

Enhancement of an E-Learning Platform^{*}

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Abstract: It is introduced a dynamic, flexible and responsive learning and training platform, which is VClass in which people can enhance and maintain their own skills, as well as play an active role in planning and building their own futures. VClass E-Learning platform in some functions is also introduced in order to provide more convenience and facility to learners.

Key words: E-Learning; GMSVU; VClass; Learning Management System (LMS); VClass Authoring Tool

CLC number: TP 39 **Document code:** A **Article ID:** 0258-7971(2005)02-0107-05

In late 1999 many experts brought attention to learning since knowledge is the supreme competitive advantage for companies to be dominating in the economic market. Today's markets are becoming more competitive than ever before and profitable business more uncertain, changes are rapid and the future is highly unpredictable. That is why skilled, well-educated people are the key factor for the success of business in the coming years.

Therefore, how to fulfill the task of managing and developing people's knowledge in this changeful information age? Rapid technological development and computer penetration challenges traditional face-to-face study in all aspects^[1]. The Internet and the World Wide Web have altered the conditions for organized education in many ways. Hypertext and multimedia allow new ways of presenting, organizing and delivering educational content. Discussion forums, conferences and chat rooms can support flexible and innovative ways of teaching and tutoring. Today's ICT (Information, Communication & Technology) allows us to expand the communication in the ways that reach previous teacher-designed col-

laborative work practices to encompass informal peer-to-peer communication among learners. The learners can engage in a rich spectrum of collaborative activities that involve joint solutions to problems, or simply perceiving and using each other as educational resources. To cater the requirements of learning in 21 century, E-Learning has rapidly been regarded as a nice solution to the rapidly growing need for knowledge. Therefore, UNESCO (United Nations Educational Scientific and Culture Organization) initiated GMSVU (Greater Mekong Subregion Virtual University) project to build an E-Learning campus among GMS (Greater Mekong Subregion) countries, which includes China (Yunnan province), Cambodia, Lao PDR, Myanmar, Thailand and Vietnam. The major purpose of this project is to enhance technology, boost culture exchange and facilitate cooperation among GMS countries.

Based on the basic principle of E-Learning VClass, which was originally developed by AIT (Asian Institute of Technology) is adapted in GMSVU project as the major E-Learning platform to fulfill the functions of E-Learning^[2]. In order to

* Received date: 2004-09-10

Foundation item: This paper is supported by the Research Fund of Educational Department of Yunnan Province(02QY079).

improve VClass to be more stable and competitive we, representatives from China in GMS project, were responsible for upgrading some functions of VClass. In this paper we will introduce why we'd like to improve VClass in these aspects and the technical difficulties in achieving the target. We will also offer the trouble shooting for the difficulties.

1 The theoretical model of VClass

1.1 VClass components Like other E-Learning platforms, VClass is employed to transfer knowledge and experience to students, with curriculum contents arranged into self-instructional packages in both online and offline format^[3].

The two major components of VClass are VClass Learning Management System (LMS) and VClass Authoring Tool. LMS offers a set of functionalities and features to deliver and manage learning content, to track and report on student progress and student interactions. It also helps students use applications and enroll courses.

VClass Authoring Tool was designed with the goal to provide a supportive tool where users are to create synchronized course content for class on demand. Course materials prepared by lecturers to conduct real time classes can be put in more useful way through the use of VClass Authoring Tool. PowerPoint's graphs, html pages, flash files can be used as the main source creation package of course content. These materials are then synchronized with audio or video files. Users will be directed to add synchronized voice or audio narration to slides^[4].

1.2 How to synchronize courseware in VClass

Compared to other E-Learning platforms the most essential feature of VClass is that it offers vivid on-demand study, which including video files, powerpoint slides. But how to synchronize the slides, video file and control the pause, forward, backward and stop button in Player?

The mechanism of synchronizing the courseware is based on the reality that the slides are added sequentially according to the lecturer narration recorded in audio or video file. We assume that there

are situations where a single slide might have some important points that instructor will take some time to explain. Graphical Gadget is employed in VClass so that designers are able to specify which section of the slides is related to the currently running audio or video as Fig. 1.

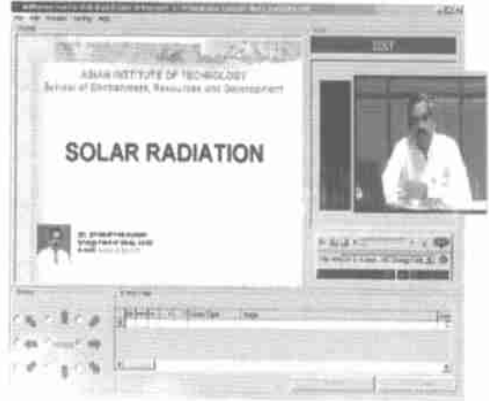


Fig. 1 Courseware synchronization

Therefore VClass offers 9 types of arrow indication to help synchronize the slides and the video file we tried to get the time schedule of the video file, the number of the slides and the location of the video file. The Fig. 2 will give you a clear description about the synchronization of courseware in VClass.

1.3 Courseware streaming After creating synchronized courseware we need to disseminate them through VClass platform to distant students. In order to efficiently and effectively deliver courseware VClass uses Helix streaming server to deliver courseware. The Fig. 3 may give you an entire model of VClass on demand streaming.

With streaming server, using Internet-based technologies, media data is fed to the user as the media is being viewed. Clients do not need to download the media before being able to view it. RTSP (Real Time Streaming Protocol) is the specified streaming protocol between server and client. Through the hyperlink learners may access the courseware easily, which includes the server address, protocol port (optional), mount points, path, and file name. For Microsoft product, Windows Media Player the hyperlink should be like: `mms://demo1/vclass/at02.05/`

basic.asf. For Real product, RealOne Player the hyperlink should be like: rtsp://demo1/vclass/at02.

05/basic.rm.

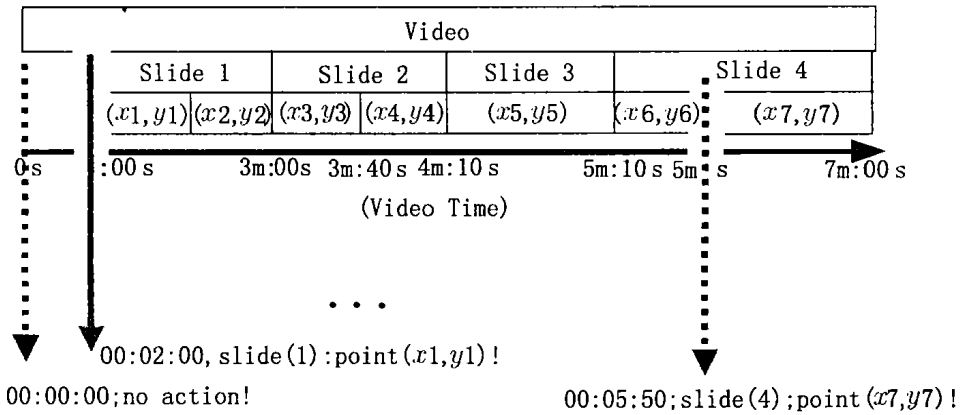


Fig. 2 Course synchronization with VClass authoring tool

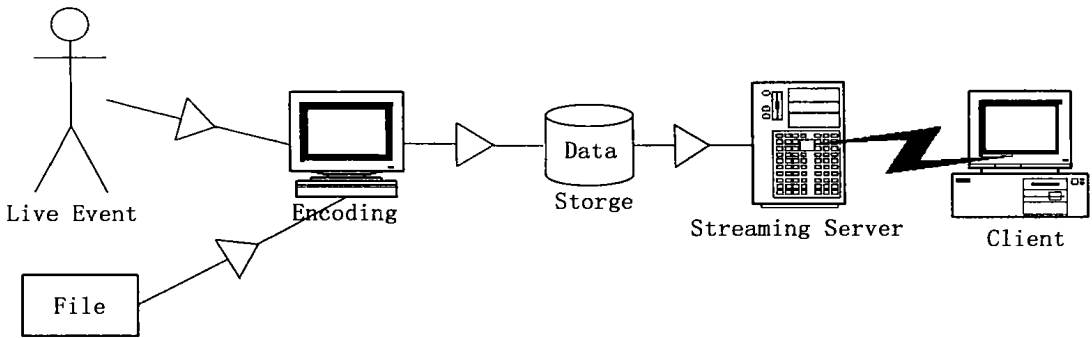


Fig. 3 VClass on demand streaming

2 The comparison between VClass and blackboard

In order to stress the characteristics of VClass platform is compared with Blackboard (www.blackboard.com), which is a commercial and stable learning platform used in many European countries and USA on price, functionality, and usability.

Blackboard with minimum functionalities costs: 5 000 USD/year. Blackboard with full functionalities: 25 000 USD/year. But VClass is an open source E-Learning platform.

In functionality and usability, VClass is not better than Blackboard. Some functionalities and usability of VClass are being improved. But it's quite fine due to low cost in the case of GMS-VU and some developing countries. Some strong points and weak points of VClass were summarized in comparison

with Blackboard. Strengths of VClass compared to Blackboard are:

Search functions VClass provides search function that users may search staff or students information personal information and course related resources.

Online chat It is a multi-user and multi-channel chatting network. It allows students all over the Internet to talk to one another in real-time. VClass Online Chat uses IRC (Internet Relay Chat) JAVA-applet. It combines the benefit of traditional face-to-face study with VClass E-Learning.

Calendar function The calendar function of VClass allows instructors to view events, announcements and course schedule based on day, month and year.

Lower hardware requirements Compared to

Blackboard VClass requires lower hardware facilities. The server side requires Pentium III 1.0 GHz, Memory RAM 512 and Hard Disk 80 GB. The client side is even lower.

Unfortunately VClass also has some weaknesses compared to Blackboard:

(1) VClass is not as stable as Blackboard. It's still being improved. Some errors come up especially when uploading files and make users annoyed.

(2) VClass has no online quiz and test functions.

3 VClass improvements

3.1 Small improvements In order to make VClass more competitive and convenient we improved VClass in the following aspects. The improvements provide more facilities and interactivities among students and instructors.

(1) Personal Information Search. We added one function that students and staffs are able to search based on user names and E-mail addresses.

(2) Photos of Students and Instructors. Photos of students and instructors were added in personal information of VClass. The images information were written into database and displayed on web page. It makes VClass personal information more attractive and interesting.

(3) Course Assignment. We developed Assignment function to support instructor to give task to the students. On the student side, they may download the assignment files. Then students may also send feedback to the instructor by Email.

(4) Contribution Board. The idea of contribution board is that students can publish their research by posting some useful links or files that they found or they made.

3.2 Embedding windows media player in VClass

The main reason that we would like to embed Windows Media Player in VClass Player instead of RealPlayer, which was the initial player in VClass is that Windows Media Player is free for many windows users but users have to pay for using Realone Player and Helix Server. It is a nice alternative to RealOne for GMS-VU participating universities. And another reason, which also makes sense is the

code of embedding Windows Media Player into Player is not so complicated as that of embedding RealOne Player.

There are two ways to play a streaming media file with Windows Media Player. The first one is through an external Media Player. To invoke the external Media Player, just place a link to a Video.asf or Video.asx file in the Web page.

The second method is to embed the Media Player in the Web page, which is VClass_Player_mm.html file. The way to do it is by embedding an ActiveX control. Each object type supports a set of properties, methods, and events that is relevant to their roles.

First of all, we would like to introduce the structure and files that are used to process video, slide and their synchronization when we embed Windows Media Player in VClass_player_mm.html page.

In order to run the VClass Player, we have to call the file vclass_player_mm.html file in Internet Explorer or Netscape browser. All the layers of VClass course content, including VideoLayer, ContentLayer, ArrowLayer, and SlideLayer and time synchronization for slides in this file are processed by the code in the VClassPlayer.js file in the folder Js as the Fig. 4.

The Events.js file contains the synchronized slides and video files, which appears in the slide, including the specified position in the slides on the VClass Player when the courseware is launched and the slides are shown.

The Video.asx file contains the link to the real video file on streaming server with the local path. This file is called when we play the streaming file with Windows Media Player in the VClass_Player_mm.html file.

The file Video.rpm contains the link to the actual video file on streaming server, using RTSP protocol (Real Time Streaming Protocol) when RealPlayer is used to play the streaming file on VClass_Player.html page, but in Windows Media Player we have to search another way to specify the path of Video file in Windows Media Player.

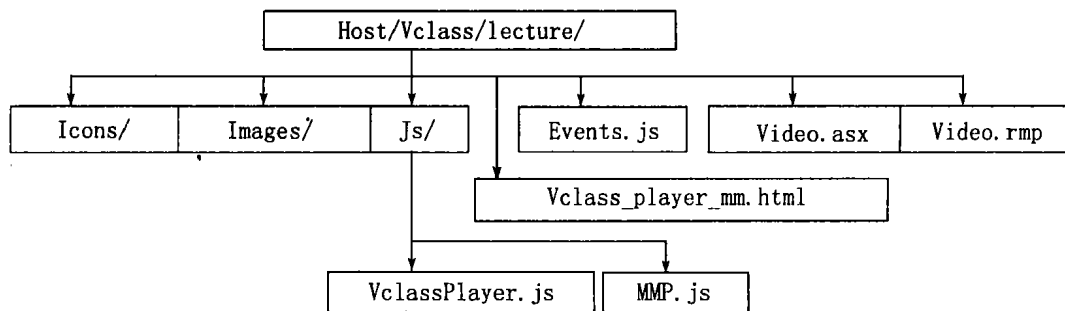


Fig. 4 The file structure of embedding windows media player

The main difference between the code of Windows Media Player and RealPlayer is about the ClassID codes, which are Media Player and RealPlayer ActiveX control registration numbers, ClassID is supposed to be unique and precise for each type of player. And the other difference is the file that links to the real video file on streaming server. In the code of embedding Windows Media Player, the source file is declared in ASF or ASX file. The video.asx file defines the ASX version and the link to the real video file on the Windows Media streaming server. Another modification of embedding Windows Media Player is that the source file that contains the link to real video file on streaming server must be declared in the video.rmp file according to the protocol RTSP (Real Time Streaming Protocol).

For RealOne Player, codes are written in VClass _ Player.js to synchronize the video file, to play or pause video file in VClass Player. But for Windows Media Player, the same function is fulfilled by a completely different mechanism. We have to use a separate file MMP.js instead of VClass Player.js file to synchronize the video file and to play or pause video file.

4 Conclusion and future work

As an E-Learning platform, VClass provides the fundamental functions for distant learning. Compared to other stable E-Learning platforms for instance Blackboard VClass looks slightly simple and it

still has some issues that need to be updated but it has its advantages that Blackboard is incomparable with. Anyway it's a nice E-Learning platform in GMS countries and their European partner, Group T, Belgium to spread the latest technologies, to motivate cooperation and to promote sustainable development.

In our research we got to know that the following issues needed to be improved for further research.

- (1) Finding the techniques to use QuickTime in VClass as another streaming tool;
- (2) Developing VoIP in VClass;
- (3) Improving VClass database to be compatible with different database formats, such as: Oracle, SQL server. For the time being, VClass is using MySQL;
- (4) Finding the technique to import and export course contents from different formats;
- (5) Synchronizing the content of the courses, staff and students information on the server at any branches for example different countries.

References:

- [1] BLOCK H M. What Is e Learning? [EB/OL] <http://www.learnframe.com/aboutelearning/page2.asp>, 2001 - 01- 02.
- [2] KANCHANASUT K. AIT's role as a regional E Education promoter[R]. Thailand: Distributed Educational Center Asian Institute of Technology, 2001.

mance of java based distributed object models: CORBA vs RMI[J]. Real Time Systems, 2001, 21: 43—75.

[3] MIMIONI F, MANGHI P. An approach to high level language bindings to XML[J]. Information and Software Technology, 2002, 44: 217—228.

[4] BRUNETON E, RIVEILL M. An architecture for extensible middleware platforms[J]. Softw Pract Exper, 2001, 31: 1 237—1 264.

[5] 徐庆生, 沈勤祖. 分布式应用系统结构设计的形式化研究[J]. 云南大学学报(自然科学版), 2003, 25(6): 493—498.

Hyperinterface architecture model of distributed computing

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Abstract: A universal interface of information passing among nodes in network distributed computing is designed. It includes middleware CORBA technology of heterogeneous platform and XML which is the standard of Internet information transmission in the future. It lowers the complex degree of data handling of nodes and reduces the hard degree of program design and enhances the total performance of distributed computing.

Key words: hyperinterface; CORBA; XML; architecture

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[3] THOUARD J. Advancing higher education in a development context[R]. The Greater Mekong Subregion Virtual University [R]. Thailand: Distributed Educational Center Asian Institute of Technology, 2002.

[4] LAGA E, CLEMENT M, BUELENS H. Learning faculty to teach with an e learning platform: some design principles[D]. Belgium: Katholieke Universiteit Leuven, Belgium, 2002.

一种 E- Learning 平台的改进*

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摘要: 介绍 1 种动态, 灵活且可交互的学习及学习平台: VClass. 这一学习平台使得用户可以提高和增强自身的技能, 在学习的过程中起到积极的主导作用以指导未来的学习, 也对 Vclass 的一些功能进行了改进以提供用户更多的方便和功能.

关键词: 远程学习; 大湄公河流域虚拟大学; 虚拟学校; 学习管理系统; VClass 课件制作工具

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