Innovative application of the teaching mode of piano impromptu accompaniment course under the perspective of "Internet +"

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Abstract: Spontaneous piano accompaniment is an important skill that students majoring in music education in mainstream universities must master. The core of teaching is whether the future college students can master music courses when they work in primary and secondary schools. With the advent of the knowledge age, the ubiquitous network has given rise to new information technologies such as the Internet of Things, cloud computing and big data, which continue to play a role in higher education. The integration of the concept of "Internet +" into the teaching process of piano impromptu accompaniment course in colleges and universities does not negate the traditional face-to-face teaching, but complements the process of traditional teachers' active teaching and students' passive learning. With the help of powerful information technology and media network, we can integrate the fragmented time and improve the teaching efficiency of impromptu accompaniment subject by making use of its openness and sharing.

Keywords: Piano impromptu accompaniment; course teaching; Internet +

1. The innovative teaching mode of piano impromptu accompaniment in colleges and universities under the concept of "Internet +"

The emergence of the Internet has narrowed the distance between people and the wireless environment, improved human learning performance, and increased the potential of human civilization. Following impromptu piano teaching, colleges and universities build a second classroom based on offline classes and supplemented by online platforms in accordance with the concept of "Internet Plus". "Internet Plus" is an extension of traditional courses, such as the creation of wechat public platform, wechat discussion groups, etc.[1.2] Students can learn online anytime, anywhere, without time, place and region restrictions, to maximize the sharing of teaching. The concept of "Internet Plus" puts forward a new relationship between teachers and students. This resulted in a simple learning model, in which the teacher recorded the main points and questions of each lesson in a video of up to 10 minutes, that is, in the form of small instructions, and used online.[3.4] The videos show students the teacher's teaching concepts and review the lessons, challenging students to learn and digest until they learn. The difference between each student's basic learning ability and basic theoretical knowledge leads to the difference in teachers' understanding of classroom content. After learning the content of each class, the students upload the homework timely according to the homework given by the teacher, and the teacher will leave an idea. This shortens the learning cycle for new content, clarifies teaching objectives, and improves learning outcomes. The basic curriculum should also include lessons in student skills, such as the major and minor scales that must be mastered, arpeggios and chords with three sharps and three flats, individual missing music, correct finger design, songs. Transposition exercises and so on are the basic resources needed to combine social thinking with piano skills. Without basic training, piano improvisation can be confusing and unimaginative. Through the Internet platform, teachers can monitor the progress of students' skills and manage students' learning in a timely manner without having to spend time in class. With the help of the Internet platform, teachers can classify the tracks in the book according to difficulty, repertoire style, nuance, etc. On the one hand, students can learn knowledge independently after class, connect theory with practice, and experience real learning. Teachers should make use of the Internet to "personalized" teaching, meet the students' thoughts and needs, while taking into account the differences in students' abilities, people-oriented, with

knowledge to ensure the transformation of students' knowledge, improve students' skills. With the help of the Internet, the combination of audio, video and text can make piano communication more effective, from passive to encouraging, taking students through external learning. As interest has been rekindled, teachers should gradually develop extra-curricular improvisations and update good examples to online platforms for students to choose and practice. [5.6] To appreciate and compare good works, constantly cultivate students' inner listening ability and external understanding ability, improve their aesthetic feeling and make themselves better. Improvise and finally gain a free and creative attitude.

2. Hardware design of the teaching platform

2.1 Overall structure design of the platform

In the traditional piano accompaniment teaching, the operation stability of the platform is poor, and the execution of the platform teaching management function is not strong for [7.8]. This paper uses the B / S framework (browser / server, browser / server mode) to create an impromptu piano accompaniment, and continuously cooperate with the neural network to build a pop music accompaniment platform model.Based on the above analysis, in terms of the teaching platform construction, this work creates an impromptu piano accompaniment teaching platform (hereinafter referred to as the teaching platform), which adopts the sudden transmission mode to optimize the teaching upload speed.resource. The platform includes accompaniment information management, teaching management and user information management, which serves students to learn impromptu piano accompaniment skills from many aspects. The application of LogicPro software can not only improve the integration of harmony theory and real accompaniment, but also practice listening, maximize the teaching quality of impromptu piano accompaniment teaching, and provide appropriate conditions for students to practice the piano effectively. The teaching platform has greatly improved the teaching level of piano accompaniment. The platform includes three layers of architecture: representation layer, business logic layer, and data access layer. The platform architecture is shown in Figure 1.[8.9]
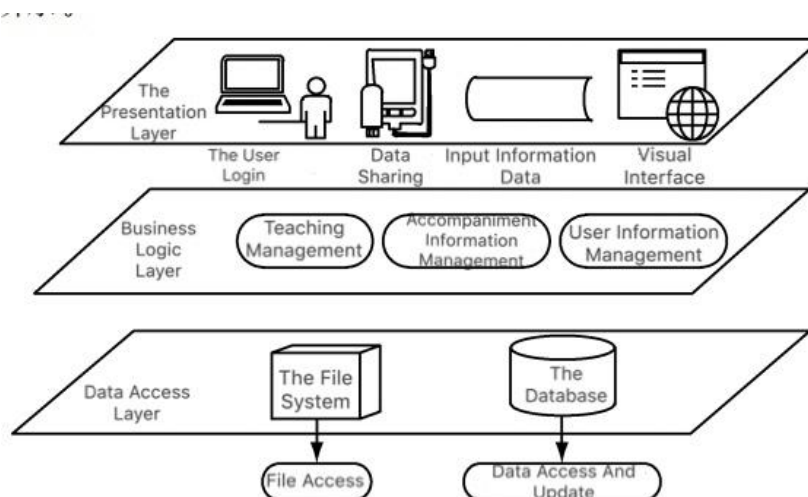

Table 1 System design

The presentation layer is responsible for the functions of the visual interface, allowing users to enter their own information and send it to the background, generating information requests and data sharing. It is the bridge between the user and the platform.

The business logic layer is the key to the entire platform and can perform the management functions of the entire platform. Each function point is encapsulated to form an atomic function point, allowing the presentation layer to mobilize the information required by the user. This layer includes three parts: subsidiary information management part, teaching management part and user

information management part. Among them, the accompaniment information management part can manage piano repertoire, such as adding new accompaniment repertoire information, deleting information, modifying information, requesting certain information and playing repertoire in the process of piano teaching [10]. On the platform, only the teacher has the operation permission to add, delete and change the track information, while the query track is the operation permission item that everyone using the platform has. The teaching management plate is an important part of the platform. After the user clicks the platform to enter the teaching management page, the corresponding course management will be carried out. Each section also includes different capabilities. The user information management dashboard manages users on the platform in a unified manner to perform O&M tasks on the platform. Only after you log in as a platform administrator, you can click the user management page on the main page of the platform to complete user management, such as adding users, selecting specific users, and changing permissions.

The data access layer is the entry point to access files and databases and can be invoked by the business logic layer to perform the query, insert, update and delete data table functions of the impromptu piano feature

2.2 Network topology of the platform application

The network construction of piano impromptu accompaniment platform covers two aspects: the construction of campus LAN and the construction of gWAN for teachers and students outside the campus, as shown in Figure 2
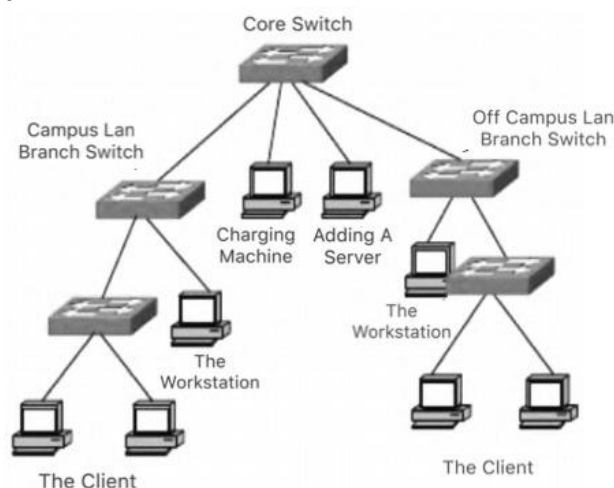

Table 2 Schematic diagram of the platform topology

In the local network, access to the piano improvisational accompaniment platform, can supplement piano lessons, inquire and play teaching repertoire and personnel management. Teachers and students can access the online platform for real-time assignment submission, download links, live chats, and more. At the same time, off-campus teachers and students can access the platform through the network to complete the access tasks in the same way as school users.Software development training platform based on Logic Pro.Logic Pro software, as a professional music software independently developed by Apple, must consider the relationship between the data transmission speed of the two software when integrated into the design of the training platform. In order to ensure the timely and reliable delivery of platform instructions, LogicPro software was introduced to create an optimization model, and the value of piano-related equipment was downloaded as transmission.

2.3 Optimize channel transmission with Shannon theor

Assuming α (t) is the transmitted signal in the platform, H(t) is the impact response function of the platform, N (t) represents the Gaussian noise signal with mean value 0 and variance 1, the received signal of the platform is denoted as:

$$y(t) = h(t)x(t) + n(t)$$

The platform channel capacity is

$$C = \lg(1 + \rho v)$$

Where, V represents the mean signal power in the transmission period, and P is the channel gain.

If the resource uploader can accurately obtain the quantization value of P, the platform will divide P into K quantization levels and define the quantity range as Qi. Set S successively;v is the effective transmission time and power of quantization range I, then the mean value of transmission rate is expressed as

$$E_{[P]} = \sum_{i=1}^{K} S_i \lg(1 + \rho v_i)$$

2.4 Balance the power distribution

The optimization of the upload rate of piano improvisational accompaniment resources includes two parts: short-term power constraint and long-term power constraint [10.11]. In the short-term power constraint, if it is in the period T, the total power is P_0. the power loss P P_0. , the constraints are transformed into:

$$s_i(v_i + \sigma) = P_c \forall i \in \{1, 2, ..., K\}$$

In order to get the best set P; , calculate the partial derivative of $E_{[P]} To \rho_i$, and set the derivative to 0 to determine the best value of F(PI +1) :

$$F_{(\rho_{i+1})} = F_{(\rho_i)} +$$

$$\frac{f(\rho_i)[s_i \lg(1 + v_i \rho_i) - s_{i-1} \lg(1 + v_{i-1} \rho_{i-1})]}{\frac{\partial s_i}{\partial \rho_i} \lg(1 + v_i \rho_i) + s_i \frac{\partial}{\partial \rho_i} \lg(1 + v_i \rho_i)}$$

Long term performance limits should be clearly defined. V Ignoring the performance constraints, the long-term performance constraints are transformed into two local optimization problems. Assuming that v in a given arbitrary set, find a locally optimal quantized boundary set O.The local optimal power distribution value of V is obtained by using the water injection method . From the boundary set PI. On the premise of considering the computing power, the alternative minimization method is adopted to clarify the resource input power meter and calculation scheme under the computing power constraint.

The energy consumption of the global resource transfer cycle is limited, and only the average power limit is required to meet the conditions. If, for a certain part of the quantization range, the dissipated power is higher than the forced power P, the following formula is obtained:

$$\sum_{i=1}^{K} (s_i P_i) \le P_c$$

$$P_i = \begin{cases} s_i(v_i + \sigma), v_i > 0 \\ 0, v_i = 0 \end{cases}$$

3. Simulation Experiment

In order to verify the practicability of the platform, the function and performance of the platform are simulated respectively.

3.1 Platform operation stability test

The stability of the designed platform is verified by different functional tests, which is to verify the platform function by using test cases. Taking accompaniment information management and teaching management as an example, the function test is carried out on the two sections. The results are shown in Table 1 and Table 2.

Serial number	Test item	Test method	The results of
1	Upload accompaniment information	Select tracks to upload attachments	Through
2	Modifying accompaniment Information	After modifying a certain information, check whether the modified information can be saved	Through
3	Deleting accompaniment information	Check whether the accompaniment can be deleted accurately	Through
4	Play an accompaniment	Can play music quickly	Through

Table 1   Accompaniment information management function test table

Serial number	Test item	Test method	The results of
1	The courseware management	Can find the required courseware correctly	Through
2	User management	Whether the number of users can be queried effectively	Through
3	Job management	Can you use keywords to browse jobs	Through
4	Online interactive	Can use this function to complete the online topic solution	Through

Table 2 Teaching management module function test table

Through functional testing can see table 1 and table 2, the platform function of data operation process, the client has relatively complete check action, not through the server, the client can complete reliable information categories calibration, prevent dirty data input, to ensure the quality of teaching resources platform, and a complete impromptu piano accompaniment in the input information, can be quickly saved to the database, and test If desired goals are met.

3.2 Platform response time test

Loadrunner 9.5 was used to complete the performance simulation experiment, and the platform response time and throughput were tested by using 300 concurrent virtual users to query at the same time. The simulation results of platform response time are shown in FIG. 3.
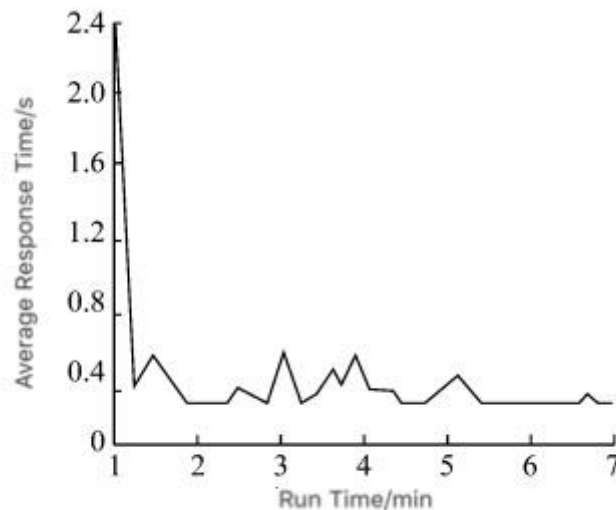
Figure 3 results show

It can be seen from FIG.3 that under the condition of 300 concurrent virtual users, the average response time of the platform is 0.384 s, the highest response time is 2.354 s, and the lowest response time is 0 301 s. Usually, when 300 concurrent users visit the platform, it can meet the design goal within 5 s. However, the platform in this paper can meet the performance requirements within 1 s, which shows the superiority of the platform in practical application.

3.3 Throughput Testing

The platform throughput simulation results are shown in FIG. 4.
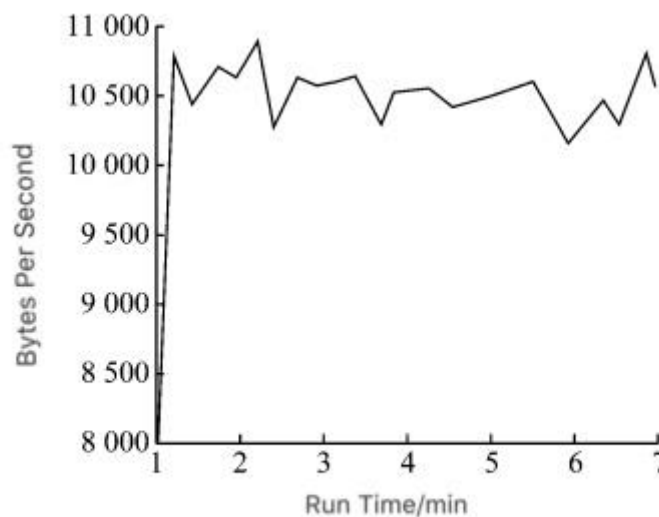
Figure 4 Results

As can be seen from Figure 4, with 300 simultaneous users, the throughput is 10,896,542 bytes/SEC at the highest and 8023 bytes/SEC at the lowest. The conclusion is that satisfying the platform requirements can make the piano impromptu accompaniment teaching platform more effective.

4. Conclusion

"Internet Plus" will not replace traditional education, but will bring new emphasis to it. If the teaching idea of colleges and universities cannot keep pace with The Times and renew the teaching idea, the teaching and impromptu teaching will inevitably develop slowly and disconnect from the truth. As higher education teachers, we must always think about how to approach the power of the Internet, change the original way of thinking about education, use various network platforms to help us learn by ourselves and increase teaching. Following the special period, improve the students' piano ability together with the discussion, and promote the innovation and development of deep stereo piano accompaniment learning.

Ackonwledegment

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