Internet of Things and Cloud Computing Integration of Opera Elements into Vocal Singing Teaching Practice Exploration

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Abstract

INTRODUCTION: With the rapid development of computer technology, the application of the Internet of Things and cloud computing technology is becoming more and more common. However, there is no more computer technology integration in integrating opera elements into vocal singing teaching. Therefore, compared with other industries, the development of verbal singing teaching could be faster and adapt to the current era of the Internet of Things and cloud computing. Thus studies the exploration of the practice of integrating opera elements into vocal singing teaching based on the Internet of Things and cloud computing.

OBJECTIVES: To improve the level of China's Internet of Things and cloud computing technology-based opera elements into vocal singing teaching practice; to solve the current problem of China's traditional culture not being integrated into verbal singing teaching; to promote the development of China's opera industry, the modernization of oral singing teaching, and to enhance the relevance of the Internet and economic development.

METHODS: In the study, firstly, the Internet of Things (IoT) and cloud computing technology are used for the establishment of the evaluation model; secondly, the feasibility of integrating opera elements into vocal singing teaching is analyzed through theoretical discussions; lastly, through the analysis of the model of the Internet of Things (IoT) and cloud computing, the feasibility of integrating opera elements into vocal singing teaching is illustrated by the analysis of the model of the Internet of Things (IoT) and cloud computing, and how the Internet of Things and cloud computing can assist opera elements to be integrated into vocal singing teaching.

RESULTS: Using the Internet of Things and cloud computing technology to enrich the vocal singing teaching model from multiple perspectives can better enhance the integration of opera elements into verbal singing teaching. Internet of Things and cloud computing technology play an auxiliary role in the integration of opera elements into vocal singing teaching; the study of the additional mechanism reveals that the effect of the integration of opera elements into verbal singing teaching can be improved through the improvement of the means of the auxiliary function.

CONCLUSION: As a representative of Chinese culture, the integration of opera elements into vocal singing teaching practice is of great significance, and the Internet of Things and cloud computing technology play an essential role in helping the integration of opera elements into vocal singing teaching practice.

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1. Introduction

Ethnic vocal music is an essential part of traditional Chinese culture, which integrates many theater elements and enhances the quality and charm of ethnic vocal music.

The unique singing voice, regional singing voice, and different singing voices of Chinese opera create new ideas for teaching ethnic vocal singing(Toles et al., 2021). To realize the innovative development of national vocal music and to improve the attractiveness and stageability

of national vocal music, it is necessary to use the elements of traditional opera flexibly, give conventional theater music rich singing and unique charms, and add endless charms to national vocal music. Therefore, colleges and universities must systematically and consciously apply the elements of opera to verbal singing teaching, improve the modernization level of China's opera, and significantly enhance the traditional cultural standard of China's vocal singing teaching. Secondly, from the point of view of national music, the opera elements can better adapt to the cultural needs of the people of China. The people can recognize opera teaching integrated into vocal singing teaching (Gold et al., 2021).

On the one hand, national vocal music can increase the pressure of performance while retaining the traditional elements of opera. On the other hand, it is hoped that verbal singing teaching and ethnic vocal music carrier can be combined to protect and spread the elements of ethnic opera. Chinese opera represents the world's traditional opera, including several local operas such as Beijing Opera House, with strong integration and colorful geographic location. Its rich content provides functional supplementary elements for developing national vocal music. With the change of time and artistic innovation, the relationship between folk vocal music and traditional opera has gradually developed into a complementary one. Today, it is committed to protecting and developing Chinese conventional culture(Filipa et al., 2022). On the one hand, using traditional drama elements for vocal training can provide students with a more colorful learning experience, further improve artistic performance, increase attention, protect, inherit, and develop Chinese drama culture, and promote the integration of traditional drama and modern music. Therefore, it is essential to encourage the development of musical art.

The teaching of vocal singing not only expands the students' artistic vision but also has a strong effect on the student's artistic time so that the learning of vocal singing can better improve the comprehensive quality of students adapted to the requirements of the current development of quality education in China(Prior et al., 2022). Many universities in China are adding traditional opera elements to vocal music courses to improve the quality of vocal music courses. The use of theater elements in verbal singing teaching is mainly reflected in technique and rhythm. Chinese drama emphasizes performance and emotional expression and strictly requires mastering musical styles, facial expressions, and stage performance skills. Teachers can integrate vocal techniques and dramatic performances into vocal lessons and choose vocal techniques flexibly according to the singers' content, characteristics, and style. It allows for more accurate and vivid expression of said emotions and moods, improved control of vocal techniques such as volume changes, repertoire shifts and transitions, and excellent vocal interpretation. Sound is the syllables of words and sentences, which can be categorized as flat and voiced and can add rhythm to words and sentences. Rhythm refers to words having the same sound and rhythm within a syllable or neighboring words, which helps to increase the rhythm of vocal music(Vyshpinska, 2021). In addition, operatic vocal music emphasizes clear and accurate pronunciation. Each syllable must be expressed clearly so the listener can hear each word. Of course, in teaching vocal singing, teachers and students should focus on the intensity and rhythm that occurs in their education. Only by mastering the relevant rhythms can the level of teaching be enhanced more naturally so that opera elements can be integrated into vocal singing. This type of teaching also allows students to carry out the learning process easier to understand. In the relevant art colleges and universities, carrying out systematic teaching and research processes can grasp the characteristics of opera and vocal singing elements, which can better enhance the students' artistic literacy. By improving the accuracy of vocal music and expression, students can understand the rhythm of opera. Opera performances, such as vocal performances, require the performance of vocal music and activities(Katsu & Okanoya, 2021). In addition to the greater importance of the script and content material in our theater performances, the actor's basic skills and on-stage play are the soul of a theater performance, and the actor's play often plays a vital role in the effectiveness of the performance. Actors must use unique narrative language and scenarios to express the emotions and personalities of different characters, making the performance more vivid and dynamic(Hamilton et al., 2021). In addition, traditional Chinese theater performances require actors to control their facial expressions flexibly, and actors must convey the character qualities and mood states expressed by the characters through different faces and facial expressions(Mack, 2021). Therefore, in teaching opera and vocal singing, the changes of face painting, facial expression, and the singing voice should be changed according to the character's state. Therefore, in the teaching of vocal lessons, teachers should emphasize that not only the agent should be conveyed but also facial expressions and body movements, and the flexible use of stage elements can encourage students to enrich the vocal content, such as adjusting the appropriate posture and gestures, increasing the sound pressure, and enhancing the expressive power of the stage works.

2. Background of the study

Vocal training education is a compulsory music teaching and management course in our colleges and universities. It provides appropriate verbal theory and necessary classroom demonstrations to enable students to master scientific singing methods and techniques and create the right oral feelings and spaces. Based on theoretical knowledge, students learn to imitate the vocal music of their teachers(Miller et al., 2021). Due to the program's specificity, teachers and students need specific backgrounds, experiences, and emotions. Therefore, voice teachers respect and follow the "one-to-one or many-to-

one" teaching format. Traditional vocal singing instruction emphasizes the integration of thought, science, and art, classroom instruction and practice, and the principles of inspiration and active awareness(Cécile Hérivaux et al., 2021). The focus of vocal singing teaching is to reflect the objective law of verbal singing teaching and to condense and concentrate the practice of oral singing teaching scientifically. With the development of vocal singing education and the further deepening of opera teaching, contemporary vocal singing teaching gradually incorporates many factors, breaking through the traditional principles of learning, enhancing the richness of the content and the diversity of teaching forms, and establishing the basic theory of vocal singing teaching and the code of conduct.

The traditional vocal lessons continue to follow the didactic and oral learning style of teaching, which guides and teaches the students to master scientific verbal methods and techniques and to create the right vocal emotions and conditions(Medeiros et al., 2021). Based on theoretical knowledge, students learn to imitate the vocal music of their teachers. With the development of time and technology, educational content becomes more and more open and accessible; for example, young students interested in the Internet of Things and cloud computing have faster and better access to learning materials. Students respond quicker and more intensely than their teachers, consciously embracing new things by searching and actively learning specialized knowledge not taught by their teachers through computers and cell phones. Modern IoT and cloud computing can be used to support traditional vocal programs. Based on theoretical knowledge and years of experience in vocal lessons, they are summarizing the experience as a practical supplement to this paper, reading a large number of domestic and international literature, analyzing the possibility of IoT technology and cloud computing applied to traditional vocal lessons(Benboujja et al., 2021). Finally, specific measures are proposed to support formal vocal music lessons through IoT technology and cloud computing.

The modern Internet of Things (IoT) and cloud computing provide an excellent platform for training and learning with many amenities. As in other disciplines, the traditional teaching of vocal singing is a two-way activity between teacher and student, and therefore, the teacher's instruction is as necessary as the student's feedback(Khaled et al., 2021). However, contrary to contemporary forms of teaching, voice teachers and students are often in the same dominant and subordinate positions as in other forms of education. Teachers are outputters, and students are inputters and need to take better advantage of modern teaching(Yuan & Li, 2021). Teachers actively impart skills and knowledge, develop scientifically correct vocal skills and voice analysis, and help students identify accurate vocal sensations and patterns. Students meet the teacher's requirements through active and passive imitation based on subjective understanding. Due to the uniqueness of the said program, collaboration and communication between the two parties,

it is more important in the vocal program than in other disciplines. During the Internet+ boom, many educational contents must be connected to the Internet of Things and cloud computing.

On the one hand, students are increasingly interested in the Internet(María et al. et al., 2021). They use IoT and cloud computing to gain in-depth knowledge, interact with their teachers, and connect anytime, anywhere; on the other hand, vocal teachers change "Internet" into Education+Internet, which should put education in a dominant position and the Internet in a subordinate position, to make good use of IoT and cloud computing technology to improve the modern level of vocal Singing teaching level. The technology can better solve the problems existing in traditional verbal singing teaching and can enhance the learning enthusiasm of students, which stimulates people's enthusiasm for learning voice, increases students' potential and improves their innovative thinking.

3. Research methodology
3.1 Internet of Things

Information technology is evolving in the Internet of Things (IoT) as technology, standards, and networks evolve, and computer and Internet technologies become sophisticated. Specifically, IoT does not include people but only connections between objects. The general concept of IoT is using networks as human-centered tools or "objects" that exchange information online in real time. In recent years, the primary trend in IoT has been the explosion of Internet connectivity and ECUs(Zhou & Saad, 2022). The widespread use of IoT technology means that the details of moving from one device to another can vary greatly, but most have basic functionality. IoT creates opportunities to integrate the physical world directly into IT systems, increase efficiency, improve profitability, and reduce labor.

Cloud computing, including applications developed for IIoT, typically uses multilingual microservices and HTTPS/OAuth architectures with inherent protections. It includes various database systems for storing sensor data, such as temporal databases or resource storage with modular storage systems. Most cloud-based IoT systems have a cloud-based event and message queuing system that supports all levels of communication. Some experts categorize IIoT into three groups: devices, platforms, and services interconnected through adjacent networks, access networks, and service networks. The different stages of IoT are shown in Figure 1.
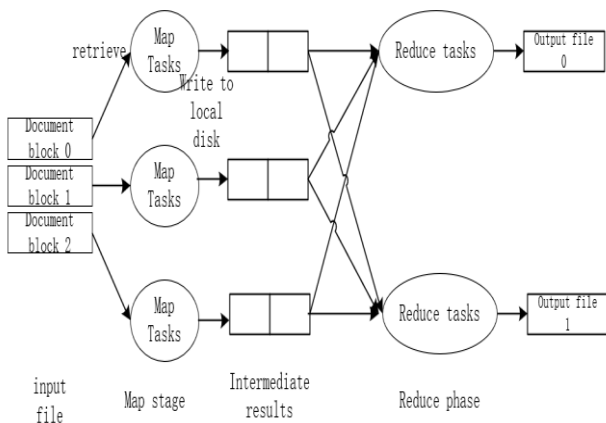
Figure1 Different stages of the Internet of Things

The term "Internet of Things" first appeared in 1999. After decades of development, IoT has become an essential part of the information age. IoT uses communication technologies like the Internet and local networks to connect information between objects and people through sensors. The observation level rises gradually from the bottom of the net(Beans, 2021). An observation level, such as a human observable, is an integral part of the IoT architecture and an essential channel for using data sources.

Access to the physical data of the objects detected at each level and collection of device data, including barcodes, QR codes, RFID, smoke sensors, speed sensors, cameras, etc. Awareness and control of the physical world. To transmit data to the network layer, alarm layer devices should have physical communication connections. The network layer is similar to the human central nervous system layer as it transmits and processes information from the sensory layer between the sensory layer and the application layer and is divided into access and transmission networks(Stephanie et al., 2022). The operational network provides access to the sensor base data, and the transport network transmits the data at the application level. The development of network-level technology extends the reach of IoT and ensures the security, accuracy, and reliability of data during communication, thus realizing the goal of mass surveillance. The application layer is the ultimate goal of IoT technology. The application processes, handles, analyzes, and retrieves collected data and provides services, such as real-time monitoring and accurate data management, to guide users in making scientific decisions. A range of intelligent applications such as smart home, smart agriculture, smart grid, and telemedicine are products that closely link the application layer with industry needs.

IoT is used in many areas of the economy and people's lives. Here are the details of the use of IoT in these areas. Various energy-intensive devices are integrated into Internet connections, allowing them to communicate with factories to balance power production and consumption and optimize energy consumption(Paul et al., 2021).

These devices enable users to manage them remotely or centrally through a cloud interface and perform these functions. It is a prevalent industry on the Internet of Things. Sensors often monitor air temperature, water quality, weather, or humidity to protect the environment, including watching wildlife and habitats. The development of intelligent mobility has provided a new impetus for smart travel, where seamless connectivity between smart travel and its devices enables the use of various vehicle steering systems.

3.2 Cloud Computing

Cloud computing provides on-demand IT system resources, especially storage and computing capabilities. Today, large mainstream clouds can be shared from a central server to multiple locations. Then, they can be referred to as device servers. Clouds can support only one organization (private cloud), numerous organizations (public cloud), or a combination of the two (hybrid cloud), and NIST's three standard models are IaaS, PaaS, and SaaS. Cloud computing raises the issue of data protection, which can alter or delete data unintentionally or intentionally(Okita et al., 2022). Multiple cloud providers can share information with third parties without legal licenses and subscriptions if necessary. It reduces costs so it can focus on business expertise without worrying about IT and infrastructure(Tang et al., 2022). However, cloud computing has some limitations and drawbacks regarding security and downtime, especially for small businesses. Sometimes, technical failures are unavoidable when the cloud computing provider's customer service is overloaded, which can lead to operational disruptions. The cloud computing data mining process is shown in Figure 2.
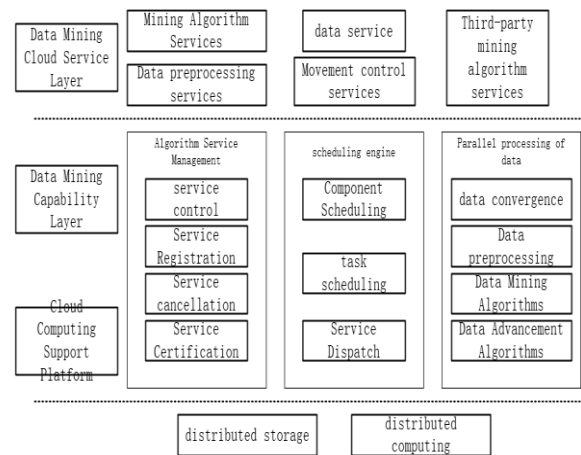

Figure 2 Cloud computing data mining process

Cloud computing combines all of the Internet's hardware and software computing resources into a single pool that provides broadband networks, servers, storage services, applications, and other services. Cloud computing is a cost-effective service model that allows users to lease as many options as they need without attending to critical

development details, saving time and focusing on the business itself. Unlike the traditional model of acquiring large amounts of hardware and software resources and cumbersome installation and maintenance, the advent of cloud computing shifts local IT services to external servers, where users use the services to perform work through a browser, which enables the full sharing and sharing of data, reduces the cost of data entry for users, improves efficiency, and facilitates the innovative development of the Internet. Infrastructure-as-a-Service integrates virtualized physical computing resources (such as operating systems, processors, and network devices) with Zero Services for installation, management, and operation. Platform-as-a-Service (PaaS) provides pre-configured programs or licensing solutions for building, testing, and deploying applications. Software as a Service (SaaS) enables users to access programs through a standard user interface and certain features using software developed as an online product.

A model for teaching vocal singing with the Internet of Things and cloud computing:

$$d = \sum_{i=1}^{N} \sqrt{(X_{1i} - X_{2i})^2} \qquad (1)$$

The d in Equation (1) is the sum of the weighted average differences of the vector differences. X under the root sign is the set of vectors.

The maximum distance is sought using Chebyshev's inequality from probability theory:

$$d_1 = MAX(|x_1 - x_2|, |y_1 - y_2|) \qquad (2)$$

Both x and y in Equation (2) are groups of transverse quantities in the matrix.

$$d_2 = \frac{\sum_{i=1}^{N} x_i y_i}{\sqrt{\sum x_i^2} \sqrt{\sum y_i^2}} \qquad (3)$$

Both x and y in Equation (3) are column vectors in a matrix, but d2 is denoted as cosine similarity.

$$RI = \frac{TP + TN}{TP + FP + FN + TN} \qquad (4)$$

Equation (4) is the cloud computing decision process, where TP and TN denote the number of positive and negative examples, respectively.

4. Results and discussion
4.1 Integration of traditional opera into the vocal mechanism
4.1.1 Increased content richness

Many universities, especially art schools, offer excellent voice programs that develop modern vocal skills. However, in some schools, voice lessons could be better developed. Neglecting the integration of traditional theater elements may weaken students' ability to understand music and artistic expression. Therefore, "vocal instruction" should be emphasized in developing

vocal singing teaching, and the content should be based on opera elements with "vocal lessons" as the carrier. On this basis, verbal singing teaching combines opera elements to improve students' vocal skills and artistic culture.

Textbook writers must strengthen the promotion of traditional culture, incorporate theater elements into voice school instruction, enhance the collection and study of conventional repertoire materials, and emphasize the essence of classic repertoire and performance. It clarifies the practical advantages of integrating theater elements into vocal music courses, reasonably introduces various aspects of opera, and provides a valuable reference for college and undergraduate vocal music courses including theater elements; promotes the understanding of theater, improves college vocal singing skills, and improves the teaching, culture, and practice of vocal singing in college songs, and further improves the level of vocal singing in colleges and universities. Secondly, the writers of teaching materials should deepen students' research and understanding of vocal music. Spoken music materials must be selected according to the student's professional and artistic characteristics to choose appropriate dramatic content. Through performance training, students can directly experience the unique artistic charm of theater music. IoT and the enhancement mechanism module for teaching vocal singing (1), as shown in Figure 3.
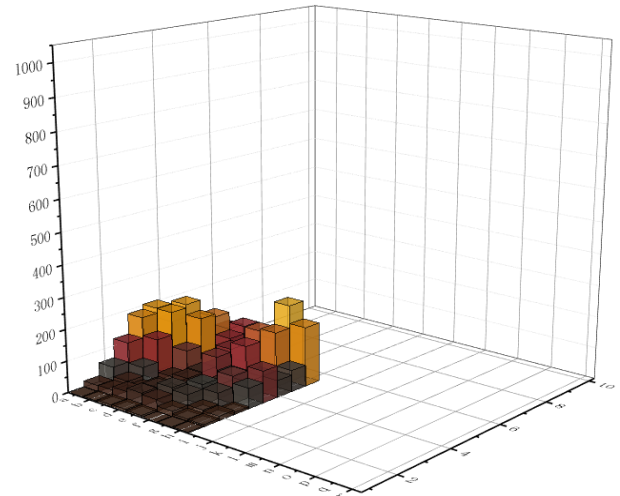

Figure 3 IoT and the enhancement mechanism module for the teaching of vocal singing (1)

When designing voice courses, colleges and universities can flexibly and rationally present Chinese theater voice, recitation, acting, dialogue, music, vocal, dance, martial arts, acrobatics, and other aspects according to the learning objectives and contents; students are guided to take vocal lessons to understand Chinese theater culture better. Please encourage students to broaden their horizons, enrich their presentations, and enhance their artistic expression. In practical classes, teachers should consider the teaching environment and adopt appropriate teaching methods for vocal singing, e.g., encouraging students to watch local popular or traditional dramas and to collect information about such dramas through various

channels，which improves students' understanding and awareness of the organization of theatrical knowledge. Teachers should encourage students to enhance their qualities and consciously take responsibility for protecting and promoting traditional culture while promoting theater culture in the new era.

Offer theater electives to expand the vocal program offerings. In the Bachelor's degree vocal program, students are encouraged to choose opera courses and learn more about the forms of dramatic voice and performance through elective courses. Students are allowed to gain a truly in-depth understanding of Chinese theater culture, appreciate the extraordinary wisdom of their predecessors, ignite their cultural trust, acquire a more excellent vocal foundation, improve their artistic qualities, and enjoy the richness and diversity of traditional culture. Encourage students to create appropriate concepts of honor and communication, and strive to educate students and celebrate the power of excellence and the good qualities of thought in the art of the new age. Cloud computing and the enhancement mechanism for teaching vocal singing module (2), as shown in Figure 4.
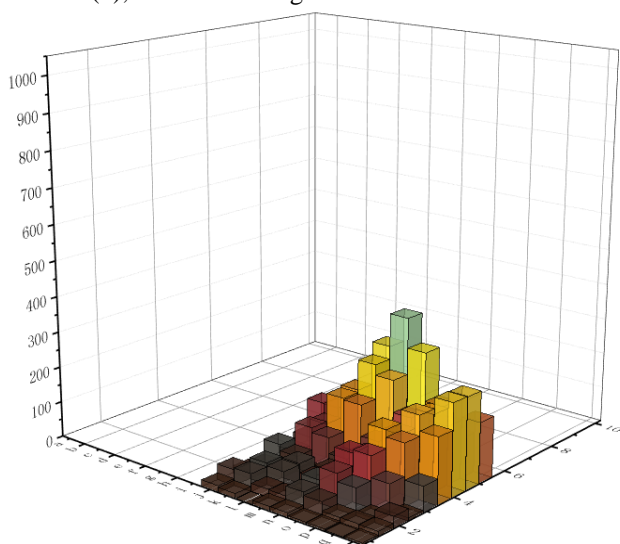

Figure 4 Cloud computing and enhancement mechanism module for teaching vocal singing (2)

4.1.2 Utilizing the Internet of Things and Cloud Computing for Assistance

Teaching voice and music at universities is closely related to the great responsibility of training musical talents. Incorporating theater elements into vocal music courses is a supplement to the content of vocal music courses, and it also helps modern students understand theater culture, which is crucial to enriching their cultural background and improving their artistic qualities. Nowadays, with the popularization of the Internet and the full integration of the Internet of Things (IoT) and cloud computing into teaching and education, university faculty can utilize IoT, cloud computing, and information technology to teach vocal singing and incorporate traditional theatrical

elements into vocal singing instruction by providing vibrant, engaging, and enriching vocal lessons. Students are encouraged to be interested in taking voice lessons to achieve satisfactory results.

Teachers can rely on the Internet of Things, cloud computing, theater music, and video in voice lessons. This approach allows students to incorporate their characteristics and enhance performance inspiration. At the same time, speech teachers can create their theater lesson videos using audio and video to enable students to learn and interact individually, which not only helps students to learn anytime, anywhere, but also saves time and resources by improving the efficiency and quality of voice lessons. Voice teachers can create virtual theaters using virtual reality with the help of school IT specialists to allow students to experience the atmosphere and glamour of an opera performance. Interactive learning of voice and performance skills will enable students to improve their vocal skills. Opera elements are integrated into the practical mechanism of teaching vocal singing module (3), as shown in Figure 5.
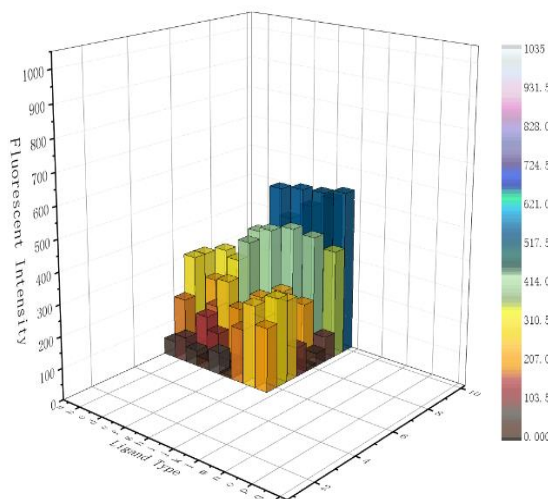

Figure 5 Integration of Opera Elements into Vocal Singing Teaching Practice Mechanism Module (3)

4.1.3 Enrichment of extracurricular opera and cultural activities for students

Learning must be focused on something other than theoretical studies. Drama cultural activities will be organized to assist students in understanding and appreciating the vocal and performance characteristics of drama. This teaching method closely integrates the traditional drama culture with the vocal course, which helps broaden students' horizons and distract them from their more profound understanding of the theoretical connotations of vocal music. Continuously improve the readability of individual artistic synthesis.

The university encourages students to create a "theatre culture" community independently. It strengthens the community team by recruiting students, choosing the best

way to sing in the theatre from among the members' choices, and getting to know the students' performances. The club organizes regular theatre culture salons, theatre appreciation, and exchange activities to enhance the understanding of the more profound spirit of theatre. It gradually creates an intense atmosphere for learning about theater culture on campus. Secondary schools regularly organize various artistic activities. First, universities regularly organize theatrical performances and experimental activities, inviting professional troupes and groups to their campuses so that students can enjoy audiovisual experiences and demonstrate the charm and beauty of Chinese theatre. Finally, undergraduates can organize various activities, such as exhibitions, lectures, and competitions at the Opera and Culture Festival, which not only attracts more students but also demonstrates the importance and efforts of the university in spreading the culture of Chinese theater, attracting the attention and trust of the society, and improving the reputation and influence of the university—vocal singing teaching enhancement mechanism module (4), as shown in Figure 6.
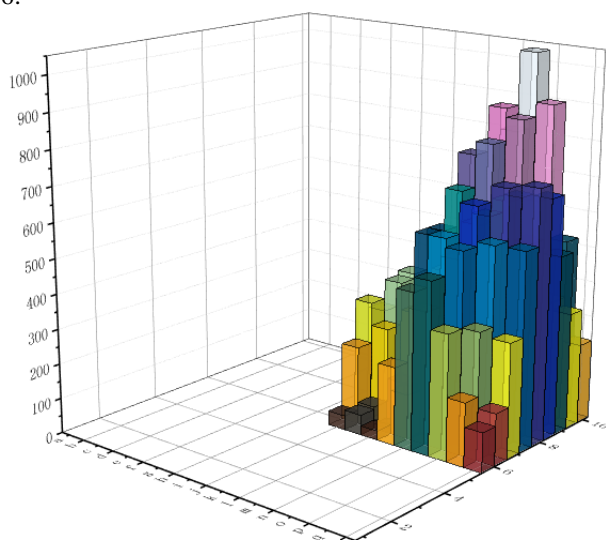

Figure 6 Vocal singing teaching enhancement mechanism module (4)

4.2 Auxiliary Mechanisms of Internet of Things and Cloud Computing Technology for Teaching Vocal Singing

The application of IoT and cloud computing in teaching and learning has created new ways and spaces for modern understanding to become more diverse. The application of IoT and cloud computing in traditional vocal music courses is a new test in the context of classroom innovation. As mentioned above, the introduction of IoT and cloud for the formal vocal program can compensate for the shortcomings of the traditional vocal program. Traditional vocal music courses face problems, such as limited time and space for teachers and students, low attendance, teaching, learning process fragmentation,

inability to attend regular classes, limited educational resources, and difficulties.

Supported by the Internet of Things and cloud computing, musical expression is becoming increasingly diverse, and learning is becoming more and more varied in content and form. Teachers transform knowledge into new forms, such as images, sounds, and videos, and combine them with textbook knowledge to make music more attractive and allow students to learn more intuitively, deeply, and quickly. Students' interest and enthusiasm for learning have also increased significantly, and learning methods have become more flexible and diverse. The Internet of Things and cloud computing have made music education an ideal tool. Vocal teachers are now immersed in theoretical approaches to vocal lessons and performances by different fans. The use of computers, cell phones, and other cutting-edge and innovative music data and concepts can be demonstrated to students, as well as vocal technology. In the process, vocal teachers can improve verbal skills according to the needs of their students. Understanding and appreciating music, as well as analyzing vocal music, plays an important role. It can achieve good teaching and learning results and make the teacher-student relationship more intimate and harmonious. The integration of IoT and cloud computing improves student motivation.

Vocal music teachers use vocal music in the classroom, mainly from optional textbooks. Today, the Internet, the modern Internet of Things, and cloud computing contribute significantly to people's productive lives. Many teaching materials are available online, including classical vocal music, arias, concerts, audiovisual materials, and live texts. They greatly facilitate vocal music collection, storage and storage by voice teachers and students. Scarce works, such as original compositions, folk music, works by distant minorities, and vocal music that cannot be found in libraries or specialized bookstores, can also be collected. With the development of the Internet of Things, cloud computing, and the Internet, these rare vocal scores are being uploaded to the Internet. In addition, the results of some of the new work will be posted online promptly, allowing teachers and students to search as many online resources as possible and easily access the information their students are learning and need. In this way, not only can they rely on rare vocal music, but they can also evolve and learn new songs promptly.

The Internet of Things and cloud computing provide a self-study platform for students to attend full-time courses "stress-free" anywhere after school. Through the Internet, visual, audio, and video lectures can be delivered in the classroom with real-time feedback, and audio materials, such as music and accompaniments, can be played and enjoyed at appropriate times. Teachers should appropriately guide students to learn basic skills online and encourage them to deepen their learning and research offline. It plays a vital role in promoting the development of learning initiative, intellectual thinking, more profound analysis, and creative thinking skills. In traditional classroom teaching, students must master the theoretical

foundation of vocal music. Face-to-face learning helps teachers and students communicate and saves much actual learning time. According to the characteristics of different disciplines and specialties, the theme of vocal singing teaching emphasizes the practice of "combining science and thought" rather than the combination of science and thought. It combines the abstract theoretical knowledge in the classroom with the approach outside the course, combines learning with thinking, and truly realizes "from learning to use." Continuous innovation in practice encourages students to actively communicate, discuss, and express their views and ideas, combining science and thinking, and promotes the development of innovative thinking. The Opera elements of the Internet of Things are integrated into the practical mechanism of the vocal singing teaching module (5), as shown in Figure 7.
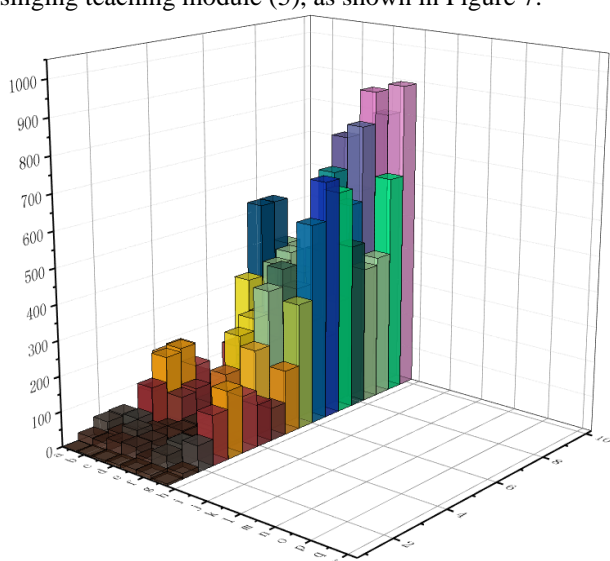

Figure 7 IoT's Opera Elements into Vocal Singing Teaching Practice Mechanism Module (5)

4.3 Specific Measures of the Internet of Things and Cloud Computing Technology to Assist the Teaching of Vocal Singing

Until now, the Internet and cloud computing for vocal pedagogy have not been developed, which makes connecting to external data difficult. Understanding new trends and concepts in the development of the discipline takes work. The voice teacher could only pass on an old book to the student in the same reference mode. In contrast, the student could only passively acquire a uniform knowledge of the teacher's teaching methods and books and could not access the latest concepts of the subject and describe the latest professional activities. Thanks to the Internet, it is possible to collect many educational resources that do not have a variety of vocal programs. Teachers and students can access mobile apps anytime and anywhere for broader and more flexible learning through the Internet of Things and the cloud. Opera, art, and creative music sung by singers of different levels at home and abroad can still be enjoyed. Searching

for videos of famous vocal teachers and masters online at home and overseas or attending public courses creates cutting-edge scientific verbal concepts and online vocal skills, simplifies student learning, and creates an open and broad educational field. Students should also be encouraged to take full advantage of the various resources of the Internet for e-learning and research in their daily studies and to use cloud-based vocal materials as the most up-to-date and valuable knowledge to deepen their understanding and appreciation of audio topics, thus increasing enthusiasm and interest in learning. Today, students show interest and curiosity in the Internet and media. Voice teachers need to understand and capitalize on their students' ability to guide them scientifically and effectively through IoT and cloud computing resources and provide valuable support for their learning. Interest in science is the driving force and initiative for education. As a result, students' educational awareness has changed, and they can learn diligently and effectively in the classroom. Using these modern teaching methods and tools wisely and effectively is essential in teaching vocal singing. For example, searches and downloads can be made to create one's music database, identify different versions and accompaniments for each spoken piece in a course, and guide students to make side-by-side comparisons rather than just advertisements.

IoT and social cloud software such as WeChat, Weibo, and QQ. IoT and cloud computing are essential applications. The most compelling features of these applications are online video and audio. If there is a teacher and students with the right internet environment and equipment, it can be a voice class or a voice lesson. Previously, voice teachers could only hope to return to the classroom to study and check exercises. It was expected to hear students say that it took time to understand and assess the correctness of these exercises after class. Due to the teacher's lack of timely assessment and correction, students had limited need and interest in practice. They needed help organizing their language learning, resulting in slow and inefficient instruction. If these habits are formed through inappropriate exercises, they may lead to difficulties in learning vocal music. Students can now be asked to record movements after class, download the appropriate audio support, and send regular audio and video exercises. Listening to and watching these audio and videos makes it possible to understand and manage the students' daily practice, evaluate their activities and voice suggestions on time, and help them correct problems and errors in their practice and avoid bad voice habits. Audio and video are recorded online through an application server with memory-reading capabilities. Students can play the audio content and find their voice problems based on the teacher's explanations, which can be utilized to the fullest extent when learning and educating students. Students usually follow the voice and are ready to participate in competitions, perform, and practice on stage.

Vocal teachers must integrate online teaching materials, the rational and efficient use of the Internet of Things,

cloud computing, and online resources, and fully use text, audio, video, and other related experiences for correct selection and self-management. Students should also have their understanding and knowledge of vocal singing education in the process of learning. They should fully understand the current status of the development of verbal singing teaching at home and abroad, understand the current focus of vocal singing teaching, and fully recognize the importance of the demeanor and movement of vocal music in performing on stage. For vocal singing students, verbal singing teaching is a fundamental course. Teachers should encourage students in daily teaching and actively participate in all kinds of art activities in school. Regularly organize students' small and medium-sized theatre performances, actively participate in various vocal competitions, and organize activities inside and outside the school. Students have the opportunity to perform on stage. Voice training should be combined with stage training so every student can achieve it. It is essential to create opportunities for students to gain a good foundation and self-confidence and, most importantly, to practice as much as possible and give them as many opportunities as possible to perform on stage. Competition, instead of practice, can better let students recognize their shortcomings, enhance their self-confidence, and enhance their ability to learn independently, to enhance the overall quality of students, improve the level of stage performance, mobilize students' learning enthusiasm, and effectively implement the concept of "learning by doing" in teaching. The impact of the Internet of Things and cloud computing on the fluctuation of vocal singing teaching practice is shown in Figure 8.
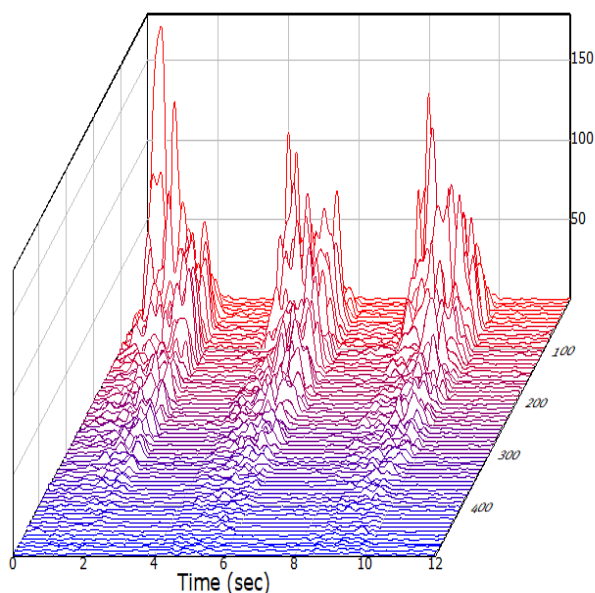

Figure 8 Impact of IoT and cloud computing on fluctuations in vocal singing teaching practices

5. Conclusion

Research shows that the main task and purpose of teaching in the new era is to transfer knowledge and improve students' thinking abilities. They are optimizing and innovating the vocal classroom through the help of technology and the rational use of the modern Internet of Things and cloud computing to support traditional vocal lessons. Modern IoT and cloud computing to support formal verbal music learning provide high-quality learning resources to share and create musical, artistic, cultural, and emotional studies as part of students' vocal singing instruction. It increased students' motivation to learn vocal music and achieved the objectives of "learning to think" and "learning to communicate"; the use of modern IoT and cloud computing to support traditional vocal music learning is a critical component of educational reform. This study also combines the advantages of the contemporary Internet of Things and cloud computing with the conventional vocal music program that supports and serves the traditional vocal music program. Eliminate the shortcomings of conventional vocal lessons and make them a necessary and valuable supplement to formal vocal lessons.

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