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# Integrating Vocal Singing into Piano Teaching: A Guidebook for Piano Students at Quzhou Senior High School

**Zhu Kaixi[1], and Thanyawat Sondhiratna[2]**
Ph.D., Music Factory, Bangkok Thonburi University, Thailand
Lecturer, Music Factory, Bangkok Thonburi University, Thailand
E-mail: 312271606@qq.com, ORCID ID: https://orcid.org/0009-0001-7467-2286
E-mail: thanyawat.son@bkkthon.ac.th, ORCID ID: https://orcid.org/0009-0001-1615-2696

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**Abstract**

**Background and Aim:** Incorporating singing into piano teaching enhances musical expression and ear training, helping students internalize melodies and develop a stronger sense of pitch. It also improves phrasing, dynamics, and overall musicality, making their piano playing more expressive and natural. This study investigated the integration of vocal techniques into piano pedagogy to improve the performance skills of high school students. The objectives were to: (1) gather expert knowledge on vocal singing and piano performance; (2) develop a piano teaching guide; (3) implement the guide in a classroom setting; and (4) evaluate its effectiveness.

**Materials and Methods:** A mixed-methods approach was employed. Qualitative data were gathered through a literature review and semi-structured interviews with vocal and piano experts. Quantitative data were collected from a sample of 20 first-year music students at Quzhou Senior High School, drawn from a population of 60 piano majors in Quzhou City. Data collection instruments included Likert-scale questionnaires, semi-structured interview guides, and performance assessments (pre- and post-intervention).

**Results:** Expert interviews revealed significant overlap between vocal and piano techniques, supporting the feasibility of integrating them. A teaching guide was developed based on the literature review and expert recommendations. The guide was implemented in an 18-week piano course (one hour per week).

The data collected through pre- and post-class questionnaires, student classroom observation records, and performance tests, as well as interviews with experts, indicate that this teaching method is highly effective and is very well appreciated and recognized by students.

**Conclusion:** The integration of vocal techniques into piano instruction significantly improved student performance. This study demonstrates the potential of this approach to enhance piano pedagogy and suggests further research to explore its broader applicability.

**Keywords**: Vocal Singing; Piano Performance; Piano Guidebook

## Introduction

While vocal singing and piano performance are often treated as separate disciplines in music education, they share fundamental principles of musical expression and technique. Although seemingly distinct, exploring the connections between these two areas can offer significant pedagogical benefits.

The historical development of Western music reveals a close relationship between vocal and instrumental forms. Early instrumental music often served as accompaniment to vocal performance, and it wasn't until the Renaissance that instrumental music truly emerged as an independent genre (Liang, 2015). This historical connection suggests that principles of vocal production, such as breath control, phrasing, and tone production, may have relevance to piano performance. Indeed, renowned pianists like Anton Rubinstein and Lazar Berman advocated for incorporating vocal techniques into piano playing to achieve a more beautiful and expressive tone (Roman, 2020).

The concept of "learning transfer," where prior learning influences new learning, provides a theoretical framework for understanding how vocal training might enhance piano performance (Sun Man, 2013). Specifically, the kinesthetic awareness developed through vocal training, such as breath support and control, can potentially transfer to improved physical control and expressiveness at the piano. Similarly, the emphasis on phrasing and musical line in vocal performance can inform a pianist's approach to shaping musical phrases and creating a sense of continuity. The interpretative skills gained from vocal training—such as understanding emotional nuances and lyrical phrasing—can help pianists develop a more nuanced approach to articulating melodies, allowing them to convey deeper emotions through their playing style and dynamics.



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In Chinese music education, some scholars have recognized the potential of integrating piano and vocal pedagogy (Liu, 2004). They suggest that comparative learning methods, analyzing the similarities and differences in sound production and musical expression, can lead to improved teaching strategies.

However, despite this theoretical recognition, the practical integration of vocal and piano instruction remains limited, particularly at the high school level. In Chinese music education, some scholars have recognized the potential of integrating piano and vocal pedagogy (Liu, 2004). They suggest that comparative learning methods, analyzing the similarities and differences in sound production and musical expression, can lead to improved teaching strategies. For instance, a study by Zhang (2020) found that approximately 65% of music educators believe that combining piano and vocal techniques can enhance students' overall musicality. However, despite this theoretical recognition, the practical integration of vocal and piano instruction remains limited, particularly at the high school level. In many high schools, piano and vocal studies are often treated as separate disciplines, which may hinder the development of a more holistic approach to music education.

This study addresses this gap by developing and evaluating a piano teaching guidebook that integrates vocal techniques, specifically designed for first-year music students at Quzhou Senior High School in Zhejiang Province, China.

Quzhou Senior High School's music program is renowned for its comprehensive curriculum that emphasizes both theoretical knowledge and practical skills across various musical disciplines. The program includes courses in vocal performance, instrumental training, music theory, and composition, providing students with a well-rounded education in music. With a diverse range of ensembles, including choirs and orchestras, students have ample opportunities to collaborate and perform, fostering a strong sense of community and teamwork. This setting is particularly suitable for studying the concept of learning transfer in music, as students are often exposed to both vocal and instrumental training simultaneously.

## Objectives

1. Gather expert knowledge on vocal singing and piano performance
2. Develop a piano teaching guide
3. Implement the guide in a classroom setting
4. Evaluate its effectiveness.

## Literature review

This literature review examines the existing body of research on the intersection of vocal singing and piano performance, focusing on their shared technical and expressive elements, pedagogical approaches for integration, and the theoretical framework of learning transfer. The review aims to establish the rationale for investigating the potential benefits of incorporating vocal techniques into piano instruction.

The Interconnectedness of Vocal and Piano Technique

A foundational premise for integrating vocal and piano pedagogy is the recognition of shared technical underpinnings. Both disciplines rely on effective breath management and physical support. Sun (2013) draws a direct analogy between the relationship of breath to sound in vocal music and the relationship of the palm to fingers in piano playing. The breath, like the palm, provides the necessary support for controlled and expressive sound production. If a pianist’s fingers lack the support of the palm, the resulting sound will be weak and uncontrolled, mirroring the effect of inadequate breath support in singing. This highlights the importance of kinaesthetic awareness – a sense of bodily control and coordination – which is crucial for both vocalists and pianists. Research has highlighted the importance of physical aspects such as posture and relaxation in both vocal and instrumental performance. For instance, studies by Lehmann and A. J. (2010) have shown that proper posture can enhance breath support in singers, which is essential for producing a consistent tone, while similar principles apply to pianists needing stable hand positions for optimal finger dexterity (Benson, 2009). Additionally, relaxation techniques have been shown to reduce performance anxiety and enhance motor coordination in musicians (Weinberg & Gould, 2014). While these studies establish a conceptual link between physical training and improved musical performance, few provide empirical evidence demonstrating a direct causal relationship between vocal-based physical training and enhanced piano technique. This gap indicates an area requiring further investigation to fully understand how vocal training may translate into refined skills at the piano.

Musical Expression in Vocal and Piano Performance



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Beyond the physical aspects, vocal and piano performance share fundamental principles of musical expression. Both disciplines require a deep understanding and interpretation of the musical work, often referred to as "re-creation" (Liu, 2004). This involves shaping phrases, controlling dynamics, and conveying the emotional content of the music. The concept of "singing tone" or "cantabile" is frequently emphasized in piano pedagogy, encouraging pianists to emulate the lyrical qualities of the human voice (Liang, 2015; Yu, 2018). Piano music itself often draws inspiration from vocal forms, with melodies and structures that mimic the characteristics of song (Yu, 2018). However, it's important to acknowledge a key difference: vocal music utilizes lyrics to convey specific meaning, while piano music relies primarily on musical language (Liu, 2004). This difference necessitates a greater emphasis on developing a pianist's ability to interpret and communicate the musical narrative through purely instrumental means.

Pedagogical Approaches to Integrating Vocal and Piano

Several authors advocate for specific pedagogical strategies to bridge the gap between vocal and piano instruction. Mikovsky, as cited in Roman (2020), emphasized the importance of listening to and singing along with recordings of great singers to develop a sense of beautiful tone and phrasing. This approach encourages pianists to internalize the vocal model and translate it to the keyboard. Li (2017) stresses the importance of "singing thinking" – analyzing the structure and musical elements of vocal music and applying that understanding to piano performance. Other practical suggestions include encouraging students to "sing while playing" (Zhang, 2011) to connect the physical act of playing with the inner musical intention, and to pay close attention to breathing, both in terms of its physical mechanics and its impact on musical phrasing (Zhang, 2011; Li, 2009). Xu (2018) suggests that piano students should actively cultivate a love of singing and engage with a wide range of vocal repertoire (art songs, operas, musicals) to broaden their musical understanding and improve their expressive capabilities (Liang, 2015). While these pedagogical recommendations offer valuable insights, there is a lack of large-scale, controlled studies that rigorously evaluate their effectiveness. Most of the evidence is anecdotal or based on small-scale observations.

Learning Transfer and Musical Skill Development

The theoretical underpinning of this integration rests on the principle of "learning transfer," which posits that prior learning experiences can influence new learning (Sun, 2013). In the context of music, this suggests that skills and knowledge acquired in vocal training, such as breath control, phrasing, and musical expression, can be transferred to and enhance piano performance. Learning transfer in music education involves applying skills and knowledge from one context, such as vocal performance, to another, like piano playing. Key cognitive mechanisms include pattern recognition, conceptual frameworks, and metacognition, which help students identify and articulate connections between the two domains. Physical mechanisms involve motor skills and kinesthetic learning that enhance dexterity and coordination. However, transfer is not automatic; challenges such as contextual differences, lack of awareness about connections, and high cognitive load can hinder this process. Educators must foster students' recognition of these links and create supportive learning environments to promote effective learning transfer.

The literature reviewed highlights a strong theoretical and anecdotal basis for integrating vocal techniques into piano pedagogy. Shared technical and expressive elements, coupled with the principle of learning transfer, suggest that vocal training can positively influence piano performance. However, the existing research is characterized by a lack of rigorous empirical studies that quantify the benefits of this integration and identify the most effective pedagogical strategies. The current study aims to address this gap by developing and evaluating a specific piano teaching guidebook that incorporates vocal techniques, using a mixed-methods approach to assess its impact on high school piano students' performance skills. This research will contribute to a more evidence-based understanding of the relationship between vocal and piano learning and inform the development of more effective pedagogical practices.

## Conceptual Framework

The conceptual framework for "The Application of Vocal Singing in Piano Teaching: A Guidebook for Teaching Piano Students at Quzhou Senior High School" revolves around the integration of vocal techniques into piano instruction to enhance musical understanding and performance. The guidebook outlines specific strategies and activities that leverage vocalization to reinforce key concepts in music theory, foster creativity, and improve overall musicianship.



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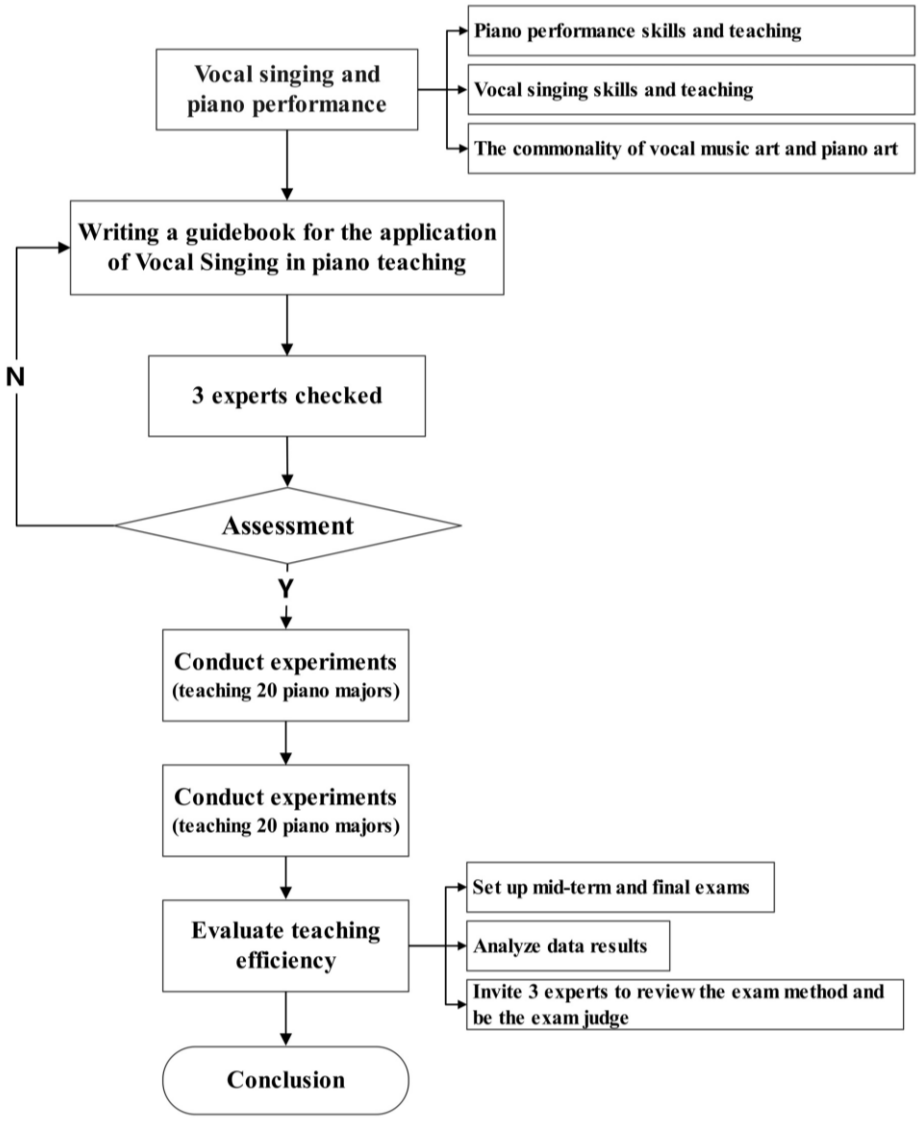


**Figure 1** Conceptual Framework

## Methodology

Research method: This study employed an explanatory sequential mixed-methods design. This design involves collecting and analyzing quantitative data first, followed by qualitative data collection and analysis to help explain or elaborate on the quantitative results (Creswell & Plano Clark, 2018). This design is appropriate for the study as it allows researchers to quantitatively assess the initial outcomes or trends, providing a broad understanding of the phenomena being studied, and then use qualitative data to explore participants' perspectives in depth, thereby offering richer insights that can explain the quantitative findings more comprehensively. Specifically, quantitative data were collected through pre- and post-tests to measure changes in piano performance skills. Qualitative data were then collected through expert interviews and student observations to provide insights into the reasons for the observed changes and to explore the participants' experiences with the intervention.

### Participants

**Population:** The population for this study comprised 60 piano majors from various high schools in Quzhou City, Zhejiang Province, China.



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**Sample:** A sample of 20 first-year piano students from the music class at Quzhou Senior High School was selected using purposive sampling. These students were chosen because they. A sample of 20 first-year piano students from the music class at Quzhou Senior High School was selected using purposive sampling. These students were chosen because they were all enrolled in the same piano class, providing a consistent learning environment, had similar levels of prior piano experience, minimizing variability, represented a range of skill levels within the class, and were willing to participate in the study and commit to the 18-week course. This approach ensures that the findings reflect the specific context of first-year piano instruction while allowing for a diverse representation of student experiences and abilities, which enriches the data collected and its applicability to the broader educational setting.

**Key Informants (Experts):**

Three experts in vocal and piano pedagogy were selected to provide insights and feedback throughout the study:

Expert 1: Gu Shuang, Professor and Director of the Piano Teaching and Research Office at Wuhan Conservatory of Music. Professor Gu has extensive experience in piano pedagogy and performance, with a particular focus on the application of expressive techniques in piano performance.

Expert 2: Zeng Jing, Professor and Director of the Vocal Teaching and Research Office at Wuhan Conservatory of Music. Professor Zeng specializes in vocal pedagogy and the development of breath control and resonance.

Expert 3: Huang Rixing, High School Music Teaching Researcher in Quzhou City, Zhejiang Province. Mr. Huang has extensive experience in music education at the high school level and provides a valuable local perspective on the curriculum and student needs.

Inclusion Criteria:

The following criteria were used for selecting the experts:

1. A minimum of 10 years of experience in researching and teaching vocal singing or piano performance.
2. Active engagement in vocal or piano education.
3. Publication of at least 5 peer-reviewed papers or book chapters in relevant journals/publications related to music education, vocal pedagogy, or piano pedagogy.
4. Willingness to participate in the study and provide informed consent.

**Data collection:** Data were collected at two time points: before the commencement of the piano course (pre-test) and after its completion (post-test). The following data collection instruments were used: **Performance Tests:** Performance Tests: Students' piano performance skills were assessed using a standardized performance test, both before and after the intervention. The test consisted of a selection of standardized pieces from the Royal Conservatory of Music repertoire, appropriate for first-year students, ensuring that all participants performed works of similar difficulty, specifically at the Level 1 to Level 2 range. Performances were recorded and evaluated by a panel of expert evaluators, including Professor Gu Shuang and Professor Zeng Jing, who provided blinded evaluations to ensure objectivity. A rubric was used to assess performance based on the following criteria: accuracy, technique, phrasing, dynamics, and musicality. If a standardized rubric was used, it was adapted from the Royal Conservatory of Music's Piano Evaluation Criteria.

**Data analysis:**

**Quantitative Data:** The pre-test and post-test performance scores were analyzed using a paired t-test to determine if there was a statistically significant improvement in performance skills.

**Qualitative Data:** The expert interview transcripts and student observation records were analyzed using that involved the analysis focused on identifying key themes related to the feasibility and effectiveness of integrating vocal techniques into piano instruction, the students' experiences with the approach, and the experts' perspectives on the students' progress.

**Ethical Considerations:**

1. Informed consent was obtained from all participants (students and experts) before the study began.
2. For the student participants, who were under the age of 18, informed consent was also obtained from their parents or legal guardians.
3. Participants were informed of their right to withdraw from the study at any time without penalty.
4. Confidentiality of participant data was maintained throughout the study.



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## Results

### 1. Expert Perspectives on Vocal Singing and Piano Performance

Thematic analysis of the expert interviews revealed several key themes related to the interconnectedness of vocal singing and piano performance. Experts emphasized the importance of incorporating vocal techniques into piano instruction to enhance musical understanding, develop listening skills, and foster expressive performance.

Professor Gu noted, "A pianist who understands the principles of vocal phrasing can bring a much greater sense of lyricism and musicality to their playing." This highlights how knowledge of vocal techniques can enrich piano performances. Mr. Huang emphasized, "Teaching students to sing the melody lines of piano pieces helps them to internalize the musical structure and to develop a more natural sense of phrasing." His insights suggest that vocalization aids in grasping the intricacies of musical phrasing and structure.

Additionally, Professor Zeng highlighted, "The breathing techniques are important." This underscores how fundamental vocal techniques can contribute to overall performance quality, even in instrumental contexts. The experts' insights, combined with the literature review, informed the development of the piano teaching guidebook, ensuring that it encompasses these valuable approaches for enhancing students' musical education. Technique for Teaching Defying Gravity Songs: first, Vocal Warm-Ups: Begin lessons with vocal warm-ups that prepare students for the demands of each song. Focus on Interpretation and discuss the meaning behind the lyrics and how to convey those emotions through voice and piano. Various arrangements that fit the student's skill level, whether it be simplified or more complex. If appropriate, encourage students to perform these songs in recitals or class presentations to build confidence.

### 2. Development of the Piano Teaching Guidebook

Based on the literature review and expert interviews, a piano teaching guidebook titled "Applying Vocal Singing to Piano Teaching" was developed. The guidebook is structured into four chapters:

**Chapter 1: The Interrelationship of Vocal and Piano Performance** explores the historical connections between vocal and instrumental music, highlighting how composers from the Renaissance to the 20th century, such as Monteverdi, Mozart, and Bernstein, integrated vocal techniques into piano compositions. It discusses theoretical concepts like breath control, expressive techniques, and melodic-harmonic relationships, emphasizing how these elements can enhance piano performance by drawing on vocal practices. The chapter advocates for a holistic approach to music education that combines both vocal and piano instruction, enriching students' understanding and execution of music.

**Chapter 2: Vocal Techniques for Enhancing Piano Performance:** focuses on how specific vocal techniques can enhance piano performance, detailing methods such as breath control, posture, resonance, phrasing, articulation, and dynamics. Each technique is applied to piano playing—using breath control for phrasing, proper posture for mobility, resonance for sound quality, phrasing for emotional impact, articulation for clarity, and dynamics for expressive volume changes. By integrating these vocal practices, pianists can significantly improve their musicality and overall performance quality.

**Chapter 3: Integrating Vocal Singing into Piano Pedagogy** presents practical strategies for integrating vocal activities into piano lessons, emphasizing their benefits for musical development. Key approaches include having students sing melodies before playing, incorporating vocal warm-ups, using relevant vocal repertoire, implementing call-and-response exercises, organizing group singing activities, and encouraging the integration of lyrics into practice. These strategies foster ear training, enhance expressiveness, improve collaboration, and create a more engaging learning environment, ultimately enriching students' overall musicianship and enjoyment of music.

**Chapter 4: Analysis and Application of Vocal Techniques in Piano Repertoire:** Chapter 4 explores the application of vocal techniques in piano repertoire through detailed analyses of selected pieces, including Beethoven's Variations in G Major, Brahms' Intermezzo Op. 118 No. 2, Chopin's Nocturne Op. 9 No. 2, Debussy's Clair de Lune, and Schubert's Impromptu D. 899 No. 3. Each piece is chosen for its lyrical qualities and melodic contours that mimic vocal music, allowing for enhanced interpretation through singing techniques such as legato, dynamic shaping, and expressive phrasing. The chapter illustrates how these vocal approaches can enrich piano performance and deepen musical expression.

### 3. Implementation of the Piano Teaching Guidebook

The guidebook was implemented in an 18-week piano course for the first 20-year music students at Quzhou Senior High School. The course plan, developed in consultation with the experts, was structured in four stages:

**Stage 1: Foundations (Weeks 1-4):** This stage focused on establishing the connection between vocal and piano performance.



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**Stage 2: Application of Vocal Techniques (Weeks 5-8):** This stage focused on applying specific vocal techniques to piano playing.

**Stage 3: Musical Expression (Weeks 9-12):** This stage focused on developing musical expression.

**Stage 4: Repertoire Performance (Weeks 13-18):** This stage focused on preparing and performing selected piano pieces.

**4. Evaluate the results of teaching by using the piano guidebook.**

This is a research method that combines qualitative and quantitative methods. Researchers collected data through pre- and post-class questionnaires, student classroom observation records, and performance tests. The questionnaire survey is used to understand students' basic learning situation and their understanding and mastery of learning methods for applying vocal music to piano performance. The evaluation of students will be conducted through daily course performance and mid-term and final piano exams. Daily course performance includes students' focus in class, completion of piano assignments, daily piano practice, attendance rate, etc. The mid-term and final piano exams are conducted through stage performances, requiring students to wear formal attire and perform a complete piano solo piece in the concert hall by memorizing the score. Exam scores are evaluated based on students' rhythm and intonation, speed and beat, timbre control, musical expression, and performance status. The score ratio is as follows: Daily course performance accounts for 30%, mid-term exams account for 35%, and final exams account for 35% (all of which are scored on a 100-point scale).

**Table 1** Compare the formative testing and summative testing scores.

| Students | Formative testing | Summative testing | Comparing | Result |
|---|---|---|---|---|
| 1 | 79 | 82 | 3 | Improved |
| 2 | 76 | 81 | 5 | Improved |
| 3 | 77 | 82 | 5 | Improved |
| 4 | 76 | 85 | 9 | Improved |
| 5 | 80 | 85.5 | 5.5 | Improved |
| 6 | 82 | 86 | 4 | Improved |
| 7 | 79 | 83 | 4 | Improved |
| 8 | 77 | 82 | 5 | Improved |
| 9 | 79 | 83 | 4 | Improved |
| 10 | 84 | 89 | 5 | Improved |
| 11 | 83 | 86 | 3 | Improved |
| 12 | 78 | 84 | 6 | Improved |
| 14 | 79 | 85 | 6 | Improved |
| 15 | 80 | 85 | 5 | Improved |
| 16 | 79 | 84.5 | 5.5 | Improved |
| 17 | 83 | 87 | 4 | Improved |
| 18 | 81 | 85 | 4 | Improved |
| 19 | 79 | 84.5 | 5.5 | Improved |
| 20 | 80 | 83 | 3 | Improved |

**Statistical Analysis Results**



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The results of the paired t-test indicated a statistically significant improvement in piano performance scores from pre-test (M = 79.0, SD = 2.93) to post-test (M = 84.25, SD = 2.07), t (19) = 6.724, $p < .001$, d = 1.32. This suggests that the intervention (the use of the teaching guidebook integrating vocal techniques) had a significant positive effect on students' piano performance skills.
Interpretation of Effect Size: The Cohen's d value of 1.32 indicates a large effect size, suggesting that the intervention had a substantial impact on improving students' piano performance abilities.

## Discussion

The findings of this study provide strong evidence that integrating vocal techniques into piano instruction can significantly improve the performance skills of high school students. The statistically significant improvement in post-test performance scores, coupled with the positive feedback from experts and the observed improvements in student engagement and technique, supports the effectiveness of the developed teaching guidebook and the implemented course plan.

This study's results align with previous research highlighting the interconnectedness of vocal and piano performance (Liang, 2015; Liu, 2004; Roman, 2020; Yu, 2018; Zhang, 2011). However, unlike much of the prior research, which relies primarily on anecdotal evidence or theoretical arguments, this study provides empirical evidence of the benefits of this integration in a specific pedagogical context. The current findings enhance prior research by providing concrete data that demonstrates how integrating vocal techniques into piano instruction improves both musical understanding and overall performance quality. While previous studies, like those by Liang (2015) and Liu (2004), discussed the advantages theoretically, this study quantitatively measures improvements in students' expressive and technical skills.

The success of the intervention can be attributed to several factors. First, the teaching guidebook provided a structured and systematic approach to integrating vocal techniques into piano instruction. The guidebook's focus on the teaching guidebook provided a systematic framework for instructors, ensuring that vocal techniques were integrated into piano lessons coherently and effectively. For instance, it included specific exercises focused on breath control, which not only improved students' vocal abilities but also had a direct impact on their piano playing. By teaching students how to manage their breath while playing, they learned to maintain better phrasing and dynamic control.

While this study demonstrates the potential of integrating vocal techniques into piano instruction, it is important to acknowledge its limitations. The sample size (20 students) was relatively small, and the study was conducted in a single school setting. Therefore, the generalizability of the findings may be limited. Future research should investigate the effectiveness of this approach with larger and more diverse student populations and in different educational contexts.

-"Future studies could explore the effectiveness of different types of vocal techniques in piano instruction."

-"Research could investigate the optimal timing and duration of vocal training for maximizing its impact on piano performance."

-"Studies could examine the role of individual student characteristics (e.g., prior musical experience, learning styles) in mediating the effectiveness of the intervention."

-"Further research should investigate how different teaching styles and approaches impact the outcome".

The findings of this study have significant implications for piano pedagogy. They suggest that incorporating vocal techniques into piano instruction can be a valuable tool for enhancing student learning and performance. This approach can help students to develop a deeper understanding of music, improve their technical skills, and become more expressive performers.

## Conclusion

This study provides compelling evidence for the benefits of integrating vocal techniques into piano instruction. Through a rigorous, sequential mixed-methods approach, including expert interviews, guidebook development, classroom implementation, and pre-/post-test performance assessments, this research demonstrates a statistically significant improvement in the piano performance skills of high school students who received instruction incorporating vocal techniques. This research contributes to the growing body of literature supporting the interconnectedness of vocal and instrumental music and, importantly, offers a practical, evidence-based approach for enhancing piano pedagogy. The developed teaching


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guidebook and course plan, informed by both expert opinion and a thorough literature review, provide a concrete framework for educators seeking to implement this integrated approach.

The findings suggest that music educators should strongly consider incorporating vocal training strategies into their piano teaching to foster more well-rounded, technically proficient, and expressive musicians. The positive outcomes observed in this study highlight the potential for cross-disciplinary approaches to music education to enrich student learning and enhance musical performance capabilities.

While the results are promising, further research is warranted to explore several key areas. These include investigating the long-term effects of this integrated approach, assessing its applicability across diverse student populations (varying ages, skill levels, and musical backgrounds), and determining the optimal methods for integrating specific vocal techniques into different levels of piano curricula. Further investigation into the specific mechanisms of learning transfer between the vocal and piano domains would also be beneficial. Ultimately, this study serves as a valuable step toward a more holistic and effective approach to piano education, leveraging the inherent connections between vocal and instrumental music.

**Recommendation**

**1. General Recommendations**

The research subjects of this study are high school music students who are under pressure from the college entrance examination. Their three-year piano study in high school must be related to China's music college entrance examination policy. China's music college entrance examination requires students to play two pieces in the piano exam: one is a piece of music, and the other is an exercise piece. At present, the piano teaching guide designed by graduate students only selects different types of Chinese and foreign music in Chapter 4, and does not involve exercises. In order to better promote this piano teaching guide to high school students in China, the piano teaching guide should gradually increase the explanation of piano exercises. Although there are numerous piano etudes, researchers can choose to use examples such as Czerny's etudes or Chopin's etudes for explanation and analysis.

The present study has several limitations that should be acknowledged. First, the research focused exclusively on high school music students in Quzhou, China, who are preparing for the national college entrance examination. This specific context, with its emphasis on performing two pieces (one musical piece and one etude), limits the direct applicability of the current teaching guidebook, which primarily addresses musical repertoire. While the principles of integrating vocal techniques are likely transferable to etude practice, the guidebook does not explicitly address this aspect. This limits the immediate utility of the guidebook for students preparing for the Chinese college entrance examination.

**2. Recommendation for future research**

Building upon the findings of this study, several avenues for future research are recommended:

Expanded Repertoire: Future studies should expand the repertoire included in the teaching guidebook to encompass a wider range of musical styles and genres, including etudes. Specific attention should be given to selecting etudes that lend themselves well to the application of vocal techniques (e.g., etudes with lyrical melodies or those requiring expressive phrasing and dynamic control, such as selections from Czerny or Chopin). The rationale for selecting specific etudes should be articulated, linking them to the principles of vocal-piano integration.

Diverse Populations: Subsequent research should investigate the effectiveness of this integrated approach with diverse student populations, including younger learners, students with varying levels of prior musical experience, and students from different cultural backgrounds. This would help to assess the generalizability of the findings and to identify any necessary adaptations of the teaching approach for different learner profiles.

Technology Integration: Future research could explore the potential of technology to enhance the delivery and effectiveness of the integrated approach. Specifically, studies could investigate the impact of online video tutorials, demonstrating the application of vocal techniques to specific piano pieces, on student learning and performance. Research questions could address the optimal design and use of such videos, their effectiveness compared to traditional instruction, and their impact on student motivation and engagement.

Longitudinal Studies: The current study provides evidence of short-term improvements in performance. Longitudinal studies are needed to assess the long-term effects of the integrated approach on students' technical development, musical understanding, and overall musicianship.

Mechanism of Transfer: Further investigation into the specific cognitive and physiological mechanisms underlying the transfer of learning between vocal and piano domains is warranted. This could



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involve qualitative and quantitative analyses of student learning processes, potentially incorporating physiological measures (e.g., breath control, muscle tension) to gain a deeper understanding of how vocal techniques impact piano performance.

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