



# The Impact of National Karaoke Software on the Academic Performance of Students Majoring in Popular Vocal Singing

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## Abstract

This dissertation explores the impact of the National Karaoke Software on the academic performance of college students majoring in popular vocal singing at Hunan University of International Economics. Adopting a quasi-experimental research design, 80 students were systematically divided into an experimental group and a control group. Due to the fact that the popular music singing course at Hunan University of International Economics usually adopts group teaching, this study used purposive sampling techniques to ensure the credibility and accuracy of the research. The total sample size of this study is 132 people. In the group of students majoring in pop music singing, purposefully select a class of 40 as the control group and another 40 as the experimental group. The experimental group utilized the National Karaoke Software as a learning aid for nine weeks, while the control group followed traditional teaching methods. Pre- and post-tests were conducted to assess students' the completeness of students' pop music singing, academic performance, and performance in singing popular music. The results reveal that students in the experimental group demonstrated significant improvements in their popular music singing skills, including pitch accuracy, rhythm control, and vocal techniques. In terms of Pop Music Singing Skills, the control group and experimental group showed a significant difference of 0.01 level in the posterior analysis ( $t=-11.562$ ,  $p=0.000$ ). The specific comparison difference can be seen that the average value of the control group was 69.400, significantly lower than the average level of the experimental group (85.300), with an average difference of 18.900. The experimental group achieved better results. In terms of Pop Music Singing Performance Integrity, the control group and the experimental group showed a significance level of 0.01 in the posterior analysis ( $t=-12.471$ ,  $p=0.000$ ). The specific comparison difference can be seen that the average value of the control group was 69.000, significantly lower than the average level of the experimental group

(83.620), with an average difference of 14.620. In terms of Pop Music Singing Expression, the control group and experimental group showed significant significance at the 0.01 level in the posterior analysis ( $t=12.923$ ,  $p=0.000$ ). The specific comparison difference can be seen that the average value of the control group was 70.500, significantly lower than the average level of the experimental group (85.850), with an average difference of 15.350. The experimental group achieved better results. Furthermore, the experimental group exhibited enhanced performance integrity, characterized by more coherent and expressive renditions of songs. Notably, the National Karaoke Software's real-time feedback and interactive features facilitated self-monitoring and evaluation, contributing to students' metacognitive development and independent learning abilities. The study underscores the potential of digital tools like the National Karaoke Software in revolutionizing music education by providing personalized, engaging, and effective learning experiences. It offers valuable insights for educators and curriculum developers on integrating technology into traditional music teaching methodologies to enhance students' overall musical development.

**Keywords:** Academic Performance, Popular Vocal Singing, Quasi-Experimental Study, Digital Music Education

## 1.Introduction

In recent years, China's digital economy has witnessed remarkable growth, with advancements in Internet big data and artificial intelligence technologies. The proliferation of 5G networks has further accelerated this trend, making smart mobile devices such as smartphones, tablets, and smartwatches integral to students' daily lives and learning experiences (Wu, 2024). The COVID-19 pandemic catalyzed this transformation, as students relied heavily on these devices for continuous learning during home isolation, making online courses a new norm for knowledge transmission (Paoli, 2024). This shift has expanded learning resources and diversified learning methods, enhancing convenience and efficiency in knowledge acquisition, ideological exchange, and experience sharing, thereby fostering comprehensive development among minors.

In the realm of karaoke and its impact on the human body, Yiu and Chan's research highlighted the benefits of hydration and vocal rest for amateur singers, showing that these factors help maintain vocal pitch and reduce fatigue (Zhao, 2024). Miyazaki & Mori's study with older adults revealed that regular karaoke practice could enhance cognitive function, akin to learning therapy, and improve physical health by enhancing respiratory function and tongue pressure, thus alleviating dysphagia (Wexler et al., 2024). Tadahiko's empirical research on cortical activity during different singing styles indicated lower oxygen-hemoglobin levels in the forecortex when singing to karaoke music compared to piano accompaniment (Tada, 2022).

The advent of the Internet has revolutionized communication, enabling people to interact regardless of geographical constraints through various online platforms, including for educational purposes (Dylan, 2024). Karaoke, a popular recreational activity, has evolved with technological advancements. Tencent's karaoke software, launched in September 2014, integrates features like intelligent rating, professional mixing, and social sharing, enhancing users' singing skills and experience (Wexler et al., 2024). This software has gained popularity among music enthusiasts and is increasingly used in middle school music education to boost

students' enthusiasm, facilitate interaction, and improve singing abilities (Loukas et al., 2024).

The rise of online music education has underscored the importance of metacognition and self-directed learning in music pedagogy (Krumme et al., 2012). As online platforms proliferate, Tencent's karaoke software continuously enhances its functionality to cater to diverse user needs, maintaining its competitive edge (Miyoshi et al., 2021). In higher education, many students utilize this software for professional learning, prompting researchers to explore strategies for optimizing its use, enhancing learning efficiency, and understanding its impact on academic performance (Huralna et al., 2022).

In conclusion, the digital economy's growth in China, coupled with technological advancements, has transformed learning and recreational activities. Karaoke, in particular, has demonstrated significant benefits for cognitive and physical health, while online platforms like Tencent's karaoke software have revolutionized music education. As these technologies continue to evolve, it is crucial to explore their full potential, address challenges, and develop strategies to maximize their benefits for users across different age groups and educational settings.

## 2.Literature review

In the literature review, the researchers conducted theories of popular music singing and learning via karaoke software, emphasizing the need for a theoretical foundation. It then examines how popular music majors at Hunan University use national karaoke software, providing empirical literature support for relevant theories. This establishes a framework for studying variables in popular music singing education.

### **Information of Topic/Technology**

Mobile karaoke software, especially ethnic varieties, have become essential entertainment tools, distinguished by technological innovation and rich cultural integration (Miyazaki & Mori, 2020). These platforms are widely used in education, enhancing students' interest and participation in music learning (Bakó, 2011). Interactive features allow students to experience music more intuitively, improving singing skills and understanding of national culture, positively impacting academic performance (Madkour & Alaskar, 2024). Karaoke's fun and interactivity encourage after-class practice, fostering self-learning and innovative thinking. Experiments highlight the importance of hydration and rest for amateur singers (Rantung et al., 2025; Shin & Lim, 2023). Karaoke training also benefits the elderly's cognitive and physical health (Faustino et al., 2024) and influences brain activity differently compared to piano accompaniment (Scherer et al., 2017; Long et al., 2024). Karaoke aids in cultural dissemination and literacy, reviving regional folk songs (Arora, Hu et al., 2022; Kim, 2021). Technological advancements enable song uploading, sharing, and immersive experiences through VR (Yeh and Chiou, Yuge et al., 2022; Miyazaki & Mori, 2020). Karaoke's integration with language learning offers personalized feedback, enhancing pronunciation (Murad and Wang, Dong, 2020). Online-offline interactions, like TV shows, boost ethnic K-songs' popularity (Hu et al., 2022; Yuge et al., 2021). Karaoke platforms support social interaction, offering various sound effects and editing tools (Nichols et al., 2024; Macedo-Lima et al., 2024). Karaoke software, with features like system scoring and friend PK, is widely used for entertainment and education (Hu et al., 2022). Music Performance Techniques up

Techniques encompass a range of movements and skills that are essential for proficient playing. These techniques involve hand and finger movements, as well as upper-body movements, such as trunk and arm actions (McPherson et al., 2006). Performance competence is built on the playing technique, with skilled players acquiring the motor skills to coordinate movement of a multi-joint limb to produce a fluent playing style. Early musical theorists realized the playing technique had not kept pace with the changes in the music environment which called for greater bodily participation (Anufrieva & Tsarev, 2017). This resulted in the realization that the technique needed to be efficient which implied making muscle use more economical by expending only the muscular energy needed for specific procedures, so that the energy load was manageable and the technique sustainable both during a performance and in the long term (Ortmann, 1929/1981).

Historically all performers had had the same difficulties in 'making music' because there is an innate variable in the act of performing: the expression. What do the performers do? The most basic requirement is that a performer should produce the correct notes, rhythms, dynamics, etc. of a musical idea (Clarke, 2002, p. 59). In this sense, we may define the interpretation as a mechanical process; nevertheless, an interpretation without expression is not musical. Thus, Erick Clarke clarified that it was also necessary 'to go beyond' due to the expert performers are obliged to transmit a musical idea and recreate expressively the score. This statement could be controlled and measured because, in an interpretation, one may observe whether the performer had played the exact musical symbols of the score or not, but the issue is more subjective when we value expressivity.

### **Measurement of Music Performance Techniques up**

As college enrollments rise, teachers focus more on pop singing theory and skills within limited class time (Liu, 2024). Yang's Online Education Platform System, with over 100 million users, utilizes e-books extensively (Nichols et al., 2024). Rosenzweig et al. advocate for evolving the "Internet + education" model into an "Internet education" model (Jia, 2024). Simones and Lima note that while online voice instruction offers advantages, it cannot fully replace traditional methods due to the specificity of pop singing. Sturtevant's system aids non-technical teachers in course creation and management. Intelligent big data technology revolutionizes online learning by enabling real-time resource playback without full downloads, saving storage and enhancing flexibility. Learning platforms can now personalize content based on learners' progress and preferences, promoting self-directed learning and boosting initiative. This technology also analyzes learning behavior, adjusting paths and content difficulty to optimize the learning experience, achieving "learning anytime, anywhere, on demand".

### **Information of the Population**

This study focuses on students majoring in popular music singing at Hunan University of International Economics, aiming to advance research in this field (Loukas et al., 2024). China has seen remarkable progress in economic and cultural development, with the vocal performance program at Hunan University playing a significant role in cultural construction, particularly in nurturing future music talent (Shu, 2023). Introduced in the early 20th century, Chinese pop music singing has evolved considerably, thanks to the dedication of vocal artists, achieving notable advancements in performance, teaching, and creation (Missfelder, 2023). Over the past decades, it has grown into an independent and mature art form, leading to a surge in learners and prompting universities to offer relevant courses.

The study's target group comprises music students at the university, specifically those in vocal performance, which encompasses three main streams: bel canto, ethnic, and pop. Pop music singing students focus on acquiring foundational theories and skills, undergoing essential training, and meeting performance ability requirements (Jones, 2023). With China's new basic education curriculum reform, vocal teaching, including pop music, has entered a new developmental phase in higher music education, prioritizing the enhancement of students' musical abilities (Hu et al., 2019). Consequently, pop music singing has become a mandatory course for vocal performance majors, reflecting the diversity and importance of this specialized field.

### **The integrity of popular music singing**

The integrity of popular music singing involves a singer's ability to comprehensively and precisely express every element of a song, including notes, rhythm, melody, harmony, and emotions, ensuring a complete and enhanced musical experience for the audience (Perrine et al., 2024). This requires technical proficiency, such as accurate pitch, steady rhythm, and effective breath control, as well as artistic elements like sincere emotional delivery and vivid stage presence (Shi et al., 2023). A singer must also interpret the song with a personalized style, creating a visual and auditory feast. Maintaining focus throughout the performance and collaborating closely with the accompanying band is crucial to achieving a harmonious and flawless musical effect. Pursuing integrity reflects a singer's technical and artistic growth, representing an ongoing journey towards musical excellence.

### **Musical expression**

The concept of popular music singing expression encompasses a wide range of elements in music art, extending beyond mere sound techniques to include the transmission of emotions, culture, and the spirit of the times. It involves singers artistically presenting the emotions, stories, and personal interpretations of songs to audiences through sound (Li et al., 2017).

This expression relies on a solid foundation of vocal skills, including pitch accuracy, rhythm, and timbre control, as well as techniques like sound conversion and resonance adjustment to enhance expressiveness (Loukas et al., 2024; Paoli, 2024). Breath control is also crucial for maintaining voice coherence and stability. Emotion serves as the core, requiring singers to deeply understand and sincerely convey the song's emotional essence, touching listeners and sparking resonance (Missfelder, 2023).

Stage performance enhances expression through body language, facial expressions, and interaction, creating a vivid, engaging experience (Kim & Park, 2024). Personal style is another vital aspect, as each singer's unique tone and performance traits contribute to their artistic charm and fan appeal. Additionally, popular music singing often reflects cultural and social contexts, with singers using diverse themes and styles to bridge cultures and societies, enriching the genre's depth and reach.

## **3. Research Questions**

RQ1: How does the use of karaoke software improved students' learning performance?

RQ2: How does the use of karaoke software improve the completeness of students' pop music singing and performance?

RQ3: How does the use of karaoke software improve the pop music performance of the

experimental group students?

## 4. Research Objectives

RO1: To determine the effect of karaoke software has improved students' academic performance.

RO2: To determine that karaoke software has improved the completeness of students' pop music singing.

RO3: To explore the influence of cadenza technique on the improvement of students' Musical expression.

## 5. Methodology

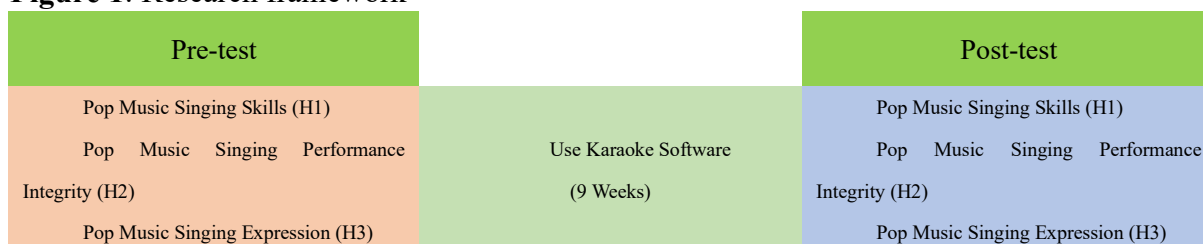
### 1. Research Design

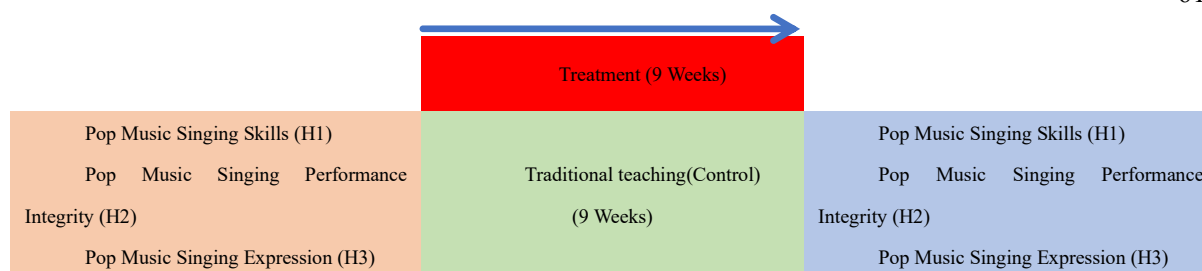
This study employs a quasi-experimental approach to test variables and assess research hypotheses experimentally. It utilizes two distinct designs, with the experimental group of pop music singing students participating in a 9-week learning program facilitated by national karaoke software. Following the program, both the experimental and control groups undergo pre- and post-tests. Quantitative data analysis is then conducted to evaluate the outcomes. In essence, the research collects scores and quantitative data on pop music singing skills, the completeness of singing performance, and the expression quality through these pre- and post-test experiments, aiming to measure the impact of the karaoke software-assisted learning program.

### 2. Research framework

This study spans a 9-week treatment period and involves 80 pop music singing majors from Hunan University of International Economics, divided equally into experimental and control groups. Prior to the course, both groups underwent assessments to gauge their initial levels in three key areas: Pop Music Singing Skills (H1), Pop Music Singing Performance Integrity (H2), and Pop Music Singing Expression (H3). The study utilizes national karaoke software as a learning aid exclusively for the experimental group, while the control group continues with traditional learning methods. This setup aims to evaluate the impact of the software on the students' development. After the 9-week intervention, both groups are reassessed to measure any changes in the aforementioned variables. The study's design allows for a comparative analysis to determine the effectiveness of the national karaoke software in enhancing pop music singing skills, performance integrity, and expression among the students.

**Figure 1: Research framework**





### 3. Research Treatment

This quasi-experimental study examines 80 pop music students over 9 weeks, split into experimental and control groups. The experimental group uses karaoke software, while the control follows traditional methods. The first week involves preparation, introducing the experiment, conducting a pre-test, and training students on software use. Weeks 2-8 focus on teaching implementation, with both groups learning songs through their respective methods, receiving guidance, and making initial singing attempts. The final week involves review and evaluation, with students reflecting on their progress and teachers providing feedback.

**Table 1:** An Outline of the Lesson Plan in Experimental Group (45 Minutes)

| Stage                                    | Time       | Activities                                                                                                                                                                                                                                                                                                                                                                                                                      | Treatment        |
|------------------------------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| 1. Introduction                          | 5 minutes  | <ul style="list-style-type: none"> <li>-The teacher plays the original singing video of the teaching song for this lesson, guiding students to carefully listen to the melody, rhythm, and lyrics of the song, and feel the emotions and style of the song.</li> <li>-Briefly introduce the background and theme of the song, and stimulate students' interest in singing.</li> </ul>                                           |                  |
| 2. Knowledge explanation                 | 10 minutes | <ul style="list-style-type: none"> <li>-Teachers provide sentence teaching for songs, analyze the melodic direction, rhythm patterns, and key singing techniques of each musical phrase, and demonstrate their performance.</li> <li>-Explain the functions that karaoke software will use in this lesson, such as speed adjustment, lyric prompts, recording, etc.</li> </ul>                                                  | karaoke software |
| 3. Practice singing sentence by sentence | 15 minutes | <ul style="list-style-type: none"> <li>-Students use karaoke software to select song accompaniment, activate the lyric prompt function, slow down the accompaniment speed to the appropriate rhythm, and practice singing sentence by sentence.</li> <li>-Teachers guide students to observe the pitch and rhythm feedback data on the software, helping them improve singing problems in a targeted manner, such as</li> </ul> | karaoke software |

|                             |            |                                                                                                                                                                                                                                                                                                                            |                  |
|-----------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
|                             |            | correcting pitch deviations, adjusting unstable rhythm parts, etc.                                                                                                                                                                                                                                                         |                  |
|                             |            | Pop Music Singing Skills:                                                                                                                                                                                                                                                                                                  |                  |
|                             |            | -The national karaoke software is used to measure features such as pitch, rhythm accuracy, pronunciation, and speed. Adjust appropriately according to different singing states.                                                                                                                                           |                  |
|                             |            | Pop Music Singing Performance Integrity:                                                                                                                                                                                                                                                                                   |                  |
|                             |            | -Through the recording function of the national karaoke software, a comparison was made on the coherence, unity, and completeness of popular music singing.                                                                                                                                                                |                  |
|                             |            | Pop Music Singing Expression:                                                                                                                                                                                                                                                                                              |                  |
|                             |            | -By using the task functions of the national karaoke software to compare the rhythm, volume, and note length of popular music singing, we can find the true pitch, uniform dynamics, and rhythm of music from the artistic expression of emotions in singing.                                                              |                  |
| 4.Complete singing practice | 10 minutes | -Students engage in complete singing exercises, and teachers guide them to integrate emotions, paying attention to the details of song expression, such as changes in intensity, control of breath strength, and emotional fluctuations.<br>-Emphasize the posture and expression of singing to enhance stage performance. | karaoke software |
| 5.Summary                   | 5 minutes  | -Teachers evaluate and summarize students' singing performance, point out their strengths and weaknesses, and encourage students to continue working hard.<br>-Remind students to use karaoke software for independent practice after class to further improve their singing skills.                                       |                  |

**Table 2:**Research Treatment

|                     |       | <b>Experimental group<br/>(Use National K-song software)</b> | <b>Control group<br/>(Do not use National K-song software)</b> |
|---------------------|-------|--------------------------------------------------------------|----------------------------------------------------------------|
| stage 1 preparation | Week1 | Basic Teaching of Pop Music Singing                          | Basic Teaching of Pop Music Singing                            |

|                                                |       |                                                                                       |                      |
|------------------------------------------------|-------|---------------------------------------------------------------------------------------|----------------------|
| stage 2<br>Teaching<br>implementation<br>stage | Week2 | -Learning to using National<br>K-song software<br>-Teaching song "Chaser of<br>Light" | Traditional teaching |
|                                                | Week3 | -Teaching song 'The Wind<br>Rises'                                                    | Traditional teaching |
|                                                | Week4 | -Teaching song "Beyond the<br>Light Year"                                             | Traditional teaching |
|                                                | Week5 | -Teaching song "Ordinary<br>Road"                                                     | Traditional teaching |
|                                                | Week6 | -Teaching song "My Future<br>is Not a Dream"                                          | Traditional teaching |
|                                                | Week7 | -Teaching song "The First<br>Dream"                                                   | Traditional teaching |
|                                                | Week8 | -Teaching song "Youthful<br>and Promising"                                            | Traditional teaching |
| stage 3<br>Summary and<br>Evaluation Stage     | Week9 | Post-Test (Performance test to the project)                                           |                      |

**Table 3:**Number of Population and Sample Size

| Classes                                                                                                     | Population | Sample Size |
|-------------------------------------------------------------------------------------------------------------|------------|-------------|
| Total Population of popular music singing<br>at Hunan University of International<br>Business and Economics | 132        |             |
| Class A<br>Experimental Group                                                                               |            | 40          |
| Class B<br>Control group                                                                                    |            | 40          |

This study employed purposive sampling to select 132 pop music singing students from Hunan University of International Business, spanning their first to fourth years of college. The aim was to gather more effective data on enhancing their pop music singing performance. The rationale for choosing these students lies in their specialized knowledge of pop music singing, which ensures a deeper understanding and suitability for the investigation. The selection criteria included: students must major in pop music singing; the sample should be representative, reflecting the broader characteristics of the pop music student population at the university, which offers a major in popular music performance with a sizable and relevant student body; and the researcher's close connection to the major facilitates meeting research requirements. This targeted approach ensures the study's findings are both relevant and insightful.

**Table 5:** Variables Measured

| Variables                               | Literature                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pop Music Singing Skills                | The concept of popular music singing techniques refers to a series of methods and means adopted by singers when singing popular music, aiming to accurately convey the emotions, style, and artistic conception of the song through the artistic processing of sound (Rantung et al., 2025). These techniques cover multiple aspects of sound production, resonance, control, and expression, and are an indispensable and important component of popular music singing (Dong, 2020). |
| Pop Music Singing Performance Integrity | The completeness of popular music singing refers to the ability of the singer to comprehensively and accurately express the emotions and artistic conception contained in every note, rhythm, melody, harmony, and lyrics of the song during the singing process, so that the singing effect is consistent with the original intention of the song, and even surpasses the expressive power of the original work (Rezaee rad & Khoddami, 2024).                                       |
| Pop Music Singing Expression            | The artistic activity of singers conveying the emotions and styles of popular songs through sound and stage performance (Loukas et al., 2024). This activity integrates multiple aspects such as sound skills, emotional expression, and stage performance, aiming to showcase the charm of popular music to the audience and create a unique music experience.                                                                                                                       |

## 6.Results

The data analysis in this study adopts quantitative data analysis. Quantitative data analysis will evaluate whether the national karaoke software has significant differences from traditional teaching methods in improving students' pop music singing skills, completeness of pop music singing, and expression of pop music singing. The independent sample t-test from Jamovi statistical analysis software will be used for hypotheses testing.

This study will use descriptive statistics methods to understand the overall situation of the data, including the mean value of the data, and standard deviation to understand the distribution and characteristics of the data. This study used independent sample t-test to compare whether there was a significant difference in the mean values between two groups of independent samples.

This section was present and discuss descriptive statistical results for all variables in this study.

### Differences Between the Pre-test Scores

In order to ensure that the students in the control group and the experimental group had the same ability at the beginning of the experiment, independent sample T-test was conducted for the three variables of this study respectively before the experiment. By comparing the Performance of the two groups of students in Music Performance Techniques up, Integrity of musical performance, and Musical expression, the following table shows the results of data analysis.

**Table 6 :** Summary of students' pre-test results (n=40)

| Variable                                       | Group              | S.D.  | Mean   | Mean Differences<br>(Experimental - Control) | p-value |
|------------------------------------------------|--------------------|-------|--------|----------------------------------------------|---------|
| <b>Pop Music Singing Skills</b>                | Control Group      | 4.762 | 65.700 | 1.225                                        | 0.301   |
|                                                | Experimental Group | 5.726 | 66.925 |                                              |         |
| <b>Pop Music Singing Performance Integrity</b> | Control Group      | 4.817 | 65.075 | 0.775                                        | 0.464   |
|                                                | Experimental Group | 4.605 | 65.850 |                                              |         |
| <b>Pop Music Singing Expression</b>            | Control Group      | 5.751 | 64.450 | 0.225                                        | 0.850   |
|                                                | Experimental Group | 4.785 | 64.338 |                                              |         |

In order to compare the pre-test scores of Pop Music Singing Skills, Pop Music Singing Performance Integrity and Pop Music Singing Expression between the experimental group and the control group, Independent sample T-test was conducted on the three variables respectively, and according to the results, there was no significant difference in the pre-test results of the two groups of Pop Music Singing Skills ( $t=1.04$ ,  $p=0.301>0.05$ ), the two groups were comparable.

There was no significant difference in the pre-test results of Pop Music Singing Performance Integrity between the two groups ( $t=0.736$ ,  $p=0.464>0.05$ ), the two groups were comparable.

There was no significant difference in the pre-test results of Pop Music Singing Expression between the two groups ( $t=0.190$ ,  $p=0.850>0.05$ ), the two groups were comparable. It should be noted that while the pre-test results may not represent an accurate estimate of the students' skills in this study, the skill levels of the students in the two groups were comparable, so it can be concluded that the differences between the two groups would not have an impact on the results based on the pre-test results.

#### **Descriptive Statistics of Pop Music Singing Skills**

Descriptive statistical methods of central tendency and dispersion degree were used to analyze the pre-test and post-test scores of the Pop Music Singing Skills to the experimental group and the control group. The following are the data analysis results.

**Table 7 :** Summary of mean results of Pop Music Singing Skills in Experimental group (n=40)

|                        | Mean   | S.D.  |
|------------------------|--------|-------|
| <b>Pre-test score</b>  | 66.925 | 5.726 |
| <b>Post-test score</b> | 85.300 | 7.104 |

From table 7, it showed that the average value of post-test score was 85.300, which was higher than the average pre-test score of 66.925. Therefore, it was concluded that the

treatment can help students improve on their singing skills.

**Table 8 :** Summary of mean results of Pop Music Singing Skills in Control group (n=40)

|                        | Mean   | S.D.  |
|------------------------|--------|-------|
| <b>Pre-test score</b>  | 65.700 | 4.762 |
| <b>Post-test score</b> | 69.400 | 5.017 |

Table 8 showed that the average value of post-test score was 69.400, which was higher than the average pre-test score of 65.700. Therefore, it was concluded that the treatment can help students improve on their singing skills.

#### **Descriptive Statistics of Pop Music Singing Performance Integrity**

The pre-test and post-test scores of the Pop Music Singing Performance Integrity of students in the experimental group and the control group were analyzed using descriptive statistical methods. The following are the results of data analysis.

**Table 9 :** Summary of mean results of Pop Music Singing Performance Integrity in experimental group (n=40)

|                        | Mean   | SD    |
|------------------------|--------|-------|
| <b>Pre-test score</b>  | 65.850 | 4.605 |
| <b>Post-test score</b> | 83.625 | 5.719 |

Table 9 showed that the average value of post-test score was 83.625, which was higher than the average pre-test score of 65.850. Therefore, it was concluded that the treatment can help students improve on their singing performance integrity.

**Table 10 :** Summary of mean results of Pop Music Singing Performance Integrity in Control group (n=40)

|                        | Mean   | SD    |
|------------------------|--------|-------|
| <b>Pre-test score</b>  | 65.075 | 4.817 |
| <b>Post-test score</b> | 69.000 | 4.723 |

Table 10 showed that the average value of post-test score was 69.000, which was higher than the average pre-test score of 65.075. Therefore, it was concluded that the treatment can help students improve on their singing performance integrity.

#### **Descriptive Statistics of Pop Music Singing Expression**

The pre-test and post-test scores of the Pop Music Singing Expression of students in the experimental group and the control group were analyzed using descriptive statistical methods. The following are the results of data analysis.

**Table 11 :** Summary of mean results of Pop Music Singing Expression in experimental group

(n=40)

|                 | Mean   | SD    |
|-----------------|--------|-------|
| Pre-test score  | 64.225 | 4.785 |
| Post-test score | 85.850 | 5.512 |

Table 11 showed that the average value of post-test score was 85.850, which was higher than the average pre-test score of 64.225. Therefore, it was concluded that the treatment can help students improve on their singing expression.

**Table 12 :** Summary of mean results of Pop Music Singing Expression in Control group (n=40)

|                 | Mean   | SD    |
|-----------------|--------|-------|
| Pre-test score  | 64.450 | 5.751 |
| Post-test score | 70.500 | 5.104 |

Table 12 showed that the average value of post-test score was 70.500, which was higher than the average pre-test score of 60.450. Therefore, it was concluded that the treatment can help students improve on their singing expression.

### *Hypotheses Testing*

This study investigated the effectiveness of Karaoke Software teaching in improving students' Pop Music Singing Skills, Pop Music Singing Performance Integrity and Pop Music Singing Expression. The average scores of the pre-test and the post-test were compared.

In this study, the independent sample t-test was used to test the three hypotheses. The hypothesis test of this study is as follows.

#### Hypotheses 1

H01: The students' Pop Music Singing Skills improvement are not different between students in the control group and experimental group.

Ha1: The students' Pop Music Singing Skills are different between students in the control group and experimental group.

**Table 13 :** T-test between control group and experimental group of students' Pop Music Singing Skills

| Tests     | Groups             | n  | Mean   | S.D.   | Mean Differences<br>(Post -Pre) | t       | df | p-value |
|-----------|--------------------|----|--------|--------|---------------------------------|---------|----|---------|
| Post-test | Control Group      | 40 | 69.400 | 5.017  | 15.9                            | -11.562 | 78 | 0.000** |
|           | Experimental group | 40 | 85.300 | 7.104  |                                 |         |    |         |
|           | Total              | 80 | 77.35  | 10.067 |                                 |         |    |         |
| Pre-test  | Control Group      | 40 | 65.700 | 4.762  | 1.225                           | -1.040  | 78 | 0.301   |
|           | Experimental group | 40 | 66.925 | 5.726  |                                 |         |    |         |
|           | Total              | 80 | 66.313 | 5.269  |                                 |         |    |         |

There was no significant difference between different groups for Pre-test ( $t=-1.040$ ,  $p=0.301>0.05$ ), the two groups were comparable.

Different groups showed 0.01 level significance for Post-test ( $t=-11.562$ ,  $p=0.000$ ), and the specific comparison difference can be seen that the average value of the Control Group (69.400), It was significantly lower than the average of experimental group (85.300), Mean Differences (18.900). The experimental group had better results.

#### Hypotheses 2

H02: The students' Pop Music Singing Performance Integrity are not different between students in the control group and experimental group.

Ha2: The students' Pop Music Singing Performance Integrity are different between students in the control group and experimental group.

**Table 14 :** T-test between control group and experimental group of students' Pop Music Singing Performance Integrity

| Tests     | Groups             | n  | Mean   | S.D.  | Mean Differences (Post -Pre) | t      | df | p-value |
|-----------|--------------------|----|--------|-------|------------------------------|--------|----|---------|
| Post-test | Control Group      | 40 | 69     | 4.723 |                              |        |    |         |
|           | Experimental Group | 40 | 83.625 | 5.719 | 14.625                       | 12.471 | 78 | 0.000** |
|           | Total              | 80 | 76.313 | 9.017 |                              |        |    |         |
| Pre-test  | Control Group      | 40 | 65.075 | 4.817 |                              |        |    |         |
|           | Experimental Group | 40 | 65.85  | 4.605 | 0.775                        | 0.736  | 78 | 0.464   |
|           | Total              | 80 | 65.463 | 4.698 |                              |        |    |         |

There was no significant difference between groups for Pre-test ( $t=-0.736$ ,  $p=0.464>0.05$ ), the two groups were comparable.

Different groups showed 0.01 level significance for Post-test ( $t=-12.471$ ,  $p=0.000$ ), and the specific comparison difference can be seen that the average value of the Control Group (69.000), It is significantly lower than the average of experimental group (83.620), Mean Differences (14.620).

#### Hypotheses 3

H03: The students' Pop Music Singing Expression are not different between students in the control group and experimental group.

Ha3: The students' Pop Music Singing Expression are different between students in the control group and experimental group.

**Table 15 :** T-test between control group and experimental group of students' Pop Music Singing Expression

| Tests     | Groups             | n  | Mean   | S.D.  | Mean Differences (Post -Pre) | t      | df | p-value |
|-----------|--------------------|----|--------|-------|------------------------------|--------|----|---------|
| Post-test | Control Group      | 40 | 70.500 | 5.104 | 15.350                       | 12.923 | 78 | 0.000** |
|           | Experimental Group | 40 | 85.850 | 5.512 |                              |        |    |         |
|           | Total              | 80 | 78.175 | 9.355 |                              |        |    |         |
| Pre-test  | Control Group      | 40 | 64.450 | 5.751 | 0.225                        | 0.190  | 78 | 0.850   |
|           | Experimental Group | 40 | 64.225 | 4.785 |                              |        |    |         |
|           | Total              | 80 | 64.338 | 5.258 |                              |        |    |         |

There was no significant difference between different groups for Pre-test ( $t=0.19$ ,  $p=0.850>0.05$ ), the two groups were comparable.

Different groups showed 0.01 level significance for Post-test ( $t=12.923$ ,  $p=0.000$ ), and the specific comparison difference can be seen that the average value of the Control Group (70.500), It was significantly lower than the average of experimental group (85.850), Mean Differences (15.350). The experimental group had better results.

**Table 16 :** Summary of Hypothesis Testing and Results

| Hypotheses | Statement                                                                                                                            | Result   |
|------------|--------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>H01</b> | The students' Pop Music Singing Skills are not different between students in the control group and experimental group                | Rejected |
| <b>H02</b> | The students' Pop Music Singing Performance Integrity are not different between students in the control group and experimental group | Rejected |
| <b>H03</b> | The students' Pop Music Singing Expression are not different between students in the control group and experimental group            | Rejected |

## 7.Conclusion

This study is an in-depth and comprehensive investigation into the use of Karaoke Software in popular music singing teaching. The purpose of the study was to determine the extent to which Karaoke Software can improve students' Pop Music Singing Skills, Pop Music Singing Performance Integrity, and Pop Music Singing Expression.

In actual teaching, by setting relevant learning content and tasks on Karaoke Software, teachers can timely understand the learning progress of students, so as to timely find errors and give feedback, and better plan the future improvement direction for students. This kind of intuitive display of students' learning content. It has significantly improved students' Pop Music Singing Skills, Pop Music Singing Performance Integrity, and Pop Music Singing Expression.

Through the study of this paper, the researchers found that the current popular music singing teaching method of College of Music of Hunan International Economics University has some limitations on the development of teaching content and the training of talents. In the face of the current rapid development of new media society, the traditional popular music

singing teaching method is not fully adapted to it. Therefore, it is necessary to combine the two and strengthen the application of digital technology in the teaching process, such as: using digital technology to enhance learning interest and innovate learning environment; Innovating teaching carriers, adjusting teaching methods and other means to keep pace with The Times to innovate popular music singing teaching methods, so that the teaching form is more novel, the teaching system is more sound, so as to fundamentally improve the effectiveness of teaching methods. However, the gains and shortcomings of the research coexist. In the research process, only students majoring in popular music singing in College of Music of Hunan International Economics University were selected as the survey objects in the survey design of sample size. Therefore, the data analysis results of this study cannot represent the views of all teachers and students majoring in popular music singing in universities. Therefore, researchers were also deepening the study and research of relevant knowledge, so as to put forward more appropriate countermeasures in the future research.

All in all, the results of this study show that integrating Karaoke Software into popular music singing teaching can be an effective and successful model for teaching popular music singing, which provides certain research value for enriching popular music singing teaching model and future teaching research and practice.

Overall, the results of this study indicate that integrating karaoke software into popular music singing teaching can be an effective and successful educational model for popular music singing. This provides certain research value for enriching the teaching mode of popular music singing and future teaching research and practice. Specifically, this study first provides a quantifiable model for technology integration in the field of teaching, and verifies the triple improvement effect of digital tools on singing skills, performance integrity, and artistic expression through empirical data. This lays a theoretical foundation for the development of intelligent teaching systems and the construction of standardized evaluation systems in the future. Secondly, the path of combining traditional teaching with digital technology revealed by the study provides practical guidance for the transformation of music education in universities, especially for colleges with limited teaching resources and outdated teaching methods. It has direct reference significance - through the software's built-in real-time scoring, error labeling, multi-dimensional comparison and other functions, teachers can break through the spatial and temporal limitations of traditional classrooms and achieve a balance between personalized teaching and large-scale training.

In addition, the dual track approach of "technology empowerment art sublimation" proposed in this study has opened up new directions for interdisciplinary teaching research. It not only promotes the deep application of digital media in the field of music education, but also prompts educators to rethink the relationship between technological tools and the essence of art, in order to find a balance between cultivating "technical artistic talents" and "artistic technical talents". Despite the limitations of the current sample, the research team has started to build a cross school data sharing platform, which will include music school samples from different regions and levels in the future, in order to form a more universal teaching standard and strategy library. This continuously deepening research path may drive popular music education from experience driven to data-driven, ultimately achieving a qualitative improvement in teaching effectiveness.

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