The Differences in 21st Century 4C Skills Among Diverse University Choirs in China

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Abstract

Choir singing originated from the choir of Christian churches in medieval Europe and first appeared in the 1st century. However, the focus of choir education had long been on musical knowledge, neglecting the cultivation of practical skills, resulting in variations in skill performance. In the 21st century, choir singing flourished, particularly in Chinese universities. Aligned with modern educational trends, choir singing aimed to foster students' 4C skills: critical thinking, creativity, communication, and collaboration. Music educators gradually emphasized skill development, recognizing it as essential for students' future lives and careers. Nevertheless, the cultivation of these 4C skills remained at a preliminary stage, with varying understandings of skills across different universities leading to differing skill levels among choir ensemble students. Therefore, this study aimed to investigate the disparities in the development of 4C skills among choir ensemble students from diverse Chinese universities. Three universities of different types were selected for the study, and a quantitative approach was employed through a case study to examine the differences in students' 4C skill development in the 21st century. Because most of the research was qualitative. Leedy & Ormrod (2009) believed that the advantage of quantitative research is that through statistical analysis of numerical data, researchers can determine meaning based on numerical data and formulate objective conclusions and recommendations rather than based on personal opinions or subjective information. Researchers distributed an online survey to all students in the music school's choir ensembles of the three universities, collecting a total of 220 valid responses. The analysis revealed that students in universities with a stronger musical emphasis exhibited a positive attitude towards skill cultivation and development. These findings provided valuable insights for the future of diverse forms of choir music education in terms of skill development.

Keywords: choir singing, collaboration, communication, creativity, critical thinking,

Background

In the 21st century, Chinese choirs from different types of universities show significant differences in cultivating students' 4C skills. These skills, including critical thinking, creativity, communication, and collaboration, are essential for students' comprehensive development and future success in the workplace.

The emphasis on "significant differences" indicates that various university choirs have distinct approaches to nurturing students' 4C skills. Based on the current situation of Chinese university choirs, these differences may manifest in the following aspects: teaching philosophy and objectives, music style and repertoire selection, teamwork and communication methods, and the level of guidance provided. These factors contribute to the diversity in 4C skill development among choir students, reflecting the varied positioning and characteristics of diverse universities in music education and cultivating students' overall abilities. When students choose to join a choir, they should consider their own interests and developmental needs to achieve comprehensive growth and personal improvement. The integration of the 4C's--critical thinking, creativity, communication, and collaboration into China's Education Policy (CEP) reflects a broader commitment to developing the comprehensive skills necessary for success in the 21st century (Dello-Iacovo, 2009). This emphasis is consistent with the evolving educational landscape, which increasingly recognizes the importance of developing competencies that go beyond traditional academic knowledge (Law, 2014; Oyeniran & Uwamahor, 2017). Perry (2014) points out the significance of studying contemporary China from the perspective of reform and opening in the field of comparative politics and public policy, which marks the beginning of a "new era of socialist development with Chinese characteristics" (Xi, 2017). In the field of choral music education, the incorporation of the 4C's not only enhances musicianship, but also fosters the development of a broader range of skills that are essential to students' personal and professional growth. By infusing choir education with opportunities for communication, collaboration, critical thinking, and creativity, educators enable students to thrive in an interconnected world while enriching their musical experience. Thus, the intersection of 4C skills, CEP, and choir music education emphasizes a dynamic approach to holistic student development.

21st century knowledge and skills are not new to us, but Rotherham and Willingham (2010) suggest that "changes in our economy and the world mean that collective and individual success depends on the possession of these skills" (p.17). P21, a national organization of business leaders and education ministries, promotes standards focused on core academic knowledge with an emphasis on life and career skills (Partnership for 21st Century Skills [P21], 2006). Akcanca (2020) emphasizes that in order to face unexpected challenges, individuals must possess a set of skills known as 21st Century Skills.

As the world enters the 21st century, there is a huge change taking place and it is a global one. Garay and Quintana (2019) define 21st century skills as a set of skills necessary to interact with work and employment in today's world, especially in technology management. In another definition, 21st century skills are defined as lifelong learning skills that enable students to familiarize themselves with their changing life conditions and become more sensitive. Wagner (2008) describes seven survival skills for careers that all students will need to continue to learn and to be citizens in the 21st century: critical thinking and problem-solving skills, collaboration and key influencing, flexibility and adaptability, initiative and entrepreneurship, effective oral and written communication, accessing and analyzing information, curiosity and imagination. Schleicher (2011), Stuart and Dahm (1999) agree that in order to meet the challenges of the 21st century, educators have made a commitment to improve the quality of teaching and learning through the development of 21st century learning skills in all students. Osman, Hamid and Hassan (2009) suggest that students in the 21st century need to apply current skills while developing new ones to cope with an ever-changing society. Topoğlu (2014) adds that new educational concepts must be needed to adapt to the new consequences for individuals in a changing world. In addition to teaching students the understanding of specialized knowledge, teachers should teach students the skills for future success in the workplace such as problem solving, creativity, collaboration, communication, innovation, adaptability, and use of technological tools (P21, 2006). Actively interacting with the real world in work and learning as a way to acquire multiple skills and approaches.

Choir singing is an art form that enhances students' overall proficiency in professional music composition, collaboration, communication, and independent thinking. Elliott's (1995) Science of Practice in Music Education provides a foundational theory for the development of choir programs. The choir education in Chinese universities is also carried out based on this theory. Based on the practical teaching of music education and the relevant review of China's choir education, Chinese university choirs are more about developing students' abilities in vocal singing, stage performance, dance art performance

and other aspects of choir music (Shao, 2018). In order to improve the students' aesthetic and comprehensive quality ability. According to university in different regions of China, they have different characteristics analysis, absorb and learn from western vocal methods, extensively dabbles in the multi-ethnic styles of the world, integrates the melody of The Times and popular factors, and steps out of the road of characteristic inheritance and innovation (Zhu, 2014; Wang, 2021). Similarly, non-music major choirs also have certain research significance (Li, 2019). This paper analyzes the teaching situation in the existing courses, so as to promote the reform of non-music choir courses in the direction of classroom design, teaching syllabus, teaching methods, etc., and build a more reasonable choir curriculum system. As for the relevant research of choir education in Chinese universities, choir education is a very important part of art education, which is more about cultivating students' music itself. For example, music expression, music literacy and so on. However, the research on the combination of choir singing and 4C in Chinese universities is almost zero.

The past development of choir music education in China has almost no relevance to the development of the 4C and is limited to the development of choir music itself, but if further exploration is needed to assess the full relevance of choir music to the 4C, the data gap in the academic field of Chinese music education needs to be addressed.

The choir education system should develop the student's abilities in all aspects and should be integrated with theory and history. However, the focus on the music itself, whether it is the theory or the practice of music (choir singing is a form of music practice), ignores the fact that it is in the practice of music that students develop their abilities, which can be applied to any field in the world, and which will enable them to face the changes in the world and succeed in the future. Students want to see that the knowledge they have is valuable and that they will learn new skills in the future (Susan, 2003).

This research is of great significance to study the diverse university choirs in cultivating students' 4C skills. This is not only instructive for educational reform and optimization, but also helps to develop more reasonable talent cultivation strategies to improve students' comprehensive literacy and competitiveness in the workplace, as well as to promote the progress and improvement of choir education. This case study conducted a differential study of the 4C skills in the 21st century, even including choral skills, with three universities choirs in China. This study found that choir students from music professional universities have strong and more comprehensive 4C skills and choir skills, choir students from art universities have 4C skills and choir skills, and choir students from comprehensive colleges are weaker in 4C skills.

Literature Review

P21 (2015) emphasizes that when students become adults and enter the "small society" of the university, they cannot rely only on their thinking skills and professional knowledge, but also learn to adapt themselves in different environments, focusing on the development of life and work skills. The four essential elements of 21st century learning and innovation skills are critical thinking, creative thinking, collaboration, and communication (Schleicher, 2011). Halpern (1999) argues that better thinking is not an inevitable result of traditional, discipline-based instruction. Shuler (2011) learned that educational leaders have long criticized classrooms that emphasize rote memorization of facts and imitation of skills. Traditional teaching methods no longer meet the demands of today's world. In the philosophy of Voogt et al. (2013), the development of students' skills in the 21st century requires the identification of new instructional and content-based educational goals. Beswick and Fraser (2019) similarly argue that it is necessary to teach the concepts of 21st century skills effectively and competently. Student learning will develop a deep understanding of conceptual theories combined with world practices. Just as students who are successful in college and are able to graduate are not necessarily academically brilliant students, but rather they have extraordinary talents (New York Times Magazine, September 2011). The main emphasis is on how teachers can incorporate the development of 21st century skills in their teaching in each situation.

Despite the fact that 20 years have passed since the beginning of the 21st century, students still have a vague concept of these skills, and teachers do not have the awareness or the ability to teach them to their students but remain in the tradition of simply passing on knowledge. Various messages disseminated by education scholars agree that four specific skills were the most important: creativity, critical thinking, collaboration, and communication. Rotherham and Willingham (2010). In the current 21st century, having these skills is important for individual and societal success.

Critical thinking is strictly a third cognitive skill that arises in unconventional problem solving and systems thinking (National Research Council, 2008, 2010). Mayer (1990) adds that critical thinking skills are often considered an important part of both skills. Halpern (1996) stated when we think critically, we are evaluating the outcome of an idea or event, how well a decision was made, or how well a problem was solved. Wagner (1997) also mentions that without engaging in an effortful thought process, no one can develop expertise in any field. Critical thinking is an essential goal in educational practice. Research on critical thinking in music education did not surface until the 1980s, and research in the music classroom has been extremely limited. Shuler (2011) argues that critical thinking skills help students assess and reflect on the quality of their musical performance skills and how to develop strategies to improve them. Thus, Garrett (2009) re-emphasized the importance of critical thinking as a condition for the development of independent musicianship, and Younker (2002) suggested how the teaching of critical thinking skills is of interest to the curriculum in all disciplines, and how instruction in music can develop children's critical thinking skills.

Koutsoupidou and Hargreaves (2009) stated creativity is a thought process at various stages. Evenhouse (2014) adds that in the rapidly changing society of the 21st century, students need to use creative thinking, which includes thoughtful questioning, thinking on their feet, and imagination, to function successfully. Linking imagination to creativity leads to a level of thinking that rises to the level of spiritual freedom. As students work and collaborate creatively with others, each will use a variety of techniques to bring out their unique ideas and maximize their creativity. Wai Chen (2017) similarly observes that musical creativity one value has been recognized as an important topic in the field of music education over the past several decades. The alignment of 21st century skills with music education is reflected in the NCCAS's focus on the definition of the artistic process "creativity," which refers to "producing original art" (National Core Arts Standards, 2014, p. 11). This original art allows students to develop creative thinking that can reflect the diverse nature of music from a variety of perspectives.

Schleicher (2011) asserted that communication skills are the foundation of 21st century learning skills. P21 (2015) defines communication as the ability to effectively express thoughts and ideas in a variety of forms and contexts using oral, written, and nonverbal communication skills. Kougl (1997) asks an important question." Do students choose silence, or does silence control them?" (p. 126). To meet the expectations of 21st century education, educators strive to improve good communication skills.

Interpersonal communication in the teacher-student relationship permeates all aspects of teaching and learning. De Vito (1990) proposed the model of "teaching as interpersonal competence" and attempted to summarize the communication skills necessary for the teaching and learning process. Although music is a universal language, not all people respond to music in a universal way. Music as a communication tool remains a potentially powerful way to facilitate communication between people. The context of communication can be influenced through "musical performances and cultural performances" (Blau, 2007). Music can help people to better understand the fundamentals of communication and the function of language, ultimately helping them to use all available communication tools more effectively (Clarke, Williams & Reynolds, 2018).

In the last decade, due to globalization and the rise of technology, the ability to collaborate effectively has gone from being important to a vital requirement for students and professionals (P21, 2015). The word collaboration alone is not the work of one person, it is a mode of working and learning in which multiple people work together. linking individual strengths into collective strengths. So, collaboration literally means teamwork. Dillenbourg et al. (1996) stated that collaboration centers on the idea that the participants work together to accomplish the same task, rather than working in isolation working in isolation, and that necessary compromises should be made to reach a common goal. The

quality of interactive communication can have a direct impact on the thinking of other participating members. From a music education perspective, the development of collaborative skills among students has been of great interest since music ensembles have been integrated into schools. Of course, many schools have varying perceptions of collaborative skills. Lisk (2010) suggests that teams are the groups that best exemplify the function of collaboration. Learning exercises from musical ensembles are the easiest way for students to experience the importance of collaborative skills in a school-like setting (Evenhouse, 2014). To promote collaboration, teachers need to immerse students in a musical environment that fosters personal responsibility and shared leadership (Shuler, 2011).

In the context of Chinese education system and background, it is found that the critical thinking ability of Chinese university students is weaker than that of western learners, and critical thinking is the shortcoming of Chinese education, and it is believed that critical thinking must be added to Chinese education (Li, 2015; Zhai, 2014 & Wei, 2012). Chinese undergraduate education is related to the level of critical thinking ability of college students, but there are obvious differences in critical thinking between diverse universities and different disciplines. Among them, students in the arts field have a lower value for critical thinking skills (Zhang & Shen, 2018); Pan and Liu (2023) believe that Chinese education is the foundation of creativity. However, it has obvious advantages in cultivating students' rich imagination and creativity. Chinese education pays attention to memory and repetition, tends to exam-oriented education, and neglects the cultivation of students' creativity. Cultivating creative people is the theme of today's Chinese education (Qin, 2016; Yu, 2013). As far as Chinese music education is concerned, creativity is the "soul" of music education and an indispensable part of violin teaching. Teachers should pay attention to cultivating students' creativity in performance, to achieve the purpose of music education itself (Yue, 2013). According to The Report on the Modernization of China's Education (2020), Chinese education needs to pay attention to cultivating students' communication skills, so that they have good expression skills and teamwork skills. In China's educational philosophy, communication ability is regarded as one of the important qualities. The spirit of collaboration is also valued in Chinese education. The Report on The Development of Choral Education in China (2018) also mentions that choral education promotes emotional exchange among students, improves their communication ability, promotes cooperation and coordination among students, and cultivates their sense of teamwork and collective honor through the expression of music, the organization of choirs and the form of performances.

A review of the literature revealed the need for today's music education to focus on developing students' 21st century 4C skills. Through the art form of college choral singing, this study. The guiding direction of this study is: "Analysis of 4C skills differences among diverse Chinese university choirs in the 21st century". The following are further consolidated research questions raised:

What are the differences between the three different types of universities for developing the 4C skills for the 21st century?

Research Objective

The purpose of the survey was to gain insight into the differences in awareness and development of 4C skills among choir students at different universities. The 4C skills, namely Critical Thinking, Creativity, Communication, and Collaboration, are of great importance in today's highly competitive society. It is of great significance in today's highly competitive society where the university choir, as a vibrant and diverse student body, provides us with an ideal research sample because it blends the skills of musical performance with the spirit of teamwork. The research objectives of this study are based on the three diverse university choirs in China. There are some variances in the knowledge of music itself and the music accomplishment of the students in the universities in China, as well as in the development of 4C skills. Through the comparative study of skills in the three universities, the researcher also analyzed the different development of 4C skills in choir. Before a formal study, the following assumptions were made that the choir students in music colleges and universities have strong and comprehensive 4C skills and choir skills, and an better cultivate the development of 4C skills. Choir students in art universities

are found to have certain 4C skills and choir skills, while choir students in comprehensive universities have relatively weak 4C skills and in the development of 4C skills.

By analyzing the findings, the researchers can make targeted recommendations for the training and education of university choirs to help students better understand and apply these 4C skills, thus laying a solid foundation for their future professional development and personal growth. At the same time, this study also contributes to a broader understanding of the importance of arts education for the development of comprehensive literacy and provides useful references for the formulation of education policies.

Theoretical Framework

A theoretical framework serves as a foundational structure, integrating fundamental ideas and principles to guide research or problem-solving endeavors. It provides a systematic approach to understanding complex phenomena, organizing key concepts, and informing methodology.

The Partnership for 21st century Learning (P21) framework emphasizes 4C skills−critical thinking, creativity, collaboration, and communication−as essential for success in the modern world. It also includes proficiency in core subjects, information and technology skills, life and career skills, and learning and innovation skills. This holistic approach prepares students for the challenges of the 21st-century by promoting immersive, experiential learning and inquiry-driven initiatives.

By embracing an integrative approach, the theoretical framework underscores the interconnectedness of 21st-century skills and their importance in navigating today's complex world. It guides educational institutions in cultivating versatile skill sets that transcend disciplinary boundaries, empowering individuals to positively influence the global landscape.

Methodology

Based on a search of literature, previous case studies have been mostly qualitative, particularly studies on the combination of choir singing with the 4C skills. It is found that a few articles are quantitative studies on music combined with 4C skills. For example, Blocher et al. (1997) evaluated the teaching behavior of 21 middle and high school band directors. They found that teacher behavior directly affects how students learn, which in turn profoundly affects how well students use creative thinking and 21st century learning skills. Chavin (2002) conducted three studies on patients with Alzheimer's disease, focusing on the use of music therapy in these patients. These studies used music to see how patients responded and found that music was a powerful communication tool that had a positive impact on the patient's condition. The benefit of quantitative research is that it produces numerical data that facilitates the identification of patterns and statistical analysis of relationships. In addition, quantitative research allows for the generalization of findings to a wider population, thereby enhancing the external validity of the study.

The purpose of this exploratory case study was to explore the differences in the development of 4C skills in the 21st century among choir students at three different colleges and universities in China through demographic questions about their gender, grade level, major, and school, using a quantitative research method of an online questionnaire. The purpose of the survey was to gain insight into the differences in the perceptions and development of 4C skills among choir students at the universities. The discussion of the case study report then shows that choir students in music-type institutions have a strong and comprehensive perception of 4C skills and build on this strong perception to actively develop 4C skills in the future. Since the respondents were from the three universities in China, the online survey was certainly a convenient and effective tool. The use of quantitative research was innovative in terms of research methodology. Similarly, this study tested the reliability and validity of the content of the instrument questionnaire. In addition, since the research questions of this study were conducted based on mature scales, a pilot study was not required.

Purposive sampling method was used in this study. The respondents were all the choir students in the diverse choirs of three universities in China. Wuhan Conservatory of Music (WCM), Shandong Arts Colleges (SAC) and Hebei Normal University (HNU). In this study, the researchers collected 220 valid questionnaires. The carrier of the questionnaire was Questionstar. Also based on statistical research, the content of the questionnaire was modified and selected based on the maturity scale for each skill. The researcher can determine the significance and formulate objective conclusions and recommendations based on numerical data rather than on personal opinions or subjective information. Therefore, the design used relevant professional data. The exploration of choir singing as an art form for developing 4C skills led to the identification of differences in choir students' perceptions of the development of 4C skills, and thus to the identification of differences in the development of 4C skills in the universities.

Table 1

Questions raised in the questionnaire

No	Questions	Perfectly	Highly	Fairly	Slightly	None
Q1	Do you understand the meaning of each of the 4C skills in the 21st century?					
Q2	What do you know about the critical thinking?					
Q3	Is it possible to use your critical thinking in the choir?					
Q4	Do choir teachers actively guide their students in the development of critical thinking skills during rehearsals?					
Q5	Is the development of critical thinking skills important in choir singing?					
Q6	Do you think it is currently creativity in the choir?					
Q7	In choir singing, do teachers allow students to demonstrate creative thinking about musical pieces?					
Q8	Do you feel that you use your imagination and creativity well in teaching choirs?					
Q9	Is the ability to communicate important in choir singing?					
Q10	In choir, where is the skills to communicate mainly manifested?					
Q11	Are you able to be in a choir and communicate professionally and effectively?					
Q12	Do you reflect after class and communicate and discuss with teachers and group members?					
Q13	Do you think that by studying in the choir, you can develop communication skills in the workplace afterwards?					
Q14	Do you think there is a need for regular observation of outstanding choirs for exchange and learning					

Q15	Is the cooperation between the students and the instructor appropriate?					
Q16	What are the main areas of collaboration among choir members?					
Q17	Will the skills to collaborate help in the future in work or life?					

Data analysis and discussion of results

Descriptive statistics of the sample

As shown in Table 2, in terms of gender ratio, female students accounted for a slightly higher percentage (51.4%), with a more balanced proportion of men and women. In terms of status level, the choir is still dominated by undergraduate students (95%). There are no doctoral students. In terms of majors, there are more vocalists, accounting for 86.8%. Piano students and other majors were 10.5% and 0.27%, respectively. All students at the three colleges were from public schools (100%).

Table 2

Descriptive statistics of the sample (N=220)

Demographic Variables	Statistical item features	Number	Percentage(%)	Cumulative percentage (%)
Gender	Male	107	48.6	48.6
	Female	113	51.4	100.0
Program	Bachelor	209	95.0	95.0
	Master	11	5.0	100.0
	PhD	0	0.0	100.0
Major	Vocal	191	86.8	86.8
	Piano	23	10.5	97.3
	Others	6	0.27	100.0
College	WCM	72	32.7	32.7
(Type)	SCA	70	1.8	64.5
	HNU	78	35.5	100.0
Types of College	Public	220	100.0	100.0
	Private	0	0.0	0.0

Analysis of the data provided in Table 2 reveals interesting insights across the dimensions. Notably, there is a slight numerical advantage for female students, suggesting a subtle gender balance in this group. The dominance of undergraduate students in the choir emphasizes youthful exuberance and perhaps a focus on skill development at this level. Notably, the absence of doctoral students suggests that participation is predominantly by those pursuing lower levels of academic achievement. Additionally, the prevalence of singers as the primary major, followed by piano students and other students, hints at the specialization within the choir and the diversity of talent it contains. It is also noteworthy that students at all three colleges come from public schools and have a uniform educational background. This reveals a shared socio-educational background among the participants that may influence their experiences and

perspectives. Overall, the analysis reflects a balanced description of individual and school characteristics, providing credibility and relevance to the findings.

Descriptive Statistics of Variables

The results of the means, extremes, and standard deviations of the variables are shown in Table 3. The means of the variables for the 21st Century 4C Skills ranged from 2.7 to 2.89, and the standard deviations ranged from 1.19 to 1.303, resulting in an overall good distribution. In addition, the means of the scales were greater than the median value of 2.5, indicating that the students in the studied choirs performed better in collaboration skills.

Table 3

Descriptive statistics for each variable (N=220)

4C skills	Sample N	Min	Max	M	SD
Critical Thinking	220	1.00	5.00	2.78	1.227
Creativity	220	1.00	5.00	2.89	1.29
Communication	220	1.00	5.00	2.86	1.19
Collaboration	220	1.00	5.00	2.7	1.303

Note : M = Mean, SD = Std. Deviation

The data displayed in Table 3 provides insights into the means, extremes, and standard deviations of the variables related to the 4C skills of the 21st century. In this dataset, the means show a range of values that indicate an average trend across the different skill dimensions. Similarly, standard deviation reflects the degree of variability or dispersion around these mean values. This diversity of values indicates the richness and variety of participants' skill levels. Of particular note, the mean of the scale exceeds the median of 2.5. This means that, on average, students who participated in choir demonstrated significantly higher proficiency in collaborative skills compared to the other skill dimensions. These findings reveal the subtle dynamics of skill development in a choir setting and emphasize the importance of collaborative skills in this context.

Reliability and Validity Tests

Reliability Analysis

The reliability of the 4Cs of 21st Century - Critical Thinking, Creativity, Communication and Collaboration Skills scales were analyzed using SPSS 26.0 software, and the results are shown in Table 4, which shows good internal consistency, indicating that the scales used in this study have good reliability.

Table 4

Reliability test results of each scale

4C skills	N of title items	Cronbach-α
Critical Thinking	7	0.824
Creativity	6	0.787
Communication	6	0.942
Collaboration	7	0.822

As can be seen from the above table, the Cronbach's-alpha values for all scales are greater than 0.8, thus indicating that the data reliability is of high quality. For "Cronbach's Alpha if Item Deleted", the reliability coefficients of the analyzed items after deletion of the items did not increase significantly, thus indicating that all the items should be retained, which further indicates that the data reliability level is high. In summary, the reliability coefficient of the research data is higher than 0.8, and the value of the reliability coefficient does not significantly increase after the deletion of the question items, which comprehensively indicates that the data reliability is of high quality and can be used for further analysis.

Validity Analysis

KMO test and Bartlett's sphere test
As can be seen from Table 5, the four scales of the 4C skills of the 21st century used in this study satisfy the Bartlett's Spherical Test values Sig < 0.001, KMO > 0.7, and the KMO value is 0.889 > 0.6, which indicates that the research data have good validity and can be used for further analysis.

Table 5

KMO test and Bartlett's spherical test results

4C skills	KMO	Bartlett's Test of Sphericity		
		Approx. Chi-Square	df	Sig.
Critical Thinking	0.912	2484.636	105	.000
Creativity	0.905	2580.471	105	.000
Communication	0.895	2464.628	105	.000
Collaboration	0.9	2334.87	105	.000

The analysis in Table 5 emphasizes the good ratings of the four scales used in this study to measure the 4C skills in the 21st century. Notably, Bartlett's test of sphericity revealed a significant correlation between the variables with a Sig value of less than 0.001. In addition, the Kaiser-Meyer-Olkin (KMO) measure exceeded the recommended threshold of 0.7 indicating satisfactory sampling adequacy. The KMO value of 0.889 was well above the acceptable limit of 0.6 indicating that the data of the study has robust validity, confirming its applicability for subsequent analysis and interpretation.

Differential Analysis of Diverse Colleges and Universities

Descriptive statistics of diverse colleges and universities
In order to compare the level of difference in the performance of each dimension under the practice of diverse choirs of colleges and universities, Table 6 provides descriptive statistics on the specific performance of choirs on the five dimensions.

Table 6

Descriptive statistics of diverse colleges and universities

| | | N | M | SD | SE | 95% Confidence Interval for Mean | | Min | Max |
						Lower Bound	Upper Bound		
CS	1	72	3.92	0.835	0.098	3.72	4.11	3	5
	2	70	2.63	1.01	0.121	2.39	2.87	1	4
	3	78	2.1	0.877	0.099	1.9	2.3	1	3
	Total	220	2.86	1.186	0.08	2.71	3.02	1	5
CT	1	72	3.92	0.801	0.094	3.73	4.1	3	5
	2	70	2.4	1.134	0.136	2.13	2.67	1	4
	3	78	2.08	0.834	0.094	1.89	2.26	1	3
	Total	220	2.78	1.227	0.083	2.62	2.94	1	5
CR	1	72	4.11	0.815	0.096	3.92	4.3	3	5
	2	70	2.59	1.148	0.137	2.31	2.86	1	4
	3	78	2.03	0.837	0.095	1.84	2.21	1	3
	Total	220	2.89	1.29	0.087	2.72	3.06	1	5
COM	1	72	3.92	0.746	0.088	3.74	4.09	3	5
	2	70	2.54	1.188	0.142	2.26	2.83	1	4
	3	78	2.18	0.802	0.091	2	2.36	1	3
	Total	220	2.86	1.19	0.08	2.71	3.02	1	5
COL	1	72	4.03	0.787	0.093	3.84	4.21	3	5
	2	70	2.37	1.066	0.127	2.12	2.63	1	4
	3	78	1.77	0.805	0.091	1.59	1.95	1	3
	Total	220	2.7	1.307	0.088	2.53	2.87	1	5

Note:1= WCM, 2= SCA, 3= HNU
CS= Choir Singing, CT= Critical Thinking, CR= Creativity, COM= Communication, COL= Collaboration

As can be seen from the table above, the mean values of the dimensions were close to 2.5 points for both colleges, except for HNU's five dimensions, which were lower. Among them, WCM has the highest mean value of the five dimensions, indicating that in most cases WCM's choirs are stronger in both choir skills and 4C skills. WCM's creativity and collaboration skills had higher scores of 4.11 and 4.03, respectively; choir skills, critical thinking skills, and communication skills all had a score of 3.92. SCA's choirs maintained moderate scores on all five dimensions, with choir skills having a slightly higher mean of 2.63. HNU's choir had lower means on all five dimensions, with collaboration skills having the lowest mean of 1.77. It proves that HNU choir lacks collaborative skills.

To answer the research objective whether there is a significant difference between different nature of colleges and universities for the development of 4C skills in the 21st century. Firstly, one-way variance was used to analyze the differences between the five dimensions. The results are shown in Table 7. The results show that the differences are statistically significant ($p<0.05$), which means that, the means of the groups are not all equal (at least one group's mean is different from the other group). If $P>0.05$, it means that the difference between the means of the groups is not statistically significant. In this case, the p-value is shown as 0.000, but this does not mean that the p-value is actually 0 (the probability is not 0). We can express it as $P<0.001$. in this case, the difference in the means of the scores (Index) between the groups (groups) is statistically significant.

An examination of the average scores highlights the differences between the colleges, with WCM clearly leading the way in creativity and collaboration, while SCA remains moderate. In contrast, HNU

had lower mean scores in all areas, particularly in collaboration skills. Statistical analysis confirms the significant differences between colleges in the development of 4C skills.

Table 7

ANOVA Test

		Sum of Squares	df	Mean	Square	F	Sig.
CS	Between Groups	128.887	2	64.443		78.114	.000
	Within Groups	179.022	217	0.825			
	Total	307.909	219				
CT	Between Groups	141.689	2	70.844		81.843	0.000
	Within Groups	187.838	217	0.866			
	Total	329.527	219				
CR	Between Groups	172.114	2	86.057		97.239	0.000
	Within Groups	192.046	217	0.885			
	Total	364.159	219				
COM	Between Groups	123.55	2	61.775		.932	0.000
	Groups	186.359	217	0.859			
	Total	309.909	219				
COL	Between Groups	202.067	2	101.033		127.368	0.000
	Within Groups	.133	217	0.793			
	Total	374.2	219				

Note: CS=Choir Singing，CT=Critical Thinking, CR=Creativity, COM=Communication, COL=Collaboration

From the above table, there is a significant difference (p< 0.001) between the five dimensions of each nature of colleges and universities i.e. choir Skills (F=78.114), Critical Thinking (F=81.843), Creativity (F=97.239), Communication (F=71.932), and Collaboration (F=127.368), and that the difference between the 21st Century 4C Skills is statistically significant. Further analysis can be done for specifics. LSD was used to further compare the detailed variability between the choirs of the three universities of different nature.

Noteworthy findings were obtained based on the numbers in the table: There were statistically significant differences between the colleges and universities on five dimensions (p<0.001). These dimensions include choral skills, critical thinking, creativity, communication, and collaboration. This emphasizes the uniqueness of the development of the 4C skills for the 21st century in different educational settings. Further detailed analysis is necessary to explore specific variations. In order to delve deeper, a Least Significant Difference (LSD) analysis was used to compare the subtle differences between the choirs of three colleges of different nature. This approach facilitated a comprehensive comparison of aspects of each college, revealing complex insights into the variability of skill development. Table 8 illustrates the results of these comparisons, revealing subtle differences between the choirs.

Table 8

Multiple Comparisons（LSD）

Dependent Variable	(I) group	(J) group	Mean Difference (I-J)	SE	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
CS	1	2	1.288*	0.152	0.000	0.99	1.59
		3	1.814*	0.148	0.000	1.52	2.11
	2	1	-1.288*	0.152	0.000	-1.59	-0.99
		3	.526*	0.15	0.001	0.23	0.82
	3	1	-1.814*	0.148	0.000	-2.11	-1.52
		2	-.526*	0.15	0.001	-0.82	-0.23
CT	1	2	1.517*	0.156	0.000	1.21	1.82
		3	1.840*	0.152	0.000	1.54	2.14
	2	1	-1.517*	0.156	0.000	-1.82	-1.21
		3	.323*	0.153	0.036	0.02	0.62
	3	1	-1.840*	0.152	0.000	-2.14	-1.54
		2	-.323*	0.153	0.036	-0.62	-0.02
CR	1	2	1.525*	0.158	0.000	1.21	1.84
		3	2.085*	0.154	0.000	1.78	2.39
	2	1	-1.525*	0.158	0.000	-1.84	-1.21
		3	.560*	0.155	0.000	0.25	0.87
	3	1	-2.085*	0.154	0.000	-2.39	-1.78
		2	-.560*	0.155	0.000	-0.87	-0.25
COM	1	2	1.374*	0.156	0.000	1.07	1.68
		3	1.737*	0.151	0.000	1.44	2.04
	2	1	-1.374*	0.156	0.000	-1.68	-1.07
		3	.363*	0.153	0.018	0.06	0.66
	3	1	-1.737*	0.151	0.000	-2.04	-1.44
		2	-.363*	0.153	0.018	-0.66	-0.06
COL	1	2	1.656*	0.149	0.000	1.36	1.95
		3	2.259*	0.146	0.000	1.97	2.55
	2	1	-1.656*	0.149	0.000	-1.95	-1.36
		3	.602*	0.147	0.000	0.31	0.89
	3	1	-2.259*	0.146	0.000	-2.55	-1.97
		2	-.602*	0.147	0.000	-0.89	-0.31

Note: $p < 0.05$，**$p < 0.01$. 1= WCM, 2= SCA, 3= HNU
CS=Choir Singing，CT=Critical Thinking，CR=Creativity, COM=Communication, COL=Collaboration

Three college choirs of different nature were compared two by two. In terms of choir skills, the mean value of WCM is 1.288 higher than SCA, and the confidence interval of the difference in means between the two groups is 0.99 ~ 1.59, which is also 1.814 higher than that of HNU, P<0.001, and the confidence interval of the difference in means between the two groups is 1.52 ~ 2.11, which indicates that there is a significant difference between the WCM, HNU and SCA; in the comparison of SCA and HNU,

SCA is 0.562 higher than HNU, P=0.001<0.01, and the confidence interval of the difference in means is 0.001<0.01, which indicates that WCM and HNU are significantly different from one another. SCA is 0.562 higher than HNU, P=0.001<0.01, and the confidence interval for the difference in means is 0.23 ~ 0.82; while HNU is lower than WCM and SCA in the means of both, which proves that HNU is more backward in choir skills.

In terms of critical thinking skills, the mean score of WCM was 1.517 higher than SCA, with a confidence interval of 1.21 ~ 1.82 for the difference in means, and likewise 1.840 higher than HNU, p<0.001, and a confidence interval of 1.54 ~ 2.14 for the difference in means; SCA's mean score was 1.517 lower than WCM's but 0.323 higher than HNU's, p=0.036 <0.05; while HNU's mean value in both was lower than WCM's, proving that HNU was lagging behind in choir skills. 0.036 < 0.05, with a confidence interval of 0.02 ~ 1.62 for the difference in means; similarly HNU had lower means than WCM and SCA for critical thinking skills.

The mean value of SCA is lower than the mean value of WCM 1.525, and the confidence interval of the mean difference is -1.84 ~ -1.21, while the mean value of SCA is higher than the mean value of HNU in creativity skill 0.560, p<0.001, and the confidence interval of the mean difference is 0.25 ~ 0.87; HNU's mean is also lower than the mean value of WCM 2.085, and the confidence interval of the mean difference is 2.085, and the mean difference of HNU is lower than the mean value of WCM 2.085. The confidence interval for the difference in means was -2.39 to -1.78; HNU was also weaker in creativity.

The mean score of WCM was 1.374 higher than that of SCA, with a confidence interval of 1.07-1.68, and also 1.737 higher than that of HNU, with a confidence interval of 1.44-2.04. The mean score of SCA was 1.374 lower than that of WCM, and still 0.363 higher than that of HNU, with a confidence interval of 0.018 < 0.05, and a difference of means of 0.018 < 0.05. The mean score of SCA was 1.374 lower than that of WCM, and still 0.363 higher than that of HNU, with a difference of 0.018 < 0.05, and a difference of means of 0.018 < 0.05. 0.05, with a confidence interval of 0.06 ~ 0.66 for the difference in means.

In terms of collaborative skills, the mean value of HNU was 2.259 lower than that of WCM, with a confidence interval of -2.55 to -1.97, and 0.602 lower than that of SCA, with confidence intervals of -0.89 to -0.31, P<0.001; SCA was higher than the mean value of HNU, but was 1.656 lower than that of WCM, with confidence intervals of -1.95 to -1.36. ~-1.36.

This shows that diverse choirs have some differences in the development of 4C skills for the 21st century. Choir students at music professional colleges have stronger and more comprehensive 4C skills and choir skills, choir students of art colleges have some 4C skills and choir skills, and choir students of comprehensive universities are weaker in 4C skills.

Suggestions and Conclusion

References to the literature mainly highlight the importance of developing 21st century skills in education, such as critical thinking, creative thinking, collaboration, and communication (P21, 2015; Schleicher, 2011). These skills are seen as key factors for academic and career success. Critical thinking enables individuals to effectively evaluate ideas, make decisions, and solve problems. Creative thinking involves questioning, imagining, and generating original ideas to adapt to the changing needs of the 21st century. Communication skills include oral, written, and non-verbal expressions and are the foundation for effective learning and communication. Cooperation is a collaborative process in which individuals work together to achieve a common goal.

While the literature agrees that these skills are key components of learning in the 21st century, they may be prioritized and handled in different contexts. Music education places a special emphasis on creativity and collaboration. While these findings provide valuable insights, their limited applicability suggests caution when applied directly to policy decisions. However, the literature can inform improved curriculum design, teacher training, and educational practices to better support the development of student skills. Ultimately, the impact of these findings on university policy will depend on the acceptance of institutional stakeholders and alignment with broader educational goals.

The main research objective of this study was to explore the differences in 21st century 4C skills among diverse Chinese universities. The respondents were mainly all students in music choirs in three Chinese universities. Most of the respondents were female students (51.4%). In terms of status level, the choirs are still dominated by undergraduate students (95%). In terms of major, the choirs were still mainly vocal majors (86.8%). All students at the three universities were from public schools (100%). The survey data suggests that choir practice has a positive effect on fostering and developing students' 4C skills, but the types of choirs may affect students' skill development to varying degrees. Choir students at music-specialized institutions possessed strong and well-rounded 4C skills and choir skills, choir students at arts-specialized institutions possessed some 4C skills and choir skills, and choir students at comprehensive institutions were relatively weak in 4C skills.

Limitations and Further Research

The study involves choirs of music majors in Chinese universities, with great accomplishments in the field. The sample size of this study is limited to three universities, and the researcher recognizes the possibility of personal bias in choir practice, which may affect the information received and interpreted. As this study was primarily a quantitative approach, the researcher took steps to address these limitations and researcher bias to ensure the internal validity of the study.

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