

RESEARCH ARTICLE

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Preservation and promotion of China's musical cultural heritage on the internet

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Abstract

The study investigates different ways of preservation and popularization of Chinese traditional music using the Internet. The study collected data by analyzing various methods of presenting traditional Chinese music in online platforms YouTube, TikTok, and Likee. Common groups for YouTube are instrumental music (46.8%) and vocal music (23.9%), whereas, for TikTok and Likee, it is dancing performances (68.6% and 71.8%) and instrumental music (21.6% and 22.3%). The samples containing information about the content on the online platforms YouTube and TikTok are continuously growing in August, October, and December, while the Likee platform has seen a decline in all indicators. For the online platform YouTube, the largest increases were seen for vocal music theory and instrumental music for August, October, and December, while for the TikTok platform, the corresponding indicators were for Chinese music theory and educational dance performances in August and October. For online platform Likee for the aforementioned months, vocal music has seen the biggest decline over time. The obtained data can be useful for a better understanding of the audience's requests, which makes it possible to popularize music content more productively. The authors see such study as necessary for the implementation of new business projects in the operation of online music platforms, changes in approaches to licensing over the Internet, and reform of the music industry. The development of the Internet popularizes Chinese musical culture on a global scale, opens up new opportunities for the Chinese population (professionals and amateurs, adults and children) to study the musical heritage of other countries, promotes musical diversity, and can bring substantial financial benefits not only to individuals or companies, but also to the state as a whole.

Keywords: China, Chinese music, Internet platforms, Likee, TikTok, YouTube

Introduction

Over the past decades, the Internet has become an indispensable tool for communication, study and work, shopping, recreation and entertainment [1].

As of January 2021, there were 4.66 billion active Internet users worldwide (that's 59.5% of the world's population) [2]. The last decade has seen the growth and prosperity of Chinese media content [3], with Chinese music being quite popular [4–6]. The Internet provides the opportunity to listen to music that has been digitized from traditional albums and music created directly

in digital form (this trend began to develop in China in 2004) [7].

The development of the Internet has led to significant changes in the music market: first, the variety of music that people can afford to listen to has expanded, and second, the territory for the sale of music is no longer limited by national borders, but is measured on a planetary scale [7].

The introduction and popularization of Asian culture is becoming a trend in other countries, such as the United States [8]. The issue of preservation and popularization of cultural, including musical heritage of China on the Internet is increasingly attracting the attention of researchers [9–12].

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The work of Petersen and Camp [13] explores the concept of Chinese music. In particular, much attention is paid to the self-concept and the influence of social settings. A large cluster of studies of Chinese music focuses on Chinese folk music, which is an integral part of the Chinese heritage and thanks to world globalization is known outside of Asian countries [14–16]. In the work of Xing et al. [17], large data on folklore and visual Chinese content were collected. In addition, in the work of Zheng et al. [18], various Chinese folklore compositions were examined using a genetic algorithm (GA), in the work of Zheng et al. [19], traditional Chinese music was also analyzed using the Makarov method. Within the framework of this work, it was revealed that this model allows one to create music that has the characteristics of Chinese folk music.

There are many studies related to YouTube [20–23] and TikTok [24–27] content. It should be noted that the online platform Likee has hardly been studied, and no literature has been found on this topic. YouTube studies examined what kind of music should be called Chinese music, what are the preferences for watching Chinese music videos, and what impression Chinese music creates; these studies were based on likes, comments, and number of views [23]. The approach based on counting likes and comments has some limitations - the sample does not cover passive users who do not write comments or put likes. That is why the current study considers the number of views. Less studied in terms of China's musical heritage is TikTok content, with researchers viewing the music component mainly as part of the video clip [24–27]. The current study fills this research gap, optimizes approaches to learning Chinese music on YouTube and TikTok, and offers such approaches for Likee. Based on information about listener preferences, it is possible to draw conclusions about the popularity of a particular musical trend and to outline constructive reforms in the music industry [7].

Thus, the purpose of the study is to quantify Chinese music content on the online platforms YouTube, TikTok, and Likee.

For this purpose, several tasks were solved:

- a content analysis was done using purposive sampling method to study the global popularity of Chinese music content through the number of views;
- the percentage variation of views over time for each of the three platforms studied across the 8 music categories was traced;
- Student's t-test was used to confirm the difference between the three samples;

- the samples were subjected to the normal law of distribution—using the Shapiro-Wilk criterion.

Based on the findings, the study tries to outline ways to preserve and enhance Chinese music culture through the Internet.

Materials and methods

Research methods

The study observes different musical Chinese content on online platforms YouTube, TikTok, and Likee. In the first step, traditional Chinese musical content was analyzed by typing phrases "music China" and "Chinese music" in YouTube, TikTok, and Likee. In the second step, it was decided to compare the number of views for all five groups depending on time (August, October, and December of 2020).

Search by keywords "music China" and "Chinese music" was conducted for video titles; the search parameters were: "the exact phrase" and "all these words", without a specific order. Videos posted on YouTube, TikTok, and Likee from July to December 2020 were studied; promotional videos, repetitive videos, or offensive content were not considered. For content analysis, the purposive sampling method was used [28]. The music videos were sorted by number of views (from most to least viewed).

After setting a time filter (July 2020–December 2020) and screening out songs that do not meet the goals of the study, 453 musical samples were analyzed, and the number of views as a percentage for the selected musical categories was calculated. Of interest were the following musical categories: instrumental music, vocal music, dancing performances, theory of Chinese music, educational vocal, instrumental, dance content, and choral music. These categories are considered on the basis of existing classifications of musical trends [29, 30].

Statistical methods

The main analysis tool of the research is a two-sample t-test for independent variables. Student's t-test requires normal distribution of data. The paper proves compliance with Shapiro-Wilk test. Besides, compared datasets must have dimension bigger than eight.

For the empirical Shapiro-Wilk test, the following formula was employed:

$$W = \frac{1}{s^2} \left[\sum_{i=1}^n a_{n-i+1} (x_{n-i+1} - \bar{x}) \right]^2, \quad (1)$$

where s^2 represents variance; a_{n-i+1} – constant, x is the value of variables; n is the sample size; and i – a variable that can take the values 1, 2, 3, and 4.

The critical value of Shapiro-Wilk test was obtained with the formula:

$$W_{cr} = \frac{(-0.0113 \cdot n^4 + 1.656 \cdot n^3 - 91.88 \cdot n^2 + 2408.6 \cdot n + 67,608)/100,000}{(2)$$

where n is dimension of samples. The critical value of Shapiro-Wilk test is 0.14 for $\alpha = 0.05$.

For the empirical value of Student's t-test, the following formula was used:

$$t = \bar{x}_1 - \bar{x}_2 / s \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \quad (3)$$

where \bar{x}_1 is the average value of the first sample, \bar{x}_2 is the average value of the second sample, s is the square root of the variance, n_1, n_2 – sample sizes.

The hypothesis about the difference between samples depending on time (and growth of the percentage of views in the case of median growth with time) is proved if the empirical value of the t-test is bigger than a critical one, which equals 2.14 for $\alpha = 0.05$.

It should be noted that the results for Tables 4, 5, and 6 were obtained using the following formula:

$$x = (x_{current}/x_{previously} - 1) \times 100\%, \quad (4)$$

where $x_{current}$ is a variable's value in the current month and $x_{previously}$ is a variable's value in the previous month.

All results were obtained using STATISTICA 13.3.

Research limitation

It should be noted that within the framework of this study, there are a number of factors that can affect the

Table 1 Percentages of investigated groups on YouTube

YouTube	
%	Name of group
46.8	Instrumental music
23.9	Vocal music
9.6	Dance performance
9.2	Theory of Chinese music
4.5	Educational vocal content
2.3	Educational instrumental content
2.1	Educational dance content
1.6	Choral music

accuracy of the results obtained. In particular, the study did not analyze all the content on this topic. However, the volume of analyzed content is large enough to generalize the study sample for all content on the studied online platforms.

In addition, as indicated above, the studied samples were analyzed using the Student's t-test with an error of $\alpha = 0.05$ (as for any experimentally obtained data).

Results and discussion

Analysis of Chinese traditional music content on YouTube, TikTok, and Likee

Tables 1, 2 and 3 present the results of the analysis of Chinese traditional music content on YouTube, TikTok, and Likee, respectively. All analyzed material was classified according to [29, 30] one of eight groups presented in the right columns of the tables. The left columns of the tables indicate the percentages of each of the groups.

As can be seen, for the YouTube platform (Table 1), the most popular videos are those related to instrumental and vocal music (the percentages are 46.8 and 23.9, respectively). Much less popular are dance performances and videos containing theoretical knowledge of

Table 2 Percentages of investigated groups on TikTok

TikTok	
%	Name of group
68.6	Dance performance
21.6	Instrumental music
3.2	Vocal music
2.1	Theory of Chinese music
1.5	Educational vocal content
1.2	Educational instrumental content
1.1	Educational dance content
0.7	Choral music

Table 3 Percentages of investigated groups on Likee

Likee	
%	Name of group
63.8	Dance performance
25.3	Instrumental music
3.3	Vocal music
2.8	Theory of Chinese music
1.4	Educational vocal content
1.5	Educational instrumental content
1.2	Educational dance content
0.7	Choral music

Table 4 Percentage of changing interest in Chinese traditional musical content on YouTube

Group	YouTube		
	August, %	October, %	December, %
Instrumental music	11.72	14.78	17.34
Vocal music	11.98	14.98	17.56
Dance performance	12.03	15.74	17.18
Theory of Chinese music	12.11	15.67	17.22
Educational vocal content	11.87	15.66	17.08
Educational instrumental content	11.68	15.03	16.87
Educational dance content	12.1	15.24	16.92
Choral music	12.13	15.52	16.97

Chinese traditional folk music. The least numerous are

Table 5 Percentage of changing interest in Chinese traditional musical content on TikTok

Group	TikTok		
	August, %	October, %	December, %
Instrumental music	23.6	56.54	76.81
Vocal music	23.81	57.12	76.42
Dance performance	24.51	57.04	76.85
Theory of Chinese music	24.43	56.89	75.83
Educational vocal content	24.32	56.67	76.31
Educational instrumental content	23.98	56.89	76.57
Educational dance content	24.12	57.19	75.88
Choral music	24.28	57.06	76.36

instructional videos, as well as videos of choral works.

Table 6 Percentage of changing interest in Chinese traditional musical content on Likee

Group	Likee		
	August, %	October, %	December, %
Instrumental music	17.3	12.3	9.52
Vocal music	17.4	12.8	9.81
Dance performance	16.9	12.6	9.77
Theory of Chinese music	16.6	12.4	8.99
Educational vocal content	16.7	12.2	8.84
Educational instrumental content	17.2	12.1	9.35
Educational dance content	17.3	11.8	9.29
Choral music	16.7	11.9	9.13

Table 2 shows the percentages for the online platform TikTok. For the TikTok app, dance performances are the most popular, with a percentage of 68.8 %. In second place is instrumental music (21.6%). Other content makes up a relatively small proportion, and in this case, vocal content also makes up a small percentage of the total content.

As one can see in Table 3, for the Likee online platform, the percentages of content on different topics are the same as for the TikTok app. Content with dance performances and instrumental music (63.8% and 25.3%, respectively) is the most numerous, while the rest of the topics make up less than 4% separately.

Analysis of all three platforms showed that the most popular are vocal, instrumental and Dance performance, this is consistent with similar studies [23]. It is these three directions that are most promising to develop—to digitize existing music albums that have not yet been digitized, to make them available to a multimillion audience, to sponsor musicians, and to advertise new music trends again through online platforms. The next ranking—Theory of Chinese music, Educational vocal content, Educational instrumental content, Educational dance content—are interesting to a smaller number of users, this is logical, because they have an educational direction and are not popular music, they are attractive only for a certain audience. Since students of music schools will be listening to educational music more often, it is necessary to think over a strategy of cooperation with educational institutions so that teachers could use the music content in their lessons, to simplify their access to educational and methodical materials, especially now that modern technology allows them to do so. The least popular in all three samples is Choral music, here, too, the audience is specific, choral music events need information support, and conditions for information exchange between people interested in the choral content should be created (they should want to use the resource themselves and recommend it to others).

Changes in the percentage of views over time

Further, in Tables 4, 5 and 6, the changes in the percentage of views over time are presented. In this case, it was decided to analyze the percentage change in August, October, and December of 2020. The first column presents the studied groups, the second, third, and fourth columns show the results of the analysis of changes in the percentage of views compared to the previous month.

As one can see, over time, there is a steady trend towards an increasing interest in Chinese folk music for the online applications YouTube and TikTok, while on the Likee online platform, all indicators fall over time. This

Table 7 Student's

Values	Student's t-test		
	August/ October	October/December	December/August
t_{cr}	29.7	41.4	19.7
t_{emp}	2.14		

Table 8 Shapiro-Wilk test

Values	Shapiro-Wilk test		
	August	October	December
$<x>$	17.01	12.26	9.29
s^2	0.1	0.11	1.57
W_{emp}	0.25	0.36	0.18
W_{cr}	0.14		

trend may be due to the fact that YouTube is an international platform, and TikTok is a Chinese development, while Likee is a Singapore platform and is not particularly popular in China.

Below, one can see that the greatest increase in interest in Chinese music on the YouTube platform was observed in December. The average values for the three samples are 11.95, 15.23, and 17.14, which indicates a steady increase in interest in Chinese content on YouTube.

The biggest growth for the TikTok platform was seen in December. The average values are 24.13, 56.92, and 71.85 for the respective samples, which also indicates an increase in interest in Chinese content on this platform.

For the online platform Likee, there has been a decline in interest in Chinese content, which may presumably be due to the low popularity of this platform in China. For August, October, and December, the averages are 17.01, 12.26, and 9.29, indicating a steady decline in interest in Chinese content.

Statistical analysis of the obtained samples using the Student's t-test

Further, Table 7 shows the results of the statistical analysis of the obtained samples using the Student's t-test. The first line shows the empirical values of the Student's t-test, in the second—the tabular value with the sample size 8. The hypothesis of the existence of a difference between the studied samples is confirmed if the empirical value of the Student's t-test is greater than the tabular one. The second, third, and fourth columns indicate the months when the compared samples were collected.

As one can see, the empirical values of the Student's t-test are greater than the tabular value for all pairs of compared samples, which confirms the hypothesis that there is a difference between the samples under study. In addition, as shown earlier, an increase was observed for the set of samples for the online platforms YouTube and TikTok, while for the online platform Likee, a decrease in the sample values with time was observed.

Table 8 shows the results of checking the obtained samples for compliance with the normal distribution law using the Shapiro-Wilk test. The first line shows the average values of the obtained samples, the second – the variance, the third and fourth lines indicate the empirical and tabular values of the Shapiro-Wilk test. In this case, the hypothesis of the normal distribution is satisfied if the Shapiro-Wilk empirical value is greater than the tabular one. This hypothesis is also confirmed.

The topic of the relationship between China's musical heritage and its distribution on the Internet is not sufficiently disclosed. However, there are a large number of articles that study global music trends and their spread on the Internet. For example, in an article [31] it was revealed that unlicensed downloading of music practically does not replace digital sales. A link has also been found between licensed streaming websites and websites selling licensed music, which could presumably stimulate digital music sales on the Internet. In research of Essl et al. [32] the main factors that can support the Internet of Musical Things (IoMusT) were examined, namely concerts, audience participation, the possibility of remote rehearsals, e-learning music, and modernization of studio music creation. Besides, comparative analysis [33] showed that demand for streaming music servers is driving the global growth of the Recorded Music industry. The work [34] examined the impact of new technologies on teaching vocal and instrumental skills to students. In particular, there was a positive shift in learning after classes using new technologies. In the work of Ardit [35], the problem of dependence of listeners on subscriptions to music streaming services was noticed, which allows them to get unlimited access to music. In addition, it was found that the recording industry is seeking to increase music fees by 200% or more.

Research of music content on the YouTube online platform deserves special attention. Despite the relatively small amount of information, there are several new studies of music content on YouTube. In the work of Hiller [36], music content on the YouTube online platform for 2009 was investigated. In particular, this work revealed the positive impact of posting debut albums on the YouTube platform. For the TikTok and Likee platforms, almost no information has been found about China's

musical heritage, since the main music content is dances or short humorous videos.

There is little information about the popularization of Chinese music on the Internet. However, there are still a number of studies of Chinese music content on various online platforms. The work of Yu and Schroeder [23] reveals the issue of globalization of Chinese local music and the "global audience" on the example of the YouTube platform. In a study [37], dynamics were observed between global and local content. Besides, in the work of Yang [38], a connection was noticed between the growing interest in the cultural heritage of China and the Internet.

The present work uses such musical categories as instrumental music, vocal music, dancing performances, theory of Chinese music, educational vocal, instrumental, dance content, and choral music, which is consistent with the classification of musical trends accepted in the music world [29]. The criterion of most views is often used in the practice of content analysis [28], the present study also used it.

Analyzing other research [7, 23, 39], one may conclude that in order to promote Chinese music, it is necessary to reform licensing - to introduce the provision of licensed content through online platforms directly to a consumer, so that s/he him/herself chooses the option of payment and the volume of the product. In addition, it is necessary to expand the number of services that an online platform can provide, and this requires the development of business models to solve the problems of profit generation from music platforms. For this reason, it is important to take into account user preferences (which is highlighted in the present work) and government requirements. Steps to strengthen the position of Chinese music in the Internet space are already being taken - Alibaba has presented two major projects - Xiami Musician Channel and Light-searching Project. Netease funds individual musicians (this is beneficial because the musicians already have a fan base, in addition, they can advertise the platform) [7]. China is a huge domestic market and a balanced foreign policy allows it to expand to a planetary scale.

The development of the Internet continues to open up Chinese music to the world. Chinese composers have the opportunity to get to know Western practices, to pass Western ideology through the prism of Chinese values and to implement this experience in their work, to create compositions that are interesting to both the Western and Eastern worlds [39]. It is not only professional composers who are changing - Western instruments and Western music culture are being adopted by the people of China, by millions of Chinese children and adults [39], and YouTube, TikTok, and Likee are helping them do so in the 21st century. The Internet gives everyone the

opportunity to distribute their music and expand musical diversity - popular artists on the Internet can be ordinary people without musical training [7].

Conclusions

Within the framework of this study, a statistical analysis of Chinese music content on the online platforms YouTube, TikTok, and Likee was carried out. This topic has practically not been studied, which is a sufficient basis for its detailed study. As it is shown by the data analysis, the largest amount of content on the YouTube platform falls on instrumental music (46.8%) and vocal music (23.9), while choral music occupies the smallest share of the total studied content (1.6%). On the TikTok platform, dance performances (68.6%) and instrumental music (21.6%) occupy a large share, while training instrumental content takes up a smaller share (6.2%). On the Likee platform, dance performances and instrumental music prevail (63.8%, 25.3%, respectively), while choral singing has the smallest share (0.7%). In addition, a statistical analysis of the growth in interest in the studied content on the above platforms was carried out. As the result showed, the average values for the YouTube and TikTok platforms are growing (11.95, 15.33, 17.14 and 24.13, 56.92, 71.85, respectively), while the Likee platform has seen a decline in all indicators (17.01, 12.26, and 9.29). Statistical analysis using the Student's t-test shows that there is a significant difference between the studied samples over time, which indicates the confirmation of the hypothesis ($29.7 > 2.14$, $41.4 > 2.14$, $19.7 > 2.14$ at a significance level $\alpha = 0.05$). Indicators for August, October, and December were compared. It should be noted that the values in the obtained samples were obtained by comparing Internet content about China in July and August, September and October, as well as November and December. Thus, the ratio of a present study month and a previous month was obtained. In addition, the hypothesis of the normal distribution of all samples was confirmed using the Shapiro-Wilk criterion, which is a necessary condition for the applicability of the Student's t-test.

In this way, the Chinese musical heritage is, firstly, popularized through the Internet, with such areas as Instrumental music, Vocal music, and Dance performance being of particular interest to the world. Second, it can improve the new developments of Chinese composers and musicians, both professional and amateur (because it allows them to become fully acquainted with the work of previous and new generations of colleagues from their own and other countries). Third, it can generate considerable income through the licensing and operation of online music platforms. The practical value of the study

is that the information on the preferences of users of YouTube and TikTok platforms is optimized, the data on the Likee platform are provided, the scientific value is in the analysis of the published works in order to outline the development of Chinese musical cultural heritage.

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Authors' contributions

JW contributed to the conceptualization, formal analysis, investigation, methodology, writing of the original draft, and the review and editing. The author read and approved the final manuscript.

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Availability of data and materials

Data will be available on request.

Declarations

Competing interests

The authors declare that they have no competing interests.

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