



Piano education online: Challenges and solutions

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Abstract

The research objectives are as follows: to consider the possibilities of modern digital technologies in education; to assess the impact of digital technology on the study of a work of art. The study results show the advantages and disadvantages of the WeChat software and the MOOC application, obtained on the basis of a survey of students. According to the WeChat software, 100% of students said they use the app. According to 100% (328 students) of the respondents, the advantage is free use; 98% (321 students) noted learning flexibility and ease of use; 85% (279 students) reported high quality sound and image; 83% (272 students) appreciated instant messages; 75% (246 students) enjoyed integrated screen sharing during conversation; 65% (213 students) reported call recording; 25% (82 students) enjoyed phone calls and protection of private conversations. According to 46% of respondents (151 students), the disadvantages are delay and poor audio quality at the beginning of communication; 42% (138 students) - inaccessibility to other incoming calls during a conversation; 35% (115 students) - difficulties associated with reading a text message received during a video chat; 20% (66 students) - lack of round-the-clock technical support.

Keywords Piano education · Innovation · Online · Benefits · WeChat, MOOC

1 Introduction

Today, piano education is actively developing around the world and, in particular in China. Currently, pianists of Chinese schools demonstrate high achievements at international musical events and competitions (Wenjiao, 2021).

At the turn of the 20th-21st centuries, a number of famous Chinese pianists appeared. Today, such pianists as Yuja Wang, Zhang Haochen, Chen Sa, Lang Lang, and many others are disseminating the piano culture (Peng, 2020).

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Piano education has become very popular and there is a developed infrastructure to deliver it to students in China: piano schools and conservatories, modern equipment, adequate funding, and government support. The active development of piano education led to the Chinese boom and Chinese pianists began to appear in the international music arena (Chen, 2020) increasingly often.

Due to the huge scale of popularization and the high level of musical works, the Chinese professional piano education has been highly developed and supported. Millions of children got interested in learning to play the piano. At the same time, the Chinese piano industry is actively developing making China a leader in the production and export of pianos (Din, 2020).

Today, playing the piano is taught not only in music schools but also in other educational institutions which have music faculties. Along with the development of the art of piano, the Chinese piano pedagogy is being modernized in China (Liang, 2015). The features of piano pedagogy are the use of group teaching, the development of musical perceptions of students, general humanitarian education, an increase in the cultural level of students, the elimination of unhealthy competition between students, stimulation of motivation to learn to play the piano; teachers never apply the authoritarian teaching style (Wenjiao, 2021).

The COVID-19 pandemic has introduced the changes in the life of every country and field of activity, including in piano education. Teaching music has accepted a serious challenge starting from technical issues up to sound quality. Teachers and students had to look for new methods and ways of communication and collaboration. Modern digital solutions are being actively introduced in music education. These include video content, Massive Open Online Courses (n.d.), various platforms, programs, applications, and others (Park, 2021). In 2020, first in the world, an entrance exam with live pianists was held in China (Sishka et al., 2021). The development of piano education is a multifaceted creative process, which aims to ensure effective teaching in modern conditions. The study of music involves a combination of both offline and online formats with the use of modern digital capabilities (Gibson, 2021).

Thus, research that aimed to show the temporal dynamics of the study of a classical work using modern digital technologies was conducted. The importance of the study is due to the focus on online learning, especially the problematic issue of learning to play the piano, which caused difficulties in a pandemic. It is important to develop and use new innovative educational methods that can be used in online learning.

Research questions are to analyze the possibilities of using modern digital technologies, especially online educational platforms and various applications, in music education, including learning to play the piano and to evaluate the effectiveness of modern technologies in teaching piano.

1.1 Literature review

The development of piano education in modern conditions is faced with a number of problems, the solution of which is the main task for the world music community.

Scientific studies by Korean scholars (Shin, 2021) analyzed the collaborative considerations of educators related to sharing and improving excellence in music teaching. The study used meta-analysis and one-to-one interviews. Music teachers noted the technical difficulties and the need to expand their reflective thinking. Among the positive factors, they reported a sense of emotional security in the team, which allows them to resist teacher worries and problems (Shin, 2021).

A study of the factors affecting the educational process in music education and the effectiveness of a music teacher was carried out by American scientists (Fisher et al., 2021). The study participants were undergraduate students of the Faculty of Music. The professional disposition, the development of musical skills, and learning difficulties were of great importance (Fisher et al., 2021).

Scientists from Manchester Metropolitan University, UK (Savage, 2021) studied the problems of music education in modern England. The study was conducted using an online survey and telephone interviews with music teachers from all regions of the country during the period of isolation due to the COVID-19 pandemic. The key issues were related to funding, equal opportunities, access to music education, hidden personal costs, and other learning challenges (Savage, 2021).

The analysis of factors affecting the acquisition of music education and the internal motivation of students was carried out by scientists from Ukraine (Bondarenko & Nalivaiko, 2021). Only a harmonious combination of teacher politeness, psychological readiness, understanding of the inner world of the student, and the lack of misunderstandings and problems among applicants helps music teachers increase the internal motivation of students to master musical instruments. The guarantee of the effective development of intrinsic motivation in piano students is understanding of the applicant, psychological and pedagogical training of teachers, and the introduction of modern digital tools (Bondarenko & Nalivaiko, 2021).

Piano education and motivation to get it were studied by scientists from China (Bai, 2021). Over the past 30 years, the popularity of piano education in China has skyrocketed and the concept of the “piano path” has emerged. Today, there is a relationship between learning to play the piano and formal learning, as well as a relationship with a range of motivation. The piano path (the likelihood of success) depends on continuing to learn the instrument and accessing beautiful music. Learning to play the piano allows to compete in society, improve their social status, receive a stable income, have freedom and creativity in their work, or enjoy a better life - the piano has opened new ways to life satisfaction and success (Bai, 2021).

The common factors in the learning process of piano students were identified by Australian scientists (Arthur et al., 2020). The required skill (musical sight-reading) is common to all pianists and musicians, but not everyone has it. Such a skill can be obtained from a teacher or through personal experience during the training period (Arthur et al., 2020).

Scientists from Turkey studied the features of piano education and anxiety while playing the piano (Güven, 2016). Female students were more anxious than male students; graduate students were more anxious than undergraduate students; no significant relationship was found between academic grades and anxiety (Güven, 2016).

The issues of visualization of piano education were dealt with by Israeli scientists (Elkoshi, 2019). The study participants were people with and without music education, they listened to a classical composition of a certain pitch and visualized the

music with the help of the notation they invented. The ability to reflect pitch was determined by age and musical experience (Elkoshi, 2019).

The functional skills of piano playing and their perception by music educators were studied by American scientists (Snell & Stringham, 2021). Functional piano skill is a basic piano musician competency. The components of this competency are performance technique, repertoire, accompanying and functional skills of playing the piano, sight-reading, and generative creativity (Snell & Stringham, 2021).

The analysis of the learning environment and motivation in piano education was carried out by Canadian scientists (Gerelus et al., 2020). A common problem among students is dropping out of piano education before reaching an average level of proficiency in the instrument; the reasons for this are a decrease in motivation and learning difficulties (Gerelus et al., 2020).

Work-related issues and self-perceptions of music teachers were studied in the USA (Brown, 2020). Health problems and/or stress led to burnout. There was a correlation between health problems and stress. Thus, teachers with less experience had higher levels of stress; female music teachers had more health problems (Brown, 2020).

The effect of physical parameters on the study of piano compositions was considered by scientists from the USA (Russell, 2019). The determining factors are pitch and rhythm, accuracy and fluency of sight reading, accuracy or smoothness of sound (Russell, 2019).

The importance of increasing intrinsic motivation of students when learning to play the piano was studied by Australian researchers (Cheng & Southcott, 2016). To learn to play the piano, a student needs to be motivated and many students need external reasons for this: an interview of a teacher with parents and students before the start of training; a clear explanation of what and how they will learn; enthusiasm, pleasure, and professionalism; individual teaching and learning; suitable repertoire; managing the expectations of students and parents; support for students in the context of their choice (to continue or stop learning) (Cheng & Southcott, 2016).

The satisfaction of piano teachers in music schools was studied by scientists from the Republic of Croatia (Sabljarić et al., 2020). To achieve good results, piano teachers must be satisfied with the work they do. Piano teachers are moderately satisfied, there are no differences either by gender or by the type of school where they teach. Teachers with great experience and teachers who have advanced in their professional field are more satisfied with their jobs (Sabljarić et al., 2020).

When studying musical disciplines, it is important to develop the creative skills of students (Gao, 2021).

Due to the pandemic, the sphere of education and knowledge transfer have switched to different learning formats: offline, online, and blended learning. To transfer theoretical knowledge and gain practical skills, teachers began to actively use digital technologies: distance, electronic, digital, and mobile learning (Khutorskoy, 2019).

To synchronize effective learning, improve the assimilation of knowledge, and increase motivation, modern digital tools are being widely used (Kolykhmatov, 2020; Werth & Williams, 2021). Digital applications, such as Skype, Zoom, Facebook Messenger, Apple Facetime, Google Hangouts, WhatsApp, and others, ensure

good quality video and audio content and allow users to record a lesson, as well as to obtain quick feedback (Yee, 2020).

At the same time, the research on online piano education supplements and deepens the preliminary studies of this problem.

1.2 Setting objectives

Mastering the skill of playing the piano requires an active interaction between a teacher and a student; this allows learners to learn the skill of playing the instrument more effectively, competently analyze the texture of a music piece, and recognize it at a different level. A teacher reveals students' abilities. A teacher must be modern, easily adapt to new things, and meet the requirements of an ultra-modern student. Today, the world of pedagogy provides for the use of digital technology in teaching to play the piano. Piano education is adapting to non-standard conditions, including the online format, and is actively using the possibilities of digital technologies, smartphones, computers, tablets, and the Internet.

The relevance of this research determined the choice of the topic (online piano education: problems and solutions). This study was designed to show the temporal dynamics of studying a classical piece of music using modern digital technologies. The research objectives are as follows:

- to consider the possibilities of modern digital technologies in education;
- to assess the impact of digital technology on the study of a work of art.

The scientific novelty lies in the fact that the temporal dynamics of learning a classical work using modern digital technologies will be studied for the first time. Digital technologies can and should be used in piano education today; they make it possible to create and improve the practical competencies of piano players. An integral approach to piano teaching involves the use of high pedagogical skills and modern digitalization capabilities.

2 Methods and Materials

2.1 Research design and sample

This research was carried out in the higher educational institutions of China, where piano training takes place, and *the research methodology and design were collectively developed*.

The research sample consisted of 328 third-year intramural students of the Faculty of Music and Performing Arts. The average age was 20.67 ± 0.63 ; there were 53% of girls and 47% of boys. The criteria for the sample were music specialty, the ability to play the piano, knowledge of modern technologies, and the ability to use them in education. One of the most famous classical compositions "Moonlight Sonata" by Ludwig van Beethoven was selected for the study.

2.2 Research tools

The sample was divided into 2 groups:

1. Students who had classes with a teacher in the online format (WeChat) and studied musical composition using a lead sheet (165 students).
2. Students who had classes with a teacher in the online format (WeChat) and studied musical composition using the specialized MOOC (163 students).

The purpose of the involvement of 2 student groups was to compare the temporal dynamics of studying a classical work.

To analyze the capabilities of modern digital tools (WeChat app and the MOOC), an online survey was conducted with the help of Google Forms. Students received a link to an online questionnaire that consisted of 2 parts: part 1 related to WeChat and part 2 related to the MOOC. Each part had 3 open-ended questions: Do you use this digital tool? What are the advantages of this digital tool? What are the disadvantages of this digital tool? The online questionnaire required students to answer on their own. The link was accessible from any modern gadget (computer, tablet, or smartphone).

Academic success was assessed on a five-point scale, where: “1 = weak success in the study of a piece of music”; “2 = mediocre”; “3 = sufficient”; “4 = good”; “5 = excellent”. The score of “5” reflects excellent knowledge of the text, possession of technical skills; good sound production, understanding of the style of the music piece; the use of artistically justified techniques that make it possible to create an artistic image that corresponds to the author’s intention. The score of “4” demonstrates competent performance with some minor technical errors, slight discrepancy in tempo, and incomplete presentation of the image of the piece being performed. The score of “3” shows poor knowledge of the musical text and technical errors; the nature of the piece is not revealed during the performance. The score of “2” shows ignorance of musical text and bad piano skills while implying poor independent work.

2.3 Statistical data analysis

The statistical method was used to calculate the indicators, for which the Statistics program was used. To represent quantitative parameters, the formula ($x \pm m$) was used, where x is the arithmetic mean, m is the error of the mean. The comparison results were considered at the significance level of 0.05.

2.4 Research limitations

The study did not include students of the faculties of choreography, theater and cinema, and art history as they have different educational programs.

2.5 Ethical issues

This review was conducted in accordance with the concepts of the World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects. The research participants were provided with information on the objectives and methods of the research; all participants agreed to participate in the study and their complete anonymity was ensured. There was no conflict of interest. The Bioethics Committee of the university approved this experiment in the 2019/2020 academic year.

3 Results

When studying the digital capabilities of the WeChat software, it was found that this digital tool was used by 100% of students. The respondents also noted the need for a sufficient charge of the gadget and high-speed Internet. According to 100% (328 students) of the respondents, the advantage is free use; 98% (321 students) noted learning flexibility and ease of use; 85% (279 students) reported high quality sound and image; 83% (272 students) appreciated instant messages; 75% (246 students) enjoyed integrated screen sharing during conversation; 65% (213 students) reported call recording; 25% (82 students) enjoyed phone calls and protection of private conversations. According to 46% of respondents (151 students), the disadvantages are delay and poor audio quality at the beginning of communication; 42% (138 students) - inaccessibility to other incoming calls during a conversation; 35% (115 students) - difficulties associated with reading a text message received during a video chat; 20% (66 students) - lack of round-the-clock technical support (See Fig. 1). The results showed a positive attitude of students to the WeChat software, which indicates a sufficient level of students' awareness of modern technologies and readiness to learn to play the piano online. In addition, students' responses indicate that it is convenient for students to use the WeChat software to communicate with classmates and teachers while studying.

When studying the possibilities of the MOOC application, it was found that this digital tool was used by 100% of students, who also noted the need for the full battery charge of the gadget and high-speed Internet; 97% of respondents (318 students) reported ease of use; 89% (292 students) - quick and easy learning of the composition; 65% (213 students) - suitability for both beginners and professionals. The disadvantage of MOOC, according to 83% (272 students) of respondents, is no music score; 32% (105 students) noted that it cannot be connected with piano sound (See Fig. 2). The results showed that students are satisfied with the use of the MOOC application in education, due to the large number of courses presented on the educational online platform, from which students can choose the courses they want to study. In general, the analysis of the indicators obtained from the survey shows that both platforms can be used in music education, however, learning will be more effective if these educational platforms are used together, as they complement each other (the first is more focused on communication, and the second gives the opportunity to conduct online classes and watch online courses).

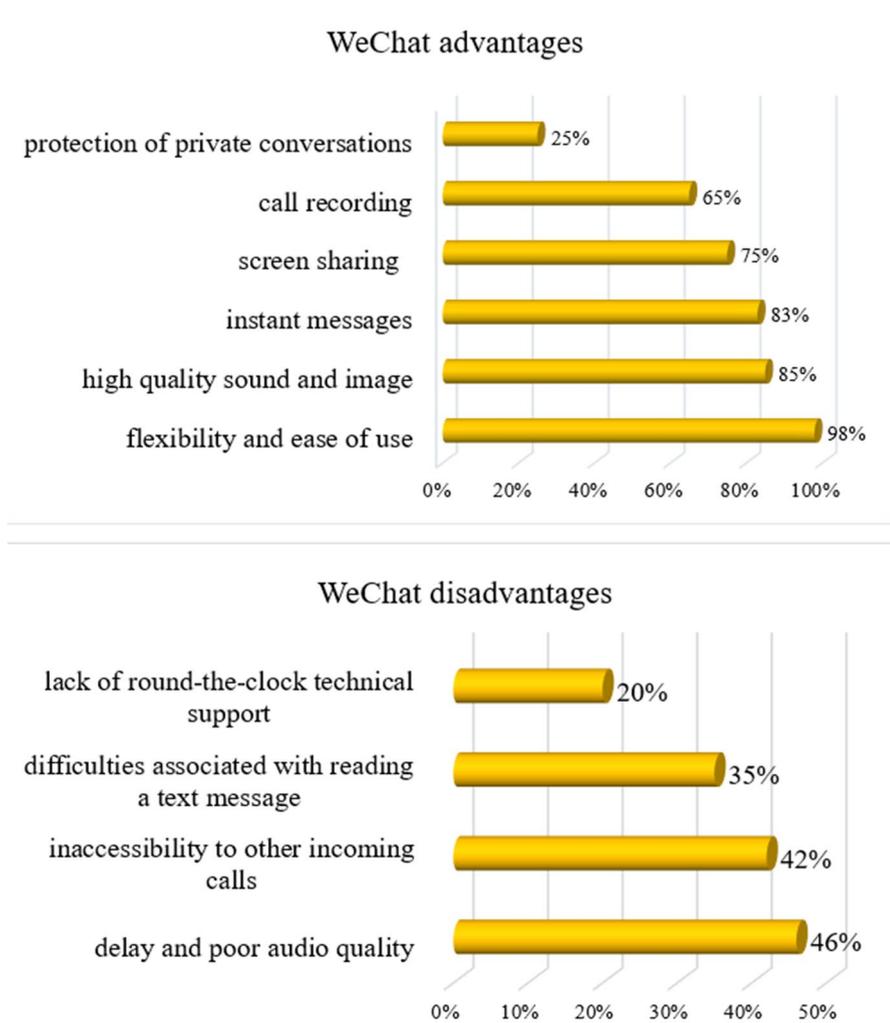


Fig. 1 WeChat software in piano education

The study of a piece of music took place in the key of C-sharp minor and had 3 stages:

- primary acquaintance with the piece (reading and parsing sheet music);
- careful work with the text (improvement of the performance technique and detailed analysis);
- preparation for concert performance (achieving an optimal concert state, work on the integrity of the artistic image, and interpretation of the work).

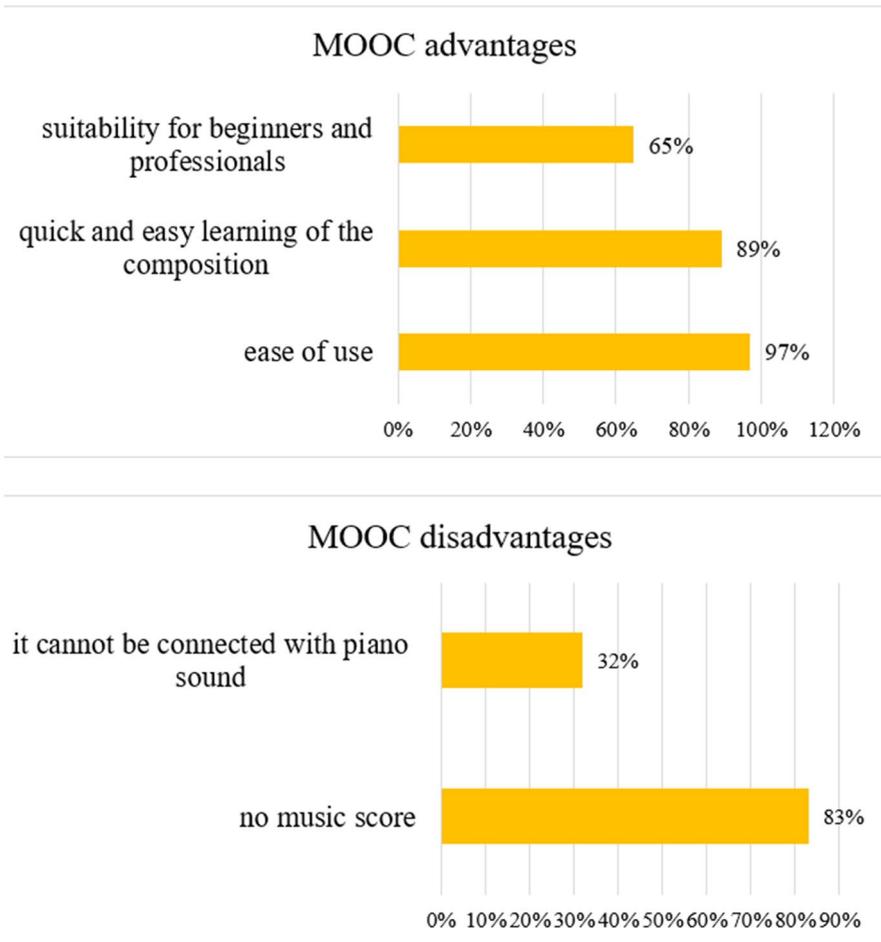


Fig. 2 MOOC software in piano education

When learning the piece of music, the students constantly looked at music scores (paper or electronic); practiced; and worked independently.

Thus, it took the group of students who used a lead sheet 45.46 ± 2.71 days to learn the composition while a group of students who used the MOOC application needed 33.22 ± 2.11 days to learn it. The use of a specialized application reduced the time it takes to learn a piece of music by 26.92%; the average score was 3.87 ± 0.76 and 4.03 ± 0.19 , respectively (the results do not differ significantly).

As a result of the study, it was found that in piano education, students actively use WeChat and believe that it is a user-friendly program that ensures high-quality sound and image, instantly transmits messages, has an integrated screen sharing feature during a conversation, allows users to make phone calls, and is protected; however, there might be some delays and poor audio quality. For hand training, students

actively use the MOOC service, which is also user-friendly. It reports errors and helps users quickly learn compositions; it is suitable for both beginners and professionals. The disadvantages are no music score and that it cannot be connected with piano sound. The use of the specialized application MOOC reduces the time it takes to study a piece of music by 26.92%, and the average score tends to increase.

4 Discussion

The problems of teaching music virtually and online are described by Senior Writer and Editor of Australia's Music Journal (Strahle, 2020). Today, music teachers in Australia actively use Zoom, FaceTime, and other apps as essential digital learning tools. The present study also used the digital learning instrument WeChat. The author insists that "virtual lessons" ensure high results and the continuity of learning. The present study also found that students had good learning outcomes when using WeChat.

Online music education, as well as its advantages and disadvantages have been studied in Greece (Koutsoupidou, 2014). An experiment based on a questionnaire was conducted; the present study used the same tool. The study results showed that the use of digital lessons makes it possible to maintain high sound quality and create a real learning environment. In the present study, 85% of respondents also noted the high quality of sound and image.

Online music education models were considered by a scientist from the USA (Cremata, 2021). The results showed the need to introduce an online learning environment in music training. To ensure the synchronous work of a teacher and a student, the present study also used digital capabilities. The author claims that personal communication, the ability to visualize the process and view the screen are important; the present study also found that 75% of students consider screen sharing to be an important benefit.

The possibilities of audio and video content for co-creation and study of music were considered by American researchers (Riley et al., 2016). They explored the potential of the three technologies used to teach music: LOLA, PolyCom, and Skype. These technologies ensure a synchronous process and are efficient. The study found that LOLA was more effective than PolyCom and Skype; in the present study, MOOC turned out to be more effective than WeChat.

A scientist from Turkey studied the opinions of music teachers about online music lessons during the COVID-19 pandemic (Akarsu, 2021). The study relied on a screening model with a questionnaire. Content analysis showed that most participants in the experiment believe that distance education is not suitable for music lessons, most teachers have difficulty in using digital tools. In the present study, the author considered the opinions of students and got the opposite results: absolutely all students use digital tools, and 98% of students find them easy to use.

Today, modern piano companies and pianists recommend digital apps for piano learning (Sung, 2021). In the present study, 97% of participants found MOOC easy to use and effective; 65% found it suitable for beginners and professionals.

The study of the role of distance learning in the formation of performance competency of rising music teachers was carried out by a Ukrainian researcher

(Zamorotskaya, 2019). The author emphasized that at the present stage of music education development, the use of information and communication technologies in music teaching contributes to its transformation into a highly artistic and high-tech process. The positive aspects are the individual pace of mastering the educational content and more flexible learning, which was also noted by 98% of the participants in the present study experiment.

A team of scientists from the USA studied the possibilities of improving music teaching and learning with the help of an online service (Pike, 2017). The study was based on synchronous online classes and teachers taught students to play the piano for 8 weeks. As a result of the experiment, the students demonstrated music understanding. In the present study, it took students 6.4 weeks to learn the piece of music.

The features of learning to play the piano online were described by an American researcher (Pike, 2020). The author described the need to apply innovative digital technologies in music education, especially when learning to play the piano: interactive websites, online applications, and/or computer software for training, video conferencing, online platforms. In the experiment, a digital piano, the Internet, a computer, and the modern digital platform were used. As a result of the study, it was found that in addition to advantages, online piano lessons also have a disadvantage - the problem of audio/video content lag. In the present study, the disadvantages were a delay and poor audio quality, the inaccessibility to other incoming calls during the conversation, and the difficulty associated with reading the text message received during the video chat.

The influence of social media on learning to play the piano online has been studied by scholars in Indonesia (Setiawan et al., 2021). Students of Lampung University took part in the research. The results of the data analysis showed that the use of social networks in online piano teaching increased the motivation and effectiveness of students, the present study also found a trend towards an increase in learning effectiveness.

Today, piano education is actively developing in the format of online learning, such training expands the possibilities of theoretical knowledge and practical skills of students regardless of place and time while having high efficiency. Many modern scholars are inclined to think about the possibility and necessity of using the online format of piano learning, especially in higher education.

5 Conclusions

The study results show the advantages and disadvantages of the WeChat software and the MOOC application, obtained on the basis of a survey of students. 100% of students said they use WeChat software. According to 100% (328 students) of the respondents, the advantage is free use; 98% (321 students) noted learning flexibility and ease of use; 85% (279 students) reported high quality sound and image; 83% (272 students) appreciated instant messages; 75% (246 students) enjoyed integrated screen sharing during conversation; 65% (213 students) reported call recording; 25% (82 students) enjoyed phone calls and protection of private conversations. According

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The study results indicate the need for further scientific research to study the features of online piano education to modernize the educational process. In the future, it is also planned to consider the relationship between student motivation and the results of learning to play the piano in the online format. Based on the results obtained, it will be possible to make changes to training programs to improve competencies.

Data availability Data will be available on request.

Authors' contributions All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by RunTao Ma and Runchun Ma. The first draft of the manuscript was written by RunTao. All authors read and approved the final manuscript.

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Declarations

Ethics approval This study was conducted in accordance with the concepts of the World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects. The research participants were provided with information on research objectives and methods; all participants agreed to participate in the study and their complete anonymity was ensured.

Consent to participate The survey and the interview were conducted anonymously. Students' and teachers' participation was voluntary.

Consent for publication Not applicable.

Conflicts of interest The authors declare that there are no conflicts of interest related to this article.

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