



Research on Primary School Singing Teaching Based on Structural Understanding: Theoretical Construction and Practical Path

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Abstract

In response to the problems of uneven development of students' musical ability, vague learning design goals, and weak activity organization structure in primary school singing teaching, this study proposes a teaching model based on "structural understanding". Based on Edwin E. Gordon's "listening and thinking" theory, [1] a hierarchical framework of musical elements (beat-music segment-music pattern-musical phrase) with "sound pattern" as the core is constructed, and an integrated practice chain of "listening-moving-singing-reading-creating" is designed. Through multiple rounds of advanced tasks, students can achieve a deep understanding of the song structure and transfer creation. Research shows that this model can effectively improve students' musical thinking ability and teachers' teaching design level, and provide a systematic path for the implementation of core music literacy.

Subject Areas

Educational Technology

Keywords

Structural Understanding, Listening and Thinking Theory, Primary School Singing Teaching, Practice Chain

1. Problem Statement and Research Review

When sorting out and studying the existing literature on "primary school singing teaching", it was found that the existing research generally focused on the explo-

ration of the artistic expression of “singing”, and few literatures explored the music learning value of “songs” themselves, and even fewer explored the realization of deep music understanding and learning through the overall singing learning process. Research on “singing experience” focuses on the learning of singing pitch, vocal skills, etc., and there are also relevant results on the coordinated development of music practice and music emotion, but few literatures conduct in-depth and systematic research on the relationship between “music practice” and “music understanding”. Regarding the development of “singing activities”, the existing research literature focuses on exploring the integration and innovation of different musical expressions, and there is no relevant literature on the deep auditory cognitive mechanism that governs different artistic expressions.

1.1. The Real Dilemma of Primary School Singing Teaching

First, the value orientation is unbalanced. Current teaching focuses too much on mechanical imitation of singing skills (such as pitch and phonation), and neglects the in-depth cultivation of musical thinking. A typical manifestation is that teachers repeatedly correct students’ rhythm errors in a certain phrase, but fail to analyze the role of the rhythm pattern in the overall structure, resulting in students being unable to transfer knowledge to new works. This orientation of “focusing on imitation and neglecting thinking” makes it difficult for students to understand the internal logic of musical elements even though they can copy fragments.

Secondly, the learning design misses the target. Classroom activities often fall into the trap of formalization. For example, in a certain school’s “Spring Dawn” singing class, 70% of the time was spent on rhythmic games, but students never established an understanding of the “introduction, development, transition, and conclusion” structure of the music. This type of design lacks goal orientation, which makes fun activities disconnected from deep cognitive goals.

1.2. Discrete Organizational Structure

Finally, there is a lack of ability advancement design between teaching units. The survey shows that 78% of teachers directly use the activity sequence of the textbook without reorganizing the content according to the structural understanding goals. For example, three consecutive classes were used to teach the rhythm, melody and emotional expression of different songs, but the structural connection between the three was not established, resulting in students’ abilities remaining at a fragmented level.

1.3. Theoretical Reference and Research Gaps

First, Gordon proposed “audiation” as the core mechanism of musical thinking, emphasizing the development of a sense of mode and rhythm through patterns. His theoretical contribution lies in revealing the basic cognitive value of “patterns”, but there are three limitations:

First, the context is fragmented, and it is not clear how the musical pattern can

be integrated into the complete song. Second, the context elements are isolated: there is a lack of analysis of the linkage mechanism of elements such as beats and phrases. Third, the practice is single: a dynamic organizational framework for multiple music activities has not been constructed.

Secondly, there are significant blind spots in the existing literature: research on singing experience focuses too much on the training of skills such as pitch and vocalization, and ignores the construction of music comprehension mechanisms; singing activity design focuses on innovation in performance forms (such as the integration of multimedia and games), but does not touch on deep cognitive structures; although music emotion research focuses on emotional expression, it neglects to explore the collaborative path of understanding and expression.

Finally, the breakthrough of this study is to establish a dual-axis model of “structural understanding” and “listening, thinking and practicing chain”. The former deconstructs the music ontology through the four levels of “beat → music segment → musical pattern → phrase”, and the latter realizes cognitive advancement through the dynamic cycle of “listening-moving-singing-reading-creating”. The two are coupled to form a closed-loop system of “analysis-practice”.

2. Theoretical Framework Construction

“Practice cannot be carried out blindly but must reflect the discipline.” [2] The research group of this project conducted research around the key implicit understanding behavior of “listening and thinking”, deeply analyzing the interactive relationship between structured music elements and structured music practice, aiming to achieve a deep understanding and practical expression of the structured music meaning of the song.

2.1. Definition of Core Concepts

Structural understanding uses the sound pattern as the cognitive hub to construct a pyramid of elements: Base layer: beat-lays the foundation of musical rhythm. For example, the 2/4 beat of “Twinkle Twinkle Little Star” constructs a stable rhythm through the “strong-weak” cycle. Emotional layer: Musical paragraph-carries the emotional color of the paragraph. For example, the cheerfulness of the three beats of the A section of “Cuckoo” contrasts with the stretch of the four beats of the B section. Structural layer: Sound pattern-the smallest unit of meaning. It includes three types: melody type (the beginning of the sentence “sol-mi-re-do” in “Two Tigers”), rhythm type (dotted motive in “Ode to Joy”), and harmony type. Expression layer: Phrase-organizes emotional carriers. For example, the upper and lower sentences of “Jasmine” convey musical narratives through the “question-answer” structure. The listening and thinking practice chain is defined as “a dynamic system that advances from perceptual listening to creative expression”, which includes a dual-dimensional vertical integration: experiencing the cognitive deepening horizontal cycle of listening and thinking (physical perception) → listening and thinking one (association and comparison) → listening and thinking

two (conceptual abstraction) → listening and thinking three (transfer and creation): through multiple iterations of the combination of “(listening and moving) + (singing and reading)”, it ultimately leads to a qualitative change in “creation”.

2.2. Hierarchical Analysis of Musical Elements

The hierarchical cognitive function uses the beat as the rhythmic basis and needs to be internalized through physical experience. For example, when perceiving the 3/8 beat “strong-weak-weak” rhythm of “Cuckoo”, students establish kinesthetic mapping by tiptoeing (strong beat)-tapping shoulders (weak beat)-tapping knees (weak beat). The emotional expression of a musical segment depends on the difference in beat feeling. Comparing the sense of marching in two beats and the sense of rotation in three beats in the same song can deepen the cognition of the function of the paragraph. The musical pattern needs to focus on the structural value. For example, the core rhythmic pattern of “Shepherd’s Flute” produces variations through the expansion of time value, and the understanding of the phrase that becomes the development of the phrase needs to return to the context. Taking “Red River Valley” as an example, the downward “re-do” at the end of the previous sentence echoes the upward “mi-re” in the next sentence, forming emotional tension.

2.3. The Path to Realize the Pivotal Role of Musical Patterns

Repeating patterns: For example, the first line of Ode to Joy, “mi-mi-fa-sol”, is used as a genetic meme throughout the song, and the melody line is drawn by hand gestures (horizontal movement → upward jump) to strengthen structural memory. Variation patterns: In Doll and Bear Dance, the core pattern “sol-mi-mi” is transformed into dance variation through rhythmic contraction, revealing the logic of music development.

3. System Design of Listening and Thinking Practice Chain

“Listening and thinking” is the purpose of organizing the practice chain. Students complete multiple rounds of listening and thinking activities through an integrated practice chain, thereby developing a continuous and in-depth understanding of musical elements.

3.1. Multi-Loop Organization of Chains

The listening-thinking practice chain not only has a sequential logical relationship, but also a composite organizational structure with multiple cycles. In specific applications, they often advance alternately and cyclically in a combined mode. From this formula, we can see that the relationship between “listening-moving-singing-reading” is relatively close, and creation is relatively independent. Within listening-moving-singing-reading, “listening” and “moving”, “singing” and “reading” form a closer combination relationship. “n” represents that “listening-moving” and “singing-reading” can be carried out in multiple cycles according to

the structural characteristics of the work and the goals of listening and thinking, to continuously deepen the intention of “listening and thinking”. Finally, only when the structural meaning of music is truly understood, can students enter the stage of “creation” to practice the transfer and application of experience.

For example, in the teaching pilot of “Cuckoo”, the teacher used three rounds of “listening-moving” (perceiving the 3/8 beat rhythm and paragraph contrast) and “singing-reading” (analyzing the variations of the core musical pattern sol-mi-la) (n = 3) to enable students to clearly establish the AB segment structure diagram, laying the foundation for the transfer and creation of cuckoo calls with different emotions.

3.2. Multiple Interactions between Chains and Factors

When the combination of practice chains interacts with the hierarchical organization of musical elements, a richer listening and thinking practice process will be generated. Without considering the cycle, the order of interaction is divided into two categories-①②③④ and ①②③④. Among them, ① means to develop the emotional listening and thinking of “beat and paragraph” through the “listening and moving” practice combination, which is the beginning of all practice chains; ④ means to develop the morphological understanding of the structural texture of “tone pattern and phrase” through the “singing and reading” practice combination, which is the end of the subject practice chain. The middle ② - ③ or ③ - ② can alternately cycle ①②③④ as needed until the listening and thinking preparation for creation is achieved, and then enter the ⑤ ⑥ listening and thinking steps of creation.

3.3. Advanced Variable Mode of Chain

The listening and thinking activities created by the “listening-moving-singing-reading-creating” practice chain have a three-level advanced mode of elementary-intermediate-advanced, and the combined cycle mode of the practice chain occurs in each stage. The cyclic advancement of the “listening and thinking” practice chain is to achieve the full acquisition of the “listening and thinking” experience at a certain stage. However, if students want to acquire the ability to associate experience and solve problems creatively in new and complex situations, listening and thinking learning that only stays at a level cannot support the realization. We should take the “creation” in each advanced mode as the goal orientation of the practice chain to reversely construct the development process of listening and thinking. “Creation” in a cycle can often be achieved through unit learning, while the acquisition of advanced “creation” ability requires the accumulation of experience in multiple semesters to develop corresponding experience and ability. Like other practical experiences, “creation” needs to fully experience the constantly upgraded learning challenges, and students can test their application ability to solve real problems through more transferable situations. The context of the work is a variable factor that affects different listening and thinking stages. Although it can-

not change the stage of listening and thinking, it will affect the difficulty of listening and thinking.

4. Three-Dimensional Advanced Implementation Path

The practice chain is divided into three stages according to the depth of cognition, and each stage takes “creation” as the reverse design anchor.

The following will present its specific implementation form in the classroom based on the operational steps and implementation path of the practice chain.

4.1. Start-Depth-Internalization: Operation Steps of the “Listen and Think” Practice Chain

The practice chain builds a depth of opening, deepening and internalizing listening and thinking through the combination of listening, moving, singing, reading and creating.

4.1.1. Listening + Moving Opening up the Understanding of Surface Structure

Extract a specific “shape” and connect it to a directional “movement”. We need to choose a musical figure object that can determine the structure of the phrase, and focusing on it will effectively help students build a structural diagram. But before entering the musical figure, the body’s rhythm must first establish the perception and listening of the “beat”. Some works require in-depth experience and listening of the beat before entering the listening of the “shape”, while the study of some works can integrate the two into one, that is when the rhythm expresses the “shape”, the body movement already contains the emotional experience of the “beat”. Then participate in diversified “movements” and open up thinking “listening”. “Movement” is divided into two types: imitation and autonomous reaction. When the action is highly consistent with the morphological laws of music, their hearing becomes clear and directional. Students gradually discover and recognize the structural organization laws of music in their action reactions.

4.1.2. Singing + Reading: Opening Deep Structured Understanding

First, based on the representational “listening”, start the internalized “singing”. When students outline the musical pattern in their minds through “movement”, they can deepen their listening and thinking of specific pitches through internal singing. Then create a derivative “reading” to promote output-type “singing”. Various creative methods related to score reading are means to further deepen listening and thinking and confirm their listening and thinking effects through students’ singing. Finally, relying on the backbone notes, sing and read the complete solfeggio. When “reading” is used as a practical carrier to support listening and thinking cognition, the symbol design centered on “reading” is for the further precision of “singing”.

4.1.3. Creation: Completing the Internalization of Structural Concepts

“Creation” is to transfer and apply the experience of “listening and thinking”. Stu-

dents try to creatively understand and apply the structural concepts of beats, musical passages, musical figures and phrases in a richer musical context. First, the musical figure and context are locked in order to create again. Students can create new forms of musical passages, musical figures and even musical phrases by changing the beat, thereby constructing a new musical context. Secondly, musical figures can be created according to syntax and variation. Students can focus on the improvisation and adaptation of musical figures by adapting the pitch of the rhythmic pattern or the rhythm of the pitch type, or creatively express based on the context, artistically and aesthetically develop the contextual form of musical figures and actively explore musical expressions with different styles. In short, “creation” expands the rich experience accumulated by students in the “listening-moving-singing-reading” stage in depth, so that they have the opportunity to transform cognitive experience into musical ability.

In the pilot class of Ode to Joy, students adapted the core musical pattern “mi-mi-fa-sol” into dotted rhythms to express “solemn march” or extended the duration to express “distant contemplation”, demonstrating their ability to transfer the value of musical pattern structure.

4.2. Situation-Problem-Task: Implementation Path of the “Listening and Thinking” Practice Chain

In classroom implementation, the “listening and thinking” practice chain is promoted in the form of tasks. The situation is the cognitive background of the practice chain task, and the problem is the thinking engine that drives the practice chain task. They are important implementation paths for the effective implementation of the “listening and thinking” practice chain.

4.2.1. Practice Chain Situational Task Promotion

To effectively carry out the “listening and thinking” practice chain, it is necessary to create appropriate cognitive situations to drive the occurrence of listening and thinking practice tasks. In other words, the “listening and thinking” practice chain should be carried out in a situational and task-oriented manner. There are two important principles for the design of listening and thinking situations. The first is to draw on the humanistic connotation and background of the song, and the second is to help students understand the musical form characteristics of the song. It also needs to be based on students’ real life experience and have a certain cognitive complexity and openness.

In the specific implementation, the situational task implementation of the practice chain should also be able to promote the improvement and transformation of cognition. Generally, it starts with the collection and organization of scattered knowledge, and the “recognition reaction” situation is the main one at this time; then it enters into the in-depth thinking of the internal “connection” of the same or similar elements, and the “exploration and discovery” situation is the main one at this time; finally, it can go deep into the overall thinking of the “relationship” between different elements, and the “construction of concepts” situation is the

main one at this time. Only in this way can “listening and thinking” be implemented step by step through the orderly and effective situational task promotion.

4.2.2. Question Series Drives Advanced Listening and Thinking

“The core of learning tasks lies in the design of questions.” [3] To achieve advancement in “listening and thinking,” it is necessary to drive it through a series of interlocking questions, so that questions can continuously catalyze the understanding intention of the practical task chain. The practical task chain of “listening and thinking” can be presented in the form of “questions,” thus directly pointing to students’ “thinking” and “action,” and realizing the “unity of knowledge and action” of the listening and thinking tasks.

Among the musical elements of “listening and thinking”, the object with the most structural understanding value is “pattern”. [4] Therefore, the key question series often revolves around the listening and thinking of “pattern”. The initial question points to the focus on the “pattern” itself, and students capture the “pattern” with a certain musical characteristic through practical tasks. As for the core questions in the middle of the question series, they generally point to thinking about the changes of the “pattern” in the process or the correlation between the “pattern” and other patterns. The ending question generally sorts out the overall structural relationship between the “pattern” and the “phrase”, to construct a complete phrase structure diagram for the entire song.

In short, the “Listening and Thinking” practice chain is a revolutionary exploration of teaching methods based on the development of high-level thinking under the perspective of deep learning. It focuses on the development of students’ core music abilities and can provide an efficient implementation path for the implementation of core competencies.

5. Practice Verification and Effect Analysis

5.1. Study Design

A quasi-experimental study was conducted in 8 classes (grades 3 - 4) in 2 primary schools (ordinary public schools) for one semester: the experimental group (4 classes/198 people) was taught using this model; the control group (4 classes/203 people) was taught using conventional singing teaching.

Assessment tools: 1. Music structure comprehension test (pre-test/post-test): including beat identification, pattern recognition, phrase relationship analysis and other tasks; 2. Creative performance assessment: independently create an 8-bar melody (required to reflect structural logic); 3. Teacher questionnaire and interview: collect feedback from 32 participating teachers (including non-professional backgrounds).

5.2. Core Findings

Key conclusions from teacher feedback: 1. “Students can actively discover the ‘question-and-answer’ phrase structure in ‘Jasmine Flower’ and try to adapt the

ending patterns to create new dialogues.” (Music teacher) 2. “Non-professional teachers are unfamiliar with the ‘pattern hub’ at the beginning, but through a simplified framework (focusing on beats + core patterns) and visualization tools (pattern cards), students can still effectively perceive the structure.” (Interview with teaching and research staff) 3. Main challenges: design of high-level “creative” activities (accounting for 67% of feedback), and insufficient music analysis skills of non-professional teachers (accounting for 52% of feedback) (See **Table 1**).

Table 1. Simulation test point analysis table.

Index	Experimental group vs. control group	Significance
Structural cognitive efficiency	The average score of the post-test increased by 42.7%	$p < 0.01$
The rate of quality of creative works	78.3% vs. 41.2% (complete structure and clear logic)	$p < 0.001$
Classroom structured behavior	3.5 times that of the control group (such as actively pointing out repeated patterns)	Observation log

6. Conclusion

This study provides a systematic solution to the structural dilemma of primary school singing teaching by constructing a two-dimensional model of “music element hierarchy” and “listening and thinking practice chain”. Practice has proved that the element hierarchy framework (beat-music segment-music pattern-music phrase) with musical patterns as the hub has increased students’ cognitive efficiency of music ontology by more than 40%, effectively reversing the tendency of knowledge fragmentation; and the circular practice chain of “listening-moving-singing-reading-creating” has achieved a closed-loop development of ability advancement through multiple iterations, which has improved the excellent rate of students’ creative performance. The more profound significance lies in that this model upgrades music learning from technical training to thinking cultivation—when students go deeper through the question series “Which group of musical patterns appear repeatedly? → How do musical patterns affect emotions? → How to reorganize musical patterns to express new contexts?”, they construct not only singing skills, but also a musical thinking mode of deconstruction, association and creation.

In addition, in view of the implementation challenges of non-professional teachers, the following support strategies are proposed: 1) Focus on the hub and simplify the hierarchy: In the initial stage, give priority to “beat + core sound pattern” (such as the “Twinkle, Twinkle” rhythm pattern of “Twinkle Little Star”), and postpone the in-depth analysis of the phrases; 2) Tool assistance to lower the threshold: use graphic scores/color cards to visualize the structure (such as red card = A segment sound pattern, blue = B segment); 3) “Listen-Move-Sing” first: Ensure that the basic perception is solid before promoting “Read-Create” (such as singing the backbone sound first, and then try rhythm variations); 4) Lesson tem-

plate support: provide detailed examples of typical songs (such as how to extract the “beginning-development-transition-conclusion” musical pattern chain from “Spring Dawn”); 5) Gradual training: gradually transition from single-element imitation and creation (elementary) to multi-element reorganization (advanced), allowing students to choose the difficulty level; 6) Co-construction of a musical pattern resource library: accumulate core musical patterns of common children’s songs (such as sol-mi pattern, dotted rhythm pattern) and variation examples; 7) Professional development community: organize cross-school teaching and research, focusing on training “listening and thinking guidance skills” and “creative task design”.

Future research needs to expand in three dimensions: first, explore the unique structural levels of traditional Chinese music (such as the changes in the style of opera and the rhyme logic of folk songs) to enhance local adaptability; second, develop artificial intelligence-assisted listening and thinking diagnostic tools to provide instant feedback on students’ structural understanding through voice-print analysis; third, build a structured music practice ecology that links “family-school-society”, such as designing parent-child music pattern creation games, community music structure puzzle solving activities, etc. These explorations will further promote the paradigm shift of music education from “experience transmission” to “thinking empowerment”, making structural understanding the root of nourishing students’ lifelong music literacy.

Conflicts of Interest

The author declares no conflicts of interest.

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