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Improvement of Changbar Application Teaching on Student Singing Performance in Media and Communications, Sichuan University

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Abstract

Background and Aim: Background and Purpose: A flipped classroom, as a modern teaching method, has been widely concerned with improving students' academic performance. This study uses a flipped classroom teaching strategy and modern technology to conduct teaching experiments on students. Through vocal singing tests and questionnaire surveys, this study investigated the influence of mixed teaching methods on the academic achievement of experimental group students.

Materials and Methods: Materials and methods: This study is a quasi-experimental study using quantitative research methods. The subjects of this study are sophomore students majoring in vocal music at the Sichuan University of Media and Communication in China. There is only one group of students, all of whom are experimental groups. The mixed teaching strategy was adopted by 100 students from Class A and Class B in the experimental group. Through the Singing test, we try to understand students' ability in Singing Intonation, Rhythm, Pronunciation, and Stage Performance. And the Perceived Usefulness and Perceived Ease of Use of ChangbarAPP in blended teaching curricula. The data was collected through tests and questionnaires and analyzed using the statistical software Jamovi. The hypothesis was tested by paired sample t-test.

Results: The results show that blended teaching methods have a very positive impact on students' academic performance. Students' vocal singing ability has been significantly improved. Students showed higher Perceived Usefulness and Perceived Ease of Use when using ChangbarAPP for blended learning.

Conclusion: Based on the research results, this paper puts forward some suggestions on the application of blended teaching in the vocal music curriculum.

Keywords: Vocal Teaching; Blended Teaching; Vocal Education

Introduction

Blended teaching, a pivotal evolution in education, emerges from the integration of traditional face-to-face instruction with technology-mediated learning components (Garrison & Vaughan, 2008). As outlined by Graham (2006) and Bonk & Graham (2006), blended teaching seeks to capitalize on the unique strengths of both in-person and digital learning modes. It offers an adaptable approach to education, allowing for a dynamic synthesis of real-time interactions in the classroom with the anytime, anywhere access enabled by technology.

Blended teaching, as defined by Garrison and Vaughan (2008), represents a structured educational strategy that thoughtfully combines traditional classroom interactions with digital resources, aiming to enhance the learning experience. This approach recognizes the potential of technology to transcend.

Temporal and spatial constraints offer students flexibility in how they engage with course materials

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and encourage self-directed learning (Attewell, 2005). Blended teaching is not merely a juxtaposition of these elements but rather a purposeful fusion, leveraging technology to optimize learning outcomes while maintaining the valuable aspects of in-person instruction (Sharples et al., 2013).

The research purpose of mixed vocal music teaching, as guided by the insights of Rosenthal et al. (2018) and Appelman (1967), centers on leveraging technology to enhance the quality and accessibility of vocal music education. This study endeavors to investigate how the integration of digital tools and online platforms, such as the Changbar software, can revolutionize vocal music instruction. By capitalizing on the benefits of blended teaching, it aims to create a dynamic learning environment that transcends traditional constraints, providing students with opportunities for flexible practice, creative expression, and personalized feedback. Through a comparative analysis with conventional teaching methods, this research seeks to discern the impact of mixed vocal music teaching on students' skill development, engagement, and overall learning experiences, thereby contributing to the advancement of pedagogical strategies in the realm of vocal music education.

Changbar is a mobile karaoke app that allows users to sing, record, and share their performances with others. The application is widely used for practicing singing, recording covers of popular songs, and showcasing vocal talents. It provides a platform for users to select songs, record their performances, add effects, and share their creations within the app's community changbar's mode of application involves users selecting songs from the app's library, singing along with the instrumental track, and recording their performance. Users can then apply various audio effects to enhance the recording, and finally, share their performances on the platform for others to listen and comment on Changbar entered the Chinese market in 2011 and rapidly gained popularity due to its user-friendly interface and the surge in mobile app usage (Zhu & Ganesan, 2015). Its growth was driven by the widespread adoption of smartphones and the ease of sharing recorded performances on social media platforms.

As of the literature cutoff date in September 2021, Changbar has established a significant presence in the Chinese market, with millions of users actively engaging with the app for singing practice and sharing their performances.

Objectives of Research

The purpose of this study is to explore the effect of blended teaching methods on vocal music teaching and to understand the Perceived Usefulness and Ease of Use of ChangbarApp by students.

Literature review

Singing Intonation

Singing Intonation refers to the accuracy of pitch and the ability to maintain correct musical intervals while singing. It is a fundamental aspect of vocal music performance. The literature highlights the importance of accurate intonation in singing, as it greatly impacts the overall quality and expressiveness of vocal performances (Dalla Bella, Giguère, & Peretz, 2009). Various teaching methods and technologies, including karaoke software, have been employed to help students improve their singing intonation.

Singing Rhythm

Singing Rhythm pertains to the ability to maintain a consistent and accurate sense of timing and tempo while singing. Timing and rhythm are crucial elements in music, and they play a vital role

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in vocal music performance. Research has shown that rhythm training can significantly enhance singing rhythm skills (Grahn & Brett, 2007). Blended learning approaches often incorporate rhythm exercises and digital tools to improve students' rhythm awareness and precision.

Singing Pronunciation

Singing Pronunciation involves articulating lyrics and vocal sounds clearly and accurately. Proper pronunciation is essential for conveying the intended meaning of a song and for effective communication in vocal music. Literature in vocal pedagogy emphasizes the importance of diction and articulation in singing (Miller, 2014). Technology-assisted learning, such as using karaoke software with lyric prompts and feedback, can aid students in improving their singing pronunciation.

Singing Stage Performance

Singing Stage Performance encompasses the overall presentation and expression of a song during live performances. It involves not only singing skills but also stage presence, emotional expression, and communication with the audience. Research on stage performance in vocal music education often explores techniques for enhancing students' confidence and stage presence. Blended learning may incorporate video feedback and performance assessment tools to help students refine their stage performance skills (Aufegger, L., et al., 2017).

Perceived Usefulness

Definition: Perceived Usefulness refers to an individual's subjective assessment of how valuable and beneficial they perceive a technology or system to be in facilitating their tasks and achieving their goals (Davis, 1989).

Perceived Usefulness is a critical factor in technology adoption and acceptance. It has been extensively studied in various fields, including education and information systems. In the context of educational technology, several studies have highlighted the importance of perceived usefulness in determining students' willingness to use digital tools and resources (Venkatesh et al., 2003).

Perceived Ease of Use

Definition: Perceived Ease of Use refers to an individual's perception of how effortless and straightforward it is to use a technology or system (Davis, 1989).

Perceived Ease of Use is another pivotal factor in the adoption and acceptance of technology. Users are more likely to embrace and use technology if they find it easy to navigate and interact with

Research Hypothesis and Theoretical Model

Singing Intonation

Technology-assisted music instruction, including the use of computer software, on students' singing accuracy. It provides evidence that technology-enhanced activities can lead to improvements in students' pitch accuracy. Karaoke software for interactive singing with preschoolers and its effects on vocal pitch accuracy. The findings suggest that such activities can enhance students' pitch accuracy, which directly supports this hypothesis.

The hypotheses center around the effectiveness of blended teaching in enhancing students' singing intonation skills. To understand this relationship, we can draw upon the principles of blended learning, pedagogical theories, and prior research in music education.

Blended teaching combines traditional face-to-face instruction with online or digital components (Garrison & Kanuka, 2004). In the context of music education, blended learning approaches may incorporate both in-person lessons and online resources, including virtual choirs, music software, or

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practice platforms. The combination of these modalities offers opportunities for diverse learning experiences and practice, which may lead to improved singing intonation. Blended teaching often aligns with constructivist and socio-constructivist pedagogical theories, emphasizing active learning, collaboration, and engagement (Garrison & Vaughan, 2008). These approaches encourage students to take an active role in their learning, which is particularly important for improving musical skills like singing intonation through practice and peer interactions.

Music Education and Blended Learning: Research in music education has explored the integration of technology and blended learning to enhance students' musical abilities (Bernard et al., 2009). Studies have shown that the use of digital tools and online resources can positively impact singing intonation skills when integrated effectively into music instruction (Lim, K.A., & Raphael, C., 2009).

H1a: The students' singing intonation score after learning through change bar activity is not improved

H1b: The students' singing intonation score after learning through the change bar activity is improved

Singing Rhythm

Blended teaching models that incorporate technology have gained prominence in recent years. They offer innovative approaches to enhancing music education, including rhythm training. Research by Grahn and Brett (2007) has shown that rhythm training can significantly improve students' singing rhythm skills. This study, which focused on rhythm perception and production in music, highlighted the potential of technology-enhanced learning to facilitate rhythm skill development. It aligns with H20 by suggesting that an intervention like changbar, which incorporates technology, may indeed have the potential to influence students' singing rhythm.

On the other hand, existing research in music education underscores the value of blended teaching models that integrate both in-person instruction and online resources. Offer a versatile learning environment that can cater to individualized practice and skill development. Such an approach aligns with H2a, which posits that changbar activity, as a digital resource, could potentially lead to improved singing rhythm. By drawing from the principles of blended teaching, we recognize that the integration of technology into music education can create diverse learning experiences and enhance students' rhythm awareness and precision.

Computer-assisted keyboard instruction on rhythm discrimination and production among college instrumental music education majors. While not focused on karaoke software, it underscores how technology-assisted music activities can enhance rhythm-related skills. Computer-based rhythm-matching activities on students' rhythm-matching accuracy and self-efficacy. While not specific to karaoke software, it provides insights into the positive effects of technology-enhanced rhythm activities on students' rhythm skills (Lim, Y.S. et al., 2018). The literature suggests that karaoke software, possibly including technology-enhanced activities, can improve rhythm-related memory and cognitive skills, leading me to the following hypothesis:

H2a: The students' singing rhythm score after learning through the change bar activity is not improved

H2b: The students' singing rhythm score after learning through change bar activity is improved

Singing pronunciation

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The significance of vocal performance, encompassing aspects like pronunciation, holds a pivotal place within musical contexts (Kenny, D.T. & Ackermann, B.J., 2016). This recognition underscores the multifaceted nature of singing, where precision in pronunciation plays a critical role in elevating overall vocal performance. In this vein, the integration of technology, particularly karaoke software, emerges as a potent tool for honing and perfecting pronunciation, thereby contributing significantly to enhanced singing performance. The work of Kenny and Ackermann (2016) provides insightful perspectives on the pivotal role of technology in facilitating interactive and effective approaches to elevate vocal performance, including aspects related to pronunciation (Aarons, D., et al., 2013).

These foundational references underscore the importance of pronunciation in the realm of vocal performance, reinforcing its inseparability from the broader musical context. The fusion of technology, exemplified by karaoke software, introduces a transformative dimension to vocal training. It not only offers a platform for practice but also facilitates constructive feedback mechanisms, ultimately yielding improvements in singing pronunciation scores. These insights position pronunciation as a core element in the comprehensive assessment of vocal abilities and highlight the potential of technology-driven solutions in elevating this critical facet of vocal music. The hypotheses encapsulate the core research objectives of our study, aiming to investigate the impact of changbar activities on students' singing pronunciation skills. By exploring the potential improvements in singing pronunciation scores, we seek to shed light on the effectiveness of this technology-mediated approach in the realm of vocal music education. Through rigorous analysis and examination, we aspire to discern whether changbar activities can indeed catalyze enhanced singing pronunciation, aligning with the broader goal of elevating vocal performance.

H3a: The students' Singing pronunciation score after learning through the change bar activity is not improved

H3b: The students' Singing pronunciation score after learning through the change bar activity is improved

Singing Stage Performance

Stage performances in vocal music constitute a distinctive and multifaceted domain that prioritizes creativity and expressiveness (Lee, M.Y., et al., 2013). Singing on stage entails more than just technical competence; it necessitates immersive and expressive interactions with the audience. In this context, interactive singing with karaoke software emerges as a potent pedagogical tool with the potential to positively influence students' vocal skills, including their aptitude for stage performance.

Karaoke software, intrinsically connected to music, plays a pivotal role in shaping stage performances. The musical element is integral to any successful stage act, and karaoke software provides a platform for students to immerse themselves in the expressive aspects of music (Dannenberg, R.B., 2007). Dannenberg's insights illuminate the profound relationship between musical expression and stage performance, highlighting how karaoke software can contribute to heightened expressive and stage performance scores.

This literature highlights the transformative potential of karaoke software, particularly in the context of stage performance. They advocate for the integration of creative and expressive singing experiences facilitated by this technology, emphasizing the value of musical expression as a driving force behind improved stage performance.

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These hypotheses encapsulate our research objectives, aiming to investigate the impact of changbar activities on students' stage performance in vocal music. By assessing potential improvements in stage performance scores, we seek to ascertain whether changbar activities can indeed catalyze nurturing students' creative and expressive dimensions, ultimately contributing to elevated stage performance.

H4a: The students' Singing Stage Performance score after learning through change bar activity is not improved

H4b: The students' Singing Stage Performance score after learning through change bar activity is improved

Students' Behavioral Responses

The perception of technology plays a pivotal role in shaping users' intentions and behaviors regarding its usage (Venkatesh et al., 2003). In the realm of educational technology, the Technology Acceptance Model (TAM) has emerged as a fundamental framework for understanding how users' perceptions of technology affect their willingness to adopt and utilize it (Chuttur, 2009). This model is highly applicable to a wide range of technological contexts, including the use of karaoke software in educational settings. In this context, if students perceive karaoke software as both easy to use and valuable for enhancing their learning and singing experiences, it is likely to lead to positive attitudes and increased utilization.

This hypothesis is rooted in the foundational work of Venkatesh et al. (2003), who highlighted that users' perceptions of technology's ease of use and usefulness are central determinants of their intentions to embrace and actively engage with it. Chuttur (2009) further underscores the relevance of the Technology Acceptance Model (TAM) in comprehending how these perceptions influence user behavior, making it a pertinent framework for analyzing students' responses to karaoke software in the context of vocal music education. The application of this framework allows us to investigate whether students' perceptions of karaoke software align with a positive orientation, specifically in terms of its ease of use and usefulness for their educational and singing endeavors. If the results of this study confirm that students indeed perceive karaoke software as both user-friendly and beneficial, it would affirm the applicability of the TAM to this technological context and provide valuable insights into students' behavioral responses toward such educational tools.

H5a: The students' perceived ease of use and perceived usefulness are not different from neutral

H5b: The students' perceived ease of use and perceived usefulness are greater than the neutral

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Conceptual Framework

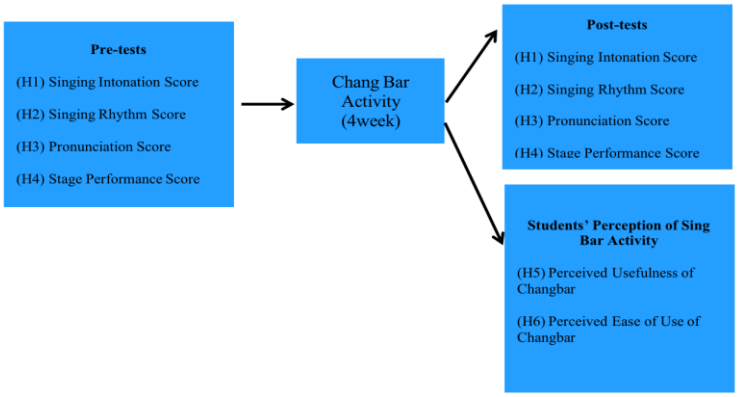

Figure 1 Conceptual Framework

Methodology

The study aimed to assess the influence of blended teaching on students' learning outcomes in vocal music courses and their perception of software utilization. It utilized a quasi-experimental research design employing quantitative research methods. Specifically, the study concentrated on students in the experimental group, collecting and analyzing data from their pre-test and post-test scores. In the experimental group, teachers implemented blended teaching strategies to conduct the research.

Population and sample size

The study focused on a population of sophomore students enrolled in a Chinese university. The sample was drawn from senior students at the Sichuan University of Media and Communication, aged between 18 and 21 years. The Sichuan University of Communication is a private undergraduate institution located in Southwest China and admission to this university is based on China's national college entrance examination. These sophomore students had already acclimated to the university's learning environment and possessed a reasonable understanding of their respective majors. Furthermore, students within the same major and academic year followed identical curricula and syllabi, with the school administration assigning consistent teachers for the same courses.

To determine the required sample size, the research employed G*Power software, a tool tailored for behavioral research, offering precise power analysis for a variety of statistical experiments (Erdfelder et al., 1996). The results indicated that a minimum of 50 samples per group, totaling 100 samples, was necessary for the study.

Sampling method

Purposeful sampling is a technique that allows researchers to explore phenomena or populations more extensively by selecting samples based on predetermined aims and criteria (Miles & Huberman, 1994). The samples are from sophomores studying voice music at China's Sichuan University of Communication. In the first semester of their sophomore year, they are taking fundamental vocal music courses. They were drawn from two classes of 50 students each, for a total of 100 participants in the teaching experiment.

Research tool

The researcher performed a questionnaire survey on the ChangbarApp Perceived Usefulness and Perceived Ease of Use of blended teaching using the scoring standard of vocal music course instruction at Sichuan University of Media and Communication as the source to evaluate students'

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vocal singing abilities. The questionnaire was customized to fit the subject matter of this study. Pilot tests were also used by the researchers to assess the usefulness and reliability of the assessment methods.

To understand students' emotions about utilizing ChangbarAPP, the Perceived Usefulness and Perceived Ease of Use questionnaires were used in this study. Perceived usefulness is the degree to which a person believes that using a particular system will improve their performance Perceived ease of use is the degree to which a person believes that using a particular system is effortless (Kitchakarn, 2016).

Study the reliability of the instrument

A pilot test of the questionnaire was conducted with a smaller sample to assess respondents' comprehension of and ability to navigate the survey questions effectively. The primary purpose of this pilot test was to evaluate the questionnaire's suitability before administering it to a larger and more significant sample, ensuring that data collection efforts served their intended purpose optimally. Additionally, the pilot test served as a means to identify and rectify any errors or issues present in the questionnaire.

The survey participants for this pilot test were sophomore students majoring in vocal music at Sichuan University of Media and Communication, all of whom had previously taken part in the blended teaching experiment. Incomplete questionnaires were excluded from further analysis and processing. Respondents were asked to provide feedback regarding their perspectives on the questionnaire's overall process, the phrasing of questions, and the level of difficulty associated with providing responses and following instructions, this helps to effectively reveal some shortcomings of predictive questionnaires.

To test the reliability of the questionnaire, 30 samples completed the pilot test of the questionnaire. The internal consistency reliability of the scale was measured by Cronbach, alpha. According to Cronbach, (1951) and Hair (2014), Cronbach alpha greater than 0.7 is considered "good." Cronbach,'s Alpha values are shown in Table 1.

Table 1: Cronbach's Alpha of the Constructs Measured

Construct	Number of Items	Cronbach's Alpha
Perceived Ease of Use	#11-13	0.935
Perceived Usefulness	#1-10	0.948

Perceived usefulness had an alpha value of 0.948. Perceived ease of use had an alpha value of 0.935. Reliability statistics for the constructs were excellent as the reliability score is seen to be above 0.7. As a result, the questionnaire for the research is considered reliable and can be employed to collect data for the research.

Validity of Research Instruments

The item objective consistency (IOC) approach was used to examine the consistency of the questionnaire items to measure the constructs to test the content validity of the questionnaire items. For each item, three experts were asked to submit ratings. These experts were chosen based on the following criteria: possessing a master's or doctoral degree, expertise and experience in education and/or fields, and being a university instructor. According to the expert assessments, all of the items measuring the constructs had an IOC rating greater than 0.67, indicating they were valid to use (Turner and Carlson, 2003).

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Data collection and analysis

A ChangbarAPP user manual has been created by the school software technician for all teachers. Teachers who were qualified to conduct instructional technology projects and willing to participate in instructional reform trials were chosen by the researchers. The students who would participate in the experiment were anticipated before the experiment began, and then the teaching experiment was carried out. The students were post-tested on their vocal singing skills at the end of the five-week trial, and then a questionnaire survey was done on the Perceived Usefulness and Perceived Ease of Use of ChangbarAPP, and data from the test and questionnaire were collected. A 5-point Likert scale ranging from 1=Strongly Disagree; 2=Disagree; 3=Neither Agree nor Disagree; 4=Agree; and 5=Strongly Agree was utilized in the questionnaire. Students in the experimental group were given questionnaires.

The researchers utilized a paired sample T-test to evaluate the data in this study and test the hypothesis. For statistical analysis, the Jamovi statistical software was employed. Descriptive statistics, such as measures of central tendency and variability, were used in the study. The mean, median, and standard deviation will be used to describe the experiment's data. The respondents' data were collected using a 5-point Likert scale, and the data were interpreted at any level. A paired sample T-test is a statistical hypothesis test in which the mean of two groups of related data is compared. When paired observations, such as measurements made from the same subject at different moments in time or under different conditions, show a connection (Abdullah & Ward, 2016).

Result

Data analysis is used to achieve the outcomes. The sample's demographic information is presented first, followed by a detailed description of the statistical results of the test and questionnaire. A paired sample T-test was used to evaluate the hypothesis.

Data collection and sample information

The table below provides a clear and concise overview of the demographics of the sample, including age, gender, and other relevant factors. As you can see, 100 students participated in the experiment. The experimental group consisted of 50 male students (50%) and 50 female students (50%). Aged between 18 and 21, there are 9 people aged 18, accounting for 9%; 25 (25%) are 19 years old; There are 60 people in their 20s, accounting for 60%. Six were 21 years old, accounting for 6%; At 122 years of age, 36 people accounted for 65.45% and 10 people accounted for 18.18%(Table 2).

Table 2 Basic information of samples

Information	Category	Quantity	Proportion (%)
Gender	Male	50	50
	Female	50	50
Age	18years old	9	9
	19years old	25	25
	20years old	60	60
	21 years old	6	6
Education	undergraduate second grade	100	100

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Hypotheses Testing

The following hypotheses testing aims to measure the student's performance score on the Singing Intonation, Rhythm, Pronunciation, and Stage Performance between the pre-test and the post-test scores. The following are the hypotheses that were tested.

H1a: The students' singing intonation score after learning through the change bar activity is not improved

H1b: The students' singing intonation score after learning through change bar activity is improved

H2a: The students' singing rhythm score after learning through change bar activity is not improved

H2b: The students' singing rhythm score after learning through change bar activity is improved

H3a:: The students' Singing pronunciation score after learning through change bar activity is not improved

H3b: The students' Singing pronunciation score after learning through the change bar activity is improved

H4a: The students' Singing Stage Performance score after learning through the change bar activity is not improved

H4b: The students' Singing Stage Performance score after learning through the change bar activity is improved

The paired Sample T-test was conducted to test the hypotheses, the results showed that all the scores (Singing Intonation, Rhythm, Pronunciation, and Stage Performance) of the post-tests were higher than the pre-test scores on all variables. The biggest difference was in the average movement score, which was how many points higher than the average score before the test. The difference in the average movement score was -3.4 points, indicating that the average score before the test was 3.4 points lower than the average score after the test.

For the other average score differences compared to before the test:

Singing Intonation: The difference was -1.9 points, meaning that the average score before the test was 1.9 points lower than the average score after the test.

Singing Rhythm: The difference was -2.6 points, indicating that the average score before the test was 2.6 points lower than the average score after the test.

Singing Pronunciation: The difference was -1.1 points, signifying that the average score before the test was 1.1 points lower than the average score after the test.

In summary, the average movement score had the biggest difference and was 3.4 points lower before the test compared to after the test. The other variables also showed lower average scores before the test, with differences ranging from 1.1 to 2.6 points. The details of the paired sample t-test are in Table 3 and the descriptive statistics of the scores are in Table 4.

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Table 3 Paired Samples T-Test

			statistic	df	p	Mean difference
Singing Intonation Pre-test	Singing Intonation Post-test	Student's t	-52.4	99	< .001	-1.9
Singing Rhythm Pre-test	Singing Rhythm Post-test	Student's t	-30.2	99	< .001	-2.61
Singing Pronunciation Pre-test	Singing Pronunciation Post-test	Student's t	-34	99	< .001	-1.06
Singing Stage Performance Pre-test	Singing Stage Performance Post-test	Student's t	-18.1	99	< .001	-3.42

Note. H_a $\mu_{\text{Measure 1 - Measure 2}} < 0$

Table 4 Descriptives

	N	Mean	Median	SD	SE
Singing Intonation Pre-test	100	19.4	19	1.49	0.149
Singing Intonation Post-test	100	21.3	21	1.3	0.13
Singing Rhythm Pre-test	100	19	19	1.91	0.191
Singing Rhythm Post-test	100	21.6	21.5	1.39	0.139
Singing Pronunciation Pre-test	100	17.9	18	2.55	0.255
Singing Pronunciation Post-test	100	19	19	2.6	0.26
Singing Stage Performance Pre-test	100	17.8	18	2.41	0.241
Singing Stage Performance Post-test	100	21.2	21	2.06	0.206

Singing Intonation

For the pre-test, the mean score is approximately 19.4, with a median of 19.0. For the post-test, the mean score is approximately 21.3, with a median of 21.0. In both cases, the post-test scores are higher than the pre-test scores, indicating an improvement in singing intonation skills.

Singing Rhythm

For the pre-test, the mean score is 19.0, with a median of 19.0. For the post-test, the mean score is 21.6, with a median of 21.5. Similar to singing intonation, the post-test scores for singing rhythm are higher than the pre-test scores, suggesting an improvement in rhythm skills.

Singing Pronunciation

For the pre-test, the mean score is approximately 17.9, with a median of 18.0. For the post-test, the mean score is approximately 19.0, with a median of 19.0. Once again, the post-test scores are higher than the pre-test scores, indicating an enhancement in singing pronunciation skills.

Singing Stage Performance

For the pre-test, the mean score is 17.8, with a median of 18.0. For the post-test, the mean score is 21.2, with a median of 21.0. As observed in the previous variables, the post-test scores for singing stage performance are higher than the pre-test scores, suggesting an improvement in stage

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performance skills.

Overall, the descriptive statistics reveal consistent improvements in singing skills across all four variables (intonation, rhythm, pronunciation, and stage performance) from the pre-test to the post-test. The means and medians for the post-tests are consistently higher than those for the pre-tests, indicating that the interventions or teaching methods have had a positive impact on the participants' singing abilities.

Discussion

The use of mixed teaching and ChangbarAPP teaching strategy in vocal singing courses has improved students' ability in vocal singing. The main reason is that the strategy of using ChangbarApp for blended teaching is a relatively novel teaching method for students, which can fully mobilize students' learning enthusiasm and improve their participation.

The use of scientific and technological means is very consistent with the learning characteristics of modern students, and they are willing to use such scientific and technological means to assist their learning, which is also consistent with the learning characteristics of modern and contemporary students. In particular, the stage performance of students improved the most. It shows that the teaching means of science and technology can make students take the initiative to practice and boldly express their singing ability, and the network technology can broaden their knowledge and vision and improve their aesthetic ability.

From the learning experience. Through the questionnaire survey on the use of ChangbarAPP in blended teaching, we found that students generally believe that the use of ChangbarAPP in blended teaching can effectively improve students' learning effect and that ChangbarAPP is convenient to use, easy to operate, and has significant effects. This shows that it is a suitable learning platform for vocal music lessons

Conclusion

This study aims to explore how blended learning enhances the learning experience of vocal music students, providing flexibility to cater to diverse learning preferences. The research promotes a shift from traditional to integrated learning models, harnessing the pedagogical potential of blended learning. Vocal music educators can adopt innovative teaching models and strategies to enhance teaching quality. Scholars and practitioners in vocal education can gain valuable insights from this study to inform unique pedagogical approaches. The research also encourages technological innovation, the development of multimedia materials, and the enhancement of online learning platforms.

Through the application of blended learning in vocal singing teaching and increased awareness of blended learning, students engage in online interactive and collaborative projects. This enables them to participate in vocal lessons, communicate, and provide feedback to fellow students and teachers, thereby enhancing their engagement and learning experiences. In this environment, students enjoy greater autonomy and flexibility to learn according to their individual interests and needs.
Through a comprehensive review of literature and experimental research, the results consistently demonstrate that students adopting a blended learning style exhibit improvements in vocal singing. Therefore, it can be concluded that blended learning has proven to be an effective pedagogical approach for vocal music lessons.

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However, this study has certain limitations. Firstly, extending the study period would provide a more comprehensive understanding of the long-term effects of blended learning on vocal technique. Secondly, the study did not encompass a diverse range of students and teachers, which limits the generalizability of the results.

In summary, blended learning holds immense potential for vocal music teaching, enhancing students' learning outcomes, engagement, and overall learning experiences. It opens up new possibilities for the advancement of vocal education. Future research can build upon this study by exploring long-term effects, involving diverse participant demographics, considering a broader range of variables, and mitigating the influence of subjective factors. Comparative analyses, interdisciplinary investigations, mixed methods, and research conducted in multicultural contexts will further enrich our understanding of blended learning in vocal music education. Staying updated with emerging technologies remains crucial for the future of research in this field, ultimately contributing to the advancement of vocal education through blended learning. This research has far-reaching implications for students, educators, scholars, and the broader educational technology landscape.

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