Theatre Music Education in the Human-Computer Interaction Model

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Abstract. This paper takes "human-computer interaction" as the research entry point, and briefly outlines the concept of "human-computer interaction" mode and the development of "human-computer interaction" technology. This study will explore the role of "Human-Computer Interaction" in drama and music education through a brief description of the concept of "Human-Computer Interaction" and the development of "Human-Computer Interaction" technology. To study the changes in the acceptance process, human-computer interaction and interest of drama students in the "human-computer interaction" mode of music learning. And how can we make it interactive and immersive more efficient. We use "public void jButton1_actionPerformed(ActionEvent e) throws Exception {UserName = jTextField1.getText().toString(); for (int i = 0; i < jPasswordField1.getPassword().length; i++) {passwordtemp + = jPasswordField1.getPassword ()[i];}" The extended computer language creates a simple login window and continues to set the login selection interface "public void jButton1_actionPerformed(ActionEvent e) {eventFrame eventframe1 = new eventFrame(UserName, UserRight); eventframe1.setSize(1024, 768); Dimension screenSize = Toolkit.getDefaultToolkit().getScreenSize();Dimension frameSize = eventframe1.getSize() eventframe1.setLocation((screenSize.width -frameSize.width)/2,(screenSize.height - frameSize.height)/2); eventframe1.setVisible(true); eventframe1.setTitle("Computer Graphics Aided Teaching Platform"); this.dispose();}", build a complete digital opera "Human-Machine" The new model of "interactive" learning will better attract opera students to study the Western District, reasonably analyze the teaching objectives of the course, and study the design of the curriculum system, including the theoretical knowledge system and the practical teaching system, so as to assist teachers in the teaching of drama and music education. Finally, an analysis mode similar to Microsoft SQL Server 2000 is established as the background database to conduct preliminary data collection and data analysis, and then conduct assessment and grading. It will explore the changes, impacts and advantages of this new "human-computer interaction" model compared with traditional music education models, as well as the problems that need to be solved.

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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 theatre music education and social music education, namely the "human-computer interaction" mode [12]. In the process of deepening the education model, the music education of drama 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 drama students [8]. It can play a good role in their growth process.

Theatre music education has benefited from the advancement of the Internet, which has enabled the development of a 'human-computer interaction' model for theatre 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 drama students [14]. Only in this way can theatre 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. 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 [10].

In drama 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 [13]. It also enables the sharing of teaching resources and improves the mastery of student learning. Drama music education is a good way to promote the development of music quality and musical aesthetics. It can help drama 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 Fig. 1.

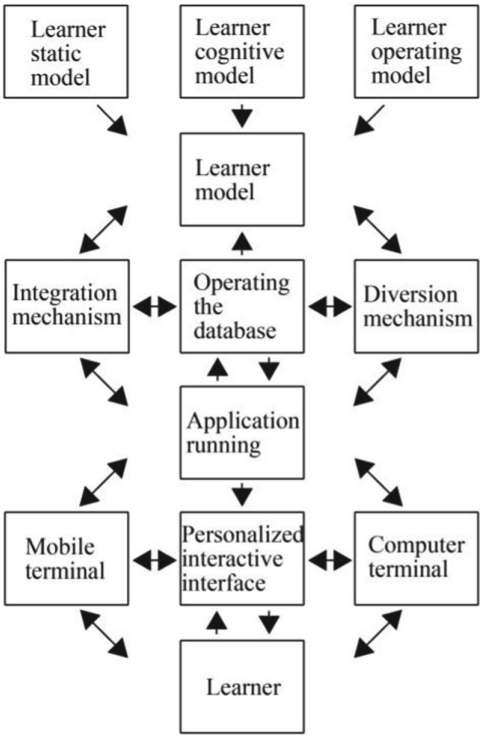

Fig. 1. Learner-centered interactive system model.

2 The Concept and Development 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 [18]. 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 [4].

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 [3], as shown in Fig. 2.

In 1946, the world's first computer was developed at the University of Pennsylvania, signalling the birth of the 'human-computer interaction' paradigm [7]. This was followed by the introduction of the mouse in 1964, which brought us into the age of the personal

Fig. 2. F.W. Taylor and Gilbreth.

computer, and the increased number of users, which accelerated the development of interaction technology [1]. In May 1965, the first technical conference on "human-computer interaction" was held in the United States [2], and in 1973 Martin published The Design of Man-Computer Dialogues, which brought the issue of human-computer interfaces to the attention of industry [5]. 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 [6]. In 1989, the world entered the information age and research on 'human-computer interaction' began to emerge [15].

3 Features of the "Human-Computer Interaction" Model in the Field of Music

Music itself is an interactive art, and the performer is the participant in the interaction. Artistic expression itself is a response to artistic perception, and the two are interrelated, as illustrated in Fig. 3. A review of the literature shows that the main applications of human-computer interaction in music are: interactive electronic music research, intelligent instrument music teaching research, multimedia classroom applications, and research on interactive interface APPs [16].

3.1 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".

"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. [17]. 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.

Fig. 3. Human-computer interaction of ballet movements.

3.2 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.

4 Music Education in the Mode of "Human-Computer Interaction"

4.1 The Implementation Mode of "Human-Computer Interaction" Equipment in Drama and Music Education

Drama 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 [9]. 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.

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

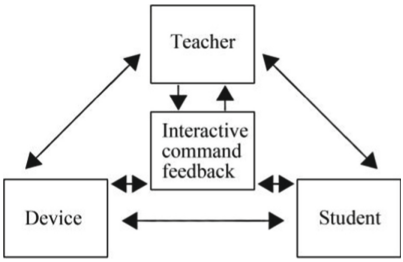

Fig. 4. Teacher-machine-student interaction.

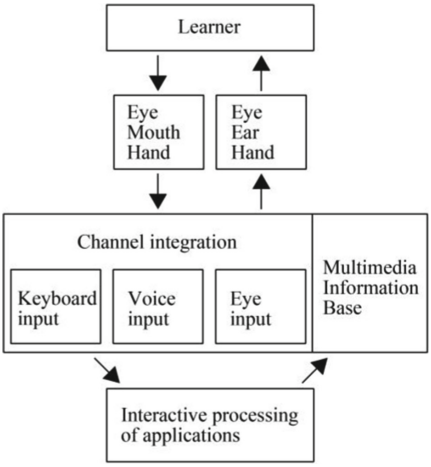

Fig. 5. Multi-channel human-machine interaction interface.

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 Fig. 5.

The teaching process, on the other hand, focuses on student inquiry and the interactive integration of diverse and personalised teaching content. The teacher guides the students in their teaching activities, giving full play to their self-learning initiative and stimulating creativity, with the ultimate goal of active development and overall improvement of quality. In the "human-computer interaction" teaching mode, educators need to pay special attention to students' feedback, so as to achieve the most optimal education and teaching. We propose a general design for the HCI curriculum, as shown in Fig. 6. The scheme includes the teaching objectives of the course, the theoretical knowledge of the course, the practical teaching system, the teaching outcomes of the course and the assessment and evaluation system. The implementation of the "human-computer interaction" mode of teaching effectively makes the classroom "alive", enables each student

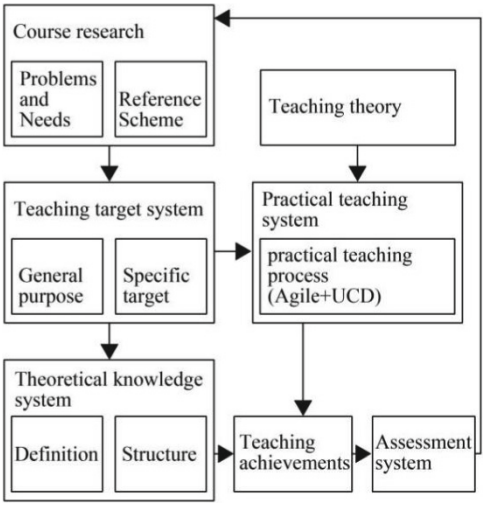

Fig. 6. Human-computer interaction course system.

to give full play to creativity, effectively promotes the good development of students' personality, transmits the learning content to students through the interactive device implicitly, and gradually stimulates the cognition of things in the learning. The content is transmitted to the students through interactive devices, which gradually stimulate their cognitive skills and inspire their love of learning and life.

4.1.1 Design and Implementation of Main Interface of Human-Computer Interaction System Client

Design and implementation of the login interface. In order to ensure the safety of the system, any user before entering the client to the user login in the first place, because the platform for different user permissions, can realize the function of different, has the teacher permissions users enter into the platform can implement the client all the operations, with students access platform for the user to enter can query, browse operation, etc. And can not be new operations such as courseware. The client login interface is shown in Fig. 7.

Users open the client software, will pop up the login interface, based on interface in the login screen enter your user name and password, the system will automatically search the database the existence of the users, if the user logged in, record the user's user name, user permissions value read from the database records, and according to the permission values shows that the system main interface, If the user does not exist, a corresponding prompt will be given.

Fig. 7. Login interface

The operation of the login interface is completed by determining the event of the button. The main implementation code is as follows:

```
public void jButton1_actionPerformed (ActionEvent e) throws Exception {
UserName = jTextField1.getText (). toString ();
for (int i = 0; i < jPasswordField1.getPassword ().length; i++) {
passwordtemp += jPasswordField1.getPassword ()[i];
}
if (!UserName.equals("") && !passwordtemp.equals("")) {
loginQuery = "select * from yonghu"; //The query
try {
cgConnect cgconnect = new cgConnect (); //Get an object
//First get the information about the query results
ResultSet rs = cgconnect.executeQuery(loginQuery);
while (rs.next ()) {
ManagerName = rs.getString("uName");
ManagerPassword = rs.getString("uPwd");
ManagerRight = rs.getString("uRight");
if (ManagerName.equals(UserName) &&
ManagerPassword.equals(passwordtemp)) {
this.flag = true;
this.setVisible(false);
mainFrame mainFrame1 = new mainFrame(UserName,
ManagerRight);
mainFrame1.setSize(1024, 768);
Dimension screenSize = Toolkit.getDefaultToolkit ().
getScreenSize ();
Dimension frameSize = mainFrame1.getSize ();
//mainFrame1.setState(mainFrame1.NORMAL);
mainFrame1.setLocation((screenSize.width -
frameSize.width) / 2,
(screenSize.height -
frameSize.height) / 2);
```

```
mainFrame1.setVisible(true);
break;
} else { //end if
jLabel4.setText("The user name or password is incorrect. Please enter it again!");
jTextField1.setText("");
jPasswordField1.setText("");
UserName="";
passwordtemp="";
break;
}
} //end while
} catch (SQLException q) {
System.out.println(q);
}
} else { //end if, All empty values, display error information
jLabel4.setText("Please enter complete information");
}
}
```

Main interface design and implementation

User right after log in, will see the main interface system, in the main interface will see four buttons, respectively corresponding to the computer graphics, computer aided teaching platform graphics generation model, model generated by music and quit, here basically is the better option would be for user access to the platform for the classroom teaching section or choose the other two models into the extracurricular teaching section. The main interface is shown in Fig. 8.

Fig. 8. Main interface of the system

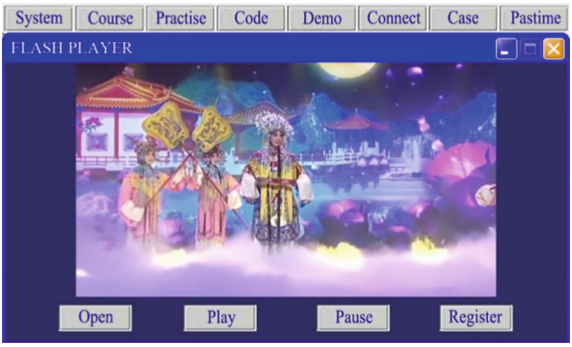

Fig. 9. Audio-visual entertainment of multimedia integrated teaching system during class break

In this interface, the user clicks "Computer graphics auxiliary teaching platform" button, the system will automatically create the main control interface of computer graphics auxiliary teaching platform. The operation is mainly completed by button events, and the main modern codes are as follows:

```
public void jButton1_actionPerformed (ActionEvent e) {
eventFrame eventframe1 = new eventFrame (UserName, UserRight);
eventframe1.setSize(1024, 768);
Dimension screenSize = Toolkit.getDefaultToolkit ().getScreenSize ();
Dimension frameSize = eventframe1.getSize ();
eventframe1.setLocation((screenSize.width -frameSize.width) / 2,
(screenSize.height -frameSize.height) / 2);
eventframe1.setVisible(true);
eventframe1.setTitle("Computer Graphics Aided Teaching Platform ");
this.dispose ();
}
```

On the main interface of the system, click the buttons of "Score Graph Generation Model" and "Fractal graph Generation Model" to pop up the main interface of cellular automata model and fractal graph generation model respectively. Click the "Exit" button to exit the whole system, and the exit code of the system is as follows:

```
public void jButton4_actionPerformed (ActionEvent e) {
System.exit(0);
}
```

About the system: this module gives the system help information and realizes the system exit. The front-end programs of the multimedia teaching integrated system are shown in Fig. 9.

4.2 Analysis of Theatre Music Education Experience Under the "Human-Computer Interaction" Model

4.2.1 Objects of Educational Experience

The main disciplines related to drama music education in the "human-computer interaction" mode are: "human-computer interaction" technology, preschool education, student

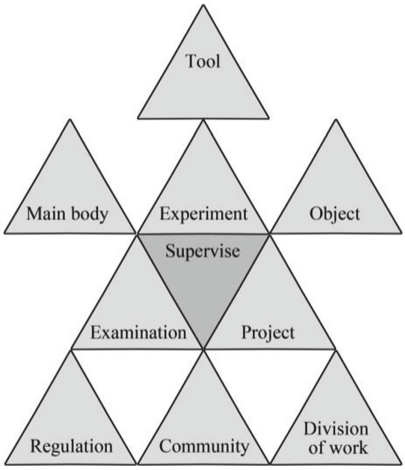

Fig. 10. Structure of the drama course activities.

development psychology, acoustics and other disciplines". In short, theatre music education in the "human-computer interaction mode is a new and comprehensive music discipline formed by the intersection of various disciplines. Therefore, general drama students need to master the basic principles and theoretical knowledge of related disciplines in order to teach music in the 'human-computer interaction' mode. There are two main ways to implement the "human-computer interaction" model of music teaching for drama students: interactive whiteboards and intelligent musical instruments [11]. Interactive whiteboards are mainly used in campus classrooms, while smart musical instruments are widely used in social education institutions. Among them, smart musical instruments are mainly concentrated in smart piano music classrooms and mini-classrooms for drums.

4.2.2 The Structure of Curriculum Activities

According to the theory of drama activities and based on the basic structure of drama teaching, we designed the structure of drama education curriculum activities, as shown in Fig. 10. According to the structure of the course activities, students can complete theoretical knowledge learning and practical learning activities of the course under the teaching, guidance and supervision of the teacher. This assessment method provides a more holistic assessment of student learning outcomes in a drama teaching course than a purely written assessment method.

The classification of the course assessment, the course activities, the form of the course activities and their proportion in the teaching evaluation are shown in Table 1 at the end of the course, students are required to write a personal experience of their participation in the course, for which teachers are required to conduct research and analysis, and to communicate face-to-face with some students to obtain an important subjective evaluation basis for improving the course design.

Table 1. Course assessment criteria.

Assessment classification	Course	Content	Proportion (%)
Theory	Attend class	Attendance	10
	Research	Research report	10
	Examination	Take an exam	30
Practice	Experiment	experimental report	20
	Participate in the team	Report and Lecture	30

5 The Advantages of Theatre Music Education in the "Human-Computer Interaction" Mode

Interactive devices participate in classroom teaching, which can expand teachers' resources for lesson preparation, enrich the content of teaching courses, improve teaching efficiency and expand the ways of quality education, and can effectively stimulate students' learning enthusiasm and enrich the way of knowledge acquisition. The "human-computer interaction" mode provides a new auxiliary teaching mode for traditional music education for drama students, but it cannot completely replace traditional teaching methods in the specific teaching practice process [19]. In the process of theatre students' music classroom observation and theatre music education practice experience, in view of the shortcomings of the "human-computer interaction" mode in theatre music education, the author combined the "human-computer interaction" mode in theatre music education experience questionnaire The data is analysed and summarised.

5.1 Optimising Theatre Music Education Pathways

5.1.1 Expanding the Quality Education Pathway

Music education is an educational discipline full of charming experiences, which not only expands students' intellectual horizons, but also helps them to establish a good sense of musical aesthetics and musical literacy. The use of "human-computer interaction" equipment plays a multi-level supplementary role in the selection of teaching resources for teachers, teaching content and learning activities for students, and provides a good way for music quality education for drama students.

5.1.2 Enriching the Way of Acquiring Knowledge

Drama music education in the mode of "human-computer interaction" is an inevitable manifestation of music education in today's information-driven era. The interactive device is adapted to theatre music education, and its terminal system contains teaching resources for teachers, learning resources for students, teacher-student interaction and student-student interaction game resources. In the process of using the interactive device, the interactive device system identifies and analyses information according to the

information instructions issued by teachers and students, and completes teachers' music teaching preparation and instruction, as well as students' learning content, knowledge assessment and other activities. In the knowledge expansion link, drama students, under the guidance of the teacher, can carry out simple music creation through the interactive device, according to the creation of music results with interesting drawings or videos, guide students to learn in a specific musical environment, enrich the way students acquire knowledge.

5.1.3 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 drama 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 drama students and stimulate their competitiveness in learning.

5.2 Enriching Access to Teaching Resources

The "human-computer interaction" terminal system can effectively collect and classify music teaching plans, music works, pictures of musical instruments and audio, and can also achieve real-time updating of music teaching resources. Teachers have more choice of teaching resources and can share their achievements and experiences in real time, while students have more varied and interesting ways of accessing their knowledge.

5.3 Improving the Sense of Participation of Teachers and Students in Practice

Participation is an important part of music education in which the educated person gains a sense of musical aesthetics through the experience of music. In the "human-computer interaction" model of music education activities, the interactive device is used to give a specific instruction to the teacher or student. The interactive terminal system recognises and judges the command behaviour. The interactive terminal system outputs the interactive information in the form of video or audio. This allows teachers and students to get a visual impression of the teaching scene, thus enhancing the sense of practice in the classroom activities they are participating in together. In the creation of learning content, students create a particular element of the music, through the interactive interface, achieving a shift from a state of passive learning to one of active participation in creation.

6 Shortcomings of Theatre 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 drama music education activities.

6.1 Students' Over-Reliance on Interactive Devices

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

6.2 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 drama 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 drama students.

7 Research Limitations and Recommendations for the Future

7.1 It Is Difficult to Obtain Data on Theatre 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 theatre music education data as a survey subject. Access to music industry data has become very difficult.

7.2 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.

7.3 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 drama 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.

7.4 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 drama 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?

8 Conclusions

This paper takes "human-computer interaction" as the entry point and locates the research object in the voice of drama students. The study summarizes the positive effects of the "Human-Computer Interaction" model of music education on the music learning of drama students, as well as the advantages and shortcomings of the development of drama music education under this educational model.

The "Human-Computer Interaction" model of music education is the optimal embodiment of "teaching for understanding". The "Human-Computer Interaction" terminal system provides video storytelling of teaching content and simplifies games to help drama students better understand the content and encourage them to participate in teaching activities.

In addition, the possibilities for practical music teaching activities are enriched by the 'human-computer interaction' model, which effectively leads to the development of students' imagination and creativity, and the whole teaching process focuses on the interaction between teachers and students. The teachers use the interactive devices scientifically and rationally, select teaching resources rationally, guide the students to use the interactive devices effectively and reduce the distance between the teachers and the drama students.

The study proves that the design of the HCI course system can develop a well-defined and structured theoretical knowledge system as well as a practical teaching system in the teaching process, which can better meet the needs of drama and music education students for HCI knowledge and competence in the practical workplace.

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