Optimization design method of human computer interaction mode for basic Japanese teaching software

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Abstract: In order to solve the problems of less teacher-student interaction and large amount of exercises in modern teaching process, the optimization design method of human-computer interaction mode of basic Japanese teaching software is optimized. Firstly, the overall structure and function of the basic Japanese teaching software are analyzed, including the parameter selection in the chain drive design; secondly, the basic Japanese teaching software is designed in detail, and the innovation of the software in the design process is analyzed; finally, the functions of the designed software are realized. The running example of the system shows that the designed man-machine interactive chain drive assistant teaching software can improve the man-machine interactive experience and is accepted by teachers and students.

1. Introduction
With the development of mobile Internet technology and the popularization of mobile information teaching platform, the implementation of hybrid teaching mode has become a new trend of higher education\(^1\). The deep integration of mobile Internet technology and Japanese teaching has become an inevitable trend of Japanese teaching development in the era of big data. The development of the times has brought new opportunities and challenges to the evaluation of Japanese Teaching in Colleges and universities\(^2\). Modern teaching methods are all about the process of analysis and design in the classroom, leaving homework for students to practice after class. Students seldom ask questions and discuss in the classroom, and there is no communication and interaction between teachers and students. Therefore, the students have less practice in the design process and little understanding of the design content, which reduces the learning effect. Using computer-aided instruction, students can choose their own learning situation and needs, and participate as the main body of learning\(^3\), in the process of learning, the interaction between teachers and students is more convenient. Therefore, the interactive learning environment is provided for students to stimulate their participation and enthusiasm in learning and improve the learning effect. Interactive chain drive assistant teaching software can simulate the design process by computer, and simplify the steps and save time by calculating mathematical formula by computer\(^4\). To sum up, in the actual teaching process, teachers can reasonably use a variety of computer-aided teaching methods to realize the teaching process of human-computer interaction, which can not be satisfied by a single software system “The demand of "double main" teaching mode. However, at present, there is no systematic research and design for the rationalization of the human-computer interaction electronic teaching means of the dual main teaching mode\(^5\). Therefore, the research of this topic has important practical significance, and has extremely important guiding significance for the modern teaching of front-line teachers. The application of this method can further improve the level of running a school, improve the effect of classroom teaching, and meet the needs of personnel training.
2. Optimization of human computer interaction mode of basic Japanese teaching software

2.1 Functional structure optimization of basic Japanese teaching software

Through Front Page 2000 to develop the framework and interface of basic Japanese teaching software, using the typical word interface design, it has the functions of web page production, website creation and management, and can realize operation[6]. Users can design multi-element web pages such as image, text and sound without learning HTML and other website related language. The content of intensive oral English teaching at the same level is the same, so we can make a unified multimedia courseware, which can not only reduce the time of teaching preparation, but also improve the quality of teaching[7]. However, when different teachers teach the same teaching content, they occasionally adopt some personalized teaching strategies. Therefore, if the unified teaching courseware is used completely, it may restrict the hands and feet of these teachers, making it difficult for them to play their own unique teaching methods. In addition, the personalized courseware made by teachers will become an important source of information for changing and improving the unified teaching courseware[8]. Therefore, the establishment of information database becomes very important. Teachers can download the content of a certain lesson to the local computer at will, and then find the required pictures, audio, video and other information from the database, and then modify the courseware slightly according to their own ideas, so that their own personalized courseware can be completed quickly, and the production is simple and fast. The system structure is shown in the figure 1.

![Fig. 1 Framework of basic Japanese teaching software](image-url)
controlled in the operation interface\cite{9}. Multimedia system is an operating system platform directly for users. In the design process of the platform, we pay attention to the internal function display, and combine with the operability function to create a field simulation platform, so as to improve the control effect. In the process of developing the multimedia system, the resources are obtained according to the network platform to determine the appropriate site environment for the use of resources, so as to avoid the inconsistency between the visual interface and the actual situation\cite{10}. The chain drive design process mainly includes two parts: calculation formula and selection parameters. When the calculation of mathematical formula is more complicated, students have no value in learning the content of chain drive design, so this step can be realized by computer. In the design process, the selection of parameters can fully show the students' level ability and knowledge, and the results of different designers are also different. This step fully shows the individual differences of designers, such as the number of small sprocket teeth, working condition coefficient, etc\cite{11}. Within the allowable range, the values selected by different designers are also different, which has an impact on the final design results and is also a feature of engineering design. This link can not be selected automatically by computer, but should be selected by students in the design process, and input in the computer, and then proceed to the next step of design\cite{12}. The overall division of software functions, the teaching process includes pre class preparation, in class teaching and after class improvement of two major processes, rather than just limited to the classroom\cite{13}. Combined with the actual situation of teaching content, students' cognitive level, learning conditions and so on, we should timely play the main role of teachers or students, and realize the "double main" teaching mode. Before class, teachers of the same professional discipline exchange lesson preparation experience\cite{14}. According to the content of the teaching plan, teachers make full preparation for the class content by studying teaching materials, selecting and preparing case materials, and making multimedia courseware; Through investigation, testing and other means to understand the students have the old knowledge related to new knowledge and skills, to determine whether the students have the ability to recognize new knowledge and skills. The process is shown in the figure 2.

![Diagram](image-url)

**Fig. 2 Optimization of software teacher student interaction function**
If students don't have the cognitive ability of new knowledge, they need to give full play to the main role of teachers in class, and help students accumulate knowledge reserves before cognition by traditional teaching methods\(^{[15]}\). This process is completed in the classroom or computer room by playing courseware, synchronous demonstration and follow-up, monitoring guidance and effect evaluation. The main application of electronic teaching means is projection and teaching E-classroom system, in the evaluation, can directly use the teacher-student and face-to-face communication comments, easier for students to accept\(^{[16]}\). If the students have the cognitive ability of new knowledge, they can use the task driven teaching method, design and assign one or more practical tasks to the students in combination with the learning content, so that the students can complete the teacher's predetermined tasks in this class through learning and efforts, autonomous learning and cooperative learning\(^{[17]}\). Before that, teachers can predict in advance the new knowledge difficulties that students can not complete independently, and guide and assist students to complete them by teaching. In this process, students can divide the work and discuss through the face-to-face language communication in the classroom, and cooperate to realize the operation of the daily standard and complete the task through the electronic self board.

2.2 Process optimization of interpersonal interaction in basic Japanese software

In the classroom teaching of multimedia assisted oral English, one is to show that both teachers and students are the main body. Only by giving full play to the leading role of teachers and the initiative of students, that is, the two aspects of enthusiasm, can we achieve good education and teaching results. The leading role of teachers mainly lies in: carrying out teaching design conscientiously; determining the amount of teaching information in line with students' acceptance ability; selecting appropriate multimedia materials; guiding students to study lively and actively. Students' initiative is mainly manifested in: careful observation, positive thinking, can find and put forward problems, and use the knowledge to analyze and solve problems; through their own brain, hands, mouth to acquire knowledge, develop intelligence; can choose the appropriate multimedia teaching materials for effective self-study\(^{[18]}\). Second, the new teacher-student relationship is reflected in the multimedia assisted oral English Intensive classroom teaching. The new relationship between teachers and students is democratic, equal, friendly and cooperative. With this relationship, we can fully mobilize the enthusiasm of both teaching and learning, and make the teaching process always in the state of collaborative activities and mutual promotion between teachers and students. In the design process, for the created work interface model, creating the model is the basis of software program design. The layered method is used to design the software function, and the unreasonable function is analyzed to improve the matching degree of hardware and software. Design work interface based on software wizard, put the software function in the first place, and consider whether there are human-computer interaction problems. The optimization software is used to solve the problem and improve the efficiency of the system\(^{[19]}\). The human-computer interaction module is more common, and its main function has interference. It guides the loader to determine the software part, and coordinates with the implementation of the field design and control scheme. Human computer interaction software uses communication interface to cooperate in the realization of functions, determines the best connection mode of ports, and creates a virtual operating system based on Linux to avoid affecting the task of software control function port design. Software development task is also based on the creation of integrated control system, so as to coordinate this part of functions and avoid affecting the control function stability.
The mobile terminal is connected with the wireless LAN, and the server is connected with the teacher control terminal, so as to realize the interaction between teachers and students. In this mode, information resources are stored in the server database by document [20-21]. When the user inquires the information, the mobile client application is executed. Use HTTP protocol to realize data transmission and communication. The interactive process is shown in the figure 4.
The software can access the mobile phone client, which is a standard teaching assistant software. Its main functions include score query, classroom check-in, and so on. Through the driver to achieve communication with the hardware, through the call interface to support specific applications, to achieve the function of human-computer interaction. The model is a low-level physical model, which can decompose the high-level interaction behavior, and form the low-level physical operation behavior by mapping again, which is convenient to predict the time spent in the execution phase of a low-level interaction task

$$A_x = A_1 + A_2 + A_3 + A_4 + A_5 + A_6$$  \hspace{1cm} (1)$$

For the user's execution, it needs to be extracted from various human operation behaviors to ensure that the model outputs the characteristic index representing human operation activities. By analyzing the time of different stages, the wearable human-computer interaction device information based on inertial sensor can be effectively controlled. Select a semester of teachers and students online teaching video situation, from the forum to participate in the discussion, the completion of students' homework, the number of resource browsing, teachers and students online video communication to collect experimental data.

The algorithm of vertical crossing is adopted

$$A(x) = A(x-1) + A(x)$$
$$A(x') = PA_1(x') + PA_2(x') + PA_3(x')$$
$$A_1(x') = \|Ax\| - \|Ax(W(x'))N(x')\| - \|Ax(W(x'))N\|$$
$$A_2 = \sum \|W(x')W(x'-1)N(x'-1)\|$$
$$A_3 = \|P(x') - P(x'-1)\|$$  \hspace{1cm} (2)$$

In the formula: $A$ represents the extracted student achievement data; $P$ represents the correction coefficient of the data; $W$ represents the orientation parameter of the data; $n$ represents the difference parameter of the student achievement; $x$ represents the data of the online evaluation result; $C$ represents the data of the online evaluation result; $x'$ is the ideal parameter of online evaluation data; $\Delta x$ represents the difference of online evaluation data; $A_1, A_2, A_3$ refers to the correction of video frequency data, the correction of the number of teachers, and the correction of the number of students.

From the perspective of "learning", students are in the main state. According to the principles of constructivism and cognitivism, students' subjective learning should mainly adopt the cooperative way to explore and construct knowledge. The "learning" with students as the main body is mainly reflected in students' autonomous learning and cooperative learning. Here, the students' team cooperative
learning is divided into two forms: one is the task driven classroom cooperative learning; the other is the project driven after class cooperative learning; the students' individual autonomous learning includes two forms: one is as an individual student in the team, through autonomous learning to complete the sub task of the project division; the other is as an independent student in the team; Second, driven by interest, students set up and complete tasks independently, which is reflected in the two aspects of self-study in class and extended learning after class. Accordingly, through the way of human-computer interaction to achieve students' cooperative learning and autonomous learning form. In the student-centered learning process, the human-computer interaction model is shown in the figure 5.

![Fig. 5 Human computer interaction process model](image)

In the classroom learning process, the task driven teaching method is used to promote students' cooperative learning. The so-called "task driven" is that in the process of learning information technology, with the help of teachers, students closely around a common task activity center, driven by strong problem motivation, through the active application of learning resources, carry out autonomous exploration and interactive collaborative learning, and guide students to produce a kind of learning practice while completing the established tasks Move. Under task driven, students are required to complete the same work in groups, which is called "task" here. Therefore, it is necessary to realize this process by sharing applications, so that students can interact with each other through computers and finally complete the task.

### 2.3 Realization of human computer interaction in Japanese teaching software

In the computer room with LAN connection, the teacher transmits the screen broadcast or other information of the teacher computer to each student computer through the broadcast teaching function of the teacher end program of the electronic classroom on the teacher computer. The students watch various demonstrations through the student end of the electronic classroom and operate according to the teacher's instructions. The human-computer interaction process is shown in the figure 6.
Fig. 6 Steps of application sharing to realize classroom cooperation

Students' learning participation, interactivity and goal achievement are evaluated from three nodes: before class, in class and after class. Based on the functions of resource upload, questionnaire, brainstorming, homework, Q & A discussion, experience value statistics and so on, the author collects the students' learning data, and carries out the dynamic teaching evaluation in the pre class preview stage, offline classroom teaching stage and post class review stage. In order to facilitate teachers to grasp students' learning dynamics in time, the pre class preview stage mainly evaluates students' completion of preview tasks uploaded to the platform by teachers in advance. In this stage, this study extracts the data of students' login times, watching video time, experience value of learning platform resources on the blue ink cloud class platform for statistics, analyzes the students' initiative and enthusiasm to participate in learning in the preview stage, and evaluates the students' learning participation. In the classroom teaching stage, students' interaction performance in the classroom is mainly evaluated. Brainstorming, classroom response and group cooperation report are used to realize the interaction between teachers, students and students. Teachers' evaluation, students' self-evaluation and students' mutual evaluation are carried out to investigate students' team cooperation ability, language expression ability and autonomous learning ability. After class review stage is the stage of absorbing and digesting the knowledge of classroom teaching stage, and it is also the stage of students combing the knowledge points and finding out the missing points. Students complete and submit the after class development exercises released by teachers on the platform. Teachers evaluate the achievement of students' learning objectives in this chapter according to the completion and accuracy of the development exercises submitted by students. The traditional form of mid-term and final examination is used for test evaluation. This study takes the mid-term examination and final examination as the summative evaluation of the teaching effect of this semester. It mainly evaluates the students' mastery of the knowledge points learned this semester and their comprehensive application ability of knowledge. In the teaching of Japanese software, students combine their personal interests freely after class and form several groups. Each group completes a project independently. Because there is no LAN environment in campus, a cooperation mechanism based on Internet is needed. Students cooperate through Wan. The cooperative learning here should include two aspects, one is the communication and discussion between students, the other is the cooperation to complete the homework. The interaction process is shown in the figure 7.
In view of the existing technology and hardware and software conditions, this paper discusses how to use simple methods to achieve the teaching effect of humanized classroom through human-computer interaction. When teachers impart knowledge to students, they also convey a series of non-verbal teaching aids to students through computer. Turn the stiff computer "electronic course" into a vivid "electronic classroom" with teacher-student interaction, activate the classroom atmosphere and enhance the teaching effect.

3. Analysis of experimental results
In order to verify the optimization effect of human-computer interaction mode of basic Japanese teaching software, a comparative experiment is carried out. Therefore, the keyboard of the control panel is composed of eight normally open buttons, and the output display adopts four bit VR technology. In the process of data input and output, serial parallel conversion is used to save DSP hardware resources. The most concise operation is used to achieve the expected related functions, and the related data is displayed in VR technology at the same time. Although only 7 DSP pins are used for input and output display in the design, it can control 6 LED status indicators, detect 4 input bits of 8 buttons, 7 segments of VR technology and 4 control bits of VR technology, which greatly saves the cost of DSP hardware resources. Test platform processing needs to collect user login information, historical data information, real-time data, network information, etc., as shown in Table 1 and table 2.

| number | login information | historical data | real-time data | network information |
|--------|-------------------|----------------|---------------|-------------------|
| 1      | 30.00             | 45.15          | 28.55         | 48.22             |
| 2      | 30.15             | 46.23          | 30.15         | 49.01             |
| 3      | 31.01             | 45.90          | 30.38         | 46.23             |
Table 2 Information processing rate of teaching software under this method

| number | login information | historical data | real-time data | network information |
|--------|-------------------|-----------------|---------------|---------------------|
| 1      | 80.13             | 62.15           | 61.36         | 82.85               |
| 2      | 79.28             | 63.24           | 62.25         | 79.28               |
| 3      | 78.31             | 60.98           | 61.88         | 78.51               |
| 4      | 77.52             | 65.13           | 63.23         | 76.35               |
| 5      | 77.15             | 64.14           | 65.15         | 76.98               |

According to the data collected above, compared with the traditional methods, the optimization design method of human-computer interaction mode of basic Japanese teaching software proposed in this paper has better information processing effect in practical application, which can better guarantee the improvement of teaching quality and guarantee the teaching effect.

4. Concluding remarks
The CAI software is developed, which enables designers to use the function of CAI by web. The interactive chain drive assistant teaching software is designed. Combined with the design and calculation results, the operators can practice independently based on the interactive interface. Through the teaching application, it can be seen that this software can improve the efficiency of students' learning chain drive design content, stimulate students' participation and enthusiasm, and is very beneficial to the selection of students' parameters in the design process. By connecting with the design process for many times, the design training effect of students can be improved, and the students' understanding and cognition of knowledge can be deepened, the learning efficiency can be improved, and the students' learning achievement detection can be completed.

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