DESIGN AND ACHIEVEMENT OF MODERN DISTANCE INSTRUCTION SYSTEM

Jianmin Qu   Yan Qu

ABSTRACT:

Modern Distance Instruction is becoming a new form of instruction. Developing the Internet-based instruction system, which is with the functions of instruction, exercise, testing and supervision, is convenient for distance instruction and individual studies. Based on the practical development of Internet-based instruction system, My paper first introduces the structure, function and speciality of this system. Secondly, it presents the methods, technology and experience in designing and developing the Internet-based instruction software. And last it discusses the mode and technology in developing the database-mode distance instruction software in the Internet environment.

KEYWORDS:

Internet, Distance Instruction, Database-mode, ASP, Website

PREFACE

With the fast development of network technology, Computer Aided Instruction (CAI) develops sharply from the mode of single computer and local area network (LAN) to the mode of Internet distance instruction. Up to now however, the construction of information resource for distance instruction is still lagging far from the requirement of instruction.

My paper is written based on the practical developing experience of the "Computer Fundamental Instruction", a database-mode distance instruction system that takes the Internet as the information transmission carrier and takes the SQL Server Database as the data platform.

SYSTEM FEATURE AND SPECIALITY

This instruction system serves for the studies of computer fundamental knowledge. It is published with the form of website, so its widespread availability benefits the learners in studies with no restriction of time and location and in the achievement of real-time access. It has the following main specialities:

1. Accordance with the CAI instruction regularity

    The designing and developing process of this instruction software accords to the CAI instruction regularity and adapts to the Internet environment. We fully consider the relation between the transmission of instruction information and many kinds of carriers such as character, image and video, and also consider the lively color and elegance of the instruction webpages.

2. Abundant content

    This system includes not only all the contents required by the principles for computer fundamental instruction, but also more than one thousand exercises and 10 sets of simulating exercises. Users can choose the contents and schedule of studies and the difficulty level of exercises according to the individual need and level.

3. Nonlinear instruction and exercise

    The sequence between instruction and exercise can be either linear or nonlinear. This means learners can study through the sequence guided by the system, or go ahead selectively according to the individual conditions.

4. Interactive function

    Learners can gradually reinforce the understanding of what is taught with the use of the multi-type exercise and testing module provided by the system. The system provides many interactive ways and creates an environment of community study. Learners can give their feedback to the teachers by filling "Message Book" and sending E-mails, and also can discuss and exchange their thought and experience in studies at the "Online Exchange Room" which can improve the instruction effect.

5. Using multimedia database to store instruction contents

    By using multimedia database to store instruction contents, it is convenient to organize, access, modify, add and delete instruction contents. In the database each knowledge point is designed with the access feature, parameter and method related to the exercise contents. By using different types of storage and making connection between data for different types of data such as text, sound, image and video, organic connections can be realized between these multimedia data cells and other types of data.

6. Disconnection between Control Module and Data Module

    This system adopts the mode of disconnecting Program Control Module (PCM) and Data Store Module (DSM). PCM, adopting the object-oriented program design technology and computer multimedia process technology, enhances the program's

flexibility and control function. While DSM, with the use of database to store the data of instruction, exercise, test and exam, makes the data module independent on the control module so as to facilitate modifying and adding data. It also makes it possible to modify data without modifying the control program. With the sift and find functions in the database system, it is convenient for data digging and making connections between hypertext and hypermedia.

7. Dynamic data maintenance for distance network

   By adopting the ASP dynamic webpage creating technology, this system not only makes it possible for exam information and instruction contents to update instantly so as to adapt to the continuously changed instruction demands, but also realizes easy application and maintenance.

8. Multimedia function

   All of the instruction is provided with sweet human voice and partly with images and video information.

9. Administration function

   This system can administrate the learner and the teacher's identification, studying process, study scores and operating priority.

SYSTEM STRUCTURE AND FUNCTION

This instruction system makes up of the following 4 sub-systems: instruction administration, Instruction, exercise database administration, and information feedback.

1. Instruction administration sub-system

   The function of this sub-system is to record the learner's and the teacher's login information into the database and to record the learner's history scores to keep the systematization and continuity in the studying process. Furthermore, this sub-system administrates the teacher's access priority to ensure the system security. It includes the following sub-modules:

       (1) Learner administration sub-module.

           It provides not only difference login for new and old learners but also concentrated administration.

       (2) Teacher administration sub-module

           It provides the teachers and system maintenance operator with different priority to access database, which is convenient for the teacher to gain an overall understanding about the outcome of the learner's exams.

2. Instruction sub-system

   As the core of this system, this sub-system includes 3 sub-module of course

teaching, concentrated exercise and simulating exam. The teaching sub-module realizes the linear or nonlinear instruction according to chapters, segments and knowledge points. During the teaching process, it is also provided with example analysis and testing to help learners to reinforce the knowledge that is taught. In the concentrated exercise sub-module, according to the learner's range of study, system picks up related exercise from the exercise database to form an exam for assessment and judgement. This can not only examine the learner's master level for this part of knowledge, but also record the learner's score for future inquiry, statistics and direction. In the simulating exam sub-module, system provides many sets of exams covering the whole course for simulating exam.

(1) Course teaching sub-module

This sub-module has a very large related database that includes each knowledge point's specific content, related image, sound and video, exercise's and exam's mark, exam and exercise and answer related to knowledge point, and the knowledge point's index. Concerning that the knowledge point in each chapter is unique, we set the knowledge point with a serial number as the master index. In order for convenient maintenance and reducing the code's redundancy, the system transfers the chapter's and segment's knowledge points as parameter to the ".ASP" file that has a certain function.

(2) Concentrated exercise sub-module

In the main interface of concentrated exercise, it is up to the user to choose the following four exercise contents: chapter, segment, exercise type and difficulty level. According to the user's submitted request (chapter, exercise type, difficulty level, etc that have been chosen by the user) via Request object, the system makes a combined inquiry in the related tables from the database, and picks up exercises from the exercise table and the related answers from the answer table.

(3) Simulating exam sub-module

Provided with simulating exams, learners can realize self-assessment and judge the situation about how they master what they have learned. This module can also assess and score the learners' exam situations.

3. Exercise database administration sub-system

This sub-system provides teachers with an interface for online database administration and maintenance. By applying for the related access priority to the system administrator, teachers can browse all the exercise's information in the exercise database. And also teachers may adjust instruction strategies and update the contents of exercise database within the priority.

4. Information feedback sub-system

This sub-system includes message-book administration module and exchange-room administration module. It not only provides the whole system with

a good exchange environment, but also provides learners with a community study atmosphere, in which different means of online exchange are possible not only between the learners and teachers but also between the learners themselves.

TECHNOLOGICAL PECULIARITY OF THIS SYSTEM

1. Creating dynamic websites via ASP

   In order to continuously update the website's contents in the system, it is necessary to create a dynamic website to make the webpage's contents dynamic. The "dynamic contents" refers to the Web page that is specifically created for the individual user according to the individual need.

   With the use of ASP dynamic webpage's technological peculiarity of easy development and powerful function, this system provides a script composition environment at the server terminals to create dynamic webpages or functionally powerful Web executive programs. For example, the interactive dynamic webpage, which includes collecting and processing information with the use of HTML table, adding interactive contents to webpage via ASP, and creating the whole Web executive programs with the use of HTML.

   The running procedure of ASP is presented step by step as followed. When users apply for an "*.asp" homepage via the browser, Web server will respond this HTTP request, call ASP engine and interpret the applied file. In the case that the script instructions in this file include the request for access to the database, the database access section will run the database access operation via the connection between ODBC and backstage database. Executed by the server's interpretation, ASP script, according to the outcome of database access, automatically creates the home page in accordance with HTML to respond the user's request. ASP makes a dialogue with ODBC through ADO, the module of ActiveX. At the user terminal, the browser displays the pure HTML interface.

2. Database with the MS SQL Server as the backstage

   This system adopts SQL Server 7.0 run under Windows NT as the database administration system and realizes the multi-linear client/server infrastructure. It not only simplifies the system, but also provides maintenance function at Servers to ensure the completion of data. SQL Server is relatively an ideal database administration system that adapts to this system's designing and developing demand for database-mode distance instruction system based on the Internet.

3. Adopting InterDev and FrontPage as frontstage developing tool

   This frontstage of this system is created mainly via Visual InterDev and FrontPage2000. Visual InterDev is an integrated developing environment for

creating dynamic website, and it serves to develop ASP and HTML executive programs combined with various scripts. With the use of InterDev, we can design the structure and various control and process functions for Web executive programs.

This system adopts FrontPage2000 to realize website's creation, administration and page decoration. FrontPage2000's style of visualized design, direct preview and the embedded JavaScript makes it convenient for this system to create lively HTML interface, and make page decorations and edit to the created Web executive programs.

DEVELOPING TOOLS AND RUNNING ENVIRONMENTS

1. Developing tools

   InterDev, FrontPage2000, Dreamweaver 3.0, Photoshop 5.0, Encoder and MS SQL Server 7.0

2. Running environments

   Server: Windows NT Server 4.0, Microsoft SQL Server 7.0, IIS (Internet Information Server) 4.0

   Client: Windows 98, Internet Explorer browser higher than 4.0

CONCLUDING REMARKS

The continuous development of network communication technology and the fast development of computer technology facilitate to the development of distance instruction. Distance instruction adds new connotations to the traditional concepts of schools, students and teachers. We believe there must be appearing new modes of distance instruction. Meanwhile, new problems and new demands will certainly come out and require our exploration and exchange.

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Jianmin Qu
Department of Computer Science
Tianjin Normal University
Tianjin 300074
P. R. China
E-mail: qujianm@public.tpt.tj.cn

Yan Qu
College of Telecommunication Engineering
Beijing University of Posts and Telecommunications
Beijing 100876
P. R. China
E-mail: yan_qu@263.net