

The Construction and Implementation Strategies of an Internet-based Music Education Platform

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Abstract: *This paper focuses on the application and development of “human-computer interaction” (HCI) in online education by briefly outlining the concept of human-computer interaction mode and the development of human-computer interaction technology. According to analysis, from 2010 to 2020, the total revenue of the global digital music industry will first decline and then increase, with the total revenue of the global digital music industry reaching US\$21.5 billion in 2020, an increase of 7.7% year-on-year. The role of the HCI model in music education is discussed. A new portfolio of HCI online music applications is proposed and existing HCI online music teaching software is analysed. This is followed by a study of 'Little leaf Music Education' using HCI as an entry point. A participatory action research approach was used to develop a HCI course rating scale. A survey method was used to conduct the study and 66.67% of the 12 individuals surveyed attended the sessions. The four students who were not fully enrolled had an attendance rate of 60% or more. This demonstrates that the students were not resistant to the HCI 'Little Leaf Music Education'. Subsequent research into after-school work revealed that students' offline work submission rates under the HCI system were as high as 90%. Assignment pass rates were as high as 90%. Finally, a mock exam found that 75% of students scored well on the exams. In addition, the HCI classroom satisfaction and teacher satisfaction surveys found that the overall satisfaction rate for both was 100%. The HCI model has enriched the possibilities of hands-on music teaching activities and has effectively guided the development of students' imagination and creativity. This also provides strong data to support and guide the future use and development of HCI in online education.*

Keywords: Human-computer interaction" model, music education, curriculum and teaching objectives, teaching platform, multimedia teaching system

1. Introduction

In an era when internet technology is highly developed and reunited with art, information science and technology, which is highly interpenetrated and influenced by human, machine and environment, has brought a new teaching mode to traditional music education and social music education, namely the "human-computer interaction" mode. In the process of deepening the education model, the music education of students has also gradually been strengthened and managed, and a reasonable and standardised education model can effectively promote the development of cognitive ability, perceptual ability and physical and mental health of students (Li, 2020). It can play a good role in their growth process.

Music education has benefited from the advancement of the Internet, which has enabled the development of a 'human-computer interaction' model for music education. However, in the process of developing music software for education, it should be fun, simple and easy to use. A 'human-computer interaction' model of education should be established that is in line with the psychological characteristics of students. Only in this way can students' perception and imagination be fully stimulated.

In music education, the research and development of HCI software has started relatively early, and there is now a wealth of relatively mature HCI teaching models. The global market is huge. According to IFPI data (Seago, 2013), the total revenue of the global digital music industry from 2010 to 2020 has shown a trend of first decline and then increase. In the past two years, the total revenue of global digital music has been increasing year by year. In 2020, the total revenue of the global digital music industry will be 21.5 billion USD, a year-on-year increase of 7.7%, as shown in Figure 1.

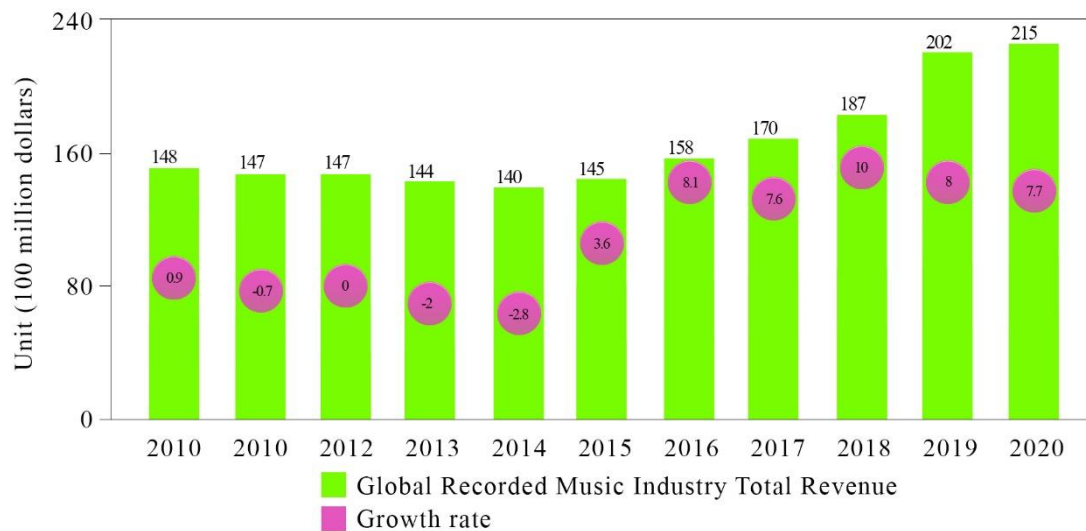


Figure 1: 2010-2020 total revenue of the global digital music industry

From a functional point of view, existing music education software can be roughly divided into several categories: music education software for basic knowledge, piano training software, listening and ear training software, song flash and so on (Pizarro, 2022). Nowadays there are music online education platforms such as MOOC, EduSoho, Adele Music and so on. "Little leaf music education" are very famous app in online music MOOC, as shown in Figure 2.

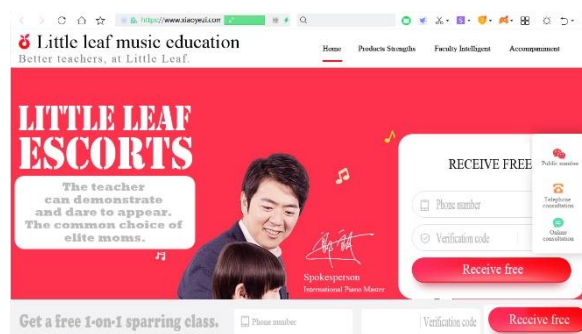


Figure 2: Registration page of Little leaf music education

Influenced by COVID-19, most regions of the country can not normally carry out music course teaching. Influenced by this, online music courses continue to grow. However, with the

increasing number of users, the boredom and inflexibility of online music education courses are gradually reflected. This is also an urgent problem for online education at this stage.

The "Human-computer Interaction" management mode (HCI) is proposed to solve the boredom and instability of online music courses. In music education, the integration of 'human-computer interaction' technology with the subject of music can optimise the quality of teaching and learning in the curriculum (Li, 2016). It also enables the sharing of teaching resources and improves the mastery of student learning. Music education is a good way to promote the development of music quality and musical aesthetics. It can help students to build good cognitive and perceptual skills. The student-centred form of human-computer interaction is flexible and varied. Interaction is rich. The amount of information communicated is high. Communication is timely and efficient. "Human-computer interaction" should make full use of the different cognitive potential of humans and machines for each other, as shown in Figure 3.

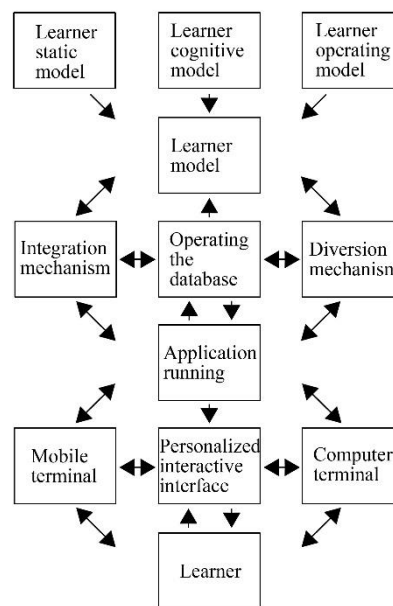


Figure 3: Learner-centered interactive system model

Firstly, static, cognitive and operational mods are built from the learner's perspective to align them with the service student modules. The student feedback data is then fed into the central database through an integration and transfer mechanism. This is initially analysed by the central database. Instructions are then given to the application runtime mechanism via the integration mechanism, the transfer mechanism and the operating system. The final output is provided to students and teachers via the mobile module, computerised module and personalisation port. This article starts from "Little leaf music education" to study the help of "human-computer interaction" online music education.

2. Research Background and Methods

2.1 The context of human-computer interaction

Human-Computer Interaction (HCI), in a narrow sense, is the study of human-computer interaction and information sharing through interaction technologies. In a narrow sense, HCI is the study of the science and technology of human-computer interaction and the interaction between them. The human and the computer use the user interface set up by the system as a medium of communication, passing and exchanging information through the user interface to

exchange information. In simple terms, "human-computer interaction" refers to the process of exchanging information between a human and a computer in a certain way, using some kind of conversational language, in order to complete a defined task (Oppenheim, 1994).

At the beginning of the 20th century, Human-Computer Interaction (HCI) emerged as a separate science and technology. The earliest research on HCI through modern scientific means was carried out by F.W. Taylor and Gilbreth, who used HCI to solve the problems of loading and unloading goods in industrial production and in the construction industry, as shown in Figure 4.

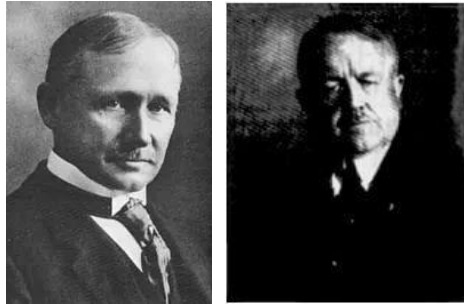


Figure 4: F.W. Taylor and Gilbreth

In 1946, the world's first computer was developed at the University of Pennsylvania, signalling the birth of the 'human-computer interaction' paradigm (Wu, 2016, May). This was followed by the introduction of the mouse in 1964, which brought us into the age of the personal computer, and the increased number of users, which accelerated the development of interaction technology. In May 1965, the first technical conference on "human-computer interaction" was held in the United States, and in 1973 Martin published *The Design of Man-Computer Dialogues*, which brought the issue of human-computer interfaces to the attention of industry. *The Design of Man-Computer Dialogues* In the 1970s, new research and application directions for computer programs were introduced: the proposal of overlapping multi-window and object programming, which pointed the way to modern computer operating systems. In 1989, the world entered the information age and research on 'human-computer interaction' began to emerge.

2.1.1 Interactivity

"Interactivity" is mainly about the user manipulating the virtual environment through an interactive interface, and receiving feedback from the virtual environment. This kind of immersive "interactivity" is mainly in the form of "visual interaction" and "behavioural interaction". (Erkunt, 2001).

"Visual interaction" refers to the interaction between the user visually and the images presented by the interactive device. This means that the interactive device can follow the user's physical actions and changes in vision, and present new images in real time corresponding to the interactive interface. "Behavioural interaction" refers to the behaviour emanating from the user themselves, such as the touching of buttons in the interactive device, changes in body behaviour, etc. By interacting with objects in the virtual space created by the interactive device. During this time, the interactive device captures data about the interactive behaviour and analyses the data transmitted by the system, enabling feedback to be passed directly to the control device in real time, thus giving the user a realistic experience of touching objects in the interactive device.

2.1.2 Immersion

Through the interactive device, users can experience a sense of immersion and spatio-temporality in the "human-computer interaction" mode. The "immersion" experienced by users is mainly due to the use of interactive devices, which allow for multiple views in a virtual environment. The ideal 'human-computer interaction' model creates the best contextual effect by using the 3D modelling function in the interactive system, which allows for the three-dimensional processing of graphics, text, music and other related information, bringing the user a variety of three-dimensional cross-perception functional experiences. Secondly, autonomy means that in a 'human-computer interaction' mode environment, the user touches an interactive device or an object in the interactive space and the system provides the user with real-time feedback on the object based on the information. In real life, we cannot exist in two different spaces and times at the same time, but through the immersive experience of interactive devices, we can feel the beauty of nature indoors, or talk to our favourite animals in specific scenes through interactive devices, as if we were there, realising the sense of three-dimensional interaction between people and space. (Gu, & Li, 2020).

2.2 The implementation mode of "human-computer interaction" equipment in and music education

2.2.1 Multi-channel human-machine interaction interface

The main teaching devices that can be used effectively in the music classroom are: multimedia (e.g. interactive whiteboards) and intelligent musical instruments (e.g. intelligent pianos, intelligent drums). Interactive whiteboards are more commonly used in schools, schools and universities, while smart musical instruments are more widely used in social education institutions. In the "human-computer interaction" model of music teaching, emphasis is placed on the study of students' learning process, learning resources and how to develop students' potential, emphasising the student as the main body, mobilising students' eyes, ears, mouth, hands, brain and other functional organs, guiding students to take the initiative to learn and stimulating their creative thinking, as shown in Figure 5. (Fan, & Zhong, 2022).

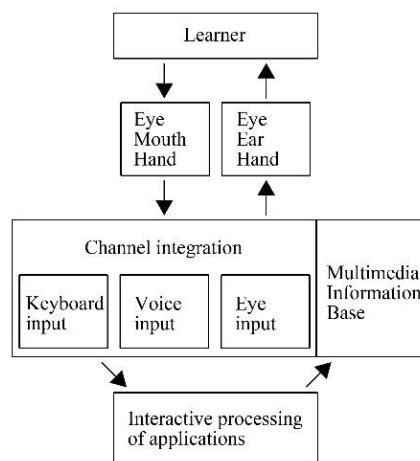


Figure 5: Multi-channel human-machine interaction interface

2.2.1 Teacher-machine-student interaction

The music education in the "human-computer interaction" mode is a new teaching mode that combines "human-computer interaction" technology with the subject of music education [28]. In the course of implementing the curriculum, teachers create instructions for interactive devices or create teaching situations through the interactive device system, expanding the traditional "teacher-student" teaching model into a "teacher-machine -The teacher creates

instructions for the interactive device or creates teaching situations through the interactive device system, as shown in Figure 6. (Rapp, 2020).

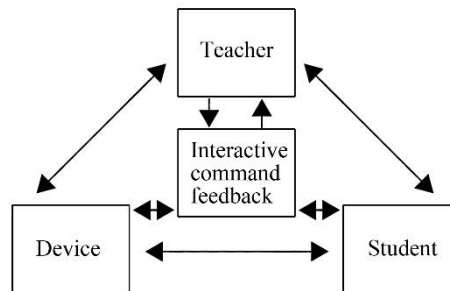


Figure 6: Teacher-machine-student interaction

2.2.3 Human-computer interaction course system

On the other hand, the teaching and learning process focuses on the ideas of the students. The interactive integration of diverse and personalised teaching content. Teachers guide students in their teaching activities, giving full play to their independent learning initiatives and stimulating their creativity. Its ultimate aim is the positive development and overall improvement of students' quality. We have proposed a general design for the HCI course, as shown in Figure 7. (Fan, & Zhong, 2022).

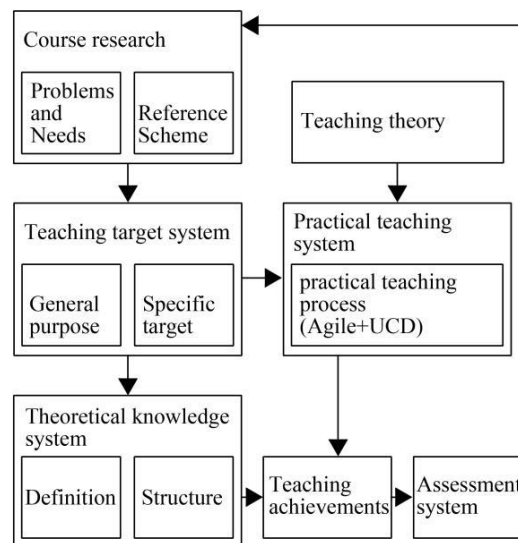


Figure 7: Human-computer interaction course system

2.3 Sampling survey method

Students are randomly selected from several online music education software without any grouping, categorization, queuing and so on. The characteristics are: the probability of each sample unit being drawn is equal, each unit of the sample is completely independent, and there is no certain correlation and exclusion between each other. Simple random sampling is the basis of other forms of sampling. This approach is usually used only when the degree of variation between the total units is small and the number of units is small .

Through the "Little leaf Music Education" Internet teaching platform online music education software from the sample survey of students. Get students' comments on the management, teaching and convenience of each online music education. Understand the existing online music education management forms and shortcomings.

2.4 Participative action research

Participatory Action Research (PAR) is the most prominent methodology applied in development communication research in recent decades. Its core concept is to identify problems, diagnose obstacles, seek solutions and achieve solutions by empowering members of society and pooling the knowledge of all participants. On the other hand, in the natural sciences, participatory action research is still a novelty, as its research objects are mainly objective laws. (Melnik, 2019).

In this study, researchers will participate in online piano teaching and the Internet teaching platform "Lobular Music Education". According to the goals set by the researchers.

3. Results and Discussion

3.1 Analysis of music education experience under the "human-computer interaction" model

The application "Little leaf Music Education", which uses HCI, was selected for the teacher-student satisfaction survey. Teacher ratings were 60% students' ratings were 40%. The survey consisted of student attendance, classroom summary assignments and exam scores and student satisfaction with the course schedule, and satisfaction with the quality of the teacher's teaching. The former of these was assessed by the teacher and the latter by the students. The specific scoring percentages and criteria for the full ten point scale are shown in Table 1.

Table 1: HCI System Curriculum Assessment criteria

Raters	Course	Content	Proportion (%)
Teachers	Attend class	Attendance	10
	Theoretical knowledge	After-class assignments	20
	Examination	Take an exam	30
Students	Course System	Course System Satisfaction	20
	Quality of teaching	Teacher satisfaction	20

3.1.1 Attendance

From Table 2 and Table 3 data of 12 students in the online Music Education software "Little leaf Music Education" are sampled. Students range in age from 5 to 14. Their pianos are between one and five years old. 41.6% of the students have one year of piano age. 16.7% of the students are at the piano age of 4 to 5.

Table 2: The number of students attending classes through the app in one month in 2021

Name	Piano Age	Age	June															
			6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Student 1	2	7																
Student 2	1	9																
Student 3	1	8																
Student 4	1	10																
Student 5	1	14																
Student 6	3	12																
Student 7	3	13																
Student 8	5	9																
Student 9	2	5	2								2							2
Student 10	3	10																

Student 11	1	11														
Student 12	4	10														

Note: Yellow highlight part denotes class space. If there is a 2 in the yellow box, it means that there are two lessons at a time.

Table 3. The number of students attending classes through the app in one month in 2021

Name	Piano Age	Age	June														
			21	22	23	24	25	26	27	28	29	30	1	2	3	4	5
Student 1	2	7															
Student 2	1	9															
Student 3	1	8															
Student 4	1	10							2								
Student 5	1	14															
Student 6	3	12															
Student 7	3	13															
Student 8	5	9															
Student 9	2	5							2							2	
Student 10	3	10															
Student 11	1	11															
Student 12	4	10															

Note: Yellow highlight part denotes class space. If there is a 2 in the yellow box, it means that there are two lessons at a time.

Attendance is calculated for a minimum of 8 lessons a month, with full marks being awarded for exceeding and reaching 8 lessons. Students who do not reach 8 lessons are given a percentage of points based on “lessons attended ÷ 8 × 10”. According to the statistics, only 4 students did not reach 8 lessons and were not awarded full marks. The remaining eight received full marks in attendance. Five of them were well over 8 lessons in attendance. Of the 12 people surveyed, a full attendance rate of 66.67% was recorded, and the four students who did not have a full attendance rate were all above 60%. This shows that students do not reject HCI online music education courses. (Karpov, & Yusupov, 2018).

3.1.2 After-class assignments

Each student's work was counted and judged according to the HCI System Curriculum Assessment criteria and categorized into three grades: excellent blue, average green and poor red. The statistics are shown in Table 4 and Table 5. Blue represents a score of 7-10, green represents a score of 4-6 and red represents a score of 1-3.

Table 4: HCI online music homework response statistics

Name	Piano Age	Age	After-class assignments (June)																
			6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
Student 1	2	7		7								8							
Student 2	1	9				8					6					4			
Student 3	1	8				7				4			4			3			
Student 4	1	10				4				6				4			5		
Student 5	1	14				3			4					3	5				
Student 6	3	12				5			6		8	6				6			
Student 7	3	13		8				6						8					
Student 8	5	9		6	8			6	9	6		10	8	6		8	6	10	

Student 9	2	5		9						6						
Student10	3	10					6	8					6	9		
Student11	1	11				5				5				3		
Student12	4	10			8		9				10				10	

Note: Judged on three levels excellent blue, average green, poor red

Table 5: HCI online music homework response statistics

Name	Piano Age	Age	After-class assignments (June)														
			21	22	23	24	25	26	27	28	29	30	1	2	3	4	5
Student 1	2	7	6								5						9
Student 2	1	9					6								3	6	
Student 3	1	8	7			6			5			5			3	5	
Student 4	1	10				6			7								
Student 5	1	14			5		6					7		5			
Student 6	3	12	9			6	8		7			7		6	7		
Student 7	3	13					7			7			6				7
Student 8	5	9	7		8		7		10	10	8		6	6	7		
Student 9	2	5	6							7							6
Student10	3	10			6	8					6	7					7
Student11	1	11					5					6					7
Student12	4	10			8				5				8				9

Note: Judged on three levels excellent blue, average green, poor red

The survey of “Little leaf Music Education” students in the 4-5 piano age group showed a high level of proficiency in completing after-school assignments. The rate of guaranteed uploads of work managed by HCI is high, with 45.10% of the work being excellent. This data also indicates that the HCI course support is conducive to the development of online music teaching. (Melnik, 2019).

3.1.3 Mock Proficiency Examination

The quality of HCI online music education is not only assessed through daily performance and completion of assignments but also through mock exams and music examinations. Daily performance and post-class assignments have a certain direction, i.e. students may practice a piece of music for a long time before they play it to achieve a certain level of proficiency, which makes it difficult to highlight the advantages of online music teaching at HCI. This is where the mock exams can show the full benefits of HCI online music tuition. The score is Basic + Exercises + Polyphony + Music + Music Theory + Listening. Of these, 35% are basic skills, 25% are music theory and the rest are 10%. The specific formula (on a ten point scale) is basic technique x 35% + music theory x 25% + exercises x 10% + polyphony x 10% + music x 10% + listening x 10%. The specific figures are shown in Table 6.

Table 6: HCI online music daily mock test scores

Name	Piano Age	Age	Examination results (simulation)
Student 1	2	7	5.5
Student 2	1	9	6.5
Student 3	1	8	7.0
Student 4	1	10	6.5
Student 5	1	14	5.5
Student 6	3	12	9.5

Student 7	3	13	9.0
Student 8	5	9	9.5
Student 9	2	5	7.0
Student10	3	10	8.5
Student11	1	11	4.5
Student12	4	10	8.5

Note: Ten points out of ten

Based on HCI online music teaching practice exam data. Out of these 12 people reaching and exceeding the passing mark by six points represent 75% of the total. Three of these scores were above the 9 mark and reached distinction, accounting for 25% of the total. The mock exams are evidence that online music teaching under the HCI system is more conducive to home learning for students in unexpected situations and home music education for teachers.

3.1.3 Students' attitudes towards HCI online music teaching courses and teachers

In the student satisfaction statistics from satisfaction with teachers and satisfaction with HCI courses. (on a ten point scale) 8-10 is excellent, 5-7 is fair and 1-4 is poor. The survey showed that the Course System Satisfaction rate was 66.67% excellent, 33.33% fair and 0% poor. The excellent rate of 100% in the Teacher satisfaction survey is an indirect proof that teachers can communicate better with their students under the HCI system. The teachers' choice of student-approved teaching methods brings teachers and students closer to each other. This also increases the efficiency of teaching and learning. This is shown in Figure 10. (Rautaray, & Agrawal, 2015).

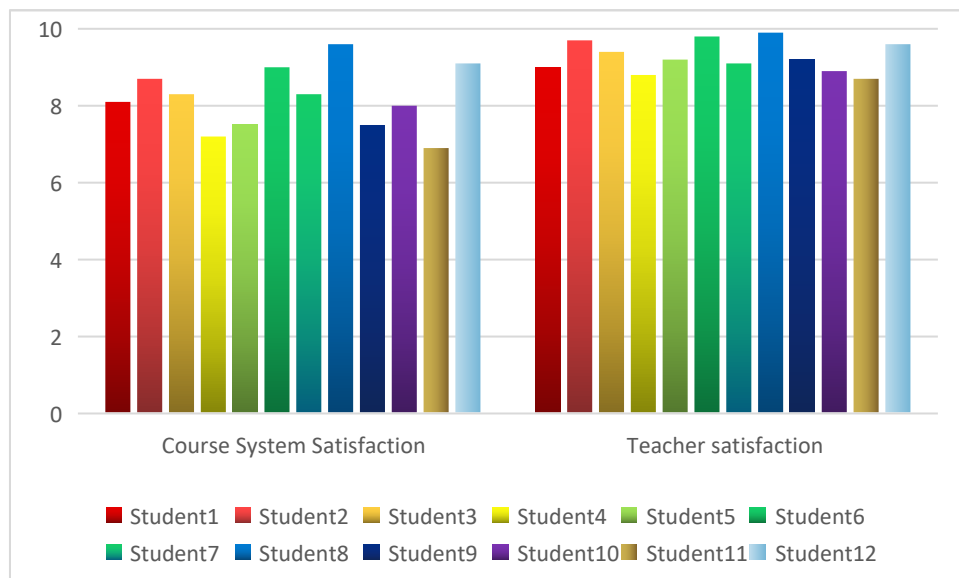


Figure 10: Statistical chart of student satisfaction with the classroom and teacher satisfaction

4. Advantages and Disadvantages of Music Education Under "Human-computer interaction" Mode

HCI devices involved in online classroom teaching can expand online teacher preparation resources, enrich teaching course content and improve teaching efficiency. It can also expand the quality of education, effectively motivate students to learn and enrich the acquisition of knowledge. The "human-computer interaction" model provides a new teaching mode for

traditional music education students, but it cannot completely replace traditional teaching methods in the specific teaching practice process. This is evident in 3.2.2 After-class assignments, where daily assignments are submitted. Nearly 90% of the students who did not have class the next day had sufficient time to record and submit their music assignments, which resulted in good grades for their after-class assignments. Less than 10% of the students who had class the next day clearly had some problems with their work in class. These problems were not evident in the work of the students who did not have class time, which also suggests that the work submitted by the students who did not have class time the next day was suspect of revision. So, there are still problems with the HCI online music model. To address the shortcomings of the HCI model in music education, I have analysed and summarised the data in the context of the HCI experience questionnaire in music education. (Antle, Corness, & Droumeva, 2009).

4.1 Optimising music education pathways

4.1.1 Expanding the quality education pathway

The use of "human-computer interaction" equipment plays a multi-level complementary role in teachers' choice of teaching resources, students' teaching content and learning activities, and provides a good way for students' music quality education. From the course management evaluation of HCI online Education "Little leaf Music Education", students' recognition of HCI online music expansion can be seen. According to the survey, 100% students agree with HCI course management. 66.67% of the students expressed special recognition. This also fully proves that the application of HCI equipment online music education expands the quality education path.

4.1.2 Alleviate the tedium of traditional music learning

In the efficient integration of 'human-computer interaction' technology with music education, teachers should try to avoid 'technology-only' music education activities. The application of 'HCI' technology to music classroom teaching provides new ways and means for teachers to access teaching resources and students to acquire knowledge. This also reduces the sense of tedium in the music classroom for students. In addition, the students' ability to compose and imagine musical material will be effectively enhanced. The interactive "game-like" teaching will reduce the boredom of learning and at the same time enhance the cooperation among students and stimulate their competitiveness in learning. According to the survey, 100% of the respondents recognized the education level and teaching style of the teachers in HCI online music teaching. The average score of the 12 respondents was 9 out of 10. This also proves that HCI online music teaching is popular among students, which can alleviate the monotony of traditional music learning. (Melnik, 2019).

4.2 Shortcomings of music education in the "human-computer interaction" mode

In a good interactive course, the interactive devices present rich learning images, which can reduce the fear of learning new knowledge, alleviate the feeling of dullness in learning and enhance the sense of participation in learning practice. However, during the specific teaching observation and practice activities, questionnaire analysis and interviews with frontline teachers, it was found that there are some practical problems that need to be solved in the "human-computer interaction" mode of music education activities.

4.2.1 Students' over-reliance on interactive devices

In the process of music classroom observation and learning for students, it was found that the richness of the images in the interactive devices allowed students to quickly enter the learning situation. During the interactive games, the students were easily immersed in the "games" and

neglected their knowledge in the classroom. This ultimately leads to low scores in the knowledge assessment session, which in turn reduces the motivation of students. From the homework survey, it can be found that the homework of the piano age respondents in 1-2 years is mostly at an intermediate level of 4-6, accounting for up to 80%. They rise after being reprimanded by teachers and then fall back to average. What's more, the homework is only a low level of 3. For the students who have been prompted to play by interactive devices, corresponding rectification should be made to the entertainment teaching links in HCI.

4.2.2 Lack of appropriate use

The interactive device terminal system provides a wealth of teaching resources. However, this can easily lead to teachers ignoring the teaching tips in the syllabus and making unreasonable choices about teaching resources, which can easily lead to deviations from the teaching objectives. In the teaching process, teachers who rely excessively on, or lack a scientific method of using, teaching interactive devices are apt to form a single teaching mode again. Even though students are attracted by the rich teaching images in the classroom, the single teaching mode tends to limit the development of the cognitive, creative and perceptual abilities of students. (Melnik, 2019).

5. Research Limitations and Recommendations for the Future

5.1 It is difficult to obtain data on music education.

There are many well-known data analysis companies in the world. For example Gesellschaft für Konsumforschung (GfK), BLOOMBERG PROFESSIONAL(R), McKinsey American, IMS Health, Synovate, Ipsos, Nielsen, etc. However, not many companies use music education data as a survey subject. Access to music industry data has become very difficult.

5.2 Access to data is limited by time

Access to music industry market data is limited by time. Often, data from the previous year will be released in the next year. Sometimes data needs to be released every 2 or 3 years. This is because access to the most up-to-date music industry market data becomes invaluable.

5.3 Limitations of the HCI model

The "human-computer interaction" model is a supplementary teaching tool that cannot replace traditional teaching tools. When students are dependent on interactive devices, the lack of communication between teachers and students can easily create a sense of distance between teachers and students. A music classroom that lacks teacher-student communication can reduce the interest of students in learning music and hinder the development of cognitive skills. For difficult points, the teacher needs to explain, guide and demonstrate them, which cannot be replaced by the 'human-computer interaction' mode of teaching.

5.4 Suggestions for the study

In the process of teaching, the speed of real-time updating of teaching resources by the terminal system of the interactive device as an auxiliary music teaching tool, whether it can meet the speed of teachers' demand for teaching resources, and whether the interaction between students and the interactive device can meet the target requirements of teaching activities. In the music teaching activities of students under the "human-computer interaction" mode, the three-dimensional and diverse interactive teaching and learning methods of "teacher-computer-student" can grasp the relationship between teacher-led and student-led; can teachers grasp the relationship between teachers and students? The relationship between teacher-led and student-led teaching and learning methods, and whether teachers can use interactive devices

scientifically and reasonably for teaching, are issues that still need to be considered and improved.

6. Conclusion

This paper takes HCI as an entry point and uses the HCI “Little Leaf Music Education” application as an object of study. It examines the impact of HCI on students in online music courses. The study summarises the positive effects of the HCI model on students' music learning, as well as the strengths and weaknesses of the development of music education in this educational model. A new portfolio of HCI online music applications is proposed and then analysed against the existing HCI online music teaching software “Little Leaf Music Education”.

The study begins with an explanation of the system components and application scope associated with HCI systems. The HCI "little Music Education" was investigated and participated in the course by using the participate action research method, and the HCI curriculum rating table was formed. This further set the direction of the research and provided experimental data for the experiment.

The survey method was used to collect student participation in HCI online courses from the student side. Monthly course volumes were obtained from which student motivation to attend classes was analysed. According to the study it was found that 66.67% of the twelve people surveyed had full attendance. Of the four students who were not fully enrolled, the attendance rate was above 60%. This demonstrates that students are not resistant to HCI "Little leaf Music Education".

A study of the students' after-school work was conducted. It was found that the pass rate for after-school work was 90%. More than 80% of the total survey population turned in their work the next day. Students had a high submission rate for assignments managed by the HCI system. A subsequent survey on the quality of assignments found a high submission rate of 90% for offline assignments. The submission rate of assignments during the second course was only 10%. However, the quality of work submitted for the second course was found to be much lower than the quality of offline work submitted. It was found that the offline submissions were now perfect due to the time available for preparation and repeated recording opportunities, and that the level of completion of the assignments did not match their strengths. The live performance of online assignments highlights the students' level of performance.

Participative action research was used to gather students' attitudes towards the quality of teaching in the HCI music programme and the teachers in the HCI system. The data showed that 66.67% of the respondents were very satisfied with the HCI music programme. 33.33% of the respondents were satisfied with the HCI music programme. Overall satisfaction was 100%. Very high satisfaction with the quality of teachers' teaching under the HCI system was 100%.

In summary, the HCI model of music education is the best expression of "teaching for understanding". The HCI terminal system provides video storytelling and simplified games to help students better understand the content and encourage them to participate in teaching activities. In addition, the HCI model enriches the possibilities of hands-on music teaching activities, effectively guides the development of students' imagination and creativity, and focuses on the interaction between teachers and students throughout the teaching process. This

study also provides institutional ideas and basic data for the future application of HCI in upward music teaching.

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