

# ***Blending and Interaction between Vocal Music Performance and Piano Education: Teaching Practice of Digitally Empowering International Students***

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**Abstract:** This paper focuses on the integration of vocal performance and piano education in the digital age, and focuses on exploring the practical path of music teaching for Korean international students in China. The research first analyzes the core value of vocal music performance in music education, and proposes to strengthen Korean students' cultural cognition and emotional resonance of China music with the help of digital tools. Secondly, it discusses the adaptive application of piano education in vocal performance, presupposes the accompaniment template of Chinese and Korean cultural integration, and realizes the synchronization of piano skill teaching and cultural transmission. Finally, taking the China folk song "Chinese Cabbage" as an example, the application of digital means in the whole teaching process is expounded in detail by using the digital music production software Songle, from the visual presentation of melody cultural differences to the integration of cross-cultural elements in piano accompaniment, and then to the precise guidance of vocal emotion expression. The research shows that the construction of an integrated vocal music teaching model with "vocal music culture as the core and digital technology as the bridge" can not only promote the deep interaction between vocal music performance and piano education, but also provide a cross-cultural teaching scheme that can be popularized for international music education, thus helping the exchange of music culture between China and South Korea.

## **1. Introduction**

As two important branches of music education, vocal performance and piano education are closely related and influence each other. Vocal performance provides students with rich musical experience with its unique artistic charm, while piano education has laid a solid musical foundation for students with its rigorous teaching system. Piano accompaniment plays a significant guiding role in the overture stage of vocal music singing, which can significantly mobilize the emotions of singers and help them quickly enter the best singing state. At the same time, vocal music singing,

accompanied by piano, enables the singer to understand the artistic conception and the deep meaning conveyed in the music works more deeply. Singers will naturally follow the pitch, melody, rhythm and music flow of piano accompaniment, so as to interpret the connotation, emotion and theme of music more perfectly and comprehensively.[1]

Under the background of the digital age, aiming at the music teaching of Korean students studying in China, we can construct the integration path of vocal music and piano education based on the concept of "technical empowerment and cultural transmission"[2]. In the field of digital technology research, Xu Dengfeng (2010) found that students generally do not have obvious singing formants after the sound intensity envelope of the spectrum decays after the peak of the pitch frequency (Figure 1). So resonance becomes intuitive and easy to understand[3]. Guo Jiaxuan (2013) believes that the music computer-aided system (CASM) mainly connects external devices and computers, analyzes the audio and video information of the trainers by collecting their physiological state and musical expression state, and provides scientific parameters and generates images and data through the analysis of the system software, so that teachers can provide more targeted guidance to students according to these[4].

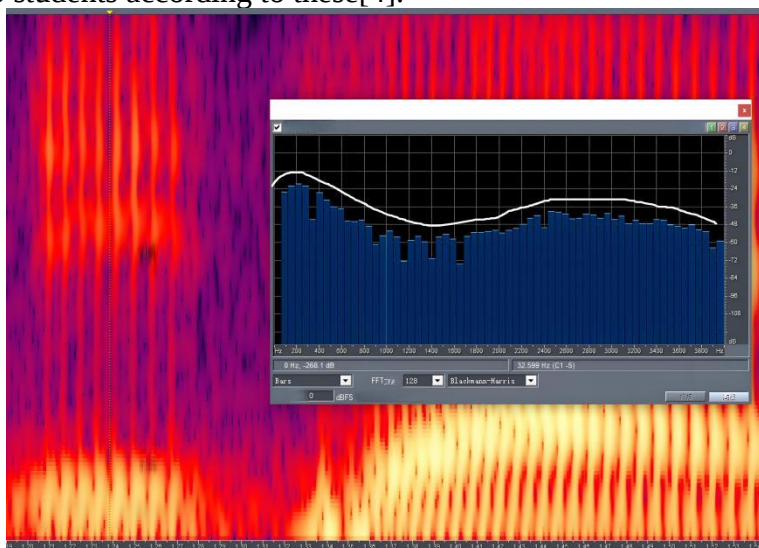


Figure 1 Resonance spectrum analysis

On the research of music education for international students in colleges and universities, Wang Xue (2013) general music education for international students in colleges and universities is a teacher-oriented course-an adaptive course with students as the main body. It is necessary not only to meet the learning needs of foreign students, but also to spread the spirit of China's excellent culture. The construction of the general music course for foreign students in colleges and universities includes the analysis of the overall design of the course, that is, the positioning of the course in professional teaching, the setting of the teaching objectives of the course, the selection and determination of the course content, and the dynamic teaching process design[5]. Zhang Haixia (2021) thinks that the expressive law of China folk song singing teaching in the cross-cultural background and the expressive color of vocal language intonation reflect the image-building and artistic style in students' education, and foreign students should be trained comprehensively and systematically in pronunciation, pronunciation, articulation and rhyme. In terms of teaching methods, according to the needs of teaching content, students are familiar with cartoon pop songs, film clips, China's traditional cross talk, sketches, etc., to stimulate students' interest in learning, transfer new knowledge, and solve the language difficulties of foreign students, thus improving their language expression ability. At the same time, we should adopt the teaching method of

creating situations to teach. China folk songs carry out all kinds of music practice activities, so that they can use the training method of vocal music language in the teaching of singing in the music situation, experience the unique beauty of China folk music based on phonetics, excite the interest with beauty, feel the friendship between students and teachers and students, and draw closer to each other's knowledge as the leading factor, combined with China's traditional vocal music art theory[6].

Chen (2024) believes that at present, AIGC music has not really surpassed human creators, and the content value and commercial value of excellent works are still being verified, promoted and amplified in the process of technological innovation. We should actively promote the wide application of artificial intelligence technology in cultural creation and dissemination, and enter a new realm of human art in a benign and reasonable open sharing[7].

This paper discusses the mutual promotion between vocal music performance and piano education from the perspective of blending and interaction. Using the digital music intelligence software Songle developed by Japan Industrial Technology Research Institute, this application can provide interactive auditory experience and visual analysis to interpret the core of Chinese and Korean music culture by analyzing the parts, chords and beats of online music[8]. For example, this tool can show the sadness contained in China folk song "Pakchoi" and the strong and weak rhythms displayed in Korean traditional folk song "Arirang" alternately to express desolation, so that the artistic expression of vocal music singing and piano accompaniment can be sublimated into the carrier of cross-cultural communication, thus deepening the fit of the core theme of "blending and interaction".

## 2. The important role of vocal music performance in music education

As an important part of music education, vocal performance has unique artistic charm and educational value. First of all, vocal performance can intuitively show the charm of music and stimulate students' interest and enthusiasm in learning. Secondly, vocal music performance can cultivate students' musical literacy and aesthetic ability, so that students can better understand musical works and feel the emotional expression of music. Finally, vocal performance can also exercise students' expressive force and self-confidence, and let students show their talents and charm on the stage.

In vocal music and piano education, it is very important to be student-centered and satisfy students' learning motivation. Students' motivation in class is a basic element in the learning process, especially in the student-centered learning method, students play an active role in their own learning. During the research period, students show great motivation in teaching projects based on musical creativity, and the change depends on teaching strategies or visual support used.[9] It confirms a wide range of factors that determine students' motivation in music class. Therefore, from the perspective of social and cultural motivation, the classroom can be regarded as a symbolic space where various factors gather together and affect the learning process. It seems appropriate to emphasize how psychological theory explains the influence of basic aspects that should be considered in the classroom and in the social background framework where these phenomena occur. According to the motivation and function of piano learners, from the perspective of harmony, piano, as an instrument that needs the cooperation of both hands, can build a global harmony consciousness for vocal music learners from the initial stage of contact with music. Although this concept may be abstract at first, it plays a positive role in children's further music learning in the future[10].

Furthermore, from the perspective of learners' growth, using both hands and mouth will not only help to form good thinking, but also gradually reduce their dependence on accompaniment. Vocal

music learning and piano accompaniment can complement each other and promote each other. The importance of piano accompaniment is often underestimated, but in fact, the depth of expression of songs by singers often depends on their understanding of piano accompaniment. In order to better interpret vocal music works, singers must accurately grasp the theme, harmony layout and emotional changes of songs, which are often directly reflected in the accompaniment of songs. Therefore, directly practicing piano accompaniment can make children have a deeper understanding of the whole song, thus showing the connotation of the song more comprehensively.

Vocal music learning can also deepen learners' understanding of piano functions. Vocal music teachers can start teaching with simple piano score accompaniment according to students' piano level and the difficulty of grading textbooks. In the early stage of vocal music learning, learners may not adapt to "singing while playing". After training, this method will become an indispensable means for them. It can not only cultivate learners' autonomous learning ability and provide them with the opportunity to read music, but also allow them to practice or perform independently in any place where there is a piano. This kind of self-playing and self-singing ability has injected more vitality into piano learners.

Therefore, in the teaching process of vocal music performance, teachers can cultivate students' musical literacy and aesthetic ability by guiding them to analyze works, feel music and understand emotions. At the same time, combined with students' individual differences, teachers can make personalized teaching plans to help them explore their musical potential and enhance their musical expression.

### **3. The application of piano accompaniment in vocal performance teaching**

Piano accompaniment plays an irreplaceable role in vocal performance. First of all, piano, as an accompaniment instrument, can provide rich musical background and emotional support for vocal performance[11]. In vocal music performance, piano accompaniment can accurately grasp the rhythm and style of the work, provide strong support for the singer, and make it better show the artistic charm of the work. Secondly, piano education can help students build a solid musical foundation and improve their musical expression and creativity. Through piano education, students can master basic music knowledge and skills and lay a solid foundation for vocal performance. At the same time, piano education can also cultivate students' musical thinking and innovative ability, so that students can show more unique artistic style in vocal performance.

In the process of piano education, teachers can make targeted teaching plans according to the actual situation of students to help students master the basic skills of piano playing. At the same time, teachers can also guide students to appreciate and play excellent vocal music works, so that students can feel the important role of piano accompaniment in vocal music performance in practice and improve their musical expression and creativity.

#### **3.1 Singing and training in the tone head and tone length**

When playing, the piano teacher creates the head by pressing the keys quickly and forcefully, and then quickly releases his fingers to ensure that the strings can fully vibrate within the sound length, which is the key skill to realize the correct head performance. In the process of touching the keys, teachers need to concentrate their efforts, relax quickly after touching the keys, and at the same time ensure that the pronunciation of each part is coordinated to produce a grainy musical effect.

In addition, piano teachers can also integrate vocal singing skills while playing. In the process of closing vocal cords, they will consciously let the larynx move down, stimulate the sound head through the interaction between breath, and then the larynx will relax quickly. The sound length

maintains the vibration of vocal cords through the transmission of breath, and this process is constantly alternating to achieve the harmony and unity of music and vocal music[12].

### **3.2 Vocal music and piano in the tone training blend**

The piano maker will carefully modulate his piano timbre, and at the same time, he needs to interpret it in a correct way. With the improvement of players' skills, their perception of timbre will be more acute, and the rich imagination of timbre will also enable players to explore the timbre potential of the piano more deeply.

Vocal singing training also depends on the correct pronunciation method, but not only that, the singer also needs to maintain the changeable pitch in the singing process, and ensure that the pronunciation body and the resonance body always maintain the balance of high and low frequencies. Therefore, vocal music singing is actually a process of "creating musical instruments in real time", in which the shaping of timbre is particularly critical. In particular, the acquisition of high-frequency resonance is the most arduous but important task in vocal music training.[13]

It can be seen that although piano and vocal music have different structural characteristics, they have something in common in pronunciation mechanism. Therefore, in the process of sound training for piano and vocal music, college teachers can learn from each other's strengths to improve their own training methods, so as to promote the level of music training.

## **4. The interactive blending and case of digital empowerment vocal performance and piano education**

In vocal music performance, piano accompaniment is not only a supplement to music, but also a medium for deepening and expressing emotions. Piano accompaniment can create a rich musical atmosphere and emotional background for vocal performance through its unique timbre and expressive force. For example, in the opera performance, piano accompaniment can accurately grasp the rhythm and emotional changes of the plot, provide strong support for the singer, and make him more deeply involved in the role.

At the same time, piano accompaniment has a unique artistic effect in vocal performance. Piano timbre is rich and changeable, which can be flexibly adjusted according to different styles and emotional needs of works. In vocal music performance, piano accompaniment can create a more vivid and real musical image for singers through delicate timbre changes and rich harmony texture, so that the audience can feel the artistic charm of the works more deeply.

### **4.1 vocal performance and piano education interactive blend**

#### **4.1.1 The blending of vocal performance and piano education**

##### **1) Blending of teaching contents**

Vocal performance and piano education are blended in teaching content. Vocal performance and piano education show a trend of interweaving and merging in teaching content. Singing while playing, as a comprehensive artistic activity that closely combines theory with practice, challenges the performer to quickly integrate vocal music with piano accompaniment. This integration covers many aspects, including in-depth understanding of musical works, careful handling of melodies, accurate analysis of musical forms, mastery of harmony language, display of singing skills, flexible use of accompaniment texture, and mastery of piano playing techniques. These factors together constitute the essence of singing while playing.[5]

In the course of vocal music performance, students need to learn how to cooperate with piano

accompaniment, which needs to be played according to the characteristics of vocal music works. This blended teaching method enables students to better understand music works and improve their performance level. At the same time, the piano education curriculum also includes the teaching content of accompaniment for vocal music works, so that piano majors can better serve vocal music performances.

#### 2) Blending of teaching methods

Vocal performance and piano education are also blended in teaching methods. Piano art guidance plays an important role in vocal music teaching. Through piano accompaniment and guidance, students can better understand the structure and expression of musical works and improve their singing quality. At the same time, piano education also draws lessons from the teaching methods in vocal music performance, such as emotional expression and timbre adjustment, which makes piano performance more expressive and appealing.

### 4.1.2 Interaction between vocal performance and piano education

#### 1) The support of piano accompaniment to vocal performance

Piano accompaniment plays a vital role in vocal performance. It can provide stable rhythm and melody support for vocal music singing, so that singers can better express their emotions and artistic conception in music works. At the same time, piano accompaniment can also be flexibly adjusted according to the performance of the singer, enhancing the appeal and expressiveness of the performance.

In piano playing, the rhythm and breathing of the player play an important role in the in-depth understanding of the work, the accurate expression of artistic conception, the clarity, richness and coherence of the music. [6] Therefore, teachers and students need to master how to accurately use the skills of "moving" and "static" in performance, so that players can naturally adjust their breathing rhythm with the rhythm of music and achieve a high degree of coordination between body and mind and works. Proper breathing rhythm can skillfully promote the development and change of music and make the performance more vivid and fascinating.

In piano performance, the expression of "motion" and "silence" is multi-dimensional: it not only reflects the visual expression of the player's body language, but also reflects the auditory presentation of the music itself, such as the sound's ringing, persistence, silence, rest and silence, etc. These sound elements jointly construct the dynamic and static beauty of music. When the performer can skillfully combine "motion" and "stillness" to achieve the perfect unity of body, mind and music, he can achieve the performance realm of "integration of piano and human" and make every performance a spiritual journey and artistic enjoyment.

#### 2) The promotion of vocal performance to piano education.

By accompanying vocal music works, piano majors can have a deeper understanding of music works of different styles and periods and broaden their musical horizons. At the same time, the skills of emotional expression and timbre adjustment in vocal music performance also put forward higher requirements for piano performance, which made piano majors pay more attention to details and expressiveness.

In the process of cooperation between vocal performance and piano accompaniment, we need to master certain skills and methods. First of all, singers and piano accompanists need to deeply understand the content and style of the works and accurately grasp the emotional tone and rhythm characteristics of the works. Secondly, in the process of playing, the two need to maintain close cooperation and tacit cooperation to ensure the unity and coordination of music rhythm and timbre. Finally, after the performance, they need to communicate and feedback in time, sum up the experience and lessons in the performance, and make full preparations for the next collaboration.

## 4.2 The teaching of vocal performance and piano playing of the folk song "Chinese Cabbage" in the digital environment

Piano playing and singing is a unique art form that perfectly combines piano playing and singing. With the in-depth development of artistic interest and academic research, music performance has gradually shifted from relying solely on intuitive talent and repeated practice to paying more attention to the cultivation of diversified creative talents.[14] The blending and interaction between vocal performance and piano education not only enriched the connotation of music education, but also achieved remarkable results and far-reaching influence in practical application.

Songle music intelligent software can analyze music and display information. After submitting the online music link, users can complete the analysis within 5 to 10 minutes, display information such as chords, beats, tunes and syllables, and present the voice, pitch, melody and beat of a song. Users can understand the layout of the song and jump to the chorus (Figure 2). At the same time, it supports searching songs according to chord, beat and tune structure, which is convenient for users to find songs with similar music elements. songle turns music core elements into visual analysis.

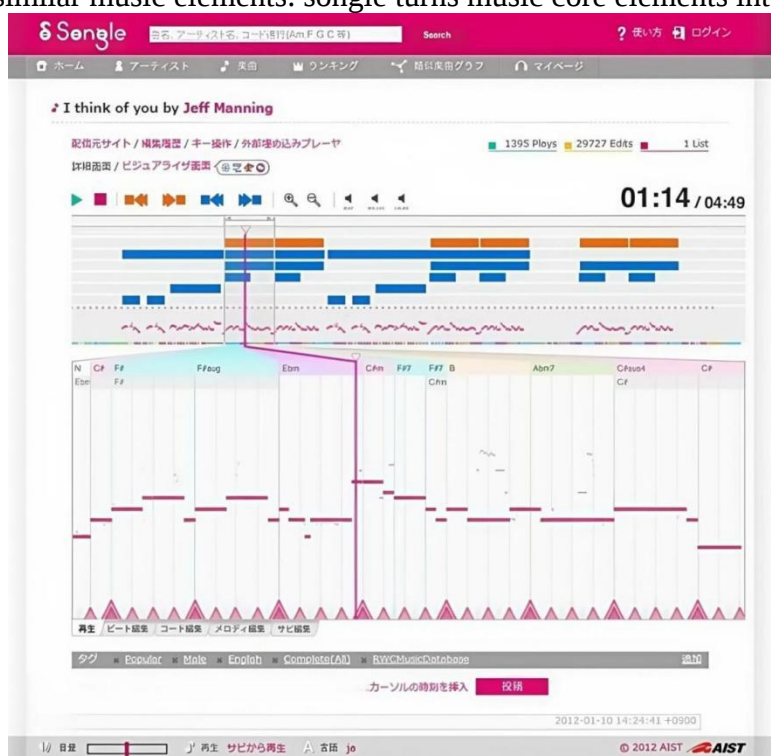


Figure 2 Visualizer mode for music map appreciation

Folk songs are closely related to people's lives, and Chinese Cabbage is a bright pearl in this treasure house. With its extremely refined musical language and excellent artistic expression, it created a poor little girl who lives in the countryside and is ill-fated-"Chinese cabbage, yellow field, two or three years old, no mother, mother!" Mother! "Through the continuous narration of seven lyrics, the tragic experience of the little girl losing her mother and her deep nostalgia for her mother are deeply described.

Although the whole song has only six short bars, including 5/4 and 4/4 beats, its structure is complete and compact, and its emotion is sincere and deep. The song takes the prelude of A Palace system and B Business Mode as the introduction, which lays a sad and heavy tone for the whole work and makes the audience deeply feel the loneliness and helplessness of the little girl in the melody (Figure 3).



Figure 3 Piano score of 'Little Cabbage'

When singing Chinese Cabbage, we need to pay attention to emotional input, articulation, timbre and volume control, emotional changes, rhythm and speed, voice skills and stage performance. Only by comprehensively grasping these points can the song be sung vividly and deeply. Singing "Chinese Cabbage" and playing the piano at the same time need to achieve harmony and coordination between vocal performance and piano playing. We need to deeply study and understand the melody, lyrics and emotional stories behind "Chinese Cabbage" to ensure that we can accurately convey the emotions of the song.

In the teaching of "Chinese cabbage" for Korean students in China, digital means run through the whole process of cultural transmission and skill integration: the melody differences between "Chinese cabbage" and "Arirang" are visually compared by using the Songle digital atlas tool, so that students can intuitively grasp the core of cultural differences (Figure 4). Intelligent system is introduced into piano training, which can prompt the integration of Korean drum rhythm and gayageum timbre in real time and experience cultural integration.

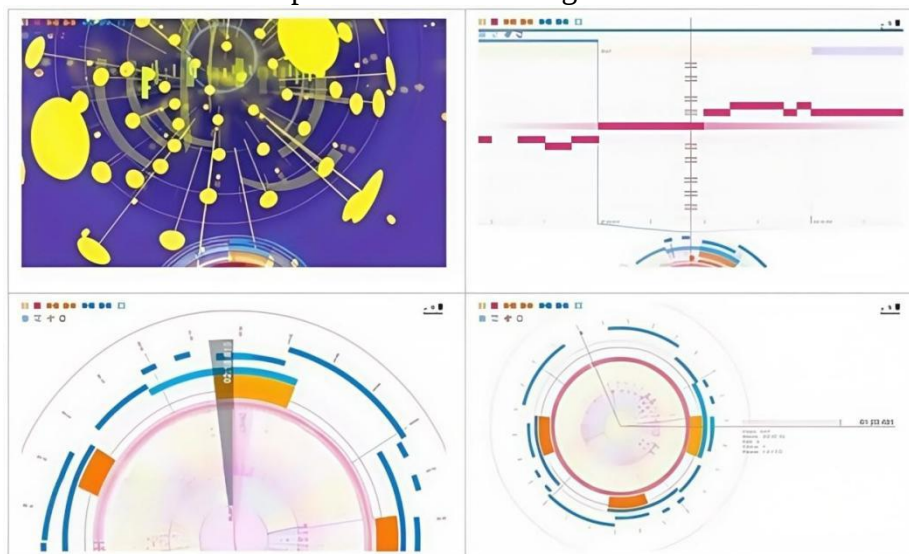


Figure 4 Songle Visual Music Map

"Chinese cabbage" rhythm and speed, strictly grasp the rhythm and speed of the song, to ensure the synchronization of playing and singing. Special attention should be paid to the possible tempo

changes in the song (such as the alternation of 5/4 and 4/4 beats) to ensure the harmonious unity of the accompaniment and the performance. This way, the sound that pops out will be louder. Each finger should be raised before and after each sound, and the fingers that don't play at intervals should also be raised, which helps to generate enough inertial force and pop up powerful sounds. Fingers should have a certain hardness, and the pop-up sound will be strong. In terms of strength and timbre, the volume of piano accompaniment should be moderate, avoid being too big or too small, and coordinate with the singer's voice. According to the emotional changes of songs, adjust the intensity and timbre of piano accompaniment in time, such as increasing the intensity and timbre brightness in the climax of songs. As a music editor, Songle can adjust the voice, pitch, melody and beat of songs. If the learners think that the computer analysis is not accurate enough, they can also manually modify the relevant music information, and the Songle software will record each revision. Learners can analyze the results visually after revision, which is helpful to improve their musical understanding, and then improve the artistic level of vocal music performance and piano performance.

In view of the adaptive challenges faced by Korean learners in the process of acquiring the "uneven rhythm" of China folk songs, this study designs and develops a "digital training module for the comparison of Chinese and Korean rhythms". This module adopts innovative technical scheme, deconstructs the 5/4 beat of Chinese Cabbage into a "2+3" compound rhythm unit, and shows the corresponding relationship between the flow rhythm and the beat structure of the lyrics of China Northern Dialect "Chinese Cabbage, the ground is yellow" through dynamic visual demonstration [10]. The "3+3" subsection mode of 6/8 beat of Arirang in South Korea is analyzed synchronously, and the rhythm mechanism of conveying sadness in the two works is marked by musical semiotics[11]. Chinese Cabbage forms an oppressive expression through the extension of appendages within the equally divided rhythm frame, while Arirang alternately realizes passionate expression by relying on the strong and weak rhythms in the double beat. Learners can carry out multimodal exercises through the rhythm synchronization training program, and synchronously perform the tasks of piano touch and vocal music production according to the bilingual rhythm instructions generated by the system in real time. The system evaluates the real-time performance and marks the rhythm deviation position through the audio analysis engine, which effectively promotes the adaptive development of learners to the rhythm system of China folk songs and significantly enhances the synergy between vocal music singing and piano accompaniment[15].

In the emotional input, in the process of singing and playing, we should invest enough emotions to ensure the accurate transmission of songs' emotions. According to the emotional changes of songs, the intensity, timbre and speed of singing and playing are adjusted in time to make the emotional expression of songs richer and more vivid. The rehearsal and performance guidelines need to ensure close communication and cooperation between the vocal performance and the piano accompaniment, and make sure that both are in harmony in terms of rhythm, tempo and emotional expression. At the same time, we should pay attention to the details. In the process of playing, we should pay attention to the handling of every detail, such as the strength of touching keys and the change of timbre, so as to make the performance more delicate and wonderful.

In the context of the digital age, in order to deepen the emotional resonance of Korean students to "Suffering Narration" in Chinese Cabbage, this paper uses Songle digital intelligent software to extract sad audio features and generate emotional maps. After students upload the playing and singing audio of "Chinese Cabbage", they systematically compare and analyze the emotional fit and provide optimization suggestions. Through emotional data and cultural comparison, it helps Korean students to cross cultural barriers and realize emotional integration of vocal music and piano.

Piano education for Korean students studying in China can be based on songle software to deepen its integration with vocal performance. When arranging the China folk song "Chinese

Cabbage" with piano accompaniment system, the left-hand voice part uses a slow descending bass line to simulate the rich timbre of China Sheng and convey the suffering narrative contained in the work; The right-hand voice is integrated with the "three-tone" key-touching technique of gayageum, Korea, and plays five-tone segments, so that Korean students can understand China's music works through familiar acoustic logic. When arranging the Korean folk song Arirang, we learn from the "sliding sound" technique of China guzheng, and use the left hand of the piano to move the keys horizontally to simulate the effect of "picking the sound by strings", so as to guide students to realize the common aesthetic characteristics of lyricism in Chinese and Korean music. The system integrates the function of "real-time cultural annotation" synchronously. When students play, the screen instantly displays the cultural elements integrated in the accompaniment paragraphs, such as "The bass here simulates the timbre of China Sheng, symbolizing the sad tone of" Chinese Cabbage", and is associated with vocal music singing guidance. "It is appropriate to adopt the vocal singing technique here, which is in line with the emotional expression paradigm of South Korea's' Pan Suoli'", so that piano education can not only impart performance skills, but also convey the cultural core, and realize the deep intertextuality integration of piano education and vocal performance[8].

In addition, some excellent vocal performance works also fully demonstrate the blending and interactive results of vocal performance and piano education. These works not only have superb artistic skills, but also contain profound musical connotations and emotional expressions. By appreciating these works, the audience can feel the beautiful vision that vocal performance and piano education promote each other and develop together.

In the exhibition of digital teaching achievements, the activity of "Digital Exhibition of Chinese-Korean Fusion Music" was organized, and Korean students in China independently created "vocal music and piano" fusion works based on "Chinese cabbage". For example, a participant adapted the piano accompaniment texture with the syncopated rhythm of "Four Things Agricultural Music" in Korea, and at the same time incorporated the vocal fry technique of "Disuoli ()" into the vocal part. Another student embeds the sliding simulation technique of China Guzheng in piano accompaniment[16], and the vocal singing strictly follows the Chinese pronunciation standard of "clear pronunciation and mellow voice". The performance is presented through the real-time streaming media platform, and the audience can trigger the interactive annotation interface of "The rhythm here comes from the Korean four-thing agricultural music" and "The slide of this piece simulates the China guzheng technique".

## 5. Conclusion

Based on the folk song "Chinese Cabbage", this study analyzes the interaction and integration of vocal music singing and piano playing, and finds that vocal music performance and piano education are two important branches of music education, and their integration and interaction are of great significance to the development of music education. Vocal performance can cultivate students' musical literacy and aesthetic ability, while piano education can improve students' musical expression and creativity. Through the blending and interaction of vocal music performance and piano education, we can cultivate more musical talents with artistic accomplishment and creativity and contribute to the prosperity and development of the music industry.

In the digital age, the vocal music and piano teaching for Korean students in universities should be based on the integration mode of "vocal music culture as the core and digital technology as the bridge". With the help of Songle digital intelligent music software, the cultural essence of China music should be deeply integrated into the cognitive system of Korean students, so that piano training can go beyond the skill imparting level and be transformed into a process of cultural understanding. At the same time, vocal music learning can break through single emotional

expression and achieve cross-cultural emotional resonance with piano accompaniment. This dual-drive empowerment of culture and technology not only echoes the core requirements of the interactive integration of vocal performance and piano education, but also provides a scalable digital teaching implementation path for international music education. In the future, we can expand the cultural dimension of digital tools, such as adding systematic comparative cases of Chinese and Korean traditional songs to ensure that the collaborative practice of vocal music and piano always takes root in the cultural soil, making it an effective bridge to promote the cultural exchange between China and South Korea.

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