

AN IMPLEMENTATION OF AN INTERACTIVE VIRTUAL CLASSROOM BASED ON FLASH MEDIA SERVER

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Abstract

In this paper, we fully describe the software that has implemented in computer engineering group at university of Kashan to create a virtual classroom to support distance education. This virtual classroom software allows instructor to control classroom and discussions on it. This software prepares good tools for instructors (such as online video and audio and text and online whiteboard) to present online course and helps learners to participate on discussion and control them. It uses flash player as portable platform for virtual class such that it promotes very good accessibility and conformability. It does not need any kinds of installation. Each learner can changes tools that he use based on his internet connection speed (text only, text and audio only, whiteboard and video and other tools). This software use flash media server for synchronization and coldfusion server for connecting to database of education (information about learners, educators, courses and etc).

Keywords - Virtual class, online learning, flash technology, flash media server.

1 INTRODUCTION

Traditionally, distant education is mostly based on tapes and VCDs in an offline manner. Educational TV programs can provide the learners with a live one way communication. Learners can communicate with the instructors through letters, telephones and forums. Nowadays, with the development of high speed communication lines for the learners, we can establish virtual classes with much higher efficiency so much so that such classes can function like real classes.

In Iran, internet speed is low and the speed differs in different parts of the country. Hence, this problem should be taken into account in virtual educational programs in a way that these programs can include different tools harmonious with diverse speeds.

In addition, these programs must create an interesting environment for the learners. In order for the virtual environment to be similar to real situations, we need create Computer Supported Collaborative Learning (CSCL). These learning environments provide facilities such as audio and video chat[1,2], shared desktop, shared whiteboard[3,4], and shared graphical applications[5].

In this study, a virtual class has been implemented at the Computer Engineering department of the University of Kashan is described [6-9]. This process has been carried with the application the software entitled Adobe Flash which is a multimedia platform. Moreover, this technology has been utilized for the purpose of internet elections and online propaganda [10,11].

2 THE USEFULNESS OF ONLINE EDUCATION

Researches conducted in this area indicate the fact that virtual education can bring the best results in case the learners are highly involved in interactions, dialogues and discussions. They need to be educated through cooperation and contribution of the instructors and themselves [12-15]. In [16], it is shown that receiving educational materials in an offline manner through tapes, CDs, DVDs or internet downloads is less effective than adopting traditional class procedures and practices. On the other hand, as it shown in [17], in face to face discussion, learners tend to produce very few short utterances. Hence, educational discussion is not valuable since these discussions are not elaborated on by the learners. On the contrary, on line writings enjoy a higher quality. Also, this study has shown that in online discussion, specially written ones, learners devotes more time and energy for thinking

deeply and preparing creative answers. They give more attention to details as compared with face to face dialogues in which a lot of utterances are made and uttered in an instant off-the-cuff manner [17].

The results of the application of MalinaLS system on some students of accounting have indicated the positive influence of this software on increasing their scores (as the criterion for comparison). The more they work with such as software, the better will be their performance [18]. Researches have indicated the fact that the existence of students and instructors in a real environment is one of the fundamental elements of any learning and teaching activity [19]. Therefore, Blended Education has been suggested [20]. A lot of reports can be found on online education, in [21], reports issues from the U.S. can be retrieved.

3 A GLANCE ON PREVIOUS STUDIES

Different technologies have been employed and are still being used in servers and clients. Flash Media Server (formerly Flash Communication Server), Microsoft Meeting Space (Microsoft NetMeeting), Virtual Network Computing, Java Multimedia Tools, Adobe Acrobat Connect Pro Web Conferencing (Macromedia Breeze) are some commercial closed source applications which are being used in virtual classes. Also, Globus Toolkit, Skype, Messenger, X3D are some open source applications and open standards which are utilized in virtual classes.

3.1 Systems based on flash

Flash Technology has been used in some educational systems. Nowadays, offline flash movies have considerable usages in the process of education. To show a flash movie, we only need a flash player installed on the web browser.

Aramahi and Gramol established virtual classes with the help of Adobe Communication Server at the University of Oklahoma [22-24]. Wen and Gramol, produced a three dimensional software with the help of Adobe Communication Server and Adobe Director [25]. Lopez Morteo and Lopez implemented a collection of tools with the help of some technologies (Flash Objects, Applets, Jabber, Jetspeed) for teaching mathematics. These movies are not online and can be downloaded from the relevant web server [26]. Garsiad and colleagues implemented a tool for teaching descriptive geometry. They used offline flash movies for this purpose [27].

3.2 Other important implementations

In this section, some of the most important virtual educational implementations which have not used the technology of flash are introduced. Webtrain, Blackbaord, Broad Learning, E-college, First class are some of commercial applications for virtual and university classes.

French Virtual Medical University has been explained in [28]. In this project, the technology of Macromedia Breeze has been employed for online classes. In this project, different communication tools such internet line, telephone line (different communication channels with different speed), TV channels, satellite and its different dishes, as well as fixed and mobile tools have been applied based upon the financial competency and the location of the learners. Ma, Huang, Shih have implemented relatively effective virtual classes. Their application has been implemented base on java and its applet can be installed on any web browser which supports java [29].

3.3 Online animation (two-way) with the help of Adobe flash

Adobe Flash (formerly Macromedia Flash) is a multimedia platform originally acquired by Macromedia and currently developed and distributed by Adobe Systems. Since its introduction in 1996, Flash has become a popular method for adding animation and interactivity to web pages. Flash is commonly used to create animation, advertisements, and various web page Flash components, to integrate video into web pages, and more recently, to develop rich Internet applications. The first version of this technology is based on Jonathan Gay in Future wave Software Company in the April of 1996. Of course it was named FutureSplash Animator. In this platform, an effort was made to increase the animation ability of the web. In November of the same year, Macromedia Company purchased the company producing such a technology and called it Macromedia Flash. The same name was applied to this platform up to the 8th version (2005), then Adobe company produced its 9th version under the name Adobe Flash in 2007 [30].

This platform is a small Plugin called Flash Player which is installed on most web browsers and only 1% of the web users lack such a Plugin [31]. Flash Player is one of the most widely distributed pieces of software today. "If you are developing on the Flash Platform, you can rest assured that you are targeting a platform with huge presence as shown in Fig. 1" [31] .

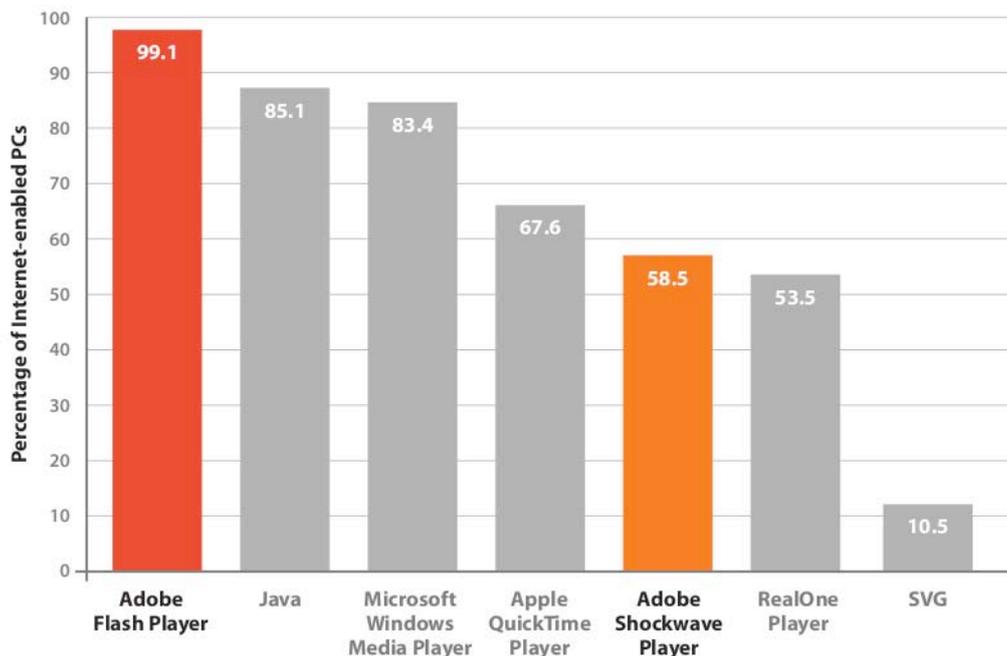


Fig. 1: Flash Player reach

The widespread use of Flash Player indicates the fact that this tool is an appropriate choice for movies and different animations. Also it is a portable platform for a two way video connection. You can get more information about this technology in [32] and [33].

4 OUR IMPLEMENTED VIRTUAL CLASS SOFTWARE

Due to the high cost of commercial applications, the difficulties involved in changing open source applications to meet our needs, and the need for the proper, dynamic environment, we decided to implement a virtual class application based on Flash. In addition, we needed to take into account factors such as the different speeds of internet in different areas of the country as well as ease of application together with Persian instructions for web users. To implement this application, we utilized Flex builder 3 for client side programming, Adobe cold fusion for connecting to DBMS and Adobe flash media server for server side programming and SQL server for storing the data. All users (administrators, instructors, and the learners) of this application need just flash players. It should be pointed out that the server of our application is installed on another computer.

4.1 Features of this Software

The following features are implemented in this software:

- Instructors and learners are able to video chat.
- Each learner can get the instructor's permission to express their ideas in the class
- Advanced online blackboard with different features
- Learners, instructors and administrators enjoy different power of manoeuvrability
- Instructors can manage their own classes and change their schedules with the administrators' consent
- Users can use various tools and disable some based on the internet speed.

4.2 Administrator Subsystem

In this software different pages are defined for various users involved. Administrator can login with his user name and password and he can perform a lot tasks such as adding/deleting/editing instructors, courses, learners, schedules, registration, etc.

4.3 Instructor Subsystem

Each instructor can login with his user name and password. After login, the instructor can see the list of his courses, classes and schedules. He can enter his virtual class at the specific time. In Fig. 2, instructor page is presented.

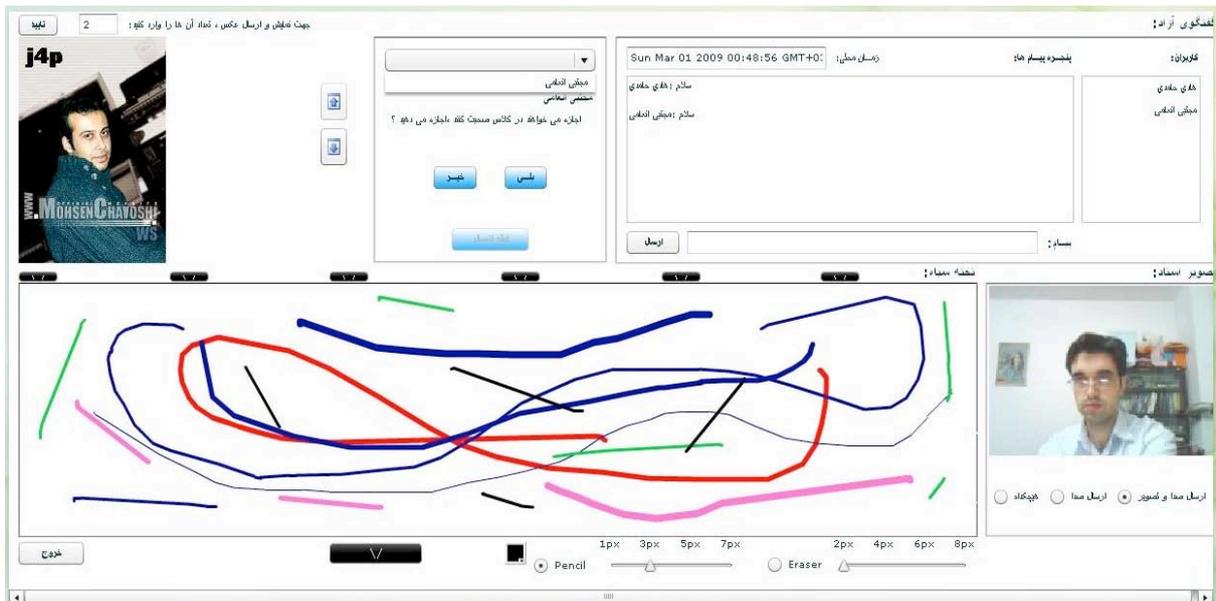


Fig. 2: Virtual class of instructor

This page consists of different parts:

- The list of online learners participating in this class is shown in the right top hand side of the page
- The list of written text messages is shown in the left hand side of the on line users
- Below the messages, you can find a textbox for sending messages to all learners or a specific one
- On the left side of the messages, the learner's request is shown. This signals to the instructor a learner's readiness to speak. The instructor may accept or reject such a request.
- The instructor can place the educational images on the top right hand side of the page.
- The blackboard is shown in the middle of the page and the instructor can write on the virtual blackboard in the same manner as he would use the normal blackboard, he can draw on the virtual blackboard as well.
- All the users of this class are simultaneously informed of every single change made on the virtual blackboard.
- At the top of the virtual blackboard, there are some rubbers each of which can rub off the part beneath itself on the blackboard.
- At the bottom of the blackboard, there are buttons by which the instructor is able to change the colour and size of the fonts.
- The instructor can rub off the blackboard with a small rubber available at the bottom left side of the blackboard,
- The instructor's picture is displayed on the right hand side of the blackboard.

- At the bottom of the instructor's picture, there are three radio buttons which can be selected by the instructor based on the internet speed (audio only, audio-video, none of them).
- Exit button can be found at the left hand side below the blackboard. When the instructor leaves the class, a message is sent to all the learners indicating the end of the session. Afterwards, the session ends automatically.

4.4 Learner Subsystem

Each learner should register and the administrator can accept him as a student. Then he can get some credits. After the login of the learner, the list of his courses is displayed and at the time of one of the classes, he can enter the relevant class. Then virtual class page which is similar to that of the instructor is shown to the learner. The only difference noticed is that the learner can not write anything on the virtual blackboard and he can not speak in the class without the instructor's permission. Nonetheless, the learner can send private messages to the other learners. In Fig. 3, the learner's page is shown.

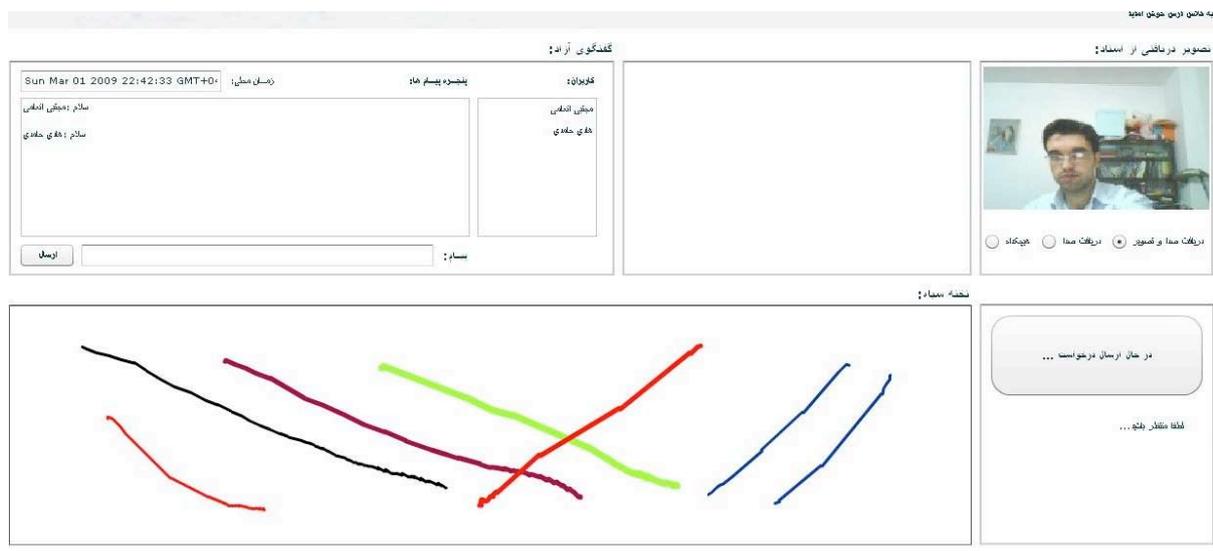


Fig.3: Virtual class of learner

The learner receives the instructor's voice and image in the top right hand side of the page. Beneath it, there are three options: voice only, voice and video, non of them (only text). The learner can choose one of these options based on his internet connection speed. The learner can press a button to ask for the instructor's permission to speak in the class. Afterwards, this request is sent to the instructor. In case the instructor accepts this request, he can speak in the class while his picture is shown to the whole class instead of the instructor's picture. Whenever the instructor likes, he can interrupt the student and terminate his talk. Then instructor's voice and picture is shown to the class.

5 CONCLUDING REMARKS

In this article, an implemented virtual class produced by the researchers is described. Portability, simplicity, effectiveness of the tools, Purely Persian User Interface, connection speed restriction awareness, etc are the main features of our virtual class application. This application has gone through rigorous assessments the results of which have been indicative of its suitability for small and average size educational institutions.

References

- [1] P. Isenhour, J. Carroll, D. Neale, M. Rosson, and D. Dunlap, "The virtual school: An integrated collaborative environment for the classroom," *Educational Technology and Society*, vol. 3, 2000, pp. 74-86.
- [2] R. Kreutz, S. Kiesow, and K. Spitzer, "NetChat: Communication and collaboration via WWW," *Educational Technology and Society*, vol. 3, 2000, pp. 87-93.

- [3] R. Abler and I. Wells, "Distributed engineering education: Evolution of the telecollaboration stations for individualized distance learning," *IEEE Transactions on Education*, vol. 48, 2005, pp. 490-496.
- [4] Z. Yang and Q. Liu, "Research and development of web-based virtual online classroom," *Computers & Education*, vol. 48, Feb. 2007, pp. 171-184.
- [5] L. Vicent, J. Anguera, E. Golobardes, D. Badia, and M. Segarra, "Work in progress - Interactive multimedia contents and synchronous graphical communication tools for distance learning in Engineering Degrees," *Proceedings - Frontiers in Education Conference, FIE*, Indianapolis, IN: 2005.
- [6] F. Hajizahiri. "virtual class". Report of final BS project, The University of Kashan, 2004.
- [7] M. Arabi. "Registration on virtual class". Report of final BS project, The University of Kashan, 2005..
- [8] F. Assari. "Online examination system". Report of final BS project, The University of Kashan, 2006.
- [9] M. Enaami. "Implementation of online class with help of flex". Report of final BS project, The University of Kashan, 2008.
- [10] H. Alizadeh. "Electronic voting". Report of final BS project, The University of Kashan, 2008.
- [11] A. Yoosofan, Hossein Alizadeh, Marjan Arabi. "Implementation of an integrated e-voting system with online video propaganda in e-city using flash media server". Second conference of electronic city, Iran, Tehran, 2009.
- [12] R. Bento and C. Schuster, "Participation: The online challenge," *Web-based education: Learning from experience*, 2003, pp. 156-164.
- [13] D. Leidner and S. Jarvenpaa, "The use of information technology to enhance management school education: A theoretical view," *MIS Quarterly: Management Information Systems*, vol. 19, 1995, pp. 265-291.
- [14] J. Webster and P. Hackley, "Teaching effectiveness in technology-mediated distance learning," *Academy of Management Journal*, vol. 40, 1997, pp. 1282-1309.
- [15] S. Hrastinski, "A theory of online learning as online participation," *Computers & Education*, vol. 52, Jan. 2009, pp. 78-82.
- [16] S. Hiltz, N. Coppola, N. Rotter, M. Turoff, and R. Benbunan-Fich, "Measuring the importance of collaborative learning for the effectiveness of ALN: A multi-measure, multi-method approach," *Journal of Asynchronous Learning Network*, vol. 4, 2000.
- [17] J. Pearson, "Investigating ICT using problem-based learning in face-to-face and online learning environments," *Computers & Education*, vol. 47, Aug. 2006, pp. 56-73.
- [18] B.N. Potter and C.G. Johnston, "The effect of interactive on-line learning systems on student learning outcomes in accounting," *Journal of Accounting Education*, vol. 24, 2006, pp. 16-34.
- [19] H. So and T.A. Brush, "Student perceptions of collaborative learning, social presence and satisfaction in a blended learning environment: Relationships and critical factors," *Computers & Education*, vol. 51, Aug. 2008, pp. 318-336.
- [20] M. Dark, C. York, V. Popescu, and C. Nita-Rotaru, "Evaluating interactivity and presence in an online distance learning system," *Proceedings - Frontiers in Education Conference, FIE*, Milwaukee, WI: 2007.

- [21] "Survey Reports | The Sloan Consortium," <http://www.sloan-c.org/publications/survey/index.asp>, 2009.
- [22] M. Alramahi and K. Gramoll, "Online collaborative drawing board for real-time student-instructor interaction and lecture creation," *Computers in Education Journal*, vol. 15, 2005, pp. 106-111.
- [23] M. AlRamahi and K. Gramoll, "Online collaborative drawing board for real-time student-instructor interaction and lecture creation," *ASEE Annual Conference Proceedings*, Salt Lake City, UT: 2004, pp. 10651-10659.
- [24] M. Alramahi, "Online Collaborative Tools for Engineering Education Using Shockwave Technologies," The University of Oklahoma, 2003.
- [25] K. Gramoll and H. Wen, "Online 3D collaboration system for engineering education," *ASEE Annual Conference and Exposition, Conference Proceedings*, Honolulu, HI: 2007.
- [26] G. Lopez-Morteo and G. Lopez, "Computer support for learning mathematics: A learning environment based on recreational learning objects," *Computers & Education*, vol. 48, May. 2007, pp. 618-641.
- [27] R.R. Garcia, J.S. Quiros, R.G. Santos, S.M. Gonzalez, and S.M. Fernanz, "Interactive multimedia animation with Macromedia Flash in Descriptive Geometry teaching," *Computers & Education*, vol. 49, Nov. 2007, pp. 615-639.
- [28] J. Dufour, M. Cuggia, G. Soula, M. Spector, and F. Kohler, "An integrated approach to distance learning with digital video in the French-speaking Virtual Medical University," *International Journal of Medical Informatics*, vol. 76, 2007, pp. 369-376.
- [29] J. Ma, R. Huang, and T. Shih, "Using VCR to support different styles and types of group collaborations in virtual universities," *Tamkang Journal of Science and Engineering*, vol. 2, 1999, pp. 69-77.
- [30] "Adobe Flash - Wikipedia, the free encyclopedia," http://en.wikipedia.org/wiki/Adobe_Flash.
- [31] A. Cole, *Learning Flex 3: Getting up to Speed with Rich Internet Applications* (Adobe Developer Library), Canada: O'Reilly, 2008.
- [32] A. Potter, "A product review of Macromedia Authorware 6.5," *The Internet and Higher Education*, vol. 6, 2003, pp. 211-213.
- [33] Z. Kablan and M. Erden, "Instructional efficiency of integrated and separated text with animated presentations in computer-based science instruction," *Computers & Education*, vol. 51, Sep. 2008, pp. 660-668.