

The Design of a Web-Based Distance Learning System: A Prototype

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Abstract

The most effective way of learning is the interaction between the instructional material and the students. Distance learning system combines the information and communication technology so as to provide an interactive environment for students without meeting with the instructor, especially for extension education students so that they can learn the material at home or at his company via the Internet.

Keyword: Quality of Service (QoS), Distance Learning, Integrated Services, Asynchronous Transfer Mode (ATM), Priority Key

1. Introduction

Traditionally, learning employs only one-way communication: the students listened to the instructor's lecture in a classroom without intensive participation. Due to the rapid progress of Internet technology nowadays, students can learn the material by using the network facility beyond the classroom at any time and anywhere, and thus the teaching type has a revolution change. In the future, students can learn the material by using the computer network technology. In addition to recording the class material for reviewing at any time, students can ask questions to the instructor by the Web-base distance learning system as well. In other word, the distance learning system improves the traditional teaching type so that learning become more conveniently and more effectively. The final purpose of distance learning system is to provide a **Just in Time Learning and Learning without Walls** of learning environment to everyone [3].

In the following section, we consider a general guideline of a long-distance learning prototype, and then we will focus on how to create the system.

2. The Concepts of Long Distance Learning

There are the two key components in distance learning system: real-time broadcast teaching systems and virtual classroom teaching systems.

2.1 Real-time broadcast teaching system:

The architecture of real-time wide band and narrow band broadcasting teaching system are shown in figure 1 and figure 2 [1][3]. The teaching system is composed of one main broadcasting room and one or more classrooms at another place. Instructors teach the course material in the main broadcasting room and students who participate the distance-learning course listen to the literature at the classroom located on another place. Instructors and students can ask and answer the questions interactively at real-time.

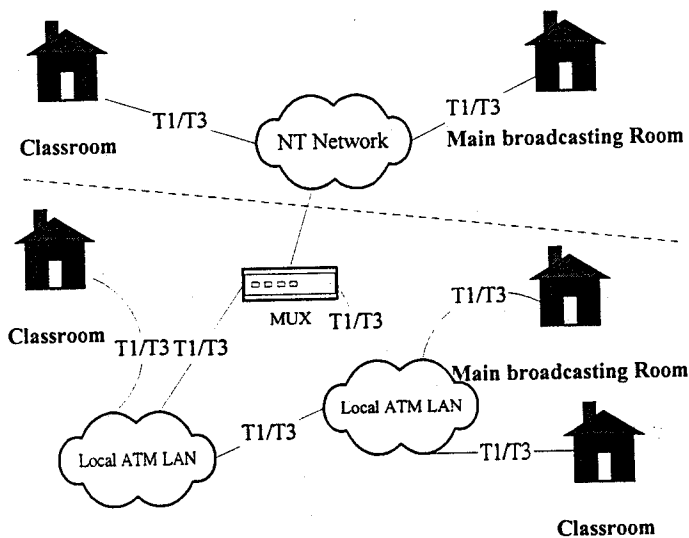


Figure 1. The architecture of real-time broadcasting teaching system (width frequency)

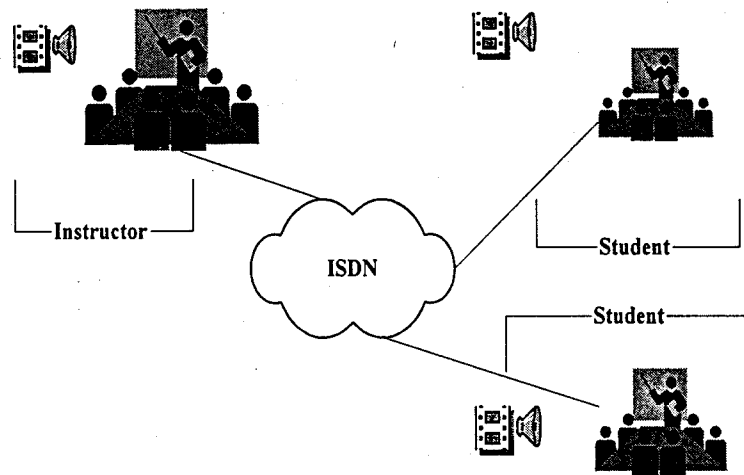


Figure 2. The architecture of real-time broadcasting teaching system (narrow band)

2.2 Virtual classroom teaching system:

Instructor designs a teaching system before the class by computer. System will impersonate the real classroom, contain teaching material, homework, and examination. Student and teacher can communicate each other by using computer network. The basic architecture of Virtual classroom is represented in figure 3 [6].

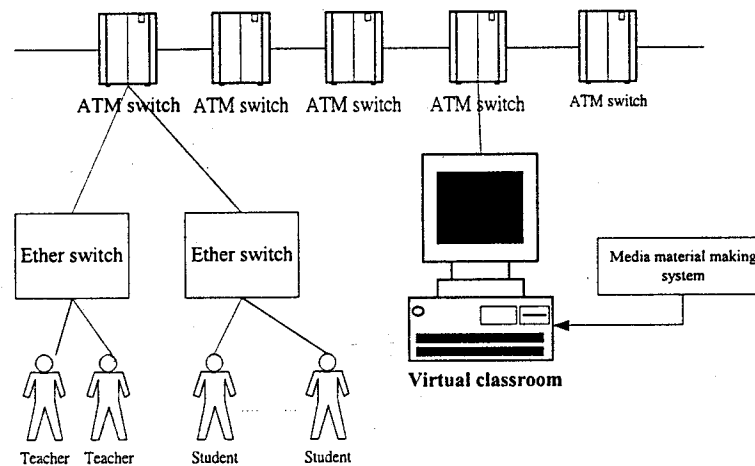


Figure 3. The basic architecture of virtual classroom

3. The Prototype of Web-Base Distance Learning

An overview web-base distance learning system is illustrated in figure4 [4]. The implementation is divided into six processing units: The Flow Chart of Web-base Chinyi distance learning system is presented in figure 5, which includes the user interface, administration system, security subsystem, Multimedia subsystem, Student ID database system, and web-based teaching material knowledge-based subsystem.

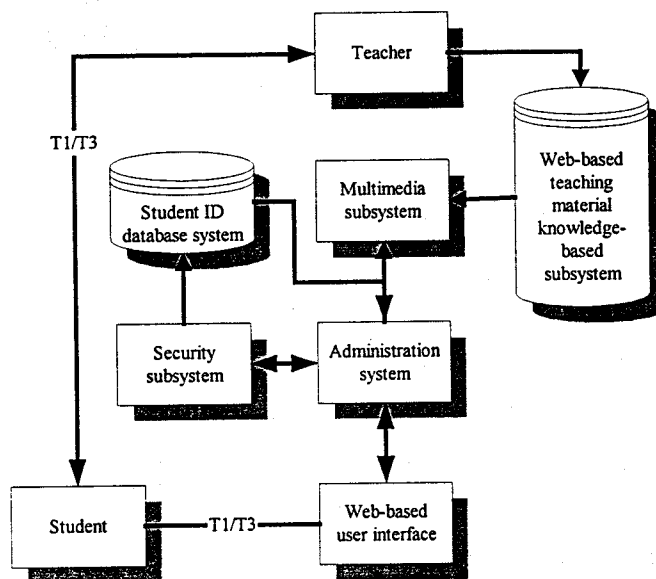


Figure 4. The system block design of web-based distance learning

3.1 The Web-based user interface

The web-based user interface provides a negotiation function between student and teacher.

3.2 The Administration system & Student ID database system

The Administration system consists of student registration processing and courses scheduling. When a student connects onto the Chinyi Distance Learning System (CDLS) at the first time, he will be asked to fill out the registration form.

3.3 Student ID database system & Security subsystem

When the registration process succeeds, system will give a number to the student. Then the student's information will be stored into Student ID database system, after that the student can select which course he want to learn, as shown in figure 6.

For security, we used two bits checking to check who is the extension education student or not. We define the first and second bit as a priority key. If the key is matched, the student will be allowed to connect into the Chinyi LDLS. The architecture of two bits checking is shown in figure 7.

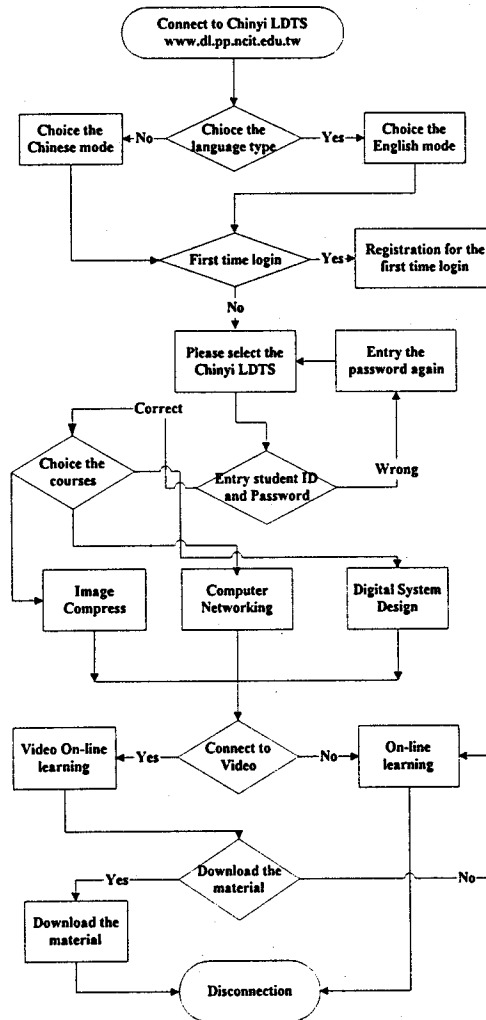


Figure 5 The Flow Chart of Web-based Chinyi long distance learning system

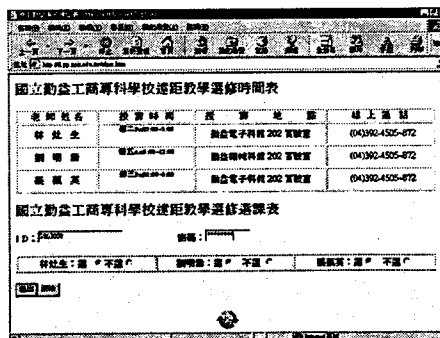


Figure 6 The Chinyi CDLS selection form & timetable

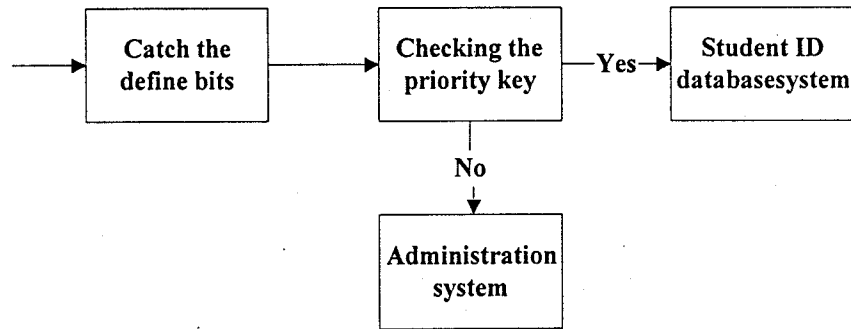


Figure 7 The architecture of two bits priority key checking

3.4 Multimedia subsystem

To make the learning more interesting, students can choose the on-line learning mode or video on-line learning mode. The video on-line learning is represented in the figure 8 in which student sees the teacher or teaching material on screen.



Figure 8 Video on-line learning mode

3.5 Web-based teaching material Knowledge-based subsystem

Instructor will put the material on web pages before the class begins. Students can fetch the material by the web network. In the subsystem, student can select the whole topics or sub topic to learn. On the other hand, instructor could post all the information on his home page, such as the scheduling, exam or homework. A sample of on-line teaching material is shown in figure 9.

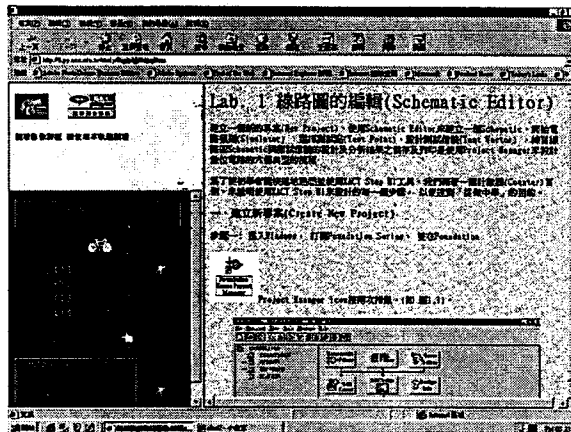


Figure 9: On-line teaching material

5. Conclusion

The distance learning system combines the information and communication technology to provide an interactive environment for learning without meeting with the instructor, which is good for extension education (EE). The extension education student can learn the material at a convenient location through Internet or cable TV backbone, and ask the questions by email or net phone.

6. Reference

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以全球資訊網為基礎之遠距教學系統模型設計之 研究

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中文摘要

遠距教學是結合資訊與通訊技術，提供給學習者一個不需與老師面對面授課的雙向、互動學習途徑。本計畫為本校推廣教育遠距教學的原型，最終目的在建立一個以有線電視及網際網路為骨幹的遠距教學系統，使參與本校推廣教育或建教合作的學員，只要在自己家中或公司即可透過有線電視連接網際網路，進行即時互動的學習。由於有線電視網路頻寬高，可滿足媒體傳輸「服務品質」(QoS)的要求，並且大多數家庭或機關均已架設有線電視，因此毋需二次施工，大大降低成本，非常適合發展作為推廣教育的遠距教學平台。

要達成上述目的，必須先將部分單向的有線電視系統轉換為雙向，以達到互動式的要求。由於雙向、互動的有線電視教學尚未有先例，為確認本項技術之可行性，擬利用本專案，執行先期的工作，以現有網際網路取代有線電視網路，作為資料傳輸的骨幹，建立一個 Web-based 的雙向教學系統。授課老師以事先錄製完成之教學帶放映，學員則以 Web 瀏覽器(如 Internet Explorer, Netscape)等同時閱讀教材或作相關之練習，而學生亦可透過現場之攝影機以 Web 瀏覽器了解上課的情形並回答問題。