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Synergy of traditions and technologies: Improving access to Chinese musical heritage through massive open online courses (MOOCS)

Sinergia de tradições e tecnologias: Melhorar o acesso à herança musical chinesa através de cursos online abertos e massivos (MOOCS)

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Abstract: The main objective of this article is to investigate the effectiveness of utilizing a supplementary learning model through Massive Open Online Courses (MOOCs) to reform traditional Chinese music education in higher education institutions in China. The study involved 314 fourth-year students from three higher education institutions, with an average age of 22.22 years (SD = 0.45). Two self-report scales were employed as instruments. The research demonstrated a significant improvement in the assimilation of traditional Chinese music among students who integrated MOOCs into their coursework, with an increase of 8.2 points. In the experimental group, all key indicators significantly increased: student satisfaction rose by 8.4 points, academic performance increased by 6.8 points, and interest in further study increased by 9.25 points. The enhancement of all examined indicators in the experimental group indicates the positive impact of MOOCs on musical education and cultural capital, confirming the effectiveness of a synergistic approach. Thus, the research results underscore the potential of online courses in enriching the educational process and expanding access to cultural heritage.

The scholarly value of this research is evident in confirming the effectiveness of integrating MOOCs to enhance the study of traditional Chinese music, serving as a foundation for further development of educational methodologies and technologies. The practical significance lies in the potential application of the results to improve the quality of musical education in higher education institutions and broaden global access to cultural heritage.

Keywords: educational technologies, traditional Chinese music, cultural heritage, innovations in education, musical education

Resumo: O principal objetivo deste artigo é investigar a eficácia da utilização de um modelo de aprendizagem complementar através de cursos online abertos e massivos (MOOCs) para a reforma do ensino da música tradicional chinesa em instituições de ensino superior na China. O estudo envolveu 314 estudantes do quarto ano de três instituições de ensino superior, com idade média de 22,22 anos (DP = 0,45). Duas escalas de autorrelato foram empregadas como instrumentos. A pesquisa demonstrou uma melhoria significativa na assimilação da música tradicional chinesa entre os alunos que integraram os MOOCs nos seus cursos, com um aumento de 8,2 pontos. No grupo experimental, todos os indicadores-chave aumentaram significativamente: a satisfação dos alunos aumentou 8,4 pontos, o desempenho académico aumentou 6,8 pontos e o interesse em estudos adicionais aumentou 9,25 pontos. A melhoria de todos os indicadores examinados no grupo experimental indica o impacto positivo dos MOOCs na educação musical e no capital cultural, confirmando a eficácia de uma abordagem sinérgica. Assim, os resultados da pesquisa ressaltam o potencial dos cursos on-line no enriquecimento do processo educativo e na ampliação do acesso ao patrimônio cultural. O valor académico desta investigação é evidente ao confirmar a eficácia da integração dos MOOCs para melhorar o estudo da música tradicional chinesa, servindo como base para um maior desenvolvimento de metodologias e

tecnologias educativas. O significado prático reside na potencial aplicação dos resultados para melhorar a qualidade da educação musical nas instituições de ensino superior e alargar o acesso global ao património cultural.

Palavras-chave: tecnologias educacionais, música tradicional chinesa, patrimônio cultural, inovações na educação, educação musical

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1. Introduction

The roots of traditional Chinese music trace back to ancient times, where central elements of its music include instruments such as the guqin (seven-stringed zither), pipa (four-stringed lute), and erhu (two-stringed fiddle) (Jing & Heng, 2023; Ma, 2019). These instruments and the music created based on them served not only as forms of artistic expression but also as means of spiritual contemplation and social communication (Gong *et al.*, 2021). Melodies and rhythms embody the philosophical and ethical values of Chinese culture (Jones, 2020). However, like many other cultural forms, traditional Chinese music has encountered significant challenges in contemporary times, particularly with the emergence of Western music and the rapidly changing cultural landscape within China itself (Bolívar-Chávez *et al.*, 2021). In the 20th century, there were both declines in traditional practices and efforts to revive and preserve this genre (Becker, 2019). Modern musicians and scholars strive to preserve this music by adapting it to contemporary tastes and integrating it with various musical styles while maintaining its distinct character (Hoene, 2017).

The past few years have witnessed a wave of innovations in approaches and methods for delivering cultural education (Camlin & Lisboa, 2021; Daubney & Fautley, 2020; Shi, 2021). This has led to a sharp increase in the number of online learning platforms, virtual presentations, and digital collaborations, opening new avenues for the dissemination and evaluation of traditional Chinese music (Wan, 2022). The emergence of these new forms of music education has not only made it more accessible to a wider audience but has also provided opportunities for creative fusion and reinterpretation (Hamzah *et al.*, 2020). Musicians and educators are leveraging technologies to reach a global audience by offering online classes, seminars, and performances (Magalhães *et al.*, 2018). These digital efforts can enable traditional Chinese music to transcend geographical boundaries, attracting enthusiasts and learners from all corners of the world and thereby increasing its cultural capital (Waddell & Williamon, 2019). One example of technology integration

in music education is Massive Open Online Courses (MOOC) – a large-scale open online education program offering courses on various topics from leading universities and educational platforms worldwide (Voudoukis & Pagiatakis, 2022). It provides access to quality education for a large number of people, regardless of their location or educational level, and has previously been applied in the context of Chinese music, specifically folk music (Li, 2022). In the context of the current research, MOOC is employed for teaching and disseminating knowledge about traditional Chinese music. Students can attend relevant courses, access educational materials, participate in interactive assignments and discussions, and track their progress through the platform. Thus, MOOCs can contribute to broader access to the learning of traditional Chinese music, potentially enhancing the quality of education by making it more flexible, accessible, and scalable, which justifies the selection of MOOCs for the current study.

This study is particularly relevant as it addresses a crucial aspect of cultural preservation and innovation. Examining how traditional Chinese music adapts to modern technologies and pedagogy provides insights into how China's cultural capital can be expanded. It discusses how these technological advancements can enhance the quality of teaching and learning, ensuring that this ancient art form continues to thrive and resonate with people worldwide. The article explores the consequences of the observed cultural evolution, discussing how the integration of modern technologies with traditional music can bring its advantages and be applied in education. The paper seeks to offer a nuanced understanding of how traditional Chinese music can persist and flourish, utilizing modern technologies to broaden its reach and relevance in today's rapidly changing world.

1.1 Literature Review

In the intricate interweaving of global cultures, traditional Chinese music stands out as a profound testament to the historical depth and aesthetic richness of China (Cheng *et al.*, 2022; Hao,

2023). Traditional Chinese music is traditionally defined by the cultural and philosophical context of various dynasties, influenced by different regions and ethnic groups (Zhou, 2019). Essentially, traditional Chinese music seeks to embody harmony between humans and nature, reflecting deeply rooted philosophical principles of Confucianism, Daoism, and Buddhism (Antoshko, 2020; Gong *et al.*, 2021). Preserving traditional Chinese music is not merely safeguarding an artistic form; it entails protecting a vital component of China's cultural identity (Wang, 2021). Cultural capital, a term popularized by sociologist Pierre Bourdieu, refers to non-financial social assets that contribute to social mobility beyond economic means (Reed & Johnson, 2023). For China, traditional music constitutes an important form of cultural capital, encapsulating centuries of knowledge, artistry, and cultural values (Kong, 2023). Preserving traditional Chinese music is crucial for maintaining cultural diversity in a globalized world, providing future generations with a sense of identity and continuity, and fostering cultural diplomacy and mutual understanding (Becker, 2019).

In the face of globalization and the rapid pace of technological changes, traditional Chinese music encounters both challenges and new opportunities (Li, 2022; Qureshi *et al.*, 2020). Numerous literary sources indicate that modern technologies and innovative educational tools can enhance the ways music is disseminated, preserved, and taught (Li, 2022; Hong & Wu, 2022; Zhang & Bryan-Kinns, 2022). Contemporary technologies enable the digital archiving of music, which is crucial for its preservation (De Kosnik, 2021). Performance recordings, musical scores, and historical documents can be digitized and stored in online libraries, accessible to researchers, musicians, and the public worldwide (Baker *et al.*, 2019; Cuk, 2021). The advent of online learning platforms and virtual classes has revolutionized music education in a specific way (Octaviani, 2021). These platforms can host a multitude of courses on traditional Chinese music, providing instructions on its history, theory, and performance (Li, 2022). They can cater to a diverse range of learners, from beginners to advanced, disseminating the

knowledge and skills necessary for tradition preservation (Li *et al.*, 2021). Interactive modules, video lessons, and virtual masterclasses enable a rich learning experience, overcoming geographical barriers (Shen *et al.*, 2019).

Furthermore, streaming services, online concerts, and virtual performances have made traditional Chinese music more accessible than ever before: technologies enable musicians and ensembles to reach a global audience, enhancing the visibility and recognition of traditional music (Zhang & Bryan-Kinns, 2022). In addition to this, technologies facilitate collaboration among individuals worldwide: internet forums, social networks, and collaborative software allow the exchange of ideas and innovations in traditional music (Li & Zhang, 2022). Musicians can engage in intercultural projects, creating new works that blend traditional Chinese music with other genres, thereby keeping the tradition vibrant and relevant (Wash, 2019). High-definition video recordings and motion capture technology enable the preservation of nuances in traditional musical performances, and detailed recordings of master performers can serve as valuable educational resources, allowing students to study and replicate complex techniques that might otherwise be lost (Hong & Wu, 2022). By integrating the aforementioned technological strategies, traditional Chinese music can be preserved and revitalized as a vital part of China's cultural heritage. Technologies not only protect music from the destructive forces of time and modernity but also propel it into the future, ensuring that it continues to enrich cultural life and serve as a cultural code (Li & Zhang, 2022).

1.2 Problem Statement

The primary motivation of this research lies in obtaining new experimental data on the impact of modern technologies on the process of learning traditional Chinese music. The main objective of the article is to investigate the effectiveness of employing an additional learning model through Massive Open Online Courses (MOOC) for the reformulation of traditional Chinese music

education in higher educational institutions in China. The study is also aimed at identifying the influence of online courses on the learning of traditional Chinese music within the experimental group, in comparison with the control group that studied music without the use of modern technological tools. To achieve the objective, the following research tasks were formulated:

1. To identify differences in the assimilation of traditional Chinese music among students studying it additionally through online courses compared to those being taught through traditional methods without the use of supplementary technologies.

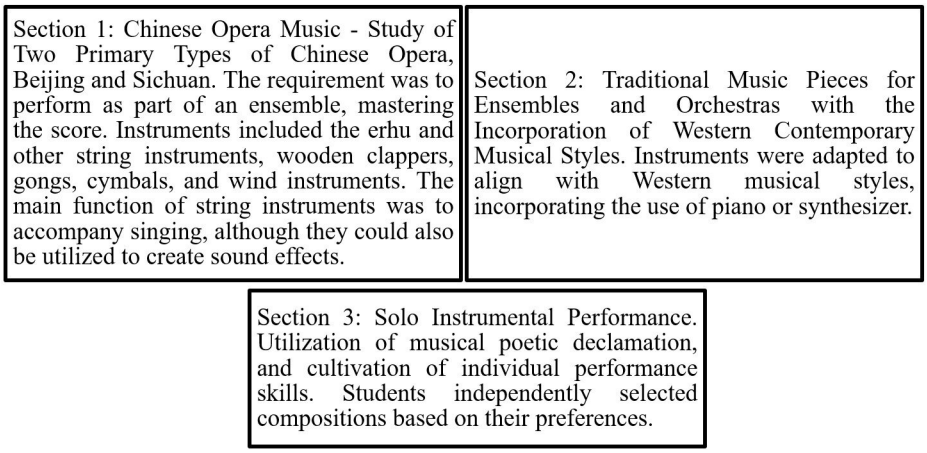
2. To determine how the integration of online courses into educational programs influences the quality of education in traditional Chinese music and contributes to the augmentation of cultural capital by conducting a comparative analysis between the control and experimental groups.

3. To conduct a calculation of the t-test for independent samples for the studied variables within the control and experimental groups to conclude the effectiveness of the intervention implemented.

2. Methods and Materials

Specifically for this research, an educational program was developed, comprising group seminars, masterclass viewings, and group activities. The educational approach based on MOOC was directed towards engaging students, fostering self-expression, increasing patriotism, and informing students about the cultural foundations and approaches to traditional Chinese music. The program encompassed Chinese opera music (for theatrical performances), ensemble and orchestral music (for cultural programs), and solo instrumental music. A detailed description is provided in Fig. 1.

Fig. 1. Description of Components of the Educational Program



As an instrument, the Traditional Chinese Music Acquisition Scale was developed, consisting of 15 statements for a 5-point Likert scale (Appendix 1). Participants were required to assess their agreement with each statement on a scale from 1 to 5, where 1 indicated complete disagreement, and 5 indicated complete agreement, with corresponding classic intermediate values. To evaluate the impact of the integration of online courses on the quality of education and the enhancement of cultural capital, the Traditional Chinese Music Lesson Integration Scale in the context of cultural capital (Appendix 2) was devised. It comprised three subscales with 10 statements each, designed for a 5-point Likert scale, where each statement was rated from 1 (completely disagree) to 5 (completely agree). The two abovementioned scales were developed by the research team, consisting of experts in pedagogy, musicology, and psychometrics, and were subsequently validated through a series of pilot tests. To confirm reliability and validity, a factor analysis was conducted, helping refine the scale structures and identify the key measured constructs; the results demonstrated a clear factor structure aligning with the initial assumptions. The final Cronbach's alpha values for each scale exceeded 0.80, indicating high internal consistency and reliability of the assessment methods employed.

2.1 Participants

The study, conducted from January to June during the academic year 2022-2023, involved 314 fourth-year students from three educational institutions in the People's Republic of China (Guangdong University of Petrochemical Technology, Maoming Radio and Television University, and Maoming Polytechnic). All participants were enrolled in traditional Chinese music courses in their respective universities during the first semester. The implementation period of the Massive Open Online Course (MOOC) program in teaching traditional Chinese music lasted for six months. Each student received an invitation to participate in the research through an email. More detailed information regarding the number of participants from each educational institution is presented in Tab. 1.

Tab. 1 Information about Participants from Three Educational Institutions

Group	Total	Women	Men	Average Age (M)	SD
Control	164	84	72	22.15	0,33
Experimental	150	84	72	22.29	0,58
Total / Mean	314	168	144	22.22	0,45

The students' ages ranged from 22 to 23 years, with a mean age of 22.22 years (SD = 0.45). Participants were selected voluntarily, and the group assignment was done randomly. The homogeneity of this approach was confirmed by calculating p-values in pre-tests for the two used subscales. None of the students or faculty members from the educational institutions were compelled to participate in the study; involvement was entirely voluntary.

2.2 Study Design

Within the scope of this research, the effectiveness of utilizing MOOC for traditional Chinese music education and its impact on the quality of education and the enhancement of cultural capital

were investigated. Respondents were randomly assigned to two groups: the control group and the intervention group. In January 2023, all participants completed pre-test scales. The control group underwent traditional methods of instruction, attending in-person lectures and practical sessions conducted by instructors. Their educational process included the study of fundamental aspects of traditional Chinese music. This approach was focused on direct interaction with the instructor, knowledge, and skill transfer through live performance and demonstration.

Conversely, the intervention group was additionally engaged in the educational process through a specially designed program uploaded to MOOC, aimed at studying traditional Chinese music. The course incorporated group seminars, video lessons from masters, and group activities. The online learning format was intended to stimulate active student participation and engagement through the immersive nature of the process.

The study involved experienced instructors and invited masters of traditional Chinese music. These experts were carefully selected based on their professional experience and contributions to the preservation and development of traditional Chinese music. They not only conducted lessons but also participated in the development of educational programs, ensuring the quality and relevance of the instructional materials uploaded to MOOCs. Within the six-month study period, an equal academic workload was established for both groups to ensure data comparability and result accuracy. Both groups participated in an educational process consisting of two lessons per week, each lasting one academic hour.

In total, approximately 48 lessons were conducted for each group over six months, providing equal conditions for comparing their progress and material assimilation. The control group exclusively attended traditional lessons held at educational institutions. These sessions involved direct interaction with instructors, live musical performances, and practical instrument practice, ensuring deep immersion in the environment of traditional music and immediate feedback from mentors. In addition to traditional lessons, the

intervention group also participated in sessions through a specially designed MOOC program. The hours spent online were equivalent to the time allocated for traditional lessons, thus ensuring equal educational loads. MOOC online sessions comprised watching video tutorials, participating in interactive seminars, and completing practical assignments. This hybrid approach combined traditional instruction with innovative methods provided by online platforms, enabling students in the intervention group to broaden their learning and self-expression opportunities. Such structuring not only ensured equal time frames and the number of lessons for both groups but also created conditions for assessing the effectiveness of different educational approaches in the study of traditional Chinese music.

Comparative analysis of the learning outcomes at the end of the academic year (post-tests conducted in June 2023) allowed for evaluating the impact of integrating MOOC online courses on the quality of education and the enhancement of students' cultural capital.

2.3 Data Analysis

IBM SPSS Statistics 24 package was employed for data analysis, and t-tests were utilized to compare results between the control and intervention groups.

2.4 Ethical Issues

Approval was obtained from the Ethics Committee of Guangdong University of Petrochemical Technology, Maoming Radio and Television University, and Maoming Polytechnic, allowing the research to proceed. All participants provided informed consent after being briefed on the project's objectives and methods. The personal data of participants were processed with full confidentiality and anonymity, ensuring guarantees of data privacy protection.

2.5 Study Limitations

The study is limited to students from three educational institutions in the People's Republic of China, which may not fully represent the diversity of the student population or the cultural nuances of other regions in China or other countries. Consequently, the results may not be entirely generalizable to a broader student audience or other cultural contexts. Self-report scales were employed in the study, introducing subjectivity into the results. The research was conducted within the unique cultural and educational context of China, which may entail specific expectations and attitudes toward traditional music that might not align with other contexts. To address the aforementioned limitations, future research should incorporate a broader and more diverse sample encompassing various educational institutions and cultural contexts. This approach would enhance the generalizability and applicability of the results across different settings. Additionally, it is advisable to consider employing objective assessment methods, such as observations, tests, and interviews, to complement self-reported data and provide a more comprehensive understanding of the impact of educational technologies on the study of traditional Chinese music. Moreover, exploring how MOOCs can be adapted to other cultural and educational contexts would be valuable, to develop universal strategies for integrating contemporary educational technologies into the study of various forms of cultural heritage. This could contribute to their preservation and promotion on a global scale.

3. Results

The primary objective of the study was to identify differences in the assimilation of traditional Chinese music between students who study it additionally through online courses and those who are taught through traditional methods without the use of additional technologies. The data are presented in Tab. 2.

Tab. 2 Statistical Analysis of Traditional Chinese Music Assimilation Scale Scores Among Respondents from Control and Influence Groups

Group		Pre-test acquisition	Post-test acquisition
Control	Mean	38.20	38.90
	Standard Deviation	3.019	2.245
	Variance	9.116	5.042
	Excess	-.795	-.975
Experimental	Mean	37.45	45.65
	Standard Deviation	3.677	4.030
	Variance	13.524	16.239
	Excess	-1.348	-1.649

The results indicate that the average acquisition of traditional Chinese music in the control group increased by 0.7 points, whereas in the influence group, the growth was significantly higher, reaching 8.2 points. This suggests a more effective acquisition of material when utilizing additional online courses.

Tab. 3 Calculation of the significance level of intragroup differences in the control and influence groups based on the scale of acquiring traditional Chinese music (paired t-test)

	Pairwise differences						
	Mean	Standard Deviation	Standard Error of the Mean	95% Confidence Interval for the Difference		T	Significance Level
				Lower	Upper		
Control	-.700	3.813	.853	-2.484	1.084	-.821	.422
Experimental	-8.200	5.791	1.295	-10.910	-5.490	-6.332	.000

Tab. 3 indicates that in the control group, the difference in the acquisition of traditional Chinese music between the pre-test and post-test is not statistically significant (t = -0.821, p-value = 0.422), suggesting no significant effect of traditional teaching methods.

However, for the intervention group, the paired t-test shows high statistical significance in the difference in acquisition (t = -6.332, p-value = 0.000), indicating a significant improvement when using MOOC online courses.

The second objective was to determine how the integration of online courses into educational programs affects the quality of education in traditional Chinese music and contributes to the increase of cultural capital, conducting a comparison between the control and intervention groups.

Tab. 4 Statistical Analysis of Indicators of the Traditional Chinese Music Lessons Integration Scale in the Context of Cultural Capital among Respondents from Control and Intervention Groups

Group		Pre-test student satisfaction	Post-test student satisfaction	Pre-test academic performance	Post-test academic performance	Pre-test interest in continued study	Post-test interest in continued study
Control	Mean	34.90	37.30	37.95	38.45	33.30	33.25
	Standard Deviation	4.103	3.389	2.946	2.874	3.310	2.936
	Standard Error of the Mean	.917	.758	.659	.643	.740	.656
	Variance	16.832	11.484	8.682	8.261	10.958	8.618
	Excess	-1.220	-1.297	-.892	-.993	-1.464	-1.083
Experimental	Mean	35.50	43.90	37.75	44.55	32.00	41.25
	Standard Deviation	2.666	2.292	3.683	2.724	3.179	2.173
	Standard Error of the Mean	.596	.512	.824	.609	.711	.486
	Variance	7.105	5.253	13.566	7.418	10.105	4.724
	Excess	-.016	-1.240	-1.623	-1.428	-.704	-.043

The data in Tab. 4 reveals that, for the control group, the mean values increased moderately: the difference in satisfaction was +2.4, in academic performance +0.5, and there was a slight decrease in interest by 0.05 points. In the influence group, where online courses were integrated, a more pronounced increase is observed in all three indicators: a difference of +8.4 in satisfaction, +6.8 in academic performance, and +9.25 in interest.

Tab. 5 Calculation of the Significance Level of Intergroup Differences in the Control and Influence Groups on the Scale of Integrating Traditional Chinese Music Lessons (TCM) in the Context of Cultural Capital (Paired t-test)

		Pairwise differences					T	Significance level
		Mean	Standard Deviation	Standard Error of the Mean	95% Confidence Interval for the Difference			
					Lower	Upper		
Control	Student satisfaction	-2.400	5.762	1.288	-5.097	.297	-1.863	.078
	Academic success	-.500	4.249	.950	-2.489	1.489	-.526	.605
	Interest in further study	.050	4.594	1.027	-2.100	2.200	.049	.962
Experimental	Student satisfaction	-8.400	3.235	.723	-9.914	-6.886	-11.613	.000
	Academic success	-6.800	4.372	.978	-8.846	-4.754	-6.955	.000
	Interest in further study	-9.250	3.754	.839	-11.007	-7.493	-11.020	.000

Tab. 5 shows that in the control group, changes in student satisfaction, academic success, and interest in continuing to study traditional Chinese music were not statistically significant, indicating a lack of dynamic indicators in the traditional teaching method. In the influence group, the increase in all three indicators was statistically significant (student satisfaction: $t = -11.613$, academic success: $t = -6.955$, interest in continuing to study: $t = -11.020$; all with a significance level $p < .000$), demonstrating the

high effectiveness of MOOC in improving the quality of education and increasing cultural capital. The third task was to calculate the t-criterion for independent samples for the studied variables among the control and influence groups to conclude the effectiveness of the intervention. The data are presented in Tabs. 6 and 7.

Tab. 6 Analysis of the Significance of Differences in Mastering Traditional Chinese Music Between the Control and Influence Groups

	Criterion of Equality of Livin		t-Criterion for Equality of Means			
	F	Significance	T	Significance (two-tailed)	Mean Difference	Mean Square Error of Difference
Pre-test	1.483	.231	.705	.485	.750	1.064
Post-test	15.955	.000	-6.544	.000	-6.750	1.032

In the pre-test, differences between the groups in the acquisition of traditional Chinese music were not statistically significant ($t = 0.705$, $p = 0.485$), indicating no significant differences between the groups before the courses began. However, the post-test revealed significant intergroup differences in favor of the influence group, where MOOCs were used ($t = -6.544$, $p < .000$), indicating a significant improvement in the studied variable.

Tab. 7 Assessment of the statistical significance of differences between groups in the integration of traditional Chinese music lessons and cultural capital

	Criterion of Equality of Livin		t-Criterion for Equality of Means					
	F	Significance	T	Significance (two-tailed))	Mean Difference	Mean Square Error of Difference	95% Confidence Interval for the Difference	
							Lower	Upper
pre-test student satisfaction	4.743	.036	-.548	.587	-.600	1.094	-2.815	1.615
post-test student satisfaction	9.010	.005	-7.215	.000	-6.600	.915	-8.452	-4.748

pre-test academic success	3.216	.081	.190	.851	.200	1.055	-1.935	2.335
post-test academic success	.011	.919	-6.889	.000	-6.100	.885	-7.892	-4.308
pre-test interest in continuing studies	.353	.556	1.267	.213	1.300	1.026	-.778	3.378
post-test interest in continuing studies	3.573	.066	-9.795	.000	-8.000	.817	-9.653	-6.347

Analysis of the data from Tab. 7 also indicates that, during the pre-test stage, differences in satisfaction, academic success, and interest in studying traditional Chinese music between the groups were not significant. However, the post-test revealed statistically significant improvements in the influence group using MOOC, particularly in student satisfaction and interest in continuing studies ($t = -7.215$ and -9.795, respectively, both with $p < .000$). These results underscore the importance and effectiveness of using online courses to enhance the quality of the educational process and increase cultural capital by improving student satisfaction and deepening their interest.

4. Discussion

The current findings demonstrate a significant improvement in the acquisition of traditional Chinese music among students using online courses, thereby confirming the effectiveness of integrating contemporary educational technologies into music education. This integration offers new opportunities for expanding access to cultural heritage and enhancing educational quality. Such changes may foster increased student interest in the study of traditional music, enhance academic performance, and improve overall satisfaction with the learning process, potentially leading

to a deeper understanding and preservation of cultural heritage. For educational practice, this underscores the need to develop and implement hybrid learning models that combine traditional methods with innovative technological solutions, such as MOOCs. For a more comprehensive understanding and interpretation of the obtained results, the data are analyzed in the context of findings presented in other works addressing the use of modern technologies in the context of traditional Chinese music. For instance, Wang (2021) discovered that the diversity of digital platforms, including YouTube, TikTok, and Likee, significantly contributes to the popularization of traditional Chinese music, particularly through the dissemination of instrumental and vocal compositions and dance performances. These findings correlate with the results obtained in this article, emphasizing the importance of MOOC online courses in enhancing the assimilation of musical material, as evidenced by the influence group's more significant increases in satisfaction, academic success, and interest in learning.

Additionally, other authors demonstrate the use of innovative technologies, specifically convolutional neural networks for recognizing the sounds of traditional Chinese musical instruments (Li & Zhang, 2022). By utilizing MEL spectrum features, the authors achieve high accuracy in sound classification, highlighting the significance of applying advanced technologies in the study and preservation of musical heritage. Such an approach not only contributes to the development of musical culture but also opens new perspectives for educational programs (Li & Zhang, 2022). This underscores the growing role of technological innovations in preserving and developing cultural heritage, confirming the substantial improvement in material assimilation when utilizing additional educational resources, as demonstrated in the influence group of the current study.

Another study explores the use of augmented reality to popularize Chinese musical instruments, offering interactive ways to study national cultural art (Hong & Wu, 2022). The authors examine an AR application designed for educational and tourism

purposes, enabling users to interactively familiarize themselves with traditional instruments. Testing the application demonstrated its effectiveness in increasing audience interest and engagement (Hong & Wu, 2022). This underscores the growing significance of innovative teaching methods in enhancing interest and satisfaction, which aligns with the current results indicating a substantial improvement in the influence group.

Similarly, another article shows that the use of virtual reality systems can enhance the perception and enjoyment of studying music, which also aligns with the current observation of increased interest and academic success in students using MOOCs to learn traditional Chinese music (Zhang & Bryan-Kinns, 2022). The authors present the QiaoLe system, which enables users to interactively engage with musical instruments. The results demonstrate that embodied interaction and gamification can significantly enhance the perception and enjoyment of learning, thereby affirming the potential of innovative technologies in education (Zhang & Bryan-Kinns, 2022). This theme is also discernible in the current study, confirming the positive impact of cutting-edge technologies on educational practices.

Another study emphasizes the importance of creating and providing access to specialized datasets, such as ChMusic, for recognizing traditional Chinese musical instruments (Gong *et al.*, 2021). This aligns with the current findings of significant improvement in the assimilation of traditional Chinese music through the integration of MOOCs, underscoring the role of technology in enriching educational resources. Another work discusses the application of Massive Open Online Courses (MOOCs) for studying Chinese folk music and their effectiveness in enhancing performance skills and popularizing culture (Li, 2022). The research results demonstrate a substantial enhancement in students' academic performance using MOOCs, coinciding with the current findings of the high efficacy of online courses in improving academic success and cultural capital.

Additionally, another scholarly work describes the shift to an online learning model in the performing arts during the pandemic, highlighting the flexibility and potential of online pedagogy in education (Li *et al.*, 2021). This aligns with the current results indicating the positive impact of online courses on the educational process, emphasizing the importance of hybrid and innovative approaches in teaching. Lastly, another study explores the influence of mobile technologies on vocal training, demonstrating how innovative technological solutions can enhance the educational process (Shi, 2021). The synergy of technologies and pedagogical methods outlined in the research reflects current conclusions regarding the significance of online technologies in the context of music.

5. Conclusion

The study revealed a significant enhancement in the assimilation of traditional Chinese music among students who integrated MOOC online courses, showing an increase of 8.2 points. Moreover, within the influence group undergoing education through integrated online courses, all key indicators experienced substantial growth: student satisfaction rose by 8.4 points, academic performance increased by 6.8, and interest in further study surged by 9.25 points. The dynamics of indicators in the control group, practicing solely traditional courses, were statistically non-significant. The elevation of all examined metrics in the influence group signifies the positive impact of MOOCs on music education and cultural capital, affirming the efficacy of a synergistic approach. Thus, the research results underscore the potential of online courses in enriching the educational process and expanding access to cultural heritage.

The scientific significance of this research lies in corroborating the effectiveness of MOOC online courses as a means of enhancing the comprehension of traditional Chinese music, enriching cultural capital, and improving students' academic success. It expands the understanding of the impact of modern educational technologies

on the preservation and study of cultural heritage by providing quantitative data on the advantages of integrating digital tools into education. The practical value of the study manifests in offering an evidentiary foundation for educational institutions to consider incorporating MOOCs into their curricula, potentially contributing to the global dissemination and preservation of Chinese musical culture. The scope of the research results encompasses higher education institutions, cultural organizations, and online educational platforms aiming to enhance the quality and accessibility of music education. The study may also serve as a basis for developing new teaching methodologies and strategies for popularizing traditional Chinese music, as well as for introducing innovations in the fields of cultural and educational technologies, ultimately fostering broader recognition and appreciation of cultural diversity.

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Appendix 1

The scale of Assimilation of Traditional Chinese Music

1. I confidently understand the historical and cultural context of traditional Chinese music.

2. I can accurately identify and describe various traditional Chinese musical instruments.

3. My skills in performing traditional Chinese music have improved during my studies.

4. I feel that my understanding of the theory and practice of traditional Chinese music is profound.

5. I actively seek additional resources and materials to enhance my skills in traditional Chinese music.

6. I frequently discuss and share my knowledge of traditional Chinese music with others.

7. I sense a deep connection with traditional Chinese music and its cultural significance.

8. I believe that my education is effective and helps me achieve my learning goals.

9. I am confident in my ability to perform complex musical pieces of traditional Chinese music.

10. I believe that I am acquiring all the necessary knowledge and skills to understand and perform traditional Chinese music.
11. I actively participate in musical events related to traditional Chinese music.
12. I feel that my education contributes to the preservation and dissemination of the cultural heritage of traditional Chinese music.
13. I evaluate the quality of educational materials and teaching methods as high.
14. I am confident that my knowledge and skills in the field of traditional Chinese music are competitive.
15. I believe that my education helps me appreciate and understand a wider range of musical genres.

Appendix 2

Scale of Integration of Traditional Chinese Music (TCM) Lessons in the Context of Cultural Capital

Subscale 1: Student Satisfaction

1. I am satisfied with the quality of education in traditional Chinese music.
2. My learning experience meets my expectations.
3. I feel that my teachers are competent and supportive.
4. Course materials and resources are useful and informative.
5. I am satisfied with the overall learning experience in traditional Chinese music.
6. I am comfortable with the teaching methods used in the course.
7. I feel that education contributes to my personal growth.
8. I would recommend my course in traditional Chinese music to others.

9. Communication and feedback with teachers and classmates are effective.
10. I feel supported by the educational institution in my studies.

Subscale 2: Academic Success

11. I believe my knowledge of traditional Chinese music has improved.
12. I successfully cope with assignments and tests.
13. I feel progress in my practical performance skills.
14. My grades reflect my efforts and understanding of the material.
15. I can effectively apply the knowledge gained in practice.
16. I am confident in my academic achievements in this field.
17. I actively participate in the learning process and discussions.
18. I feel that my skills have improved.
19. I sense that my education contributes to my academic career.
20. I am confident that I am acquiring the necessary knowledge to preserve cultural capital.

Subscale 3: Interest in Continuing the Study of Traditional Music

21. I am interested in further studying traditional Chinese music.
22. I plan to continue my education in this area, understanding the importance of preserving traditions.
23. My interest in traditional Chinese music has deepened thanks to the course.
24. I am seeking additional opportunities to study and practice music.
25. I actively discuss and share my knowledge and interests in traditional music.
26. I am willing to invest time and effort in further education.

27. I feel that studying music is important for my personal and cultural development.
28. I am motivated to continue participating in musical events and projects.
29. I feel that my education contributes to the preservation of cultural heritage.
30. I am confident in my desire to deepen and expand my knowledge in the field of traditional Chinese music.

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