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Development and Validation of the Music Teacher Self-Efficacy Scale (MTSES)

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Abstract

Self-efficacy plays a crucial role in enhancing teachers' confidence and improving teaching effectiveness. Consequently, this serves as a key theoretical framework for supporting teachers' professional development. Although existing studies have explored music teachers' self-efficacy, a standardized measurement scale tailored specifically to this domain remains to be developed. To address this gap, this study developed the Music Teacher Self-Efficacy Scale (MTSES). The development process was conducted in two phases, a pilot study and a formal study, incorporating item design, correlation analysis, Confirmatory Factor Analysis (CFA), and expert evaluation to ensure the scale's reliability and validity. This study introduced an innovative assessment tool that integrates four key sources of self-efficacy: performance accomplishments, verbal persuasion, emotional arousal, and vicarious experiences. The scale achieved high reliability (Cronbach's alpha = 0.972), making it a satisfactory instrument for evaluating teachers' self-efficacy. As the data for scale development were collected from three cities in China, this study also provided insights into the self-efficacy levels of music teachers across these regions. The MTSES contributes to evaluating teachers' self-efficacy in music instruction, helps educators assess their teaching effectiveness, identifies strengths and areas for improvement, and ultimately supports professional growth.

Keywords: Self-Efficacy, Music Teacher, Scale Development, Performance Accomplishments, Verbal Persuasion, Emotional Arousal, Vicarious

Introduction

Teacher Self-Efficacy originates from Bandura's (1997) self-efficacy theory, which is an important component of his social learning theory. It emphasizes teachers' confidence in completing specific teaching tasks, including teaching behaviors, teaching effectiveness, and students' academic achievements (Schwarzer & Hallum, 2008; Zeichner & Hoes, 2015). Previous research indicates that teachers with higher levels of self-efficacy possess more positive teaching attitudes, better classroom management skills, and more effective teaching methods (De Vries, 2017; Kaleli, 2020). Therefore, self-efficacy is a crucial element of

teachers' professional development, making it necessary to further promote its development of teachers' self-efficacy (Kaleli, 2020).

However, the development of teacher self-efficacy is influenced by multiple factors, including performance accomplishments, verbal persuasion, emotional arousal, and vicarious experiences (Bandura, 1997). Among these factors, performance accomplishments refer to the successful experiences that teachers gain in their teaching; verbal persuasion refers to feedback about their abilities received from external sources; emotional arousal denotes teachers' ability to manage and regulate their emotions; and vicarious experiences involve learning from observing others' successes (Deliana, 2023; Ma et al., 2022).

Although existing studies have explored music teachers' self-efficacy, a standardized measurement scale tailored specifically to this domain remains to be developed. A review of the literature reveals the following problems: First, most existing scales focus on classroom management skills, teaching effectiveness, and student engagement (Guskey, 1981; Tschannen-Moran & Hoy, 2001). These scales often overlook how emotional arousal, performance accomplishments, verbal persuasion, and vicarious experiences affect the development of teachers' self-efficacy (Deliana, 2023; Ma et al., 2022). However, there is a lack of comprehensive assessment scales for teacher self-efficacy. Second, the current research lacks a scale suitable for the music education context, thus lacking broader applicability (Li et al., 2022). Consequently, it is necessary to develop a new self-efficacy scale that captures the characteristics that influence music teachers' self-efficacy to measure their level of self-efficacy more effectively.

Given the limitations of existing research on measuring music teachers' self-efficacy, this study aims to design a self-efficacy scale encompassing four dimensions—performance accomplishments, verbal persuasion, emotional arousal, and vicarious experiences—to comprehensively evaluate teachers' self-efficacy. The contribution of this study lies in not only emphasizing traditional classroom management and teaching abilities, but also treating verbal persuasion, emotional arousal, and vicarious experiences as independent dimensions, thereby addressing the gaps in existing scales. Meanwhile, the design of this scale will help education policymakers gain deeper insights into the factors influencing teacher self-efficacy, providing further empirical support for professional teacher training.

Literature Review

The Evolution of Teachers' Self-Efficacy Measurement

In the 1970s, Rand Corporation's psychosocial research groups conducted pioneering studies on teacher efficacy, designing two questions to measure teaching efficacy: (1) a general teaching ability item on the influence of students' home environment on motivation and achievement, and (2) a personal teaching ability item on teaching effectiveness with challenging students. Rated on a five-point Likert scale, these questions indicate that teacher efficacy significantly affects students' achievement. However, the instrument faced criticism for its limited scope as it included only two items to measure teacher efficacy (Armor, 1976; Berman, 1977).

Subsequently, Guskey (1981) developed a 30-item Responsibility for Student Achievement (RSA) scale that uses a 10-point scale to assess whether student achievement was due to the

teacher or external factors. Grounded in Weiner's (1994) attribution theory, the RSA evaluates teacher self-efficacy by examining factors such as teaching abilities, effort, task difficulty, and luck. The scale includes two subscales, Responsibility for Student Success (R+) and Responsibility for Student Failure (R-), which measure teacher accountability for student outcomes. However, as the RSA scale focuses primarily on teachers' sense of responsibility rather than self-efficacy, it does not fully align with the broader concept of teacher self-efficacy.

Rose and Medway (1981) developed the Teacher Locus of Control (TLC) scale, a 28-item questionnaire evaluating teachers' perceived influence on student successes and failures. TLC focuses on specific teaching scenarios and provides insights into teachers' perceptions of their control over educational outcomes. This scale marks a shift from previous tools by targeting situational contexts in teaching. An example item asks teachers to choose between explanations for a student's difficulty in understanding a math concept: (a) the student's ability to understand or (b) the teacher's ability to explain effectively. TLC has proven to be a reliable predictor of teacher behavior, emphasizing the situational factors in teacher efficacy. In addition to the scale designed by Guskey (1981) for attributing student achievement and the teacher control point scale by Rose and Medway (1981), the Webb Efficacy Scale designed by Ashton and Webb (1986) attempted to improve the reliability and validity of the scale based on the Rand research group. The Webb scale has seven questions in a two-choice format, requiring participants to determine whether they supported the first or second assertion.

In the 1980s, research on teacher self-efficacy expanded significantly. Through an analysis of past studies, Gibson and Dembo (1984) developed the Teacher Efficiency Scale (TES), which contains 30 TSE items. General teaching efficacy and personal teaching efficacy were extracted through a factor analysis. General teaching efficacy refers to teachers' perceptions and judgments about the relationship between teaching and learning and the role of education in students' outcomes. Gibson and Dembo argued that these two factors correspond exactly to the two expectations in Bandura's social cognitive theory: outcome and efficacy expectations. However, Tschannen-Moran and Hoy (2001) contended that general teaching effectiveness cannot be directly linked to outcome expectations because outcome expectations refer to individuals' presumptions that certain behaviors may lead to outcomes in a given environment, whereas general teaching effectiveness reflects teachers' perceptions of teaching and learning and the influence of the external environment on perceptions of efficacy. Although TES is widely used in research, many problems remain. Woolfolk and Hoy (1990) narrowed this scale down to a 10-question scale and suggested that researchers adapt the scale to their own research (Jebb et al., 2021). Although most researchers (Tschannen-Moran et al., 1998; Tschannen-Moran & Hoy, 2001) agree that teacher self-efficacy should be linked to specific contexts, Enochs and Riggs (1990) used their Science Teaching Efficacy Belief Instrument (STEBI), a 25-item test, on Gibson and Dembo's (1984) TES scale. They also obtained two factors, namely, personal science teaching efficacy and science teaching outcome expectancy, but the results showed that these factors were not correlated.

Later, Bandura (1997) designed a teacher self-efficacy scale that focused on highlighting the multidimensional nature of efficacy, including seven dimensions: influence on decision-making, influence on school resources, teaching efficacy, disciplinary efficacy, parental

support, group participation, and creating a positive school environment. However, the reliability and validity of the scale were not described in Bandura's study; therefore, the scale has limitations.

More recently, Kaleli (2020) and Schwarzer and Hallum (2008) proposed a teacher self-efficacy scale that emphasizes teachers' coping abilities when faced with difficulties, including "Academic Achievement Efficacy" and "Teacher Behavior Efficacy." This design underscores teachers' confidence in confronting challenges, particularly regarding academic achievement and behavior management, and is helpful in examining how teachers' self-efficacy influences their ability to improve student performance. However, it lacks consideration of teachers' emotional and social support and overlooks potential needs in areas such as emotional management and support from others.

Finally, Zeichner & Hoes (2015) introduced a teacher self-efficacy scale with three dimensions—"Teaching Ability Efficacy," "Classroom Management Ability Efficacy," and "Student Motivation Efficacy"—focusing on teachers' skills in classroom instruction, management, and student motivation. This scale encompasses the key competencies required for teaching, classroom control, and stimulating student engagement, offering a distinct approach to evaluating teachers' self-efficacy, especially in assessing motivation-related aspects.

Music Teacher Self-Efficacy Research

Burak (2019) investigated how factors such as gender, age, university year, and musical experience affected self-efficacy in both music skills and teaching. The results indicated no significant gender differences in music self-efficacy; however, previous and current instrumental experience as well as self-efficacy in music instruction proved to be key predictors of musical competence. Similarly, De Vries (2017) emphasized the importance of personal factors, such as musical background, active participation in music, availability of professional development, and teaching resources. In particular, high self-efficacy in music teaching was mainly fostered by successful teaching experiences and encouragement from parents, teachers, and principals, with professional development playing a relatively small role. Moreover, Biasutti et al. (2019) and Li et al. (2022) pointed out that music teachers' self-efficacy is influenced by both personal and professional elements, including social skills, confidence in musical abilities, teaching experience, and gender, as well as the variability in self-efficacy levels based on gender and expertise among instrumental and vocal music teachers in Italy.

Building on this perspective, Kaleli (2020) analyzed preservice music teachers' attitudes and self-efficacy beliefs regarding teaching by examining differences related to gender and academic achievement, drawing on a sample of 262 preservice teachers from the Turkish Institute of Education. In a related vein, Sarıkaya (2022) explored music teachers' self-efficacy in the context of technology use, and compared factors such as gender, age, school type, and experience level among 216 teachers from different Turkish cities.

Regarding classroom management, Potter (2021) focused on elementary general music teachers, revealing that teaching experience significantly influenced classroom management self-efficacy, whereas the school environment did not. Factors such as strategic adaptation,

consistency, parental involvement, students' home environments, and teacher expectations have emerged as central to classroom management. Zelenak (2020) underscored the crucial role of effective feedback in enhancing educators' self-efficacy.

In summary, since the 1970s, the measurement of teacher self-efficacy has evolved from relatively simple to more multifaceted tools. Existing research demonstrates that music teachers' self-efficacy is shaped by various factors, including personal experience, external support, and pedagogical skills. Nonetheless, current instruments still lack sufficient attention in the field of music education and often fail to account for teachers' emotion regulation and social interactions. Against this backdrop, the present study sought to further expand and refine the design and application of teacher self-efficacy scales.

Accordingly, this study aimed to develop a new self-efficacy scale suited to music teaching. For the first time, it incorporated four factors that influence the development of self-efficacy: performance accomplishments, verbal persuasion, emotional arousal, and vicarious experiences. By including these dimensions, this study not only endeavors to provide a more comprehensive measurement tool for music education but also applies the scale to examine the self-efficacy levels of music teachers in three regions of China.

Study I: A Pilot Study

A pilot study was conducted before the main study. The aim of the pilot study was to refine the wording of the MTSES and enhance its clarity, readability, and ease of completion. Additionally, the pilot study served as an initial test to evaluate and validate the research instruments, ensuring their effectiveness and practicality for the main study (Hertzog, 2008).

Research Objective 1: To develop the dimensions and items of the **MTSES** based on theoretical foundations.
Research Objective 2: To revise the wording of the scale to ensure clarity and ease of completion.
Research Objective 3: Conduct preliminary measurements of the scale's reliability and correlation between its dimensions.

Research Objective 1: To develop the dimensions and items of the MTSES based on theoretical foundations.

This study developed the MTSES based on four key dimensions of self-efficacy theory: performance accomplishments, verbal persuasion, emotional arousal, and vicarious experiences (Bandura, 1997; De Smul et al., 2018; Sánchez-Rosas et al., 2022). These dimensions are critical in shaping self-efficacy. By measuring these dimensions, the scale aimed to offer a comprehensive understanding of the various facets of music teachers' self-efficacy. For further details, see Figure 1 and Table 1.

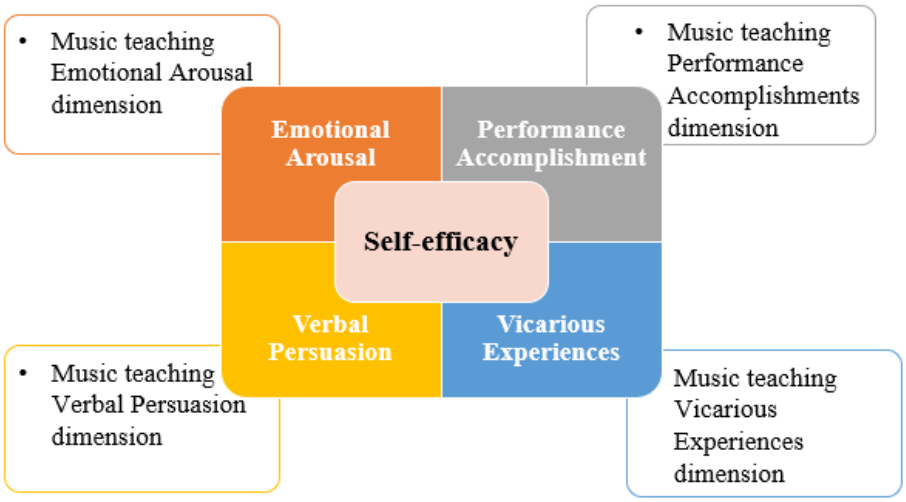

Figure 1. The dimensions of Music Teacher Self-Efficacy

The MTSES uses a five-point Likert scale for responses, ranging from 'strongly disagree' to 'strongly agree,' which indicates levels of self-efficacy from low to high. For specific item content, please refer to Appendix A.

Table 1
Dimensions and Item Numbers of the Music Teacher Self-Efficacy Scale

	Dimensions	Numbers of the items
Music Teacher Self-Efficacy	Music teaching emotional arousal	5
	Music teaching performance accomplishment	6
	Music teaching verbal persuasion	5
	Music teaching vicarious experiences	5

Objective 2: To revise the wording of the scale to ensure clarity and ease of completion.
Participants
To better determine the content validity and reliability of the scale, two music education experts were invited to review and revise the scale items. Subsequently, 60 music teachers were invited to complete the questionnaires. Sixty participants were from three districts in China: Zhifu District in Yantai City, Siming District in Xiamen City, and Shangcheng District in Hangzhou City. The choice of these three regions was based on their representation of coastal cities in northern, central, and southern China, which allowed for an effective reflection on the characteristics of music teachers from different regions.

The demographic descriptive statistical analysis of the pilot study revealed that among the 60 participants, the majority were female primary school teachers, accounting for 83.33% of the total. Most participants held a bachelor's degree (83.33%) and had relatively little teaching experience, with 61.67% having less than five years of experience. In terms of professional titles, 45% of the participants were newly appointed teachers, 31.67% were junior teachers, and few had intermediate or senior titles. See Table 2.

Table 2
Demographic descriptive statistics

Category	Option	Frequency	Percentage (%)
Gender	male	10	16.67
	female	50	83.33
School Type	primary school	50	83.33
	secondary school	10	16.67
	more than 40 hours	14	23.33
Education Qualification	master's degree (or above)	1	1.67
	bachelor's degree	50	83.33
	associate degree	9	15.00
Teaching Experience	less than 5 years	37	61.67
	6-10 years	10	16.67
	11-20 years	5	8.33
	more than 20 years	8	13.33
Professional Title	senior teacher	1	1.67
	intermediate teacher	13	21.67
	junior teacher	19	31.67
	newly appointed teacher	27	45.00
Total		60	100.0

Results

During the scale design phase, the draft was sent to two music education experts for review and suggestion. Through discussions, numerous valuable recommendations were made regarding wording and dimensional categorization, leading to significant revisions to enhance clarity and comprehension. Table 3 presents the first round of this scale.

Table 3
First Round of Scale Items Adjustment

Item	Dimensions	Preliminary items	Revised items
Part two Item 6	Performance accomplishment	I am confident that I can write lesson plans based on the teaching theme with a novel curriculum design	I am confident that I can successfully design and implement music lesson plans.
Part two Item 7	Performance accomplishment	I am confident that I can give different instructions in teaching activities according to the individual differences of students.	I am confident that I can meet the musical needs of students of all ability levels in the same classes and provide them with effective support.
Part two Item 11	Performance accomplishment	I am able to help students discover and explore their talents and potential.	I can help students discover and explore their musical talents and potential.
Part two Item 17	Vicarious experiences	I am willing to take advantage of holidays or after-school time to participate in music teacher improvement channels.	I am confident that I can learn from the teaching methods of other music teachers.

A second revision of the scale has been made, as shown in Table 4. Based on the two rounds of revisions, the final MTSES content is detailed in Appendix A.

Table 4
Second Round of Scale Items Adjustment

Item	Dimensions	Preliminary items	Revised items
Part two Item 4	Music teaching Emotional arousal	I believe it is important for students to identify what they don't know or don't understand on their own.	When students encounter difficulties in their studies, I feel confident to help them overcome these difficulties.
Part two Item 15	Music teaching Verbal persuasion	When someone helps me clarify the task requirements and encouraged me to reach specific music teaching goals, I feel confident that I would achieve them.	When someone encourages me to complete music teaching tasks, I feel more confident to complete them.

Objective 3: Measure the Reliability and Correlation of the Dimensions Through the Pilot Study

Methods

When analyzing the reliability and validity of the scale, the **Pearson Correlation Coefficient** was used to assess the intercorrelations among the dimensions (Luo et al., 2021). High correlations may indicate that these components measure constructs related to self-efficacy

to some extent, whereas low correlations suggest that they measure more independent constructs.

The purpose of the reliability analysis is to test the consistency and stability of a scale. Cronbach's alpha, which ranges from 0 to 1, is a commonly used indicator to test the reliability of a scale. Values closer to 1 indicate better reliability, representing higher internal consistency of the scale items. This method is particularly suitable for reliability analysis of attitude and opinion surveys. Cronbach's alpha was used to assess the reliability of the scale. A Cronbach's alpha value of less than 0.35 indicates low reliability, a value between 0.35 and 0.70 indicates moderate reliability, and a value greater than 0.70 indicates high reliability, respectively. To be considered reliable in this study, the scale required a Cronbach's alpha value greater than 0.80. A value of 0.85 or higher signifies good reliability (Knapp & Mueller, 2010).

Results

Table 5 displays the Pearson correlation coefficients for the four dimensions of the MTSES: emotional arousal, performance accomplishments, verbal persuasion, and vicarious experiences. All the dimensions were significantly positively correlated, with coefficients ranging from 0.534 to 0.844. These results demonstrate the interrelated influences of emotional arousal, performance accomplishments, verbal persuasion, and vicarious experiences on self-efficacy. See Table 5.

Table 5
The Pearson Correlations between the Four dimensions of MTSES

	Emotional Arousal	Performance Accomplishments	Verbal Persuasion	Vicarious Experiences
Emotional Arousal	1.00	0.844**	0.723**	0.534**
Performance Accomplishments		1.00	0.749**	0.590**
Verbal Persuasion			1.00	0.777**
Vicarious Experiences				1.00

**: $p<0.01$, *: $p<0.05$

Based on this standard, a pilot study of the MTSES, including 21 items, was tested for reliability. The overall Cronbach's alpha for self-efficacy was 0.958, indicating a high level of internal consistency among the scale items. This scale consists of four main dimensions: **Emotional Arousal**, **Performance Accomplishments**, **Verbal Persuasion**, and **Vicarious Experiences**. Their Cronbach's alpha coefficients were 0.855, 0.910, 0.898, and 0.924, respectively, all of which exceeded 0.85, demonstrating good internal consistency of the items within these dimensions. Table 6 shows the reliability coefficients for each dimension and overall reliability.

Table 6
Reliability of the Dimensions in the MTSES Pilot Study

	Emotional Arousal	Performance Accomplishments	Verbal Persuasion	Vicarious Experiences	Overall Self-Efficacy
Cronbach's alpha	0.855	0.910	0.898	0.924	0.958
Number of items	5	6	5	5	21

A pilot study was conducted to validate the reliability of the MTSES, providing essential pre-test data for the main study. The results of the pilot study established a solid foundation for implementation of the final study, ensuring that the main research was conducted effectively and accurately.

Study 2: Main Study
Research Objective: To validate the scale's structural validity and reliability.
Participants
This section presents the self-efficacy status of 278 primary and secondary school music teachers from three districts in China as collected in the main study. The final survey gathered valid responses from 278 music teachers representing primary and secondary schools across three regions: Zhifu District in Yantai City, Siming District in Xiamen City, and Shangcheng District in Hangzhou City.

Methods
To assess the overall validity of the scale, the **Kaiser-Meyer-Olkin (KMO) test** and **Bartlett's test of sphericity** were conducted. These two analytical methods are commonly used for factor analyses. The primary purpose of factor analysis is to verify the **scale's construct validity** (Arbuckle, 2011). Through factor analysis, researchers can determine whether each item on the scale accurately reflects the four dimensions of self-efficacy: **performance accomplishments**, **verbal persuasion**, **emotional arousal**, and **vicarious experiences**.

Since self-efficacy is a well-established theory and its four influencing dimensions are clearly defined, **Exploratory Factor Analysis (EFA)** is not necessary. An EFA is typically used to explore the underlying structure of data when the dimensions are not predefined or well understood (Boyer et al., 2014). In this case, **Confirmatory Factor Analysis (CFA)** is more appropriate for testing whether the data fit the hypothesized model and validating the structural integrity of the scale.

CFA was used to assess the structural validity of the scale. CFA is used to verify structural validity by evaluating the loading relationships between the measured items and latent factors, as well as the overall model fit, ensuring that the scale accurately reflects the constructs it is intended to measure (Arbuckle, 2011).

Results
The **Kaiser-Meyer-Olkin (KMO)** measure of sampling adequacy achieved an exceptionally high score of 0.963, indicating that a high proportion of variance in our variables can be attributed to underlying factors. Generally, a KMO value above 0.70 is considered suitable for

factor analysis (Luo et al., 2021). **Bartlett's test of sphericity** yielded a significant result (χ^2 = 5903.714, df = 210, p < .001). Based on these analyses, it can be concluded that factor analysis is appropriate for this study.

Structural Validity: The CFA model fit indices, including **the Goodness of Fit Index (GFI) = 0.802**, **Comparative Fit Index (CFI) = 0.918**, **Tucker-Lewis Index (TLI) = 0.907**, and **Root Mean Square Error of Approximation (RMSEA) = 0.097**, suggest a satisfactory fit to the data (Li et al., 2023), with the GFI value indicating a good model fit. See Table 7.

Table 7
Model Fit Indices from CFA

Common Indicators	χ^2	df	χ^2/df	GFI	RMSEA	TLI	CFI	NFI
Judging Criteria			1-5	>0.8	<0.10	>0.8	>0.8	>0.8
Value	665.141	185	3.595	0.802	0.097	0.907	0.918	0.891

Additionally, as shown in figure 2, the standardized factor loadings for each factor ranged from 0.710 to 0.922, all exceeding the standard of 0.50, indicating that these variables effectively explained the underlying structure of the corresponding factors. These high factor loading values support the structural validity of the scale, demonstrating that the measurement tool can effectively capture music teachers'self-efficacy. See figure 2.

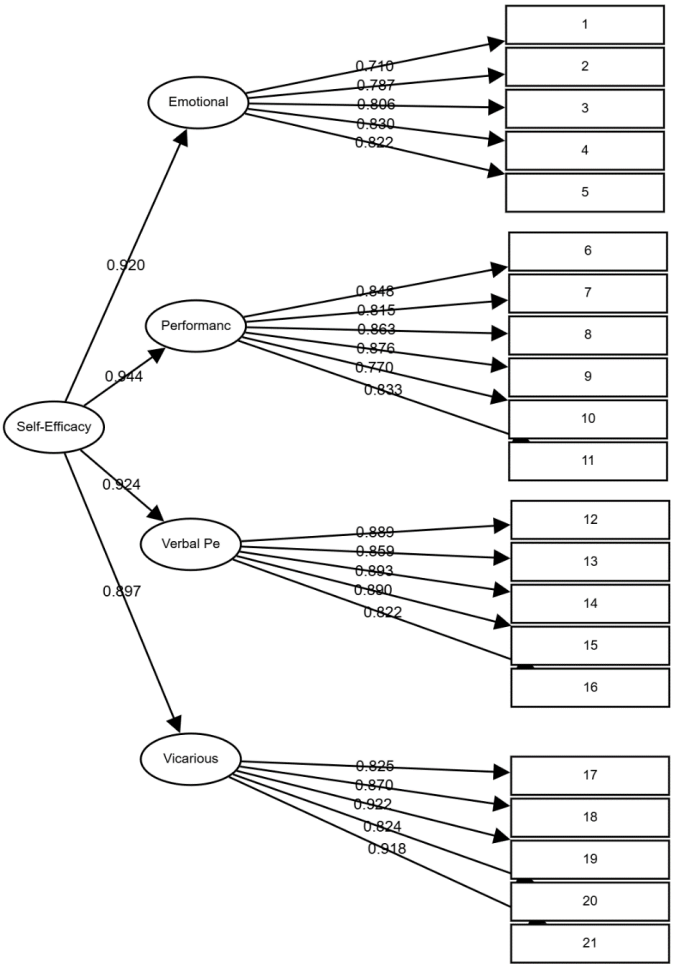

Figure 2. The Factor Loadings of MTSES

In summary, the results of the CFA support the structural validity of the MTSES, with the model achieving a good fit across various fit indices, proving that the scale can effectively reflect the theoretical structure of the target construct.

Reliability of the MTSES The internal consistency reliability of the scale was assessed using Cronbach's alpha coefficient. The MTSES exhibits reliability across its factors, as evidenced by Cronbach's alpha coefficients reported in Table 8.

Table 8
Reliability of Dimensions of MTSES

	Emotional Arousal	Performance Accomplishments	Verbal Persuasion	Vicarious Experiences	Overall Self-Efficacy
Cronbach's alpha	0.892	0.930	0.938	0.939	0.972
Number of items	5	6	5	5	21

The overall scale achieved a Cronbach's alpha of 0.972 and had internal consistency among the items. The individual dimensions of the MTSES—Emotional Arousal (0.892), Performance Accomplishments (0.930), Verbal Persuasion (0.938), and Vicarious Experiences (0.939)—all demonstrated high reliability, which underscored the scale's capability to measure music teachers'self-efficacy consistently and accurately.

Self-Efficacy Levels of Music Teachers in Three Districts of China
This study investigated the self-efficacy levels of primary and secondary school music teachers in three districts of China. Data were collected using the **MTSES** and the specific details are presented in **Table 9**.

When assessing the self-efficacy levels of music teachers, specific standards or score ranges were employed to categorize them as low, moderate, or high. The MTSES utilizes a 5-point Likert scale. According to **Jebb et al. (2021)**, an item average between 1 and 2.33 indicates a "low level," an item average between 2.34 and 3.67 signifies a "moderate level," and an item average between 3.68 and 5 reflects a "high level."

Table 9
Mean, Standard Deviation, and Sample Size of Music Teachers' Self-Efficacy Across Dimensions

Variable	*Mean*	*SD*	*n*
Emotional arousal	4.10	0.68	278
Performance accomplishment	4.18	0.65	278
Verbal persuasion	4.32	0.67	278
Vicarious experiences	4.32	0.65	278
Overall Self-efficacy	4.23	0.61	278

As shown in **Table 9**, the overall self-efficacy of teachers was high," with a mean score of 4.23 (SD = 0.61). Specifically, the dimensions of emotional arousal, performance accomplishment, verbal persuasion, and vicarious experiences all reported high levels, with mean scores of 4.10 (SD = 0.68), 4.18 (SD = 0.65), 4.32 (SD = 0.67), and 4.32 (SD = 0.65), respectively.

Discussion

Comparison of the Music Teacher Self-Efficacy Scale Design with Existing Research

The scale design in this study reflects innovation. First, the wording of the scale items was refined through multiple rounds of discussion with music education experts to ensure their applicability in the context of music teaching. For example, in the **performance accomplishments** dimension, the original item "I am confident that I can write lesson plans based on the teaching theme with a novel curriculum design" was revised to "I am confident that I am able to successfully design and implement music lesson plans." This adjustment emphasizes the specific characteristics of the music teaching process. This revision aligns with the findings of **Biasutti and Concina (2018)**, who highlighted the impact of music teachers' teaching experience on self-efficacy and emphasized the importance of practical teaching ability.

Comparing this study with existing research reveals that the scale in this study was designed based on factors influencing self-efficacy. Previous studies have focused too narrowly on classroom teaching self-efficacy but have failed to address the broader factors that influence the development of self-efficacy. For example, **Zeichner and Hoes (2015)** designed a teacher self-efficacy scale with dimensions such as **"Teaching Ability Efficacy,Classroom Management Ability Efficacy,"** and **"Student Motivation Efficacy,"** which focuses on a teacher's ability to teach, manage, and motivate students in the classroom. **Gibson and Dembo (1984)** developed the **Teacher Efficacy Scale (TES)**, which includes two factors: **general teaching efficacy** and **personal teaching efficacy**. **Schwarzer and Hallum (2008)** emphasized teachers' coping abilities when facing challenges. However, these scales do not adequately consider the broader factors that influence teachers' self-efficacy.

Through **CFA**, this study confirmed the structural validity of the scale. Compared to the scales developed by **Gibson and Dembo (1984)** and **Zeichner and Hoes (2015)**, which primarily focus on personal efficacy and teaching efficacy, the **MTSES** not only captures these dimensions but also incorporates additional factors such as **emotional arousal**, **verbal persuasion**, and **vicarious experiences**.

The survey of samples from three districts in China revealed that the **emotional arousal** dimension had relatively low scores (mean = 4.10). This finding aligns with the study by **Gale et al. (2021)**, which suggests that emotional distress could be a significant negative factor affecting teacher self-efficacy. Therefore, future research should focus on interventions targeting the **emotional arousal** dimension to improve self-efficacy and consequently enhance teaching achievement.

Comparison of Music Teacher Self-Efficacy Survey Results with Existing Research

The results of this study indicated an overall high average self-efficacy score among music teachers, with a mean score of 4.23. The dimensions with the highest scores were **"verbal persuasion"** and **"vicarious experiences,"** with an average score of 4.32. In contrast, **"emotional arousal"** and **"performance accomplishment"** had relatively lower scores, with mean scores of 4.10 and 4.18, respectively. These findings highlight the importance of these dimensions in shaping music teachers'self-efficacy. See Figure 3.

When compared with existing research, these results demonstrate similarities and differences in the self-efficacy factors that influence music teachers. Previous studies, such as those by **Biasutti and Concina (2018)**, have emphasized the impact of teaching experience and external encouragement on teachers' self-efficacy. The relatively higher scores in **"verbal persuasion"** and **"vicarious experiences"** observed in this study align with these findings, emphasizing the role of feedback and observation of others' success in boosting music teachers' confidence. However, the relatively lower scores in **"emotional arousal"** and **"performance accomplishment"** suggest that music teachers may face challenges in emotional regulation and demonstrating successful outcomes in their teaching practices, which warrants further investigation. The findings of this study contribute to a more comprehensive understanding of the factors that shape music teachers' self-efficacy, and offer important insights for targeted interventions in music teacher professional development.

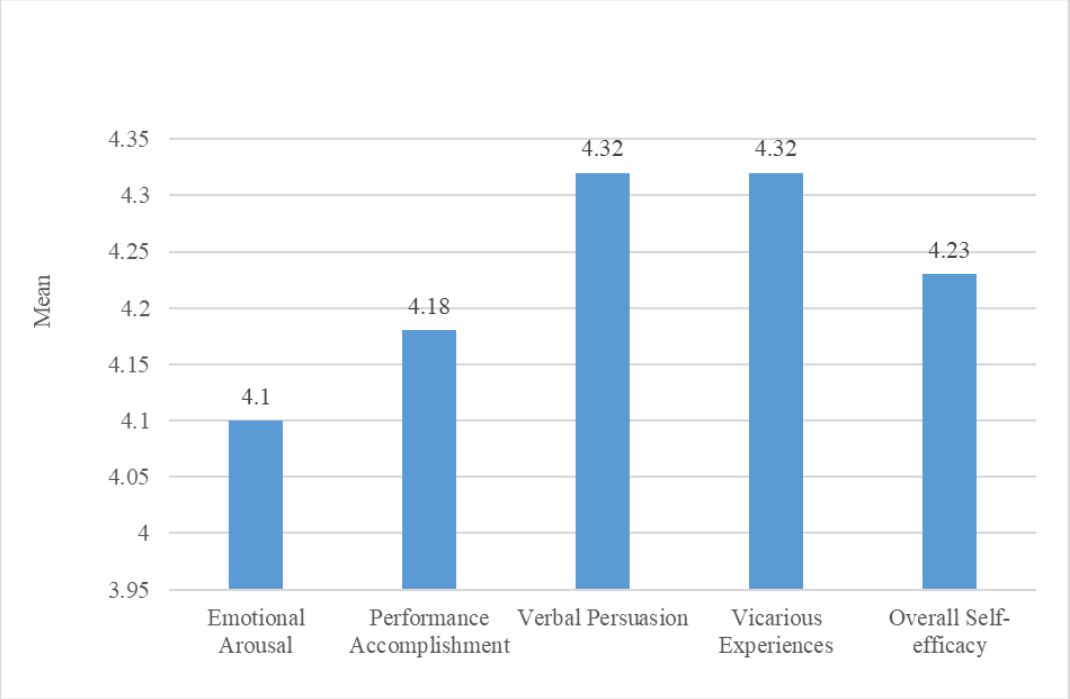

Figure 3. Histogram of mean levels of overall self-efficacy and its dimensions

Abidin and Jamaludin (2022) found that non-music major teachers relied heavily on verbal persuasion and vicarious experiences to build self-efficacy, supporting the idea that external feedback and modeled successes play pivotal roles. Similarly, Biasutti et al. (2019, 2021) and Biasutti and Concina (2018b) identified social and cognitive aspects as key drivers in music teachers' self-efficacy, aligning closely with the high influence of these dimensions held in this study. Bi (2023) also highlighted "performance accomplishment" as a crucial factor in prospective music teachers' self-efficacy, consistent with this study's finding that this dimension scored highly (mean = 4.23).

While "verbal persuasion" and "vicarious experiences" were influential, the relatively lower score for "emotional arousal" (mean = 4.10) suggests the need for interventions aimed at reducing anxiety and managing emotions to enhance music teachers' overall self-efficacy. This is consistent with the findings of Gale et al. (2021), who found that emotional arousal often

ranked lower as a contributor to teachers' self-efficacy. Additionally, Gill et al. (2024) proposed that targeted training could mitigate emotional challenges, further supporting the recommendation of this study for focused interventions in this area.

Despite these common findings, other studies have offered varied perspectives. For example, Kıran (2021) emphasized that, among preservice science teachers, performance accomplishment had the strongest impact on self-efficacy, which contrasts with the higher emphasis on verbal persuasion and vicarious experiences in this study. Blackburn and Robinson (2008) noted that rural teachers displayed lower self-efficacy overall, highlighting the importance of contextual factors such as geographical location and its impact on teacher self-efficacy. Similarly, Wise and Trunnell (2001) found that "performance accomplishment" was more significant than vicarious experience in boosting teacher self-efficacy, diverging from the findings of this study, where vicarious experience played a stronger role.

This complexity suggests that self-efficacy is influenced by a wide range of factors, and its sources may vary significantly, depending on the teaching environment. While the current research reinforces the critical role of verbal persuasion and vicarious experiences, it also underscores the need to pay closer attention to emotion regulation, especially in music education contexts.

Conclusion

This study designed and validated a new **MTSES** and assessed the self-efficacy levels of music teachers in three districts in China. This scale evaluates self-efficacy based on four dimensions: **performance accomplishments**, **verbal persuasion**, **emotional arousal**, and **vicarious experiences**. The scale development process involved two rounds of revisions and a pilot study with 60 teachers, followed by the main study, which included 278 teachers participating in the questionnaire testing. The results confirmed the scale's high reliability and validity, with a **Cronbach's alpha** value of 0.972. This study provided a new self-efficacy assessment tool for music education.

The scale presented in this study was designed based on **Bandura's (1997)** self-efficacy theory. Compared to traditional teacher efficacy scales (e.g., **Gibson & Dembo, 1984; Schwarzer & Hallum, 2008; Zeichner & Hoes, 2015**), this study focuses specifically on the music teaching domain and the factors influencing self-efficacy, addressing the gap in existing self-efficacy assessment tools for music teachers. The innovation of the MTSES lies in its alignment with the music education context and its design, which is based on the factors affecting self-efficacy. Using the MTSES, it is possible to effectively measure the self-efficacy levels of music teachers in different regions, providing data support for future intervention measures.

Limitations and Future Directions

Despite offering a new scale, this study had certain limitations. First, the sample was limited to music teachers from three districts. Future research could expand the sample to include more regions to increase the generalizability of the findings. Additionally, the **emotional arousal** dimension scored relatively low, suggesting that future research could explore how interventions can enhance teachers' self-efficacy, thereby improving their overall self-efficacy.

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