Research on Training Methods of Students' Singing Ability in College Vocal Music Teaching under Big Data

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Abstract: Economic development has improved people's living standards and enriched people's daily entertainment activities. People have put forward new requirements for singing and performing. Vocal music teaching (VMT) is a part of the education system, which aims to cultivate singers and create music art enterprises. The new curriculum reform and public demand promote the reform of singing education. The singing course must understand students' singing skills and open up new ways of learning. Therefore, this paper analyzes the principles and precautions of VMT to study its existing problems, and uses big data to optimize the corresponding training channels, so that teachers' teaching methods and students' learning ability can be innovated, to improve students' singing ability, promote them to master more singing skills, and cultivate more excellent music talents.

1. Introduction

In singing teaching, the development of students' vocal music skills focuses on the theoretical aspects of the curriculum, with less practical participation, and the lack of excellent teachers will also have an important impact. In traditional courses, students' singing skills training is only limited to education, and there is no real performance ability. Therefore, students' learning mechanism, learning strategies, learning stages, and methods should be adjusted correctly and quickly, and reasonable and effective suggestions should be put forward to improve their singing skills in singing teaching, to improve their overall singing level.

The most important thing in VMT is to cultivate the ability to extend. Svec Christina L believes that the maximum overall research effect of cross-classification variables includes the influence of the same and different differentiation techniques on the average singing score gain, and the overall average effect of the main adjustment variables varies from insignificant to moderate [1]. Okada Brooke M comprehensively evaluated the relationship between individual differences in music training and the potential measurement of three separable aspects [2]. Reifinger Jr, James L revealed the relevant factors of musical ability, reading ability, and academic ability. Regression analysis with a single variable as the predictive factor showed that the significant difference in

solfeggio achievement exceeded the explanation of pitch matching ability, which can be explained by reading comprehension ability [3]. Demorest Steven tested the effect of daily singing teaching on the accuracy of children's singing and compared the accuracy of children's singing in kindergartens in schools that received the daily singing guidance of music experts with those in control schools that did not receive the course music guidance [4]. Swaminathan Swathi believes that general cognitive ability and openness are indirectly related to musical ability by predicting musical training, which in turn predicts musical ability. Music ability seems to be the result of many factors, including but not limited to music training [5]. Hedden Debra G emphasized his belief in order to achieve success in children's singing and provided the meaning related to music teacher preparation [6]. The above studies all talk about the cultivation of singing ability, but they are not combined with big data.

Big data plays a vital role in VMT. Leung Carson KS believes that data science solutions can help manage, analyze, and mine these big data to discover interesting information and useful knowledge [7]. Miksza Peter explored a microanalysis technology to measure the self-regulation tendency of instrument players in the process of music practice and investigated whether the intervention measures informed by the characteristics of the microanalysis technology would increase the self-regulation learning tendency of students [8]. The above studies have described the application of big data in VMT, but there are still some deficiencies in the training of singing ability.

When learning singing skills in singing classes, teachers should formulate and guide the design of perfect learning programs and targeted learning strategies. They must fully grasp the teaching principles of practice and learning interests, gradually cultivate students' good voice management skills, flexibly use improved technology, skillfully manage the stage, and make singing teaching develop in a more scientific and reasonable direction. Therefore, this paper analyzes and studies the training of singing ability in VMT.

2. Principles and Precautions for Training Singing Ability in VMT

2.1. Principles of Singing Ability Training in VMT

In VMT, students' singing ability training should follow the following principles, as shown in Figure 1. First, the interest-oriented principle. Fully mobilize students' learning motivation, use rich phonetic content and vivid and interesting learning methods, let students always keep learning enthusiasm, obtain better learning experience, improve learning efficiency and expressiveness, stimulate students' learning potential, and finally achieve the educational goal of improving students' singing ability. Second, the principle of practice and learning. Teachers should guide students to further practice art; at the same time, we should learn the basic knowledge of practical skills in practice, strictly follow the standard requirements of vocal music training, constantly improve the learning rhythm from the perspective of physiology and psychology, and gradually master students' basic knowledge of vocal music. Learning also creates opportunities for musical instrument teachers to incorporate the curriculum into the curriculum [9]. At the same time, teachers should receive comprehensive scientific guidance, improve and practice the scientific training mechanism, organize more scientific and reasonable learning and performance activities, so that students can acquire more vocal music programs and on-site practical experience while cultivating good vocal habits. Third, the principle of continuous adaptation. According to the different characteristics of students, determine the advantages and key points of each student, allow each student to maximize their advantages, avoid their weaknesses, make full use of their personal advantages in the learning process, develop personal thinking from different angles, and improve their singing skills.
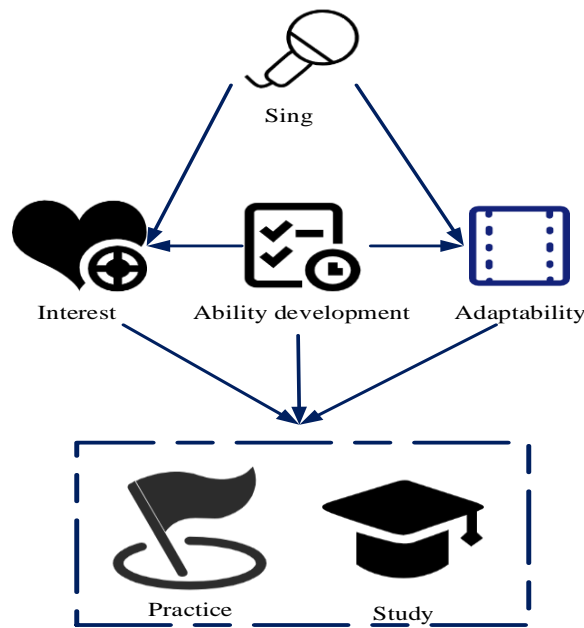
Figure 1: Principles of singing ability training in VMT.

2.2. Precautions for Training Singing Ability in VMT

There are two aspects to pay attention to the cultivation of singing ability in VMT. The first is the combination of singing and performance. Compared with other teaching methods, VMT has many variables. There are no fixed textbooks or teaching methods. In most cases, singing teachers need to explore themselves. Singers should not only understand the specific way of singing, but also integrate their feelings into the singing process and express their feelings with their own voice. Therefore, the combination of singing and performance is a problem that must be considered when developing singing technology in college singing teaching. Teachers should consciously integrate relevant performance content into students' VMT, realize the combination of singing and performance, and improve students' performance level. Implementing music activities in the early education environment can positively affect singing skills and attitudes towards music [10]. Secondly, cultural success is essential for every art student, but improving students' cultural success is a long process. Vocal music is a branch of music, and music itself is a part of culture. Vocal music uses human voice as a tool for singing and expression, and voice is more important than musical instruments. By performing songs, the audience can combine many dreams and lyrics together. Only by understanding the author's specific experience and creative background, as well as the specific meaning of songs and lyrics, can the singer better interpret the songs, which requires students to achieve good cultural achievements.

2.3. Problems in VMT

The current problems in VMT can be summarized into three aspects. The first is the lack of teachers. Most teaching methods are now taught by one teacher to many students and one teacher to one student. The disadvantage of this method is that teachers cannot accurately understand the characteristics of each student and teach according to the ability level of students. In other words, targeted training cannot be carried out according to the characteristics of each student. In addition, the lack of excellent song teachers cannot promote the overall improvement of VMT skills. The second is the single teaching method. Some teachers still believe that students can only learn one

singing style, adopt traditional indoctrination education, advocate to pay attention to knowledge dissemination, and ignore the importance of practice and innovation. In the traditional indoctrination process, teachers tend to emphasize the neglect of practical theory, which leads to the weakening of students' interest, and even leads to boring classroom activities, which is easy to lose interest in learning. Some teachers still rely on tradition, which is ignored when cultivating students' innovative consciousness, which limits students' innovative development and cannot cultivate more innovative music talents. The third is the shortage of educational resources. The shortage of teaching materials has become another obstacle to the development of teachers and students. Some schools do not pay attention to the investment and construction of music equipment when allocating teaching materials, and sometimes even use music systems without teaching materials or similar teaching materials, which is not conducive to improving students' music skills and work quality. Teachers are related to the intersection between instrumental music teaching and conducting [11]. There is no separate music class, no proper music equipment, and the school even canceled music and other art classes to study other cultural subjects, which is not conducive to the overall development of students, which also leads to the lack of vocal music ability after college admission.

3. Ways to Cultivate Singing Ability in VMT under Big Data

The training of singing ability in VMT under big data needs to be carried out from the following aspects. The first is to introduce excellent teachers. Through active and effective communication with students, teachers can achieve targeted learning, help students correct teaching methods, timely adjust teaching status, and further help students with less learning to ensure teaching quality. Therefore, we should develop appropriate student-centered and education-oriented teaching methods and should not ignore the blind study of the overall learning effect of students with weak foundations. The second is to innovate teaching methods [12-13]. Teachers should combine theory and practice, vocal music skills and body indicators, and make basic literacy skills equally important to help students better understand the psychological state of singing. The tense posture on the stage can be alleviated by loud voice, rich facial expressions, and body language, which can help the audience gain better visual perception and better understand the mood of the song. The third is to carry out practical activities. In VMT, students should not only pay attention to the amount of daily exercise, but also participate in various competitions to improve performance experience and psychological quality. Regular participation in performance can overcome psychological problems such as stress and shyness and enhance self-confidence. Schools can also actively promote incentives through these activities, so that students' learning space is not limited to the classroom. The fourth is to organize music teaching. With the continuous development of big data technology, we can try to apply it to VMT to expand students' musical thinking ability. Multimedia learning itself has the characteristics of interface and multilevel [14-15]. In practical teaching, it can stimulate and strengthen students' interest in music learning, guide teachers and students to have good interaction, and improve the development of students' innovative thinking abilities.

4. Application of Clustering Algorithm in Singing Ability Training

In order to study the key ability training in VMT, this paper analyzes and studies the singing ability training through clustering algorithm. Firstly, the clustering criterion function A of VMT is constructed as follows:

$$A = \sum_{i=1}^{n} \sum_{j=1}^{m} \left\| a_j^{(i)} - r_j \right\|^2 \tag{1}$$

Where m and n are the error and division value of the clustering criterion function, a is the teaching method of VMT, and r_j is the training effect of the clustering criterion function. Finally, according to the clustering criterion function, the effect of singing ability training in VMT can be obtained as follows:

$$r_j = \frac{1}{n}\sum_{i=1}^{m} a_j \tag{2}$$

The formula diagram for measuring college vocal music teaching ability under the condition of big data is as follows:

$$\varphi = \sqrt{\frac{\sum_{j-1}^{m}(rA_j - rn_j)^2}{i-1}} \tag{3}$$

5. Experimental Analysis of Singing Ability Cultivation under Big Data

In order to study the role of big data in the training of singing ability, this paper analyzes the satisfactory effect of VMT effect under big data by investigating vocal music students in three schools, including 100 people in each school. The specific results are shown in Table 1.

Table 1: Satisfaction of vocal music students in three schools with the teaching effect of vocal music under big data

	Satisfied	Commonly	Dissatisfied
School 1	88	5	7
School 2	85	6	9
School 3	86	8	6
Total	259	19	22

It can be seen from Table 1 that among the satisfied students, School 1 has the largest number, accounting for 34.0% of the satisfied students, and School 2 has the smallest number, accounting for 32.8% of the satisfied students; among the general students, school 3 has the largest number of students, accounting for 42.1% of the general population, and school 1 has the smallest number, accounting for 26.3% of the general population; Among the unsatisfied students, school 2 has the largest number, accounting for 40.9% of the unsatisfied students, and school 3 has the smallest number, accounting for 27.3% of the unsatisfied students. On the whole, the number of satisfied people accounted for 86.4% of the total, the general people accounted for 6.3% of the total, and the dissatisfied people accounted for 7.3% of the total. Satisfied students believe that big data can improve the interaction of VMT and can also score the singing effect. The unsatisfied students thought that the VMT under big data had lost the original classroom atmosphere and was not conducive to their ability development. Finally, analyze the effect of singing ability training and personal accomplishment in VMT under big data, and compare it with the original teaching, as shown in Figure 2.
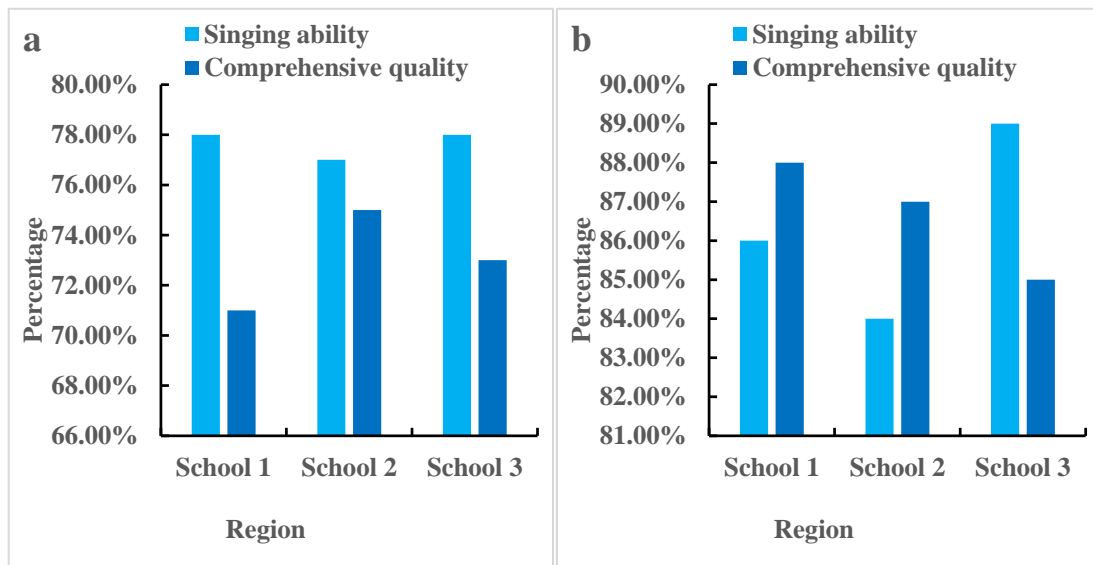
a: Traditional VMT,   b: New VMT

Figure 2: Training effect of singing ability and personal accomplishment in VMT under big data.

Figure 2a shows the traditional VMT and Figure 2b shows the new VMT, and the singing ability, training effect, and personal quality of the new VMT are higher than the traditional VMT. It can be seen from Figure 6a that, under the traditional VMT mode, the singing ability training effect of School 1 is 78%, and personal accomplishment is 71%; the training effect of singing ability in School 2 is 77%, and personal accomplishment is 75%; the training effect of singing ability in School 3 is 78%, and personal accomplishment is 73%. It can be seen from Figure 2b that the training effect of singing ability in School 1 is 86%, and personal accomplishment is 88%; the training effect of singing ability in School 2 is 84%, and personal accomplishment is 87%; the training effect of singing ability in School 3 is 89%, and personal accomplishment is 85%. Among them, the average effect of singing ability training under the traditional mode is 77.7%, and the average personal accomplishment is 73%; the average effect of singing ability training under the new mode is 86.3%, and the average personal accomplishment is 86.7%. Through comparison, we can see that the training effect of singing ability under the new mode is 11.1% higher than that of the traditional mode, and the personal accomplishment is 18.8% higher than that of the traditional mode. It can be seen that VMT under big data is more conducive to the cultivation of personal literacy and singing ability and can also be integrated into VMT's classroom to enrich the classroom content.

6. Conclusion

Only by strengthening students' comprehensive skills in continuous teaching practice can we achieve the goal of cultivating modern singers and high-quality singers for the society. In order to improve the students' singing level, we must start from many aspects, start from the students' point of view, and practice more singing skills according to the teacher's instructions; Get rich experience, innovative rational teaching methods and correct teaching attitude from the perspective of teachers; From the perspective of the school, we should attract a large number of outstanding talents, improve the corresponding basic art institutions, and work together to improve students' singing ability in all aspects. In addition, the school must also explore ways to improve students' singing ability and stage performance level. On the basis of balanced development, it should promote the improvement of students' singing ability, further promote the singing teaching to take a more reasonable and

scientific development path, and cultivate more excellent singers with solid practical skills and solid social foundation.

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