Designing an Web Based Distance Learning System with Adaptive Testing Module

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Abstract: This study presented a Distance Learning System that can improve the performance of the distance learners and also diminish the distance between distance learners virtually. We have proposed a framework for designing an Web based distance learning system with Adaptive Testing Module which can give more benefit over traditional systems and is far applicable for broadcasting knowledge. Present system provides a virtual environment, where students can get much feedback than traditional distance learning processes. Here in this study we have emphasized in collaborative teaching, mutual learning, virtual session classes and adaptive evaluation system for Distance Learning. We have also considered the implementation issues and its limitations.

Key words: Virtual University(VU), distance learning, JSP, servlet, ER diagram, adaptive testing

INTRODUCTION

Distance learning is not a very new idea. But its concept is changing with time, places and people. The differences between traditional in-class courses and distance learning courses create sever-al factors which need to be addressed in distance learning course design. First, traditional courses are face-to-face synchronous courses. This means that learning occurs with the instructor in front of the learner and instruction and learning occur simultaneously and in the same place. This personal interaction between the two gives the instructor the opportunity to provide feedback, direction and to observe learning activities. It gives the learner the opportunity to solicit feedback and receive responses and directions in real time. Second, traditional courses place the learn-er with other learners. Learners are able to draw from each others experiences and interact in groups. Third, the requirement to attend class creates a responsibility for the learner and provides a source of accountability, possibly increasing his/her motivation to perform the required tasks.

In fact, a distance learning system can not provided all these facilities in a bundle. But present web based distance learning system is capable of meeting the most of the above commitments. By using online course materials, electronic libraries, bulletin boards, conferencing facilities and carefully designed secured webpage we can make a good system that is capable of handling above criteria. Further on a web based system our proposed system lets the students submit assignments online and receive an evaluator’s review of their assignments. One of the key features of our system is that we can use automated evaluator or examiner which we call adaptive testing module.

TRADITIONAL DISTANCE LEARNING SYSTEM

Traditional distance learning system consists of three phases and it's activities are much complex compared to present WBDLS.

Phase 1. Student support services: Student Support Services is required to admit students and provide support to them. It distributes books and cassletes among the students, arranges tutorial centres, appoints coordinators and tutors hold examinations, announces results and distributes certificates.

Phase 2. Tutorial services: Tutorial Centres should be set up in different parts of the country to extend tutorial services to students. Twice a month tutorial classes should be arranged for students of every programme.

Phase 3. Media services: The main function of the media division is to produce audio-video educational programmes. Every distance learning student of a formal programme is provided with a set of audio cassettes containing course materials together with a set of textbooks. Distance learning programme should also be broadcasted by radio everyday and six days a week by television at a fixed time. The preparation of programmes for educational broadcast is a team work in which teachers, script writers, producers, camera-men, sound technicians and presenters take part.

Phase 4. Library services: Library facilities should be available at the regional resource centres and in the main campus. The regional resource centre libraries provide facilities for listening and viewing of audio-video cassettes and reading and reference books for the
students of distance learning. It provides reference and reading materials to teachers, research students and members of staff.

FRAME WORK FOR A VIRTUAL UNIVERSITY

We have designed a distinctive frame-work for web based distance learning that can be applicable to design a virtual campus for distance learning students. It's most interesting feature is that it uses continuous assessments. It's Students don't need to attend evening classes as in traditional distance learning. Being distance education, it's still convenient.

Designing an web based course curriculum: First step to make an Online Virtual University is to make its course curriculum that is applicable in WWW. Which should be demonstrably compatible with the objectives of comparable courses delivered by other means. The courses are designed with voiceovers, 3-D graphics, flash animations, on-screen text and 'visual' sentences turn complex concepts into easy-to-understand images.

Web server: For hosting present prescribed system we need a server. Apache Web Server is one of the most popular Web Server. It is an Open Source free HTTP Server. It has platform independent versions. That is why we have preferred Apache as HTTP server[1].

We have installed the Apache web server according to the informations from following address :

http://httpd.apache.org/docs-2.0/
http://httpd.apache.org/docs/install.htm

Designing front-end interface: Consistency in the web interface allows it's students to easily learn and recognize the course curriculum. It also makes repeat-ed visits and information retrieval from the same site easier. Students feel more comfort while taking their notes from a familiar environment again and again. So, present system is armed with consistent/complimentary backgrounds, font type, font size, icons, logos, banners, last update date and time of page, contact information, copyright information. For designing a good inter-face of our VU, we have used MS Front Page XP with HTML and DHTML[2].

Web database: We use My-SQL Database Engine. It is the world’s popular Database System designed for speed, power and precision. It is also free, so we have preferred this one. For improving the performance of our system we have included, support for searching and locating information by using advanced query techniques. We have to maintain all student informations, notices, exam schedules, questions, results, online library, bulletin boards and all other informations in the above data base.

Towards designing a database : ER diagram : To design an well structured database for our VU we have drawn a Entity Relation(ER) diagram of our system. It is developed to facilitate database design by the specification of a real time university.

Implementing DB Technology on web : We have chosen Java Server Pages to be the technology that can be taken to do all functionality instance tasks[3].

All application level logics implemented using Java Beans. We have used JSP Templates to implement interactive courses. JSPs are run in server side component known as JSP container, which translate them in to equivalent java servlets[4]. So the resulting servlet is a combination of the HTML from the JSP file and embedded dynamic content. Since JSP is secure, fast and independent of server platform, so our system is made convenient.

Technical requirements: We needed one or more server machines to implement our VU. Here goes a brief specifications: Processor – Pentium-class or Ultra SPARC II or higher, RAM -512MB, OS -Windows 2000 Sever, Browser- Internet Explorer 6.0, Netscape 7.x or Mozilla 1.0 and high-er, Java Enabled, Cookies Enabled. Plug-in-Macromedia Flash 5.0 or greater, display Settings- 800 x 600 resolution, high color (1024 X 768 or higher recommended), Internet Connection-56kpbs or better.

CONTACTINGEXAMINATIONS ON VU

Examining student’s performance in webased learning is not a easy task. There remains many ways to cheat authority. Infact, to remove this difficulty we have chosen Adaptive Testing Module (ATM) to find out the real genius.

Adaptive testing module design issues: An ATM works like a good oral exam. It first presents a question of moderate difficulty. After the answer is given, the question is scored immediately. If the answer is correct, the test statistically estimates the person's ability as higher than previously estimated. It then finds and presents a question that matches that higher ability. (If the first question is answered incorrectly, the opposite sequence occurs.) The test then presents the second question and waits for the answer. After the answer is given, it scores the second question. If correct, it re-estimates the person's ability as higher still; if incorrect, it
question answered. The test ends when the accuracy of that estimate reaches a statistically acceptable level or when a maximum number of items has been presented. Figure 1 shows the estimation of a test taker's competence after he or she answered each of 10 test questions. Notice how the ability is estimated lower after questions are answered incorrectly (Questions 3, 6, 8 and 10). The dotted vertical lines indicate the amount of error associated with the ability estimates (and correspondingly, the degree of confidence in the score). As more questions are presented and answered, this error amount decreases.

The Adaptive Test (AT) usually ends when the amount of measurement error around the ability estimate reaches an acceptable level. A pass/fail score is also determined by this method[56].

**Point and Drag Sessional classes:** A major problem in distance learning is to conduct the sessional classes. We have tried to overcome this important drawback of distance learning here. We have designed an web based application with JSP templates to carry on the sessional classes for several courses. Our interactive webpage contains several figures and utilities through which students can prove their practical knowledge by using point and drag tools.

**Security in examinations:** Our system proposes to use secured testing centers for conducting examination process. A secured testing centers allows only the authorized people to enter into the examination laborotory or hall, which is equipped with above specified machinaries, PCs uninterruptable power supply and internet connections.

**RESULTS AND DISCUSSIONS**

An Web based university is increasing popular topic in today's world. It is a new concept in Bangladesh. In our country we have one Open University which is conducting the distance learning activities.

But we can expand this activity by making virtual campuses for several universities. HTTP and TCP/IP protocols are available in Bangladesh. So, it's not a hard task to implement a VU here.

**CONCLUSIONS**

The objective of this research was to define a framework for Web-based distance learning or VU. We have also showed its implementation level activities and
working criteria. Our pro-posed system is easily expandable, separable, maintainable and upgradable. It provides a very strong user level security. It is highly interactive and user friendly. We think it is far applicable for the students who wish to continue their studies but do not have enough time and opportunities.

But one major problem that still exists in web based distance learning is the students’ frustrations. Working alone over night/ evening, poor feedback and technological problems can cause these frustrations. We are trying to improve our system so that it can compete with a real time distance learning system which generally do not face these type of problems.

REFERENCES

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