CONSTRUCTION OF A WEB-BASED VIRTUAL CLASSROOM AND ITS EFFECTIVE ANALYSIS

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Abstract - In classroom, information between teachers and students includes course content and learning scene. Course content is mainly information, and learning scene is assisted information that can effectively prompt learners exchanging idea and acquiring knowledge. A based-web virtual classroom should have the same features. Because of the limitation of bandwith and QoS of network, it is very difficult to transfer teaching and learning information by video in internet. The paper probes into a strategy of developing virtual classroom by the streaming media technologies.

By contrast with two kinds of information, the web-based virtual classroom we built includes two parts: Real Time Teaching Environment (RTTE) and Collaborating Learning Environment (CLE). RTTE transports course content and feedback information into teachers or students.

This paper firstly discusses the strategies of creating a virtual classroom for the remote learners. Secondly, it designs the architecture of a virtual classroom.

Index Terms - interactive learning, virtual classroom, synchronous and asynchronous, streaming media

INTRODUCTION

What are the main guidelines for designing an effective web-based virtual classroom? It depends on Information Technologies (IT) and learning theory. Streaming media technology is one of kinds of IT that can facilitate education delivery and improve QoS of course content in network. Learning theories like objectivism, constructivism and collaborativism can also provide some benefits for building the virtual environment. These theories emphasize that interaction and motivation play an important role in learning and teaching process. A virtual classroom should not only impose on the combining application of different interactive tools, but deliver instructional information and learning scenario to the learners. In addition, a teacher could control the learning and teaching process.

DESIGN OF VIRTUAL CLASSROOM

Characteristics of Virtual Classroom

Some care need to be given to the every aspects of the virtual classroom so that a virtual classroom will become more prolific. There are some basic features involved here.

- Promoting the interaction between teacher and learner or between learners.
- Delivering teaching information. Tongue and gestures of a teacher and learning scene can make learners a “live show” and motivate them to learn.
- Building a competitive environment. [1]
- Presenting supplementary materials. [2]
- Providing multiple communicating tools for end users.

Construction of Virtual Classroom

The emphasis of building a virtual classroom is to establish a synchronous based-web teaching environment (RTTE) and an asynchronous learning environment (CLE). The architecture of a virtual classroom is composed of broadcasting center (real classroom), virtual classroom, local network and servers in our project.

A broadcasting center is composed of Teaching Information Processing Unit (TIPU), Environment Information Sampling Unit (EISU) and Control Unit of Virtual Classroom (CUVC). TIPU changes instructional information into media streaming by sampling, editing and processing. In one hand, media streaming is stored in courseware server as courseware on demand. On the other hand, it is broadcasted by media streaming server. Content on demand is supported by HTTP server. EISU is used to deliver scenarios of teaching and learning, which include teacher’s gestures and students’ feedback. By TIPU and EISU, learning content and learning scenarios make the remote learners be personally on the scene. CUVC is controlled by a teacher to select a virtual classroom in order that the teacher can communicate with the remote learners.

A virtual classroom is made up of Teaching Information Receiving Unit (TIRU) and Environment Information Sampling Unit (EISU). TIRU can receive the teaching information from broadcasting center. EISU can sample, encode and deliver the learning scene in classroom to CUVC in broadcasting center. In addition, it acquires the teaching scene from the broadcasting center.

With a virtual classroom, remote learners can join a traditional on-campus lecture synchronously and can also benefit from the class at a later time by accessing archived courseware.
