JUSTCE: A Secured and Reliable E-learning Portal

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Abstract— E-learning means electronic learning. Generally it means to deliver any type of course for school, university and other business purpose by using computer and internet. Now a day's e-learning system is becoming more popular day by day. There are two types of e-learning systems they are synchronous and asynchronous e-learning system. Most of the e-learning portal includes both synchronous and asynchronous features. Though there are many but WebCT and Blackboard are two popular e-learning systems till now. Both systems have its' own advantages and limitations. In this paper, we have proposed an architecture for e-learning portal called JUSTCE (JUST Center of Education). The portal includes both synchronous and asynchronous features. Separate server to provide authenticated access and synchronous and asynchronous service makes the architecture more secured and reliable. Moreover more useful facilities have been added in the proposed portal. The aim of this work is to provide an easy, fast, more useful and secured e-learning portal for learners and teachers.

Index Terms— WebCT, Blackboard, Encryption, Portal, Authentication, Server, Streaming, Tool.

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1 INTRODUCTION

LEARNING is such kind of phenomena that cannot be measure but its result can be measured. Every people learn a lot of thing in their life and want more learning until they die [1]. Traditionally, in our educational system students usually go to educational institutions in quest of knowledge. They must be present at classroom to achieve knowledge and also carry book, paper and other necessary things. But its waste their time, cost and energy. In the era of computer and internet, the problems of traditional education system can be solved by providing IT based education. IT-based higher education is found to be a feasible and economical solution in improving the traditional education model [2, 3]. E-learning is an IT-based educational portal which represents a service point providing various services related to students' online education [4]. The term "e-learning" first is known since 1999, when the word was first utilized at a CBT systems seminar. The e-learning system/portals have developed to serve both virtual and traditional educational institutions [5]. Consequently the e-learning portals have been evolved as experimental tools in implementing online courses with existing classroom education [6, 7, 8]. Several e-learning portals have been prototyped for exploring the feasibility of developing an effective e-learning in the place of traditional education [9].

There are two types of e-learning systems synchronous e-learning system and asynchronous e-learning system. In synchronous e-learning student and teacher both interact face to face via online at the same time. Learners and teachers experience here as more social and avoid frustration by asking and answering questions in real time [1]. The benefits of this system include cost effectiveness compared to conventional education, high flexibility, and rapid feedback and encourage participation [10] and high scalability. The limitations of this system are it is not suitable for students from several time zones [10], requires high speed network, and may not be ideal for

those who have busy schedules. On the other hand, in asynchronous e-learning system lesson or course work are delivers via CD-ROMS, web, email and multimedia contents. The major advantage of this system is that student and teacher need not to interact with each other at the same time. But the drawback includes learners and teachers experience less social.

Both synchronous and asynchronous e-learning system has some pros and cons. The hybridization of both can be more beneficial rather than working singularly. There are several hybrid e-learning portals that are used at present to support either a partially or completed the on-line education. Among them Blackboard [11, 12] and WebCT [13] come with a rich set of features that are suitable for implementing a standard e-learning model. In a Gartner Group's 2002 "Distributed Learning in Higher Education" Survey reports that 38% of users use WebCT, 26% of them us Blackboard, 25% no campus standard and 9% other[14]. Thus Blackboard and WebCT have gained the interest of many researchers particularly in their prototyping experiments [15]. The problem with WebCT is that it is heavily frame-dependent. Frames have a tendency to load slowly, can be cumbersome to navigate, and require more memory than Web pages without frames [16]. Blackboard has a disadvantage of lacking the features for testing of all skills and activities and security [17]. In this paper, an architecture for e-learning portal has been proposed considering simplicity, usefulness and security. The features included in the proposed portal are both synchronous and asynchronous features. Separate authentication server has been used to provide authenticated access to the system. The information flow between the web server and the JUSTCE server is maintained by means of encryption. Synchronous features require continuous service whereas asynchronous features have more users. Considering this fact, separate servers have been used in the portal to provide synchronous and asynchronous service. Section II,

describes the details working principles, tools used and features of the portal including the architecture (Figure 1). Section III, concludes the paper.

2 PROPOSED E-LEARNING PORTAL: JUSTCE (JUST CENTER OF EDUCATION

2.1 The Architecture

The architecture of the proposed e-learning portal is designed as Figure 1. The major components of the design are described as following

End Users: The end users use the portal. The end users may be students, teachers, guests, administrators. All end users have to be registered of the portal.

JUSTCE Web Server: All users including teachers, students and administrators communicate the portal using this server. To provide a specific facilty to user, the server can communicate with other components.

Authentication Server: This server is used to provide authentication of the portal. Authentication server uses a secured cryptographic communication with JUSTCE web server.

Users File System: The user file system stores all user personal file like assignments of students, class lecture notes of teachers etc. The user can browse his/her files from this file system.

Synchronous and Asynchronous Server: Two separate servers are used to provide synchronous and asynchronous features to users. The use of two different servers reduces the loads of both servers. The synchronous server is supported with some live streaming tools and the asynchronous server is supported with some software tools.

Figure 1: Proposed E-learning architecture

Data Saving Tools: After getting service from synchronous server data saving tools are used to store the data for future references. For example, the live streaming of class lecture can be saved to server using class lecture recorder to watch it later or to store chatting data to view chat history.

Other Servers: The portal uses other different servers including database server to maintain databases of students, teachers and administrators information; compiler server to provide compilation service to users' data; digital library server to provide digital copy of books, journals, magazines in pdf forms.

2.1 Working Principle

In the proposed system architecture (Figure 1), the working principle of the portal as follows

User Authentication: Users request the JUSTCE web server to log in the system with his/her user id and password. In terns web server uses the authentication server to verify the user log in request to ensure the authenticity of user. JUSTCE web server permits authenticated users to login and access portal resources. To provide secured communication between the authentication server and JUSTCE web server, the information is flowed in encrypted form.

Resource Access: The authenticated students can access his/her file from the file system for example assignments. He/she can also access to synchronous or asynchronous features using synchronous or asynchronous server according to their demand. For example, he/she can make a chat with his/her teacher using the chat tool (synchronous feature) or can browse course related information (asynchronous feature) using course management tool. The synchronous server is supported with various live streaming tools such as video conferencing tool, chatting tool. The authenticated teachers can access his/her file from the file system. He/she can make a video conference with his/her student using video conferencing tool (synchronous feature) or can see the progress of a student like exam marks, assignments (asynchronous feature) using student management tool.

2.2 Tools Used in Portal

Student Management Tool: Teachers use student management tool to view the details information about a student. The information includes name, address information, contact information, photo of the student etc.

Course Management Tool: Course management tool is used by both students and teachers. Students use this tool to make a registration to different offered course and teachers can see the list of students registered the courses. The tools also give the details of the teacher assigned, class schedule for a registered course and also mark distribution of a course.

Smart Exam Management Tool: In a specific course, student generally takes two types of examination. The first one is skill test required to register a course. This examination is about to test a student whether he/she is qualified to register a course. The second type of examination is lesson related to a registered course. This could be chapter-wise exam and course final exam. This includes predefined timed quiz test, assignments etc. Students can see the details examination schedule of registered courses using this tool. Teachers can see the status of
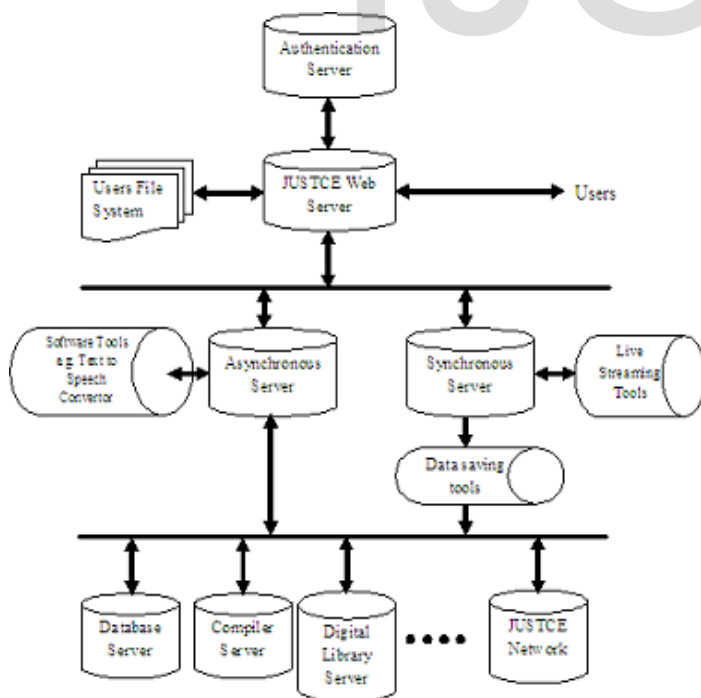
assignments.

Grading Tool: Teachers can track the progress of the students using this tool. Teachers use grading tool to see obtained marks by details in a specific registered course. Also teachers can put marks by parts manually. Also he/she can calculate grades for students. The grade tool is also provided to the students where they can view their individual scores, minimums, maximums, and average grades for each course component.

Blogs: The blogs allows participants of the course to communicate with each other at all times. This takes the form of an asynchronous discussion. Both teachers and students use blogs to share their views, comments or solution to a problem.

Chatting Tool: The chat tool provides real-time communication options for the participants. Teachers and student can communicate each other at the same time.

Text to audio Conversion Tool: A text to audio converter is a converter which converts a written text to audio sound. By this converter, a student can easily hear audio that texts are posted. If a student feels boring to look at computer screen long time or has eye-problem, he/she can hear audio sound of the corresponding text.

Live Streaming Tools: Live streaming tools are used to support real time video/audio communication like video conferencing between teachers and students.

Data Saving Tools: Live streaming tools are used to support real time video/audio communication like video conferencing between teachers and students. Teachers can record the audio/video of a video conference and save to server using data saving tools for future reference.

2.3 Features of E-learning Portal

There are many exciting and interesting feature in the proposed e-learning portal. These are given below.

System Authenticity: Authentic learning environment in the constructive tradition are situation that allow a learner to create their own personal knowledge in a particular task. To ensure authenticity, all users have to register as a student/instructor to use the proposed e-learning portal,

Course Information: There are some category of courses are include in the portal such as weekly courses, monthly courses, quarter-yearly courses and half yearly courses. Each type of category has many courses. For example, the weekly courses include data structure, C++ etc. A student also can see the name, class duration and the complexity of the class.

Skill Assessment: A pre-test must be taken by a registered student before registering the course. The question of the pre-test is related to the pre-requisite knowledge to complete the course.

Course Registration: After skill assessment, a registered stu-

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dent can register the course for which he/she has taken pre-test. A student have to score a minimum marks to qualify for registration of a course.

Smart Exam System: The proposed e-learning system provides two types of exams. The first type is chapter-wise exam and course final exam. Generally in chapter-wise exam, close questions such as multiple choices, true/false are provided. On the other hand, course final exam includes both open and closed questions. There is predefined time limit to complete both types of exam. Generally the student gets their obtained marks in chapter-wise exam. But in course final exam the result and grade is published by the admin/instructor later.

Multilanguage Support: In this system a translator is include which converts the system form one language to another. A student can convert the system to his/her native language. Suppose a student who is an Africans and do not well in English can convert this site from English language to Africans language. As a result he/she can easily complete his course. Complete a course in other e-learning has some problem the system which does not convert a user native language. For this translator the problem can be solved.

Text to audio conversion: A text to audio converter is a converter which converts a written text to audio sound. By this converter, a student can easily hear audio that texts are posted. If students have felt boring to look at computer screen long time, he/she can easily hear audio sound. Otherwise if a student has eye-problem, he/she can complete his course by listening audio conversion of text.

Tutorials: Generally, curriculum tools rely primarily on a text-based [18]. There are many types of courses in the proposed e-learning portal such as c, c++, system simulation, software engineering, Data base etc. Coding course contains sample files where a student can copy the contents into a compiler. As a result, a student will be able to practice. If a student needs additional information they get link to access additional information on related topics.

Multimedia Support: An instructor can add any media content into the lesson. Such as video, audio, pdf, word document etc. A student can see the video from the lesson and also can download the video and audio. Beside these they can also see and download the pdf, word document etc.

Student Feedback: In any lesson the student which are including in the system and the instructor can comment and discuss among themselves about the lesson topics in the comment box area by submitting the text.

Event management system: Here include an event system in this system. If any student want to see any upcoming event such as programming contest, gaming contest etc they can submit the date and search that, If there are any event are include in that day the list are then show.

Class Lecture Recorder: In the class lecture recorder option an instructor can record a class and uploaded to the site and the student can download that video.

Video Conferencing: There is a video conferencing facility in this portal. A student can take any lesson face to face. The student can see the live class of an instructor. It is like Virtual Classroom system.

Smart Content Search: There is a facility of searching in this portal. A student can search anything by typing any keyword

they want to find in the search box. They can find that content which are included in this system. There is also a Google search option they can find anything by typing in the Google search box.

E-mailing: E-mail facilities can be added to allow one to one communication between students or teachers and students.

Chatting: The portal provides the facility to chat real time between teachers and student. The condition is that they have to be in the portal at the same time.

3 CONCLUSION

The 21st century is the century of information technology and the world is in hand. E-learning is a popular word where student learns from teachers using internet and without going to typical classroom. Though there are many e-learning portals currently available but none of these without limitations. They have security and more feature demanding issue. In this paper, an e-learning portal called JUSTCE has been proposed which takes advantages of both synchronous and asynchronous e-learning features. The architecture of the proposed e-learning portal has been drawn as Figure 1. The portals reduce the security problems by using separate authentication server. The proposed JUSTCE portal provides many useful features. Some of the features are not available in all existing e-learning portals like text to audio conversion, class lecture recording. After all discussion, JUSTCE is a secured hybrid e-learning portal with many useful features.

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