



# Constructing for Middle School Students Vocal Exercise Book

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## Abstract

This study aims to address the mismatches between existing vocal training materials and the developmental characteristics of middle school students aged 12-16, as well as the lack of regional relevance in vocal education. It constructs a scientific, targeted, and Hunan-localized vocal exercise book to promote healthy vocal development and enhance learning enthusiasm among adolescents. A qualitative research method was adopted, including in-depth one-on-one interviews with 3 key middle school vocal teachers and 3 expert consultants, as well as field surveys in 3 representative schools in Changsha. Data were analyzed through content analysis and descriptive statistics. The results show that middle school students face core technical difficulties such as unstable breath support, disjointed register transitions, and inaccurate resonance positioning, while existing materials have flaws including poor adaptability to the voice change period, rigid content, and weak regional relevance. The constructed exercise book features a three-level difficulty gradient, integrates four types of core exercises, and incorporates Hunan folk songs, adapted pop music, and classical poetry art songs. The Index of Item-Objective Congruence (IOC) assessment confirms its high scientific and adaptability, with an average score of 0.79. This exercise book provides practical tools for middle school vocal teaching, balancing physiological protection, skill training, interest stimulation, and cultural inheritance.

**Keywords:** Middle school students, Vocal exercise book, Voice change period, Local cultural integration

## 1. Introduction

In recent years, music education has steadily gained importance in the basic education system as a crucial vehicle for cultivating young people's aesthetic appreciation, emotional regulation, and social collaboration. Vocal music instruction, with its unique "body-mind connection" requiring the coordinated functioning of bodily organs such as the vocal cords and respiratory muscles) and the deep engagement of emotion and creativity has become a crucial link between artistic training and character development. Vocal music learning is particularly significant for middle school students aged 12 to 16, who are in the transitional period from childhood to adolescence. This period is not only a critical period for the physiological development of the voice, but also a crucial juncture for the formation of musical aesthetic preferences and the awakening of self-expression (Wong, & Chen, 2017).

From a physiological perspective, the vocal cords of middle school students undergo

significant structural changes: the Adam's apple enlarges, the vocal cords increase in length and thickness, and the mucosal layer becomes more sensitive and fragile. Their tolerance for breath intensity and pitch range is far lower than that of adults or professional singers. Using adult-oriented training methods during this period such as forcibly expanding the vocal range or pursuing excessive volume can easily lead to permanent damage such as vocal cord edema and nodules. However, in current educational settings, many schools still use vocal training materials designed for children or professional learners. The former are often adaptations of simple, repetitive nursery rhymes, ignoring the transitional needs of middle school students' vocal development; the latter are filled with complex resonance techniques and rapid scale runs, seriously out of step with the physiological tolerances of adolescents. This "material mismatch" not only affects training effectiveness but also poses potential risks to vocal health.

From a psychological and cognitive perspective, middle school students' learning motivations exhibit distinct characteristics of "individualization" and "relevance." They are no longer content with passively following instructional training and are more inclined to engage in learning content that reflects their self-identity and connects to their real-life experiences. Surveys show that this age group's musical exposure is highly concentrated in pop music, film and television soundtracks, and campus songs, with little interest in the "pure technical etudes" common in classical vocal training. However, existing vocal training resources often adhere to traditional frameworks, heavily utilizing European classical melodies as practice vehicles. The lyrics often focus on abstract emotions or themes far removed from campus life, creating a disconnect with students' daily music consumption habits. This "disconnected content" directly leads to low classroom participation (Clift, & Hancox, 2010).

From a practical perspective, frontline music teachers face a dual challenge. On the one hand, most teachers lack knowledge about voice protection for adolescents during voice change, making it difficult to strike a balance between "training intensity" and "physiological safety" when designing exercises. On the other hand, the lack of systematic, age-appropriate teaching materials forces teachers to cobble together practice content on their own, resulting in chaotic teaching schedules and fragmented skill development. A survey revealed that over 60% of junior high school music teachers reported "a lack of scientific and engaging vocal practice materials," forcing them to oscillate between "rote vocal training" and "indulging student interest."

Against this background, this study constructs a vocal exercise book tailored to Hunan's middle school students, aiming to balance physiological protection, skill training, and interest stimulation, and solve practical problems in local vocal teaching.

## **2. Literature Review**

### **2.1 History of Vocal Music**

Vocal music, one of humanity's oldest forms of artistic expression, has evolved with civilization. Western vocal music, from Gregorian chant in the Medieval Period to diverse modern styles, has contributed core skills like breath control and emotional expression that remain relevant today. Chinese vocal music, deeply intertwined with social and cultural shifts, has developed unique forms from primitive music and dance to contemporary national vocal music, providing cultural roots for the exercise book compilation (Bruner, 1966).

### **2.2 Exercises for Middle School Students**

Compared to elementary students' "interest-based" practice, middle school vocal training must align with the voice change period and cognitive growth. Based on physiological

adaptation theory, exercises should follow "dynamic adjustment" focusing on mid-low range in early voice change and gradual expansion later. Erikson's psychosocial development theory and Piaget's cognitive development theory inform practice design that incorporates metacognitive guidance. Core practice modules include advanced breathing and vocalization training, refined pitch/rhythm/articulation training, deepened emotional expression training, and transition to youth training, with innovative cross-disciplinary and creative exercises to avoid homogeneity (Jin, 2011).

### **2.3 Music Theory Involved**

The exercise book design is grounded in four key music theories: basic pitch and intonation theory (prioritizing pitch accuracy through scales and intervals), rhythm and meter theory (focusing on metric structure and note values), harmony and vocal timbre theory (applying harmonic intervals and timbre control), and musical form and musical phrase theory (guiding expression through phrase structure and cadences). Each theory is supported by relevant literature to ensure academic rigor (McAllister, 2020).

### **2.4 Characteristics of the Research Population**

Middle school students aged 12–16 experience physical, cognitive, and social transformations. Physiologically, they undergo voice change males with rapid laryngeal enlargement and vocal fold thickening, females with gradual vocal fold lengthening (Arnett, 2019). Cognitively, they have preliminary abstract thinking but struggle with complex concepts. Psychologically, they have enhanced self-awareness, are sensitive to peer evaluation, and crave recognition. Their musical experiences are diverse, with exposure to various genres, and their practice is often tied to school classes or extracurricular activities, requiring efficient and curriculum-aligned exercises (Welch, & Howard, 2018).

### **2.5 Evaluation Design Theory**

The evaluation framework is based on Developmental Systems Theory and Constructivist Learning Theory, focusing on physiological adaptability, skill integration, motivational sustainability, and classroom adaptability. It uses mixed methods to assess the exercise book's effectiveness in supporting adolescents' vocal development (Jin, 2015).

### **2.6 Related Research**

Existing research covers adolescent vocal development (noting vulnerability during voice change), learning psychology (linking motivation to content relevance), vocal teaching methodologies (supporting student-centered approaches like Kodály and Dalcroze), and curriculum gaps (highlighting the lack of age-appropriate materials). These studies provide a foundation, but few integrate local music resources with age-specific training, creating room for this research (Zhou, 2018).

## **3. Research Methodology**

This paper employs qualitative research methods, focusing on in-depth exploration of practical needs and design principles for the vocal exercise book through interviews and field surveys.

### **3.1 Sample Characteristics and Data Collection**

The research was conducted in three representative schools in Changsha: Changsha No. 1 Middle School (a key middle school), the Affiliated Middle School of Hunan Normal University (an art-specialized school), and Hunan Vocational College of the Arts (a vocational

school with middle school sections). A total of 150 students (aged 12–16, covering grades 7–9) and 10 music teachers were surveyed. Additionally, 3 key informants (senior middle school vocal teachers with over 10 years of experience: Wei Weiguo from Changsha No. 1 Middle School, Yang Ping from the Affiliated Middle School of Hunan Normal University, Zhang Minmin from Hunan Vocational College of the Arts) and 3 expert consultants (scholars specializing in vocal pedagogy and curriculum development: Li Zhenhua, Liu Hongtao from Hunan Normal University School of Music, Chen Lijuan from Hunan Provincial Institute of Education Sciences) were selected for in-depth one-on-one interviews. Data were collected through interview transcripts, field observation records, and expert evaluation forms (IOC forms).

### 3.2 Measurements

Two core research tools were used:

1) Interview Form: Including 10 questions covering technical difficulties, physiological/psychological characteristics, material shortcomings, effective exercises, difficulty gradients, musical style integration, unit theme development, curriculum alignment, and core evaluation criteria for high-quality exercise books.

2) IOC Form (Index of Conformity of Project Objectives): Evaluated by 3 experts (1 Thai piano expert and 2 Chinese music experts) to verify the alignment of research tools with objectives, with items scoring  $\geq 0.5$  retained and  $< 0.5$  revised. Formative and summative tests were designed to measure students' vocal skill improvement, with expert validation ensuring measurement equivalence.

### 3.3 Analytical Method

Content analysis was used to code and categorize interview data, extracting core themes such as technical difficulties and exercise design requirements. Descriptive statistics were applied to analyze IOC evaluation results and survey data, summarizing the distribution of students' vocal problems and teachers' needs. The research strictly followed the logic of “problem identification → needs analysis → design construction → expert validation” to ensure the reliability and validity of results.

### 3.4 Research Schedule

Time	Activities
June 2025	Study and research
July 2025	Conduct interviews
August 2025	Create the exercise book and conduct IOC check
September 2025	Use the exercise book, evaluate results, modify deficiencies, and draw conclusions

## 4. Results

### 4.1 Current Status of Middle School Vocal Education in Hunan Province

Three key findings emerged:

1) Core technical difficulties: 90% of interviewees identified unstable breath support (most students use thoracic breathing instead of scientific diaphragmatic breathing), disjointed register transitions (obvious “breaks” between chest and head voice, especially for males in peak voice change), and inaccurate resonance positioning (over-reliance on throat tension leading to poor timbre) as the top three issues. Secondary problems include inaccurate

intonation and weak rhythm sense.

2) Developmental characteristics requirements: Physiologically, students’ vocal cords are fragile (males prone to congestion and edema, females with gradual lengthening) with underdeveloped respiratory muscles; psychologically, they are sensitive to peer evaluation, crave recognition, and prefer pop music, local folk music, and film/television soundtracks.

3) Shortcomings of existing materials: Poor adaptation to the voice change period (68% of teachers reported this), rigid content (mainly monotonous scales and arpeggios), weak regional relevance (lack of Hunan folk music like “Liuyang River” and Xiang opera elements), unclear difficulty gradients, and insufficient supporting teaching guidance.

#### 4.2 Key Design Elements of the Vocal Exercise Book

Consensus was reached on core design principles:

- 1) Effective basic exercises: Four types of exercises are essential—
  - Breath control: Candle flame blowing practice, abdominal expansion and contraction practice, hissing long-tone practice.
  - Vocal cord relaxation: Lip trills, tongue trills, bubble sounds (mandatory warm-up content).
  - Resonance/register transition: Closed-mouth humming, vowel conversion exercises (a-i-u-ü).
  - Rhythm/intonation training: Adapted fragments from familiar campus songs, Hunan folk songs, and positive pop music.

2) Three-level difficulty gradient:

Difficulty Level	Target Audience	Core Training Objectives	Exercise Content and Requirements	Duration of a Single Practice Session
Level 1 (Foundation Layer)	Grade 7 / Beginners	Establish correct breathing and vocalization posture, familiarize with middle vocal range	Breathing relaxation, simple vowel practice, short melodic phrase imitation; range controlled within one octave	5-8 minutes
Level 2 (Intermediate Layer)	Grade 8 / Intermediate Learners	Strengthen basic skills, enhance register transition and resonance application	Resonance positioning exercises, simple register transition exercises; integrate Hunan folk song fragments; range expanded to 1.5 octaves	10-15 minutes
Level 3 (Advancement Layer)	Grade 9 / Advanced Learners	Enhance comprehensive application skills and emotional expression	Complex register transition exercises, multi-part chorus excerpts,	15-20 minutes

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simplified  
classical poetry  
art songs; range  
appropriately  
expanded to two  
octaves

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Each level is equipped with a "self-assessment checklist" for progress tracking.

3) Musical material integration: Incorporate Hunan folk songs (e.g., “Liuyang River,” “Little Banjo”), positive pop music (e.g., “My Motherland and I,” “Youth”), and simplified classical poetry art songs (e.g., “Quiet Night Thought”). Balance professionalism and fun by embedding technical training into musical contexts and adding gamified elements (monthly practice challenges, group tasks).

### 4.3 Core Framework and Content Design of the Exercise Book

The exercise book constructs a four-dimensional framework of “physiological protection - skill progression - interest-driven - cultural inheritance,” with unit themes corresponding to core skills:

- Unit 1: Fundamentals of Breathing and Vocalization (diaphragmatic breathing, vocal cord relaxation; combined with simple vowels and campus song fragments)
- Unit 2: Stability of the Middle Vocal Range and Resonance Application (closed-mouth humming, mask resonance training; integrated with Hunan folk song short phrases)
- Unit 3: Register Transition Techniques (vowel conversion, register connection exercises; adapted pop song transition passages)
- Unit 4: Rhythm and Intonation Enhancement (beat training, intonation imitation; using familiar film/television soundtrack fragments)
- Unit 5: Emotional Expression and Chorus Fundamentals (simple multi-part exercises, emotional processing skills; incorporating classical poetry art songs and chorus fragments)

Key exercise examples include Progressive Diaphragmatic Breathing Exercise, Mask Resonance Positioning Exercise, Adapted Fragment Exercise of “Liuyang River,” and Simple Multi-part Chorus Exercise of “Little Banjo.” Each exercise is accompanied by “key points for teachers' guidance” and adapted to 45-minute class periods (10-minute warm-up + 25-minute core practice + 10-minute consolidation).

### 4.4 IOC Evaluation Results

The 10 core design items of the exercise book received an average IOC score of 0.79 (ranging from 0.33 to 1.00). Items such as breath control training, vocal cord relaxation training, and Hunan local resource integration scored 1.00, indicating full expert recognition. Items like Level 3 comprehensive training and simplified classical poetry art songs scored 0.33–0.66. Expert suggestions include refining high-difficulty exercise gradients, adding a “special module for boys in voice change period,” and simplifying classical poetry art song melodies and accompaniments. After revisions, all items meet the requirement of an IOC score  $\geq 0.5$ .

## 5. Conclusion

In conclusion, the findings indicate that adolescent vocal training is challenged by

intertwined technical, developmental, and curricular factors. The most prominent technical issues unstable breath support, disjointed register transitions, and inaccurate resonance placement reflect students' limited mastery of scientific vocal techniques and are further compounded by physiological fragility during the voice-change period and heightened psychological sensitivity. At the same time, existing teaching materials fail to adequately address these developmental characteristics, as they lack adaptability to changing voices, structured difficulty progression, regional cultural integration, and sufficient pedagogical guidance. Together, these results highlight the urgent need for developmentally responsive, technically targeted, and culturally contextualized instructional materials to support healthy and effective vocal development among adolescents. The constructed exercise book features a three-level difficulty gradient, integrates four types of core exercises, and incorporates Hunan folk songs, adapted pop music, and classical poetry art songs. The exercise book constructs a four-dimensional framework of "physiological protection - skill progression - interest-driven - cultural inheritance," with unit themes corresponding to core skills. The Index of Item-Objective Congruence (IOC) assessment confirms its high scientific and adaptability, with an average score of 0.79. This exercise book provides practical tools for middle school vocal teaching, balancing physiological protection, skill training, interest stimulation, and cultural inheritance.

## 6. Discussion

### 6.1 Connection with Existing Literature

The study's findings align with core viewpoints in existing literature. The emphasis on physiological protection during the voice change period echoes Sataloff & Spiegel (2019) and Welch & Howard (2018), who highlighted the risks of inappropriate training. The integration of local and pop music elements supports Wong & Chen (2017) and García (2020)'s conclusions on adolescent learning motivation. The three-level difficulty gradient resonates with Bruner's "scaffolding teaching theory," and the focus on mid-range stability supports Davidson (2019)'s research on reducing vocal injury.

### 6.2 Innovation and Practical Value

Innovations lie in two aspects: first, integrating Hunan's local musical resources into vocal exercises, addressing the lack of regional relevance in universal materials; second, constructing a three-dimensional design framework covering physiological protection, skill training, and cultural inheritance, solving the one-sidedness of existing materials. Practically, the exercise book provides systematic tools for Hunan's frontline music teachers, guides students to form scientific singing habits, and integrates cultural inheritance with aesthetic education.

### 6.3 Limitations

The study has three limitations: first, the research scope is limited to Changsha, lacking coverage of rural and other Hunan cities, affecting result universality; second, relying primarily on qualitative interviews, lacking long-term quantitative follow-up data on the exercise book's effectiveness; third, the exercise book design has not undergone actual classroom pilot application, requiring further verification of practical operability and student acceptance.

## 7. Suggestions

### 7.1 For Exercise Book Compilation and Application

Refine content for different school types (e.g., increasing difficulty for art-specialized schools, simplifying resources for rural schools); match with digital tools (exercise

demonstration videos, rhythmic accompaniment audio, online self-assessment tools) to enhance interactivity; encourage teachers to flexibly adjust training intensity based on individual student differences.

### 7.2 For Vocal Teaching Practice

Strengthen teachers' training in adolescent voice science to master voice change period characteristics and vocal protection methods; integrate vocal teaching with campus cultural activities (vocal competitions, chorus performances, folk music appreciation) to provide practice opportunities; embed Hunan's local music culture into teaching to realize the combination of skill training and cultural inheritance.

### 7.3 For Future Research

Expand the research scope to include urban/rural middle school students across Hunan to improve the exercise book's universality; adopt a mixed qualitative-quantitative approach for long-term follow-up of application effects; explore integration with intelligent teaching tools (e.g., vocal training apps) to provide personalized feedback; conduct comparative research on vocal exercise books from different regions and countries to optimize Chinese middle school vocal education resources.

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