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Research on Piano Education Based on New Internet Technology

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Abstract: According to the current situation of piano teaching in China, combined with the current theoretical background of educational informatization and intelligent space design, this paper studies the development of piano education and teaching in the Internet era, and finally forms the piano education and teaching system scheme in the Internet era of technology, to provide certain theoretical support for piano education and teaching.The importance of this study is to focus on online learning, especially on how to achieve piano teaching since the COVID-19 pandemic. Analyze the possibilities of using modern digital technology, especially online education platforms and various new devices in online piano education, and evaluate the effectiveness of modern technology in piano teaching. It is very important to develop and use new and innovative educational approaches that can be used for online learning.

Keywords: Piano education, Remote Piano Application, Intelligent Piano

1 Introduction

With the deepening of economic development, people's overall spirit and cultural needs are increasing, and quality education is paid more and more attention. Piano education is an important part of quality education. Today, piano education can also move forward. As the king of Musical Instruments, the piano is widely used in musical learning. Learning the piano can exercise willpower, cultivate intelligence, cultivate emotion.

In traditional piano learning, teachers generally arrange courses for students according to a fixed teaching schedule. Teachers often occupy a dominant position, and the teaching curriculum is mainly dominated by teachers in class. Therefore, in the actual teaching process, it is difficult to arrange the corresponding personalized education for students according to their individual needs and characteristics, but to carry out collective education for students. Even if the education reform attaches great importance to personalized development, emphasize according to the students' different background, characteristics and make appropriate teaching plan, also because of the traditional piano teaching teaching equipment, resources are very limited, so the personalized piano teaching method is difficult to implement, so the piano teaching is still stay in a certain fixed mode.

Today, the development of computer and artificial intelligence has promoted the intelligence of Internet digital technology and various devices, thus providing a material basis and premise for piano education, and making teaching become an intelligent education system. Piano education is actively using smartphones, comput-

ers, smart pianos, tablets, and extended-reality technologies that make it possible to create and improve the practical capabilities of piano players.

Piano education informatization. Literature [1] points out education informatization, emphasizing that the Internet allows teachers and students to obtain unlimited sources of information. Teaching is the central work in the field of education, and teaching informatization is to make teaching means scientific, technology and educational communication informatization, and modernize teaching methods. Education informatization needs to fully apply the modern information technology based on computer, multimedia and network communication in the process of education to promote the educational reform to meet the new requirements of future information. In the field of music education, intelligence and information teaching has become an irresistible trend.

On the one hand, modern digital solutions are being actively introduced into music education. These include video content, large-scale open online courses, various platforms, programs, applications and others [2]. On the other hand, the areas of education and knowledge transfer have shifted to different forms of learning: offline, online, and mixed learning. To convey theoretical knowledge and acquire practical skills, teachers began actively use digital technologies: remote, electronic, digital and mobile learning [3].

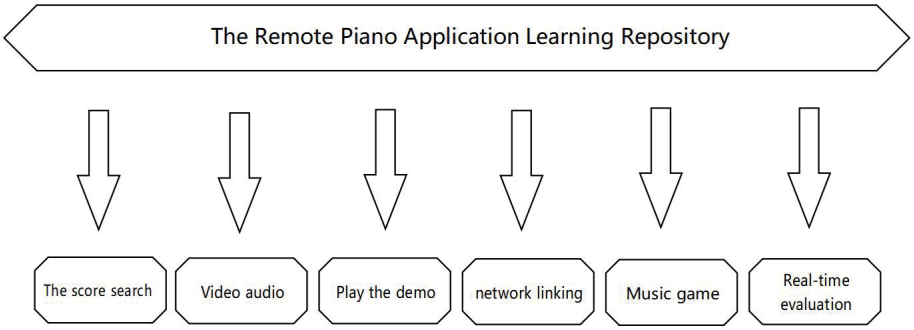
The COVID-19 pandemic has brought changes to the areas of life and activity in every country, more including piano education. Music teaching has embraced serious challenges ranging from technical issues to sound quality. Teachers and students must find new communication and collaboration methods and ways of using [4]. Therefore, online music education needs an intelligent learning space design.

The Intelligent Space Design of Piano Education. Literature [5] proposes an intelligent learning space design for education, emphasizing allowing students to learn from anywhere at any time. In the appropriate environment, teachers guide them in their activities and build on them, encouraging students to ask questions, explore and evaluate their learning abilities, and learn how to learn. In the learning process, students change from passive recipients to active learners, and build their own understanding and knowledge through experience. Combined with piano education, "intelligent learning space design" will make piano education have a more profound impact. With the application of deep Internet multimedia scene sharing technology, it can provide more learning materials and learning channels for piano education. In the teaching process, teachers can make use of a variety of teaching resources, more intuitive, immersive teaching will become vivid and specific meaning, convenient for students to understand and master, can create a lively and happy classroom atmosphere, stimulate students' initiative and creativity, is conducive to solving the difficulties of piano education. In the learning process, students can break through the limitations of time, space and educators through the Internet virtual technology, feel the teaching of the masters, and create and switch between various educational scenes or performance scenes, so as to provide comprehensive resource sharing for piano learning.

At present, some technologies and products about piano education are being actively applied by the society, and in the process of becoming effective educational technology innovation solutions in sustainable development and promotion. For example: Remote piano APP applications, Intelligent Piano, shared piano, and Extended Reality (XR). At present, the first two technologies have developed rapidly and began to be promoted in piano education and teaching.

The Remote Piano Application. In terms of the degree of technology promotion, the most convenient and economical innovation means is the use of two-way interactive remote piano education APP, terminal computer use, or operating a more convenient tablet iPad or smartphone. Currently, these applications are relatively mature, and professional music teachers are hired to provide guidance for platform, specialization, theory, and systematization. With the currently developed cable and 5G wireless networks, China is implementing them nationwide. The above innovative means are simple and convenient to use, the cost gradually reduces, and directly realize the effect of two-way interaction. With technology, we can obtain first-class, timely music education resources, very suitable for universal public use, and can be quickly promoted in some training institutions, parents and adult students.

At present, off-campus online education includes not only online education products such as VIP training partners for real people, but also innovative education products that have opened up AI intelligent training track."VIP," pioneered the "real online one-on-one instrument partner" mode, without offline booking and teacher face to face communication, pioneered the way of the "standardization" teacher quality problems, to standardization, institutionalization, effectively solve the music education resources, education means backward, the shortcomings such as insufficient teachers, has injected new vitality for music education. Literature [6] gives an example of "Little Leaf Intelligent Training Partner", which ranks first in the AI music education industry. Small leaves intelligent practice through AI science and technology, support 24 hours practice, automatically mark the problems existing in the students, put forward professional guidance, objectively reflect the practice effect, accurate positive feedback can also stimulate students practice power, including music search, playing demonstration, practice assistant and real-time evaluation services, concentrated on solving the user in the process of piano practice or self-study many problems. This helps the students to make targeted breakthroughs in the weak links, make the music learning very interesting and efficient, and become a very effective auxiliary method in the daily piano practice.

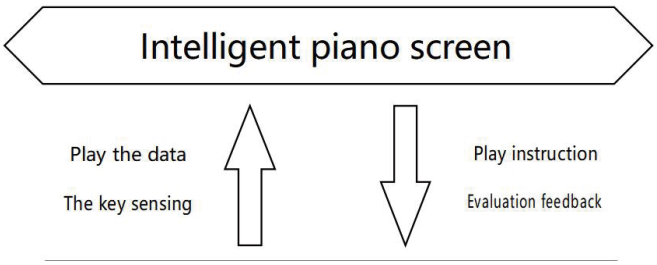


Intelligent piano. Literature [7] describes the intelligent piano retain the music characteristics of the traditional piano, the traditional piano and information technology combination: have real piano structure, timbre and feel, continue the traditional piano wooden string machine structure, with felt wooden hammer and wooden keys, and easy to play patent imitation string mechanism, make playing feel and mechanical piano. Intelligent piano optimizes the education and teaching of traditional piano, realizes the innovation of teaching content and teaching methods, and creates a new situation of piano teaching and learning. At present, the smart piano made by China Easy Play Technology has reached a certain level of science and technology. The biggest feature of this smart piano is the addition of a controllable LCD screen. The front of the piano is a 4K ultra-clear large screen running across the piano. The screen perfectly presents the famous teacher demonstration video

corresponding to the 1:1 size of the real piano keyboard, which can display multi-page music scores on the same screen. Above, there is a 1080P full HD camera that can capture the details of the user playing. The LCD screen has automatic playing system, intelligent learning system, intelligent training system, happy playing system, automatic playing function, artificial intelligence analysis, master course, family karaoke, network piano classroom, distance teaching, people and piano interaction and other functions. The system selects the world's top sound sources, with 246 different instrument timbre and infinite complex number, can completely imitate a huge band playing, bring the ultimate realistic piano timbre.

Literature [8] points out that in the traditional piano teaching mode, smart piano has established a multimedia textbook library for students to collect learning materials, builds an interactive piano teaching platform based on "human-computer interaction"; tracks students 'learning progress in time, classifies the categories and difficulties of learning resources, makes a reasonable and scientific student model according to students' learning level, so as to form intelligent evaluation. Compared with the traditional teaching, this kind of intelligent piano teaching breaks through the traditional piano teaching, solves the shortcomings of the traditional teaching, has great advantages in improving the learning interest and timely tracking and guidance, and realizes a more comprehensive teaching of music theory knowledge, music creation, background and performance skills.

Learners can also make corresponding choices according to their own needs, and both sides can interact. Therefore, Intelligent piano has changed the time-temporal relationship between teachers and students in the teaching process and become a great opportunity for the integration of piano education and information.



2 Literature review

Literature [9] points out that in the past 30 years, with the popularization of piano education in China, the concept of "piano road" has gradually emerged. Today, there is a relationship between learning to play the piano and formal learning, and relationships with a range of motivations. The road to the piano (the possibility of success) depends on continuing learning musical instruments and obtaining beautiful music. Learning to play the piano can compete in society, improve their social status, earn a stable income, have freedom and creativity at work, or enjoy a better life —— piano opens a new path for life satisfaction and success.

Literature [10] believes that, with the development of society, the teaching system should be further optimized, combined with intelligent remote multimedia, improve the curriculum content, promote teachers to improve work efficiency, and optimize the curriculum system.

With the popularity of artificial intelligence technology in the entertainment industry, the traditional entertainment methods have been greatly impacted. For example, intelligent piano is favored by many piano fans because of its integration of artificial intelligence technology, which has also changed the traditional piano teaching mode of [11].

Scientists at Manchester City University in England have conducted online surveys and telephone interviews on music teachers from all parts of the country during their quarantine over the COVID-19 pandemic. Key issues concern funding, equal opportunities, access to music education, hidden personal costs, and other learning challenges to the [12].

In order to synchronize effective learning, improve the assimilation of knowledge, increase motivation, modern digital tools are being widely used, such as Skype, Zoom, face letter make, apple face time, Google party, WhatsApp, etc, can ensure high quality video and audio content, and allow users to record courses, and get fast feedback, at the same time, the preliminary study of "online piano education" in depth [13-15].

The [16] study of the literature shows that the application potential of artificial intelligence in the field of music teaching has not been fully realized due to the different influence of people's level on music cognition. Artificial intelligence can help people analyze complex data and make it logical by integrating data resources. For example, after inputting some basic music theory knowledge into the machine database, the use of artificial intelligence technology to analyze and process the basic knowledge in the database can provide regular guidance for learners.

Literature [17] states that by constantly adding learners' thinking and emotional element words to the machine database, machines can provide intuitive guidance for learners through multi-level thinking. Using artificial intelligence technology, the tunes and notes in music works can generate virtual scenes, so that practitioners can intuitively feel the emotional charm of music, so as to stimulate students' enthusiasm and interest in music. At present, in the teaching process of basic music courses, artificial intelligence can enable students to master basic knowledge and improve their music literacy through basic learning.

Document [18] shows that intelligent piano is not only the integration of new electroacoustic technology, artificial intelligence technology, automatic control technology and network communication technology, but also the product of the development of traditional piano. It effectively solves the traditional piano in education, class time, space and other problems. Therefore, intelligent piano can meet the needs of modern music education. For example, a smart piano can use live video to accompany the piano exercises. Especially for smart piano practice, no appointment in advance. Learners can interact with the tutor through the intelligent piano practice system at any time, and report their daily piano practice to the teacher.

Literature [19-20] points out that multimedia technology is the fusion of modern technologies such as computer technology and information technology. Integrating multimedia technology into teaching is conducive to enriching the teaching content and teaching forms. Multimedia teaching can deepen and optimize the educational process. Deepening is reflected in the content of education, and optimization is reflected in the way of education. With the help of multimedia, the teaching materials and teaching materials can be deepened. At the same time, we can also change the traditional teaching methods with the help of multimedia to realize the

optimization of teaching methods.

3 Research methodology

This study was conducted in higher education institutions for piano training in China, and the research methods and design were jointly developed. The study sample included 20 sophomore students from the School of Music and Performing Arts. The mean age was 20.67 ± 0.63; 60% girls and 40% boys. Sample criteria are music professionalism, the ability to play the piano, knowledge of modern technology, and the ability to use them. One of Mozart's most famous works, The Turkish March, was selected for the study.

Samples were divided into 2 groups:
1.Students studying through the "Remote Piano Application". (10students)
2.Students studying through the "Intelligent Piano". (10students)

To analyze the capabilities of modern piano learning devices (online applications and Intelligent piano), we conducted an online survey with the help of the Kingsoft document form. Students received a link to an online questionnaire with two parts: the first part was the "Remote Piano Application", and the second part was the "Smart Piano". Each section has two open questions: What are the advantages of this smart device? What are the disadvantages of this smart device? The online questionnaire asked the students to answer by themselves. This link can be accessed from any modern device (computer, tablet, or smartphone).

The Remote Piano APP Application		Intelligent Piano	
Advantage	Disadvantage	Advantage	Disadvantage

4 Data analysis

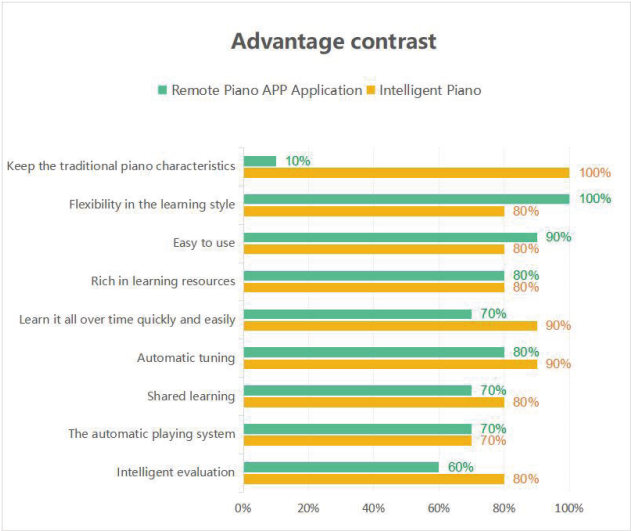
Indicators were calculated using statistical methods and using statistical procedures. To represent the quantitative parameters, the formula (x ± m) is used, where x is the arithmetic mean and m is the error of the mean. The comparison results are considered at 0.05.

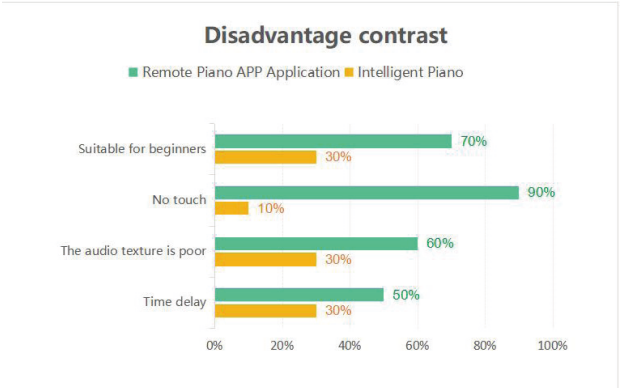
5 Results

When studying the functionality of the "Remote piano applications", According to 100% (10 students) of the respondents, One hundred percent of respondents (10 students) said the advantage was learning flexibility; The 10% (one student) said they had retained the musical characteristics of a traditional piano; Ninety percent (nine students) said they were easy to use; Eighty percent (eight students) say that they can learn quickly and easily; Seventy percent (eight students) indicate rich learning resources; Eighty percent (8 students) like intelligent evaluation; Seventy percent (7 students) like automatic playing systems; Seventy percent (7 students) like shared learning; Sixty percent (six students) like self-tuning. Seventy percent of respondents (7 students)

considered it suitable for beginners; 90 percent (9 students) said the disadvantage was that the "remote piano application" was not tactile; 60 percent (6 students) considered poor audio quality, not related to the sound of the piano; and 50 percent (5 students) considered it a time delay in learning. The results showed that students were basically satisfied with the application of the "remote piano application" in piano learning.

In studying the functions of the "Intelligent piano", According to 100% (10 students) of the respondents, Ten percent of the respondents (10 students) said the advantage was to retain the musical characteristics of the traditional piano; Eighty percent (eight students) of the respondents reported flexibility in their learning style; Ninety percent (nine students) means being easy to use; Eighty percent (eight students) say that they can learn quickly and easily; Ninety percent (nine students) indicate rich learning resources; 80% (8 students) like intelligent evaluation; Eighty percent (eight students) like automatic playing systems; Seventy percent (7 students) like shared learning; Sixty percent (six students) like auto-tuning. Thirty percent of the respondents (three students) thought it was suitable for beginners; and 10 percent (one student) said the disadvantage was that the "Intelligent piano" was not tactile. Thirty percent (three students) said the audio quality was poor during learning and could not be related to the sound of the piano; and 30% (three students) said there was a time delay during learning. The results showed that students were more positive towards smart piano.





Overall, the analysis of indicators obtained through the survey suggests that both types of equipment techniques can be used for piano education. Of course, if these educational platforms are used together, learning

will be more effective because they complement each other.

6 Conclusion

This paper analyzes the relevant theory and application characteristics of piano learning under the new Internet technology, as well as the investigation and research of the new Internet piano teaching model evaluated by piano practitioners. The statistical results show that the new intelligent piano teaching mode has a better effect than the remote piano application mode in the practical operation, which is more conducive to improving the enthusiasm of piano learners, promoting the spatial design of piano education, and building a deep Internet multimedia teaching scene. At the same time, these Internet technologies or equipment have assisted the traditional piano education to a certain extent, accelerated the development of piano education, and changed the traditional piano teaching mode. In the future, further scientific research is needed to study the characteristics of piano education with new Internet technology and equipment to modernize the education process and thus change the education plan to improve the teaching level.

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