

The Network-Based ICAI Integrate Tutoring System

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Abstract

The “Integrate ware” based on the advanced technologies of the computer science and the idea of the Chinese classical “I ching” is proposed as the idea of the designing courseware that is to adapt the essential elements to all changes in classrooms. The tool of courseware development guided by the ideas of the “Integrate ware” makes teachers change the mode of courseware development from the traditional sequential mode to the new three-dimension mode. The courseware designed by using the new mode can be changed more flexibly and dynamically.

“The Network-Based ICAI Integrate Tutoring System” has been developed based on the “Integrate ware”. This system has three functions: • provides teachers dynamic courseware designing tools ; • provides an interaction to teachers through the LAN (Local Area Network)teaching[1]; • allows students learn and review at their own pace outside class hours.

This paper discusses the main characteristics of the tool of courseware development based on the “Integrate ware” as well as describes the general structure of the tutoring system and the functions of the sub-systems of “The Classroom on LAN” and “Intelligence Student Self-Learning and Self-Test”.

Key words: Integrate ware, courseware, ICAI, CAI

I. The Design and the Feature of the System

1. The Idea and the Application of Integrate Ware

The idea of “integrate ware”, advanced by educational theorists who have made detailed analysis about the dialectical philosophy in ancient China, is based on eloquent theories and can be supported by advanced technology. The dialectical philosophy in ancient China “I ching” explains how the two contraries generate eight between the two contraries and then countless phenomena result. In accordance with this dialectical philosophy molecular combination was put forward to adapt to the countless changes in class. The countless molecular combination is the basis for “integrate ware”. From a developing point of view, the idea of “integrate ware” has conquered the static characteristics of courseware and emphasized initiating individual potential and utilizing

individuality, that is, students can build up knowledge in their own way and teachers can organize their teaching material freely according to students' needs. The structure of the system can also be reorganized[2]. The rapid development of network and multimedia technology has provided a firm technical assurance for the realization of “integrate ware”.

The Network Based ICAI Integrate Tutoring System is designed on the basis of the idea of “integrate ware”. This system has the chief features of “integrate ware” mentioned above. When applying this system, teachers can exert their efforts in the preparation of teaching materials, the selection of teaching media, the design of lectures and the organization and the management of teaching materials. Teachers don't need to spend a long time learning how to operate computer. Neither do they need to spend much time mastering how to operate the courseware generating-tools. This system can help to generate a temporary courseware called “Electronic Teaching Plan” and teachers can frequently alter and renew the contents in “Electronic Teaching Plan” according to their own needs. This system is a complete tutoring system, which has three basic functions: a tool for teachers to generate a courseware dynamically in accordance with both their own teaching and the variety of students' academic level; provide an interaction to teachers through the LAN (Local Area Network) teaching[3]; offer students an environment in which students can learn, review and test themselves at their own pace after class.

2. The Features of the System

The Network-Based ICAI Integrate Tutoring System not only differs from the traditional tools for generating courseware but also differs from ordinary CAI courseware. This integrated tutoring system, which assembles the functions of courseware developing, instructing, after-class reviewing and self-testing, has the following features: (a) Centering students-centered principle (b) Emphasizing on the dynamic combination of individual learning and cooperative learning. (c) Courseware generated by this system are contemporary, flexible and dynamic, for they can, at any time, be renewed in terms of teaching strategy, contents and teaching method according to different academic level of the students. (d) The tools for generating courseware are easy to operate. There is no need to program. Instructors can conveniently finish making courseware by simply clicking and dragging the mouse in a visual system. The whole system is illustrated by illustration[4]:(See attached illustration).

II. The Chief Functions of the System

1. The Generation of the “Electronic Teaching Plan”(contemporary courseware)

This subsystem of “Electronic Teaching Plan” is responsible for making and altering the multimedia courseware and organizing teaching materials. This subsystem provides an environment for teachers to prepare classes. In this subsystem, Resource Managing Module (RMM) takes on the duty of organizing teaching materials, including tutoring information and tests, which is the nuclear of the Network Based ICAI Integrate Tutoring System. The Teaching Plan Making Module provides teachers with a completely automatic courseware making system. Users don't

need programming. Neither is it necessary to press any keys. What users need to do is to operate the mouse and can easily complete the process of making a courseware. In the course of making a courseware, users (teachers) can freely alter the structure of the courseware and the specific information in every frame. Changing the properties of the elements in the frame is also possible. This subsystem consists of two modules.

(1) Resource Managing Module (RMM)

RMM is responsible for removing the multimedia courseware already made and stored in the computer, or texts, pictures, sounds, motion pictures and videos in the local area network to the multimedia resource database, which are used as materials for making electronic teaching plans.

(2) Teaching Plan Making Module

The Teaching Plan Module is the chief part of the whole system, through which teachers can add, delete and alter dynamically. Users (teachers) only need to click the mouse and then can easily accomplish the task of selecting information, editing the teaching materials, choosing background and adjusting the size of the texts and pictures.

a. Teaching Plan Browsing Function

With the “Teaching Plan Browsing” module, teachers can, at any time, observe the real effects of the finished teaching plan in the course of editing.

b. Creating Teaching Plan Function

With “Creating Teaching Plan” module, the system can automatically produce the general information stored in the system after a teacher has selected the class and the type of the teaching plan. In this way a teaching plan corresponded to certain students are created.

c. Teaching Plan’s Altering Function

With the Teaching Plan Altering Module, users (teachers) are able to add, delete, alter the teaching plans already finished as well as to reedit and alter the multimedia teaching resource documents.

d. Teaching Plan Ending Function

With Teaching Plan Ending Module, the system can automatically read the teaching plan recently finished and position itself at the ending frame of the finished teaching plan so that users can go on working conveniently.

2. Local Area Network Teaching

The Local Area Network Teaching has three functions, including “Classroom Teaching” “Electronic Hand-Raising” and “After-Class Question-Answering”. “Classroom-Teaching module”, a teacher can freely ask any students to answer the questions he has asked. Students have to answer the questions through the network. If students have any questions to ask the teacher, they can use Electronic-Hand-Raising key to seek answers. This process can go through the whole process of “Class-Room Teaching. “After-Class Question Answering” is a module in which teachers can answer students’ questions after class.

(1) Class-Room Teaching Function

Classroom Teaching Module is aimed at accomplishing the practical teaching assisted by the tentative courseware generated by Electronic Teaching Plan Module. It is realized by the following interfaces.

“Teacher Register” interface deals with the register of teachers’ information, selection of classes and the determination of the difficulty in teaching so as to search for the exact teaching setup in the database and adjust the teaching setup dynamically according to students academic level while teaching.

“Student Register” deals with the register of students’ information so as to connect the teacher’s computer.

After “Teacher Register” and the “Student Register” is “Teacher’s Computer Start” interface, which shows all the students’ information registered. When the subject’s computer and the teacher’s computer are connected, the teacher can choose the time for teaching (default value: 90 minutes). After pressing “Start Teaching” button, the system can check two points:(a) Based on the number of students, i.e. “zero” or “not zero”, the system will automatically choose classroom teaching or after-class browse; (b) With the control of time, the system will refuse to connect the computer applied by those students who are late for class.

(2) Hand-Raising Function

“Hand-Raising” module is used in interactive studies. Interactive studies fully embody the superiority of contemporary software over traditional ones. They include two parts: asking questions (teachers) and raising hands (students). Each part consists of “Questions” and “Answers” respectively. While the teacher is browsing the teaching material (explaining the material) at the same pace with the students, the students can ask the teacher questions at any time through “Hand Raising”. Meanwhile the system will write the questions raised by students in “Students’ Questions” so that the teacher can answer the questions in class or out of class. When the teacher receives students’ questions, the system will indicate “Questions, Answer or Not?” If the teacher chooses “answer”, appears “Answer in Class” interface.

(3) “After-Class Question-Answering” Function

“After-Class Question-Answering” function is used for answering the questions raised by students in class, helping students to consult reference books after class or discussing something further with students. This module is designed for helping individual students, either top students or lower-level students. This module is carried out by the interface of “Information Point Choosing” which consists of “Knowledge Unit Tree”, “Return”, “After-Class Question”, “After-Class-Answer”, “End Class”, “Book Mark” and “Learning Objective”

3. Self-Study and Self-Test [5]

“Self-Study and Self-Test” is used mainly for review after class or self study. This subsystem displays the intelligent individual teaching characteristics. With intelligent individual teaching,

students' initiatives will be brought into full play and their self-educating abilities will be cultivated, which embodies the teaching principle pointed out by Confucius two thousand years ago, that is, teaching should be carried out according to the difference of students.

(1) "Self-Study Managing Module"

"Self-Study Managing Module" performs the register of students and offer self-study interface. To enter this module, students first have to type in correct user's name and password, then they can select the teacher. After doing this, they can go into corresponding subject to study and have a test. Through the interface of "Self-Study" in "Self-Study Managing Module, students can study at their own paces. This system can automatically record students' present study level and the last time stop point and accordingly choose the "Establishing New Teaching Plan" to generate new teaching plan which varies from person to person. Students can use the new teaching plan to study by themselves. If students have any questions in the course of study they can write down these questions on "Electronic Blank Board. The system can retain the questions automatically and teachers can answer the questions after class. Students can obtain the answers to these questions next time when they register.

(2) Self-Test Managing Module

"Self-Test Managing" module is designed for testing while students are studying by themselves. The functions are as follows: (a) Based on students' mistakes in the test, the system offers analysis and further suggestions; (b) Recording the results of each test about every problem, every key knowledge point or every unit so that students can evaluate themselves or analyze their mistakes; (c) Evaluating students' abilities (basic ability, operating ability and comprehensive abilities) according to the results of the tests;. (d) Timing; As soon as students enter a test, the system will count down. When time is up, the system will automatically stop testing; (e) Generating test paper automatically based on the test paper bank set up by teachers in advance.

Test papers of different items are generated according to different sampling formulas that should be given while generating test papers.

III. Conclusion

The idea of "integrate ware" which is the invention of Chinese educators is a breakthrough in designing courseware. "Integrate ware" has changed the static and unchangeable quality once a courseware is generated. The idea of "integrate ware" can help people share multimedia-teaching resources in the network and make it convenient to exchange ideas in teaching. Meanwhile, "integrate ware" makes it easier to change the idea of sequent courseware making into that of hypertext, so that teachers can concentrate on the preparation of teaching materials, the selection and design of media, the organization of teaching setup and all kinds of administration. "Integrate ware" has also changed the mode of courseware development from the traditional sequential mode to the new three dimension mode, which will enrich teaching materials and improve knowledge acquisition. "Integrate ware" based network ICAI integrate tutoring system provides teachers and students with an ideal environment where operating is simple and functions are complete. With this

environment, teachers can easily generate temporary courseware, renew teaching materials and change the form of media in line with the development of science and technology. Teachers can also adjust teaching materials to offer specific teaching to individual students according to their own levels. This environment make it possible for teachers to teach and for students to study in an interactive way in the local area network and students can choose proper materials to study and evaluate themselves according to their specific needs.

We believe that CAI based on the idea of “integrate ware” will be one of the trends in the development of CAI in China

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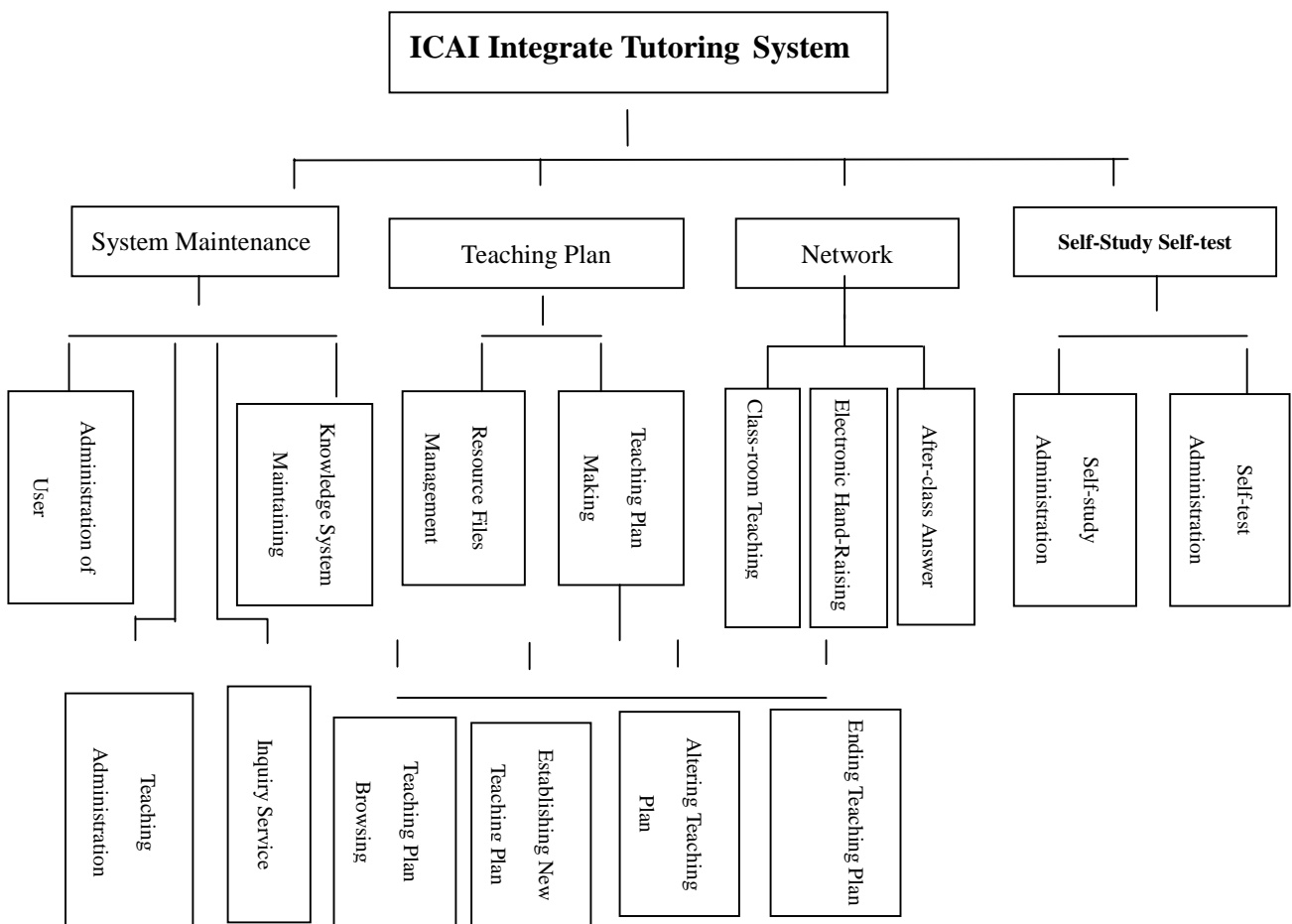


Figure. General Structure

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