31*)	1
P9. I will keep silent and not get angry when my efforts are not recognized by students.	Open-ended questionnaire (*42*)	1
P10. When some students unwillingly participate in learning activities, I will proceed my teaching without any emotional change internally and externally.	Open-ended questionnaire (*36*)	0.86
P11. When some students' minds wonder in classrooms, I will keep calm and continue my teaching.	Open-ended questionnaire (*19*)	0.86
P12. When students openly question my teaching, I will focus on the facts without any emotions.	Yang et al., 2019 Open-ended questionnaire (22)	1
Deep acting		
P13. I really try to feel the emotions I have to show as part of my job.	Brotheridge and Lee (2003)	0.57
P14. I make an effort to actually experience the emotions that I need to display during class teaching.	Diefendorff et al. (2005), Yin (2012)	1
P15. Before the class starts, I attempt to truly feel the emotions that teaching needs.	Diefendorff et al. (2005), Yin (2012)	1
P16. When annoyed by students, I try to experience positive feelings by recalling happy moments.	Open-ended questionnaire (*15*)	0.86
P17. I attempt to truly experience the emotions that teaching needs.	Yin (2012)	0.86
P18. When experiencing anxiety while teaching, I attempt to calm myself down by appreciating the students' merits.	Li and Liu (2021), Open-ended questionnaire (*17*)	1
Expression of naturally felt emotions		
P19. The emotions I show to students in class correspond with what I feel spontaneously.	Diefendorff et al. (2005), Yin (2012)	1
P20. It is easy to express my true feelings in class.	Li and Liu (2021)	1
P21. The emotions I express in class are genuine.	Diefendorff et al. (2005), Yin (2012)	1
P22. The emotions I show during class interactions come naturally.	Diefendorff et al. (2005), Yin (2012)	1

Table 2 (continued)

Dimensions and items	Sources/frequency	I-CVI
P23. When getting students to comply in the classroom, I express my satisfaction genuinely.	Çukur (2009)	0.86
P24. I show some disappointment when I really feel that way.	Li and Liu (2021), Open-ended questionnaire (*2*)	1

Note: I-CVI=item-level content validity index; frequency is in Italics and in brackets

In the second round, to determine the scale's items and structure, content validity, exploratory factor analysis (EFA), and Cronbach's α were tested. Content validity was assessed via an expert panel scoring through an adapted *Instrument Item Relevance Check Sheet* (Davis, 1992) and item-total correlation analysis. EFA was conducted to determine proper factors, and Cronbach's α examined the reliability. Finally, a 17-item formal scale was formed (Table 3).

In the third round, validity and reliability were examined. Construct validity was examined via a series of confirmatory factor analyses (CFAs). We tested 10 models containing the possible one, two, three, and four factors' structure in a maximum likelihood parameter estimation of CFA using AMOS 23.0. Subsequently, discriminant validity was examined using correlations among the subfactors and the average variance extracted (AVE) of each subfactor. Criterion validity was examined by correlating subscales with emotional exhaustion, teaching efficacy and years of teaching. Finally, Cronbach's α assessed the scale's reliability.

4 Results

4.1 Dimensionality of the TELSC scale

In the first round, after collecting 18 items from existing scales, some items were collected through the open-ended questionnaire and interviews. In the questionnaire, Question 1 showed that most teachers (85%) adjust their emotions before entering classrooms. Question 2 found that when felt emotions are inconsistent with display rules, teachers performed strategies including DA (46.8%), emotion termination (32.1%), SA (19.3%), and expressing the felt negative emotions directly (1.8%). Statements of some new items (P16, P18, P24) were also collected from examples that teachers provided. Questions 2 and 3 obtained 174 valid answers on examples regarding emotion termination and were revised to form six item statements (P7–P14) with frequencies shown (24, 31, 42, 36, 19 and 22) in Table 2.

Subsequently, the interviews provided more details. First, when maintaining proper emotions, three teachers said that they always felt exhausted, "*I always have 5 or 6 classes in one day… It always happens that I am teaching with great passion, while students are doing other things… I always feel exhausted after a day of teaching." (T4);* five said sometimes when *"administrators are listening to my lessons,"* or *"I have to keep patient after explaining one question repeatedly" (T2 and T8);* two said seldom, *"… I like to teach with passions… I feel satisfied" (T7).* Second, eight teachers provided examples of emotion termination, for instance, *"When some stu-*

Table 3 The dimensions, items, factor loadings, total variance fraction, and Cronbach's α of the formal scale

Dimensions and items	Factor loading	% variance	Cron-bach's α
Surface acting			
1. I just pretend to have the emotions I need to display in class.	0.709	13.965	0.758
2. I put on a *mask* to display the emotions I need for teaching in class.	0.850		
3. The emotions I display to the students in class are not what I feel internally.	0.806		
4. I hide my real feelings during class teaching.	0.642		
Emotion termination			
5. When students misbehave, I just stop them calmly and continue teaching, feeling nothing.	0.731	14.247	0.774
6. When conflicts arise with students, I will remain calm internally and only perform my basic duties without displaying any emotions.	0.762		
7. I will keep silent and not get angry when my efforts are not recognized by students.	0.867		
8. When some students unwillingly participate in learning activities, I will proceed my teaching without any emotional change internally and externally.	0.706		
Deep acting			
9. I make an effort to actually experience the emotions that I need to display during class teaching.	0.739	19.097	0.852
10. Before the class starts, I attempt to truly feel the emotions that teaching needs.	0.794		
11. When annoyed by students, I try to experience positive feelings by recalling happy moments.	0.814		
12. I attempt to truly experience the emotions that teaching needs.	0.825		
13. When experiencing anxiety while teaching, I attempt to calm myself down by appreciating the students' merits.	0.663		
Expression of naturally felt emotions			
14. The emotions I show to students in class correspond with what I feel spontaneously.	0.758	15.576	0.818
15. It is easy to express my true feelings in class.	0.747		
16. The emotions I express in class are genuine.	0.782		
17. The emotions I show during class interactions come naturally.	0.786		

dents do the homework of the main subject (math), I knock their desks to remind them and keep teaching… they have great pressure" (T10); and two teachers argued that emotion termination always happens as "*I feel that I have no emotions in teaching. I just concentrate on teaching." (T2 and T5*). Third, while using emotion termination, five teachers felt better because "… *Another 50 more students are listening. When I choose to be out of sight, it is out of my mind." (T1*); two felt worse because *"stopping emotional delivery is unprofessional (T4&T7)* and three feel nothing special because *"I only show my true feelings"* or *"I seldom have feelings…" (T10, T2, and T5*). These answers provided samples of TELC and showed that emotion termination exists in classrooms and affects teachers' feelings.

With all items edited by language teachers, an initial questionnaire was obtained with 24 items numbered from P1 to P24 (Table 2).

In the pilot study, the average index of content validity (CVI/AVE) scored by the expert panel was 0.917 in total, which was above the average 0.9, indicating that the initial questionnaire had a good content validity. Moreover, two items were suggested to be deleted as the *item-level content validity index* (I-CVI), the proportion of content experts giving an item a relevance rating of 3 or 4 (e.g., if six out of seven experts scored the relevance rating 3 or 4, I-CVI=6/7=0.86), was under 0.80 (Davis, 1992). They are item P6 (I-CVI=0.43), which is close to items P3 and P4, and the words "show" and "performance" make teachers feel that they do not care about students; and item P13 (I-CVI=0.57), which is close to items P14 and P17 and viewing it "as a part of my job" can evoke negative associations that their effort is simply geared toward finishing tasks. Item-total correlation analysis proved that all items were significant when correlated to the total score ($p < .05$).

EFA was appropriate to explore the dimensionality (KMO=0.793, Bartlett's test of sphericity: $p < .001$). In the EFA, the extraction method comprised a principal component analysis for a correlation matrix analysis on the four factors based on the screen plot and varimax rotation. The four-component factors explained 52.530% of total variance; results showed that items P4, P12, and P23 should be deleted as their factor loadings were less than 0.4, the difference between an item's two highest loadings was less than *25%*, and the item content was inconsistent with the factor classification (Kavsĕk & Seiffge-Krenke, 1996). Additionally, the α coefficient was 0.788, and the *Cronbach's Alpha if Item Deleted* showed that items P11, P12, and P24 were over 0.788 and could be deleted.

After seven items were omitted, the formal scale was obtained with all factor loadings over 0.64. The developed scale's Cronbach's *α* was 0.767 with SA (*α*=0.758), DA (*α*=0.852), ENFE (*α*=0.818), and emotion termination (*α*=0.774). The four-component factors explained 62.885% of the total variance (Table 3), indicating that the 17-item four-dimensional scale was acceptable.

4.2 Validity and reliability

The third-round investigation examined validity and reliability of the scale. First, a series of CFAs were performed to test the construct validity. Based on each dimension's features, the four factors were combined into different subscales with alternative one-, two-, three-, and four-factor models. Fit indices in Table 4 show that the four-factor structure (Model 10) was the best (χ^2=242.503, *df*=113, x^2/*df*=2.146, *RMSEA*=0.048, *GFI*=0.945, *AGFI*=0.926, *NNFI*=0.966, *CFI*=0.966, *SRMR*=0.046), as the χ^2/*df* was between one and three, RMSEA and SRMR were under 0.05, and the other values were over 0.9, indicating that the four factors had a good fit (Schreiber et al., 2006).

Additionally, each item's factor loading ranges between 0.61 and 0.87 (Fig. 1), indicating the four-dimensional scale was satisfactory.

Second, discriminant validity was examined using correlations among the subscales and the AVE (Table 5). The four subscales correlated with each other. SA was negatively related to ENFE (r=−0.181, $p < .01$). From high to low, the positive

Table 4 Summary of the CFAs fit indices for the measurement models

Model	χ^2	df	χ^2/df	RMSEA	GFI	AGFI	NNFI	CFI	SRMR
1. SA+DA+EN+ET	2034.681	119	17.098	0.181	0.596	0.481	0.419	0.492	0.168
2. SA+DA/EN+ET	1699.144	118	14.400	0.165	0.630	0.521	0.517	0.581	0.171
3. SA+ET/DA+EN	1395.216	118	11.824	0.149	0.687	0.594	0.610	0.661	0.165
4. SA+DA+ET/EN	1512.291	118	12.816	0.155	0.675	0.579	0.574	0.630	0.148
5. SA+DA+EN/ET	1656.767	118	14.040	0.163	0.651	0.547	0.530	0.592	0.158
6. SA+DA/EN/ET	1130.704	116	9.747	0.134	0.746	0.665	0.684	0.731	0.136
7. SA/DA/EN+ET	846.987	116	7.302	0.113	0.784	0.715	0.773	0.806	0.128
8. SA/DA+ET/EN	654.036	116	5.638	0.097	0.835	0.782	0.833	0.857	0.085
9. SA+ET/DA/EN	849.929	116	7.327	0.114	0.790	0.723	0.772	0.805	0.142
10. SA/DA/EN/ET	242.503	113	2.146	0.048	0.945	0.926	0.966	0.966	0.046

Note: SA=surface acting; DA=deep acting; EN=expression of naturally felt emotions; ET=emotion termination

correlations were as follows: DA and emotion termination (r=.510, p<.01), DA and ENFE (r=0.453, p<.01), SA and emotion termination (r=.293, p<.01), ENFE and emotion termination (r=.278, p<.01), and SA and DA (r=.136, p<.01). Additionally, each reflective component's AVE was above 0.5. The results of no high correlation among four subscale and the AVE suggest satisfying evidence regarding the discriminant validity.

Following previous studies (Çukur, 2009; Yang et al., 2019), correlations between emotional exhaustion, teacher efficacy, years of teaching and TELC were used to test the criterion validity (Table 5). Results show SA (r=.407, p<.01) and emotion termination (r=.108, p<.05) were positively related to emotional exhaustion. Emotion termination (r=.245, p<.01), DA (r=.455, p<.01) and ENFE (r=.374, p<.01) were positively related to teacher efficacy. There was no significant correlation between DA (r= .020, p=.657), ENFE (r = -.030, p=.504) and emotional exhaustion, and between SA and teacher efficacy (r=.025, p=.582), and years of teaching (r = -.018, p=.687).

Years of teaching was positively related to emotion termination (r=.158, p<.01), DA (r=.218, p<.01), and ENFE (r=.150, p<.01), and correlated to teacher efficacy (r=.181, p<.01). To eliminate the interference of years of teaching on teacher efficacy and TELC, years of teaching was added as a covariate for the covariance analysis. The results show that, under the control of teaching years, participants with different levels of teacher efficacy had significant differences in emotion termination (F=4.492, p<.001), DA (F=5.458, p<.001), and ENFE (F=4.439, p<.001), and no significant difference in SA (F=1.010, p=.445). These results further indicate that the scale has a good criterion validity.

Reliability, estimated by Cronbach's α, was excellent for total (α=0.837), SA (α=0.853), DA (α=0.880), ENFE (α=0.824), and emotion termination (α=0.799).

Therefore, the results of content validity, EFA, CFAs, discriminant validity, criterion validity, and reliability confirmed that the TELSC scale can be applied to assess strategies of TELC.
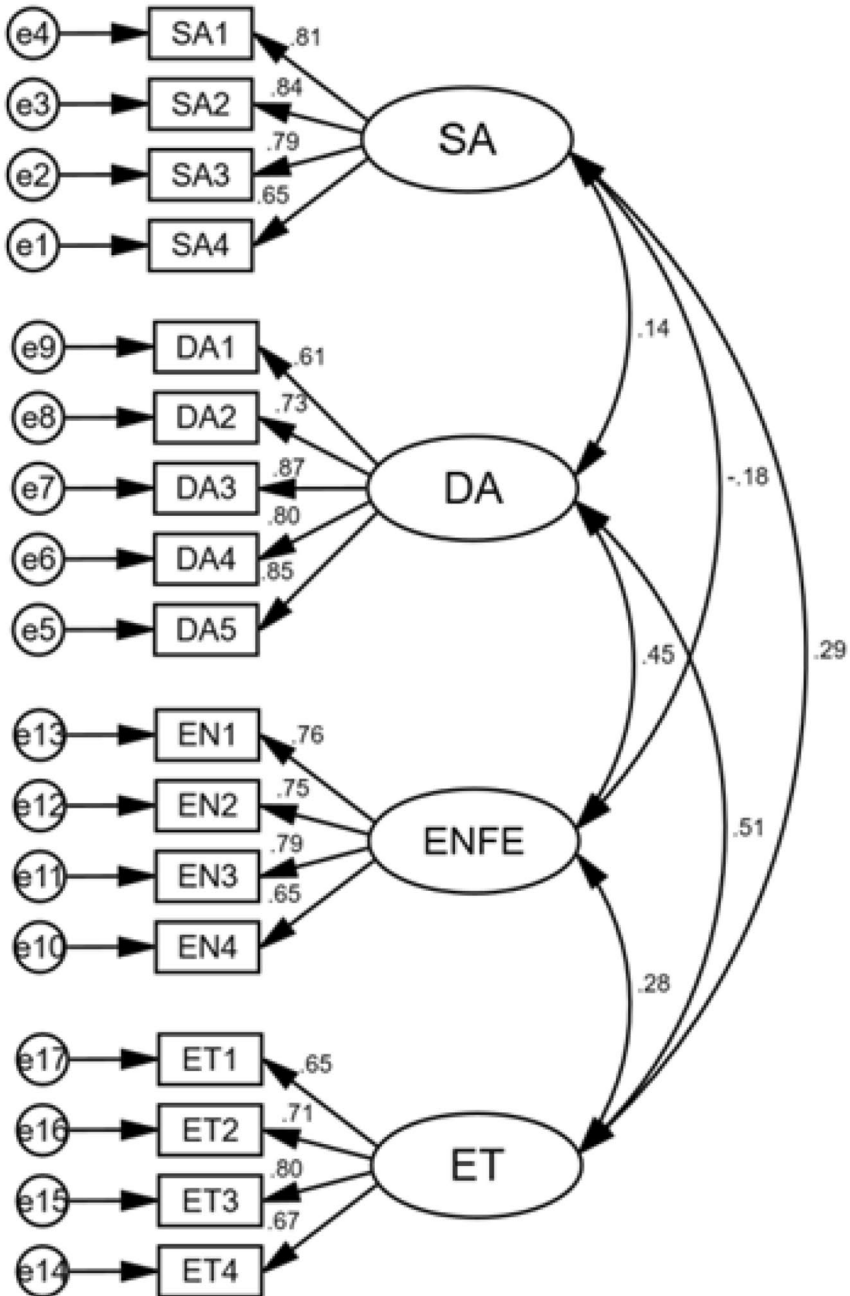
Fig. 1 The confirmatory factor analysis results of the four-factor model and factor loadings (Model 10)
Note: SA=surface acting; DA=deep acting; EN=expression of naturally felt emotions; ET=emotion termination

Table 5 Means, standard deviations, and correlations of the study variables

	M	SD	1	2	3	4	5	6	AVE
1. Surface acting	2.878	0.932	**.774**						0.600
2. Deep acting	3.767	0.758	.136**	**.777**					0.604
3. Expression of naturally felt emotions	3.689	0.704	-.181**	.453**	**0.739**				0.546
4. Emotion termination	3.200	0.830	.293**	.510**	0.278**	**.710**			0.504
5. Emotional exhaustion	3.326	0.894	.407**	.020	−0.030	.108*	**.635**		0.635
6. Teacher efficacy	3.981	0.514	.025	.455**	0.374**	.245**	.087		0.556
7. Years of teaching	14.71	10.08	-.018	.218**	0.150**	.158**	-.007	.181**	-

Note: $^{*}p<.05$, $^{**}p<.01$. *M*=mean; *SD*=standard deviation; AVE=average variance extracted

5 Discussion

5.1 The TELSC scale

This study developed and validated an instrument to assess the TEL strategy in classrooms in response to the need of expanding emotional labor assessment to teaching (Çukur, 2009; Diefendorff et al., 2005; Li & Liu, 2021) and comprehensively revealed the features of TELC. For instance, in TELC, teachers take efforts to deliver care in the teaching process (Isenbarger & Zembylas, 2006; Miller &Gkonou, 2018; Nyanjom & Naylor, 2021), and to achieve unity between the curriculum and self-actualization goals (Loh & Liew, 2016).

The development process suggests that the scale, containing SA, DA, ENFE, and emotion termination as factors, has good validity and reliability. Dimensions and 24 items were first obtained from existing scales, an open-ended questionnaire, and interviews. Content analysis and EFA were applied to shorten it into the 17-item four-dimensional formal scale. CFAs confirmed the structure of the scale. Results of discriminant validity, the correlations among the four strategies, were consistent with previous studies—that SA was positively correlated with DA but negatively with ENFE (Lee, 2019; Yang et al., 2019). Criterion validity was tested through correlations between four subscales and emotional exhaustion, teacher efficacy, and years of teaching. The results were consistent with previous studies, showing the following: (a) emotional exhaustion has a positive correlation with SA (Lee, 2019; Yao et al., 2015) and emotion termination but no significant correlation with ENFE (Yang et al., 2019) and DA (Zhang et al., 2020); (b) teacher efficacy has a positive correlation with emotion termination, DA, and ENFE (Han et al., 2021; Yin et al., 2017), when considering years of teaching; and (c) years of teaching positively impacts TELC in using emotion termination, DA, and ENFE (Kinman et al., 2011; Zhu et al., 2021).

5.2 Emotion termination as the fourth dimension

Following the three dimensions of SA, DA, and ENFE in the Emotional Labor Strategy Scale (Diefendorff et al., 2005) and TEL Strategy Scale (Yin, 2012), the study proposed and tested emotion termiantion as the fourth dimension of the TELSC scale.

Revised from teaching practice, items of emotion termination reflect that, in certain situations, teachers may choose to cease their internal feelings and external emotion display to focus on teaching tasks (Yang et al., 2019). The result that emotion termination is positively but not highly correlated with SA, DA, and ENFE shows that it can be a factor to TELC. Compared with pretending to be unannoyed, emotion termination is internally and externally peaceful (Yang et al., 2019). The differences can be distinguished via *control theory*, which argues that emotional labor strategies are used to decrease the discrepancies caused by employees' comparison between display rules and emotion display: SA is regarded as behavioral changes of emotional display, whereas DA changes one's cognition to display rules (Diefendorff & Gosserand, 2003). In TELC, emotion termination simultaneously includes both behavioral and cognitive changes that teachers cease their emotion display and lower their cognition of display rules from presenting positive emotions to maintaining smooth teaching. Although showing positive emotions is encouraged, it is inevitable that some contradictions may trigger teachers' unpleasant feelings. By applying emotion termination, teachers can calm themselves down quickly to avoid violating display rules and provide emotionless teaching to ensure the completion of teaching tasks, which reflects teachers' substantial efforts in reinstituting their cognition to display rules and managing their emotional behavior.

The correlations between emotion termination and the three variables can provide more evidence. First, the positive correlation to emotional exhaustion means that emotion termination can cost a great number of teachers' psychological resources, as does SA. Second, emotion termination is positively related to teacher efficacy, indicating that more using of this strategy can bring higher teachers' cognitions and beliefs to their task achievement ability, as do DA and ENFE. Compared with the other three strategies, emotion termination does change both teachers' emotional behavior and cognition. Third, its positive relation to years of teaching reflects that emotion termination can be improved with increased teaching experience.

Emotion termination could be regarded as a factor in further emotional labor research where task-fulfilling is superior to emotion display in certain settings. The findings also support the idea that understanding and discovering teachers' emotional work is an ongoing process (Zembylas, 2007).

5.3 Practical implications

This study highlighted the pedagogical functions of TELC and developed the TELSC scale that provides a perspective to understand teachers' professional competence in the context of emotional labor.

For teachers, the TELSC scale offers a measure to supervise their emotional performance themselves, which can be beneficial to their psychological health and class teaching. As COR theory indicates, the overuse of some TEL strategies may result

in burnout. Therefore, it is essential for teachers to detect their own emotional state by using the scale to avoid excessive loss of resources. For instance, when feeling stressed, teachers can reduce SA use. Furthermore, the TELSC scale can assist teachers to improve their teaching ability by mastering their emotional performance in teaching and encouraging better teacher–student interactions. For instance, when feeling tense, teachers can apply the scale to recall and increase the performance of some strategies (e.g., DA) to create a better classroom climate.

For educational administrators, the TELSC scale provides a perspective and an instrument to explore reasons, states, and methods to improve class teaching. Considering TELC's implicit and indirect effects on teaching, the scale can raise educational administrators' awareness of teachers' silent work in classrooms, reduce teachers' workload, provide appropriate psychological support to create a safer teaching atmosphere, and organize efficient pre-service and post-service training to improve their psychological health and teaching abilities.

For students, the application of the TELSC scale can improve their learning and social emotional competence indirectly. Teachers' emotions in TELC can be perceived and transmitted to students in classrooms (Barksdale et al., 2021; Frenzel et al., 2009). Using the scale, teachers can self-evaluate and adjust their emotions timely, which may positively impact students' learning outcomes (Frenzel et al., 2019; Moè et al., 2021), deliver teachers' care (Miller & Gkonou, 2018), and set a model for students to properly manage their emotionsFurthermore, the scale's focus of the classroom setting bridges the gap between TEL and class teaching, and the scale provides more possibilities for future research to evaluate teachers' pedagogical ability by investigating other aspects of classroom teaching.

5.4 Limitations and further directions

There are some limitations related to this study. First, the collected data were self-reported. Although it is difficult to measure emotions objectively, the consistency motif or social desirability should be noted. To minimize this problem, classroom observations, interviews, diaries, and other methods can be utilized in future studies (Wang et al., 2020). Second, the sample is not diverse enough. Referring to Çukur's (2009) and Li and Liu's (2021) studies on TEL scale development, and considering that in secondary schools, teaching tasks are relatively heavy and the boundary between inside and outside the classroom is relatively distinct, this study only investigated secondary school teachers. However, the lack of primary school and university teachers limits the generalizability of the scale. For example, primary teachers may create greater emotional intensity for higher authority in classrooms (Hargreaves, 2000), which may result in differences in emotion performance of primary and secondary school teachers. Future research could expand on the present findings by examining more school types from various cultural backgrounds. Third, variables for criterion validity are insufficient and other variables, such as job satisfaction, could be added in future research. Finally, this study did not distinguish between online and face-to-face classroom settings. Influenced by the COVID-19 epidemic, online and offline teaching were both involved in the investigation, which may cause

deviation. Future research can consider investigating teachers during online teaching to discover more features of TELC.

6 Conclusion

Three conclusions can be drawn from this study. First, the developing and validating process demonstrates that the four-dimensional TELSC scale has good reliability and validity in assessing TELC. Second, emotion termination is a factor of TELC, indicating that teachers simultaneously change their emotional behavior and cognition to support efficient teaching in classrooms. Third, there are differences and associations among the four strategies, since the strategies are correlated with emotional exhaustion, teacher efficacy and years of teaching, and the correlations vary across strategies.

In sum, the TELSC scale is a promising tool to capture teachers' emotional efforts in classroom setting and can be further promoted to measure teachers' occupational well-being for improving class teaching and learning.

7 Appendix 1

7.1 Questions in the open-ended questionnaire

Question 1. Do you adjust your emotions before entering classrooms?

Question 2. When your true feelings are inconsistent with the required or desirable emotions for teaching, what methods do you adopt to adjust your emotions, and which have you used most? (e.g., putting on a mask, trying to feel happy and express the needed emotions, focusing on teaching without emotion display and inner feelings, etc.) Please give examples.

Question 3. Under what circumstances/conditions do you choose to cease both your internal feelings and externally emotion display but focus on teaching? Please give examples.

7.2 Questions in the interview

Question 1. Is it exhausting to always have to maintain proper emotions in class? Please give some examples.

Question 2. Have you ever been in a situation where you are unwillingly to feel and express your emotions but only focus on teaching in class? If so, please give some examples.

Question 3. When you stop delivering emotions and focus solely on teaching, do you feel better or worse? Why?

in content validity evaluation: Ms. Cao, Ms. Dong, Miss Gu, Mr. Li, Ms. Liu, Mr. He, and Ms. Zhang. Finally, we would like to extend our appreciation to the three language teachers for their careful wording in the item statements.

Data, materials, and/or code availability The data of confirmatory factor analysis was listed in the document of *Fig. 1.docx*. The datasets generated and analyzed during the current study are available in the document of *Data of TELSC Scale.zip* that can be downloaded directly from the website: https://pan.baidu.com/s/1WERyydfOHPNDTXlFSIcMkA (Code: AB12).

Declarations

Competing interests The authors report that there are no competing interests to declare that are relevant to the content of this article.

Ethics approval The study design was approved by the Institutional Review Board of Faculty of Education, Shaanxi Normal University, and was conducted according to the Chinese survey and behavioral research ethics requirements. Data collection and analyses followed the Rules of the Academic Ethics described by the Social Science Department of Shaanxi Normal University.

Informed consent Informed consent was obtained from all participants in words and written in the questionnaires. Participation in the survey and interviews was completely voluntary; the participants could withdraw from the study at any time.

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