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Security and Reliability Requirements for a Virtual Classroom

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Abstract

The continuous advancement in the field of high speed online services has opened the door for various social services. One such area is education. There are many underprivileged persons in the world who do not have access to quality education. Concerning this, we propose a Virtual Classroom system that provides users a real-life experience of a classroom environment without the need of physical presence of either the instructor or the student. In this paper, we discuss the architecture of such a system and the methodology used in developing such a system and later describes the results achieved through using it.

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1. Introduction

Education is important for every human being as an individual and as a society. As our society becomes more complex and developed, education will become more important[5]. However, the unequal standard of education and the varying education systems and curricula across the world and even within one country are still a major problem that needs to be resolved. Subsequently, efforts are being made to make education universal and reachable for everybody especially the underprivileged and handicapped[9]. There are still some places in the world where education has not reached, resulting in mass illiteracy. Moreover, it is imperative that the right of every person to have equal opportunities to get education is honoured. As the development of a country completely depends on the availability of proper education, certain steps must be taken to improve it.

The continuous development in the field of internet has allowed us to reach people and disseminate information in a manner which was beyond our imagination just a few years ago. It has aided us in various fields of life[6]. The

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field of education has also greatly benefitted from it. Internet lets students increase their knowledge on their particular subject in the comfort of their homes and hometowns. Internet has emerged into one of the fastest and convenient tool that can be used to explore and grasp knowledge about the topics of one's interest[10].

With these factors in mind, we propose, in this paper, a Virtual Classroom that allows users to use all features of real classrooms just by being online and connected to internet. It allows students and instructors belonging to different geographical locations to communicate with ease. Furthermore, it is capable of accommodating one-to-one and one-to-many coaching models. The Virtual Classroom application offers classrooms for different subjects. Students would enrol themselves into the course they desire by filling in the formalities online. The schedule of every class would be made available to the enrolled students. A database is maintained to manage attendance and student records. Other notable features include aspects from attending live video lectures to discussion forums regarding the course to assignments, quizzes and exams.

Lectures are delivered in form of a webinar; a white board would also be available to assist in delivering better understanding of the subject being taught. An instructor could take a pop quiz or carry out an activity to keep a check on the student's performance any time. Study materials such as video lectures, slides, assignments and solution to the assignments would be available on each particular course section. Students could attend the lecture online by logging in to their respective profiles; they could keep track of their attendance and progress in the course. If a student is having any issues and requires individual assistance, he/she can approach the respective instructors via the chat box option and obtain an answer to their query. The rest of this paper is organized as follows. Section 2 provides the literature review. Section 3 discusses the functional and non-functional requirements of a virtual clinic. Section 4 presents the design and architecture of the virtual clinic application. Section 5 presents the concluding remarks and future work.

2. Literature Review

Toles, in his paper, mentions that any individual who opts for a virtual learning environment is missing on the physical essence of a classroom which provides face to face interactions with not only the teacher but also the peers[1]. Input from and interaction with peers is also a major part of learning and virtual education does not usually provide that. We, in our proposed system, have attempted to introduce the peer-to-peer education element by including the facility of group discussions among students using audio and video conferencing. Usually, this video conferencing facility is provided by third parts tools in existing systems. Another issue raised by Toles is that of trained professional teachers; instructors are usually fully adapted to traditional classroom teaching environment and may lack the expertise to deliver lectures on an online class. In this paper, we propose that the virtual environment should strive to be as close to the traditional environment as possible to reduce the environment-specific learning required and increase the comfort level of both the instructors and the students.

The virtual classroom discussed paper by Yang and Liu comprises of two parts: Instructional Communicating Environment (ICE) that contains learning materials and lecture videos and the Collaborative Learning Environment (CLE) that supports active learning by providing the environment with learning tools, learning materials and contextual discussion for learners[2]. These learning processes were compared and it was found that CLE is more efficient than the ICE as it provided more interaction. This indicates that some interaction, even if it is via video conferencing, improves the learning experience. The authors state that learning efficiency is determined by learning methodology. Our proposed system is more similar to their Collaborative Learning Environment in that we also provide direct interaction facilities.

Subramaniam and Kandasamy conducted a research study in Open University Malaysia (OUM)[3]. OUM provides a virtual classroom environment which has been created on myVLE learning management system which is an asynchronous-based online learning framework. The aim of this study was to explore student's perception about virtual classroom and the factors that enhanced their learning capabilities and also how virtual classroom has contributed in their self-managed learning skills. The virtual classroom provided by OUM comprised of many learning materials and tools which collectively include iBook, iTutorial, iLecture, iForum, cForum, Smart Forum, iHelp and self-assessment activities. The primary results indicate that students give priority to real time classroom environment over virtual classroom. Students consider virtual classroom as a secondary choice and it has moderate impact on their learning skills[3].

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