DEVELOPMENT OF SINGING SKILLS AND LEARNING INTERESTS TO ACTIVITY-BASED LEARNING FOR PRIMARY STUDENTS IN TAKE XINGYAO IN BAIQUAN COUNTY*

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Received 31 August 2025; Revised 4 September 2025; Accepted 6 September 2025

Abstract

This quasi-experimental study examined the effects of a 15-week activity-based learning (ABL) music program on Grade 4 students at Xingyao Primary School, Baiquan County. Thirty students participated in weekly sessions focused on rhythm, performance, instrumental play, creation, and singing. A singing assessment rubric (pitch, rhythm, timbre, expression) and a learning-interest scale reviewed by experts were used. Data were collected with a pre-test/post-test design and analyzed using paired-samples t tests; changes in score dispersion were also considered. Results showed substantial gains in singing skills (46.70 ⟶ 90.33) and learning interest (31.70 ⟶ 72.77), together with reduced variability across students, indicating more consistent performance after the intervention. The findings support ABL as an effective multi-sensory, contextual, and collaborative approach that fosters active

Citation:

* Yan Yu and Ratchanee Nokthet. (2025). Development Of Singing Skills And Learning Interests To Activity-Based Learning For Primary Students In Take Xingyao In Baiquan County. Modern Academic Development And Promotion Journal, 3(5), 272-286.;

DOI: https://doi.org/10.

https://so12.tci-thaijo.org/index.php/MADPIADP/

participation and creativity in primary music education. Practical implications for lesson planning and assessment in primary music classes are discussed.

Keywords: activity-based learning, singing skills, learning interest, primary students

Introduction

Traditional, teacher-led rote imitation can suppress engagement and constrain skill growth in primary music (Hallam, 2010; Zhao, 2019). Activity-based learning (ABL) reframes instruction as student-centered, experiential, multi-sensory, and collaborative cycles of doing–feedback–reflection (Bonwell & Eison, 1991; Hattie, 2009). Theoretically, ABL aligns with Dewey's learning-through-experience and Vygotsky's sociocultural view that development is mediated by scaffolding within the zone of proximal development (Dewey, 1938; Vygotsky, 1978). Empirically, active approaches generally outperform transmission methods and are linked to higher persistence and interest; in primary music, integrating singing with movement and cooperative practice supports pitch/rhythm accuracy and enjoyment.

Research gap. Despite growing international evidence, empirical ABL studies in mainland Chinese primary schools remain scarce; many focus on secondary/ensemble settings, lack quasi-experimental designs, or assess knowledge/listening rather than singing performance and learning interest. Purpose. This study tests a five-week ABL singing program with Grade 4 students at Xingyao Primary School (Baiquan County) using a pretest–posttest design with a standardized singing rubric (pitch, rhythm, tone/voice/breathing, expression) and a validated interest scale, providing context-specific evidence to inform lesson planning, scaffolding, and assessment in primary music.

Objectives

1. To develop a set of music teaching activities based on activity-based learning (ABL) for Grade 4 students at Xingyao Primary School, Baiquan County.

2. To examine the effects of the ABL program on students' singing skills and learning interest.

2.1 To compare students' singing-skill scores before and after participation in the ABL program.

2.2 To compare students' learning-interest scores before and after participation in the ABL program.

Literature Review

1) Activity-Based Learning (ABL)

Activity-based learning is a student-centred, experiential approach in which learners construct knowledge through structured tasks and guided reflection. It is grounded in Dewey's experiential learning and Vygotsky's sociocultural theory and zone of proximal development, highlighting purposeful activity, social interaction, and scaffolded participation (Dewey, 1938; Vygotsky, 1978). Contemporary descriptions emphasise multisensory engagement integrating practical, personal, and social dimensions, and encourage observation, discovery, and application through teacher-supported activity.

Key characteristics. (1) Student-centred task design; (2) authentic/real-world tasks; (3) collaborative problem-solving; and (4) systematic reflection (Cai, 2015; Geneva Global; Vygotsky, 1978; Dewey, 1938).

Implementation essentials. (1) Design mission-like, curriculum-aligned scenarios; (2) provide teacher scaffolding for multisensory exploration; and (3) use multi-method assessment, including self-/peer-review (Geneva Global; Andiema, 2022).

Fit with the present study. In this research, ABL is operationalised through five activity types—body rhythm, comprehensive art performance, instrumental accompaniment, music creation, and song singing—implemented once weekly over 15 weeks; this structure directly targets the two outcomes assessed (singing skills; learning interest).

2) Singing Skills Development

Singing proficiency is typically described across four dimensions: pitch accuracy, rhythmic control, timbre/voice quality, and expressive communication (He, 2020). Classic pedagogical traditions offer structured pathways for skill growth: Dalcroze eurhythmics for internalising pulse, Kodály sight-singing and tonal training for pitch, and Orff integration of movement and instruments for coordinated singing; expressive intent can be examined through situational performance tasks (Jaques-Dalcroze, 1914; Gabrielsson, 2001).

Assessment approaches include auditory pattern matching for pitch and attention to resonance/breath support for timbre/voice quality (Gordon, 1997; Miller, 1986). Contextual and collaborative activities—especially group singing and body rhythm—are frequently associated with gains in rhythm and expression (Rogers, 2010; Zhang, 2015; McPherson & Davidson, 2002). These perspectives align with this study's four-dimension rubric (pitch, rhythm, timbre, expression) used in pre- and post-assessment.

3) Learning Interest in Music

Learning interest refers to intrinsic motivation and emotional investment in learning; in music it comprises emotional connection, cognitive engagement, and behavioural persistence (Clark, 1988; McPherson, 2010; Wang, 2008). ABL tends to stimulate interest via autonomy (student choice) and enjoyment through collaborative/game-like tasks (Bonwell & Eison, 1991; Eisner, 2002). For measurement, this study employs a 16-item, 5-point scale (max = 80)

administered pre- and post-intervention, consistent with contemporary motivation/interest instruments in music education.

Summary

The literature indicates that ABL—rooted in experiential and social learning—provides multisensory, collaborative structures well suited to developing singing skills (pitch, rhythm, timbre, expression) and enhancing learning interest through meaningful, hands-on participation. This rationale underpins the study's five ABL activity types across 15 weeks and aligns with its pre–post evaluation of these two outcomes.

Methodology

Design and setting

This study adopted a one-group, pretest–posttest, quasi-experimental design in Grade 4 music classes at Xingyao Primary School, Baiquan County, China. Instruction was delivered once weekly (45 minutes) for 15 consecutive weeks using a standardized ABL lesson pack.

Participants and inclusion criteria

From a population of 120 fourth-graders, 30 students were purposively sampled based on enrollment in the school music program and full availability for all sessions; parental consent was obtained. The analytic sample comprised 15 boys and 15 girls (age 9: n=22; age 10: n=8). Inclusion criteria were: (1) enrolled in the formal music curriculum; (2) able to attend all 15 sessions; and (3) parental consent.

Intervention: ABL music program (15 weeks)

The ABL program comprised five activity types mapped to Grade-4 curriculum songs and to the two target outcomes (singing skills; learning interest). Each lesson followed a pre-activity ⟶ activity ⟶ post-activity

sequence with teacher scaffolding, quick checks for understanding, and self/peer/teacher assessment.

1 . Body Rhythm - “Little Trumpet”: stepping/clapping and group rhythm patterns for rhythmic control.

2 . Comprehensive Art Performance - “The Old Farmer Waiting for Rabbits”: role-play/dance/drama to build expressive communication.

3 . Instrumental Accompaniment - “The Fields Are Calling”: explore timbre/voice quality and rhythm via ensemble arranging (introduce instrument sounds ⟶ small-group arranging ⟶ reflect on combinations/teamwork).

4 . Music Creation — “Nadam Song”: pitch & rhythm support via melody adaptation/lyric writing with multimedia cultural prompts; share and discuss creations.

5. Song Singing — “Dongjia Children Are Really Happy”: integrate pitch, rhythm, timbre/voice with guided practice/feedback toward expressive performance.

Instructional materials, development, and validation

Lesson plans were blueprint-aligned to core ABL principles; development proceeded through needs analysis, expert content validation (IOC documented), a small try-out, and finalization for classroom use.

Instruments

(1) Feedback forms (students & teacher). Brief forms gathered suggestions on clarity, enjoyment, and perceived difficulty to refine delivery and classroom management.

(2) Practical Singing-Skills Assessment (pre/post). A performance-based test sampled textbook song excerpts across four dimensions with seven tasks: Pitch (melody imitation; single-note recognition), Rhythm (rhythm imitation; rhythm in singing), Timbre/voice quality (breath support & resonance), and Musical expression (situational & emotional expression). Weights sum to

100 (30/30/20/20). Level descriptors defined cut-scores (Excellent 85–100; Good 70–84; Needs Improvement 50–69; Poor 0–49). Administration: individual testing (~8–10 min/student) in a quiet music room using microphone/recorder and keyboard; scored on the spot with an analytic rubric. A rater guide specified administration and anchors; a small calibration round established inter-rater agreement prior to main scoring.

(3) Music Learning-Interest Questionnaire (pre/post). A 16-item Likert scale (1–5; max=80) summarizing six dimensions (general, emotional, participation, perception, activity engagement, long-term interest). Criteria: High ≥60; Medium 40–59; Low <40. Items were age-appropriate; expert review established content validity (IOC documented by the panel of music-education specialists).

Expert validation

Instruments and lesson plans underwent expert review; IOC values were computed and recorded per instrument, meeting the acceptance criterion specified in the protocol and appendices.

Procedure

Phase 1 (design). Classroom observations, teacher interviews, and literature review informed drafting of the five activity types; expert review (IOC) guided revisions.

Phase 2 (pretest). Singing test administered individually (~8–10 min) in a quiet classroom with mic/recorder + keyboard; learning-interest questionnaire administered in groups (10–15 min) with on-the-spot checks for completeness.

Phase 3 (intervention, 15 weeks). One ABL lesson per week (45 min) following the standardized plans; parents were informed of objectives and procedures; participant rights and confidentiality were ensured.

Phase 4 (posttest). Repeat the two instruments under the same conditions; collect brief reflections/observations to support interpretation.

Data analysis

Analyses (SPSS) included descriptive statistics (mean, SD) for all outcomes and paired-samples t-tests comparing pre- vs post-intervention singing scores and learning-interest scores; reporting covered per-dimension singing results (Pitch, Rhythm, Timbre, Expression) and total singing score (0–100), plus the interest profile. Where assumptions were in doubt, normality was checked (Shapiro–Wilk) and Wilcoxon signed-rank tests planned as a robustness check; effect sizes (Cohen's *d*_z) and 95% CIs were computed to aid interpretation.

Results

Present pre–post outcomes for Grade 4 students (n = 30) on two indicators: (1) singing skills-Pitch, Rhythm, Timbre/Voice, Musical Expression, and Total (0–100; higher = better), and (2) music learning interest (16–80; higher = better). Tables report means (M), standard deviations (SD), paired-samples *t*-tests (df = 29), and effect sizes (Cohen's *d*_z = $t/\sqrt{n}$).

Part 1 Singing skills (pre–post; N = 30)

Table 1 Singing skills before and after the 15-week ABL program (paired t-tests, df = 29)

Domain	Pre M (SD)	Post M (SD)	Mean difference (Post–Pre)	95% CI for MD	t(29)	p	Cohen's d_z
Pitch	13.03 (1.76)	27.10 (1.47)	14.07	13.12–15.02	30.21	< .001	5.52
Rhythm	13.07 (1.77)	27.30 (1.29)	14.23	13.30–15.16	31.45	< .001	5.74
Timbre/ Voice	10.30 (1.79)	17.90 (1.39)	7.60	7.05–8.15	28.32	< .001	5.17

Domain	Pre M (SD)	Post M (SD)	Mean difference (Post–Pre)	95% CI for MD	t(29)	p	Cohen's d_z
Musical Expression	10.30 (1.65)	18.03 (1.31)	7.73	7.19–8.27	29.06	< .001	5.31
Total (0–100)	46.70 (5.21)	90.33 (4.55)	43.63	41.06–46.20	34.71	< .001	6.34

Note. MD = Post mean − Pre mean; Cohen's d_z = t/√n (n = 30).

Plain-language summary. The Total score rose by +43.63 points (95% CI 41.06–46.20), nearly doubling overall performance. All domains improved significantly (p < .001) with very large within-subject effect sizes; smaller post-test SDs indicate more uniform performance after the ABL program.

Part 2 Music learning interest (pre–post; N = 30)

Table 2 Music learning-interest scores (scale 16–80)

Test	M	SD	t(29)	p	Cohen's d_z*
Pre-test	31.70	6.41			
Post-test	72.77	3.49	40.65	< .001	7.42

Note. d_z = t/√n (n = 30).

Interest increased by +41.07 points (95% CI: 39.00–43.14), shifting the class average from the Low range (≤39) before the program to the High range (≥60) after the program; lower SD at post-test indicates broader agreement in positive attitudes.

Alignment with objectives

Objective 2.1 (singing skills): Significant pre–post gains for the Total and all four domains confirm improved singing skills.

Objective 2.2 (learning interest): A large, significant pre–post gain confirms increased music learning interest.

Discussion

1) Improvement in singing skills

The ABL program yielded large, statistically significant gains in singing skills (Total: 46.70 ⟶ 90.33; all domains $p < .001$) with smaller post-test SDs, indicating more consistent performance across students. These patterns are compatible with experiential learning cycles-doing, feedback, reflection-(Dewey, 1938; Kolb, 1984) and with sociocultural accounts of guided participation and scaffolding within the ZPD (Vygotsky, 1978). Weekly task sequences were explicitly mapped to rubric dimensions (e.g., body-rhythm tasks for rhythmic control; focused vocal work for pitch; balance/listening tasks for timbre/voice; situational performance for expression), which likely contributed to coherent domain-level gains.

2) Enhancement of learning interest

Music learning interest rose substantially (31.70 ⟶ 72.77; $p < .001$) with reduced variability at post-test. ABL features that foreground autonomy, competence, and relatedness-structured choices, clear goals with rapid feedback, and collaborative work-align with self-determination theory and are associated with stronger intrinsic motivation and persistence (Ryan & Deci, 2000). Brief cultural or contextual “hooks,” peer interaction, and opportunities to perform/share appear to have created conditions for emotional connection and sustained engagement (see also Hattie, 2009).

3) Integrating the findings

Skill and interest likely reinforced each other. Progress toward concrete, observable goals (e.g., short-phrase pitch accuracy) paired with immediate formative feedback is known to support self-efficacy and on-task persistence (Black & Wiliam, 1998; Hattie & Timperley, 2007). The program's five activity types offered varied, distributed practice inside a time-bounded (45-min) lesson frame-an arrangement consistent with active-learning advantages reported across classroom domains (Hattie, 2009; Prince, 2004).

4) Cultural context considerations (China; county-level vs. urban)

Findings should be interpreted within the county-level public-school context of Baiquan. Relative to large urban schools, factors such as class size, available resources, access to instruments/rooms, extracurricular exposure, and local repertoire can differ and may shape both implementation and outcomes. Linguistic environment (e.g., local accent/dialect) and prevailing classroom norms (e.g., higher deference to teacher direction) may also influence vocal production, confidence in solo singing, and willingness to engage in peer feedback. Consequently, generalization to urban or highly resourced settings should be cautious; cross-regional replications would clarify how context moderates ABL effects.

5) Potential confounders and study limitations

Although the pre–post gains are large and internally consistent, several factors may have inflated or obscured effects:

- Maturation/history/testing: Over 15 weeks, natural development, seasonal events, or practice effects from repeated testing may contribute to score increases.

- Hawthorne/novelty and expectancy: Visibility of a new program and teacher enthusiasm can raise engagement independently of pedagogy.

- Selection and fidelity: Purposive sampling (N = 30) at one school and variability in implementation fidelity (e.g., pace, feedback quality) may limit causal attribution and external validity.

- Measurement issues: The same rubric was used pre/post; absence of blinded, independent raters and no inter-rater reliability reporting may introduce rater bias. Some post-test means approach domain maxima, raising the possibility of ceiling effects and variance compression.Future work should include comparison groups, multiple schools (urban/rural), fidelity checks, blinded scoring with inter-rater reliability, and a delayed post-test to assess retention.

6) Practical implications

For primary music classrooms, evidence supports designing weekly ABL lessons that explicitly target Pitch, Rhythm, Timbre/Voice, and Expression with transparent criteria and quick formative checks. A demonstration ⟶ guided practice ⟶ feedback ⟶ reflection cycle, plus structured student choice and collaborative roles, can simultaneously cultivate performance skills and interest. Adaptations should account for local resources, repertoire, and linguistic/cultural context to maximize transferability.

7) Conclusion

Within Grade 4 music at Xingyao Primary School, a 15-week ABL program was associated with large, coherent improvements in singing skills and learning interest, alongside reduced score dispersion. The pattern aligns with experiential and sociocultural learning perspectives and offers actionable guidance for lesson planning and assessment—while highlighting the need to test ABL across diverse Chinese contexts and under designs that better address potential confounders.

Recommendation

1. Create an ABL resource hub (school–district–national) with downloadable lesson plans, short demo videos, simple assessment forms, and a moderated teacher forum.

2. Embed ABL in weekly music lessons: 45 minutes per week for 15 weeks; set clear lesson objectives and use a shared rubric (self/peer/teacher).

3. Provide stepwise teacher training: ABL basics, lesson/unit design, group/ensemble management, basic vocal technique (breath, resonance), and practical, holistic assessment.

4. Use one unifying theme tied to local culture: link to student interests and other subjects; use a checklist to confirm all steps and log actual time/materials used.

5. Differentiate learning paths: group students by strengths/needs (e.g., pitch-strong, rhythm-weak), set success criteria in advance, and track progress by subgroup.

6. Strengthen evaluation: include a traditional-teaching comparison class; collect pre, post, and 4–8-week follow-up data; use at least two raters.

7. Scale across schools/areas: use the same materials and forms, and compare outcomes across contexts (rural/urban, different SES) to test generalizability.

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