

Synchronous e-learning room: scenarios, tools and usage

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The traditional higher educational learning practice is based on the information transfer model where knowledge is passed from the experts (tutors) to the learners (students) by means of lectures and text books. New educational models based on constructivism can be used in parallel with traditional learning introducing a blended (or enhanced) learning approach. In Synchronous and Asynchronous e-learning, teaching is done through the network while the students are not in the same room during the time.

In this work we describe an effort:

- ✓ To enhance the traditional learning model,
- ✓ To introduce on-line, synchronous, interactive e-learning tools,
- ✓ To use e-learning techniques to assist the non-traditional learner,
- ✓ To establish the effectiveness of remotely located lecturers teaching remotely located students

We introduce three synchronous learning scenarios supported by the technical infrastructure “HW – SW” of the e-learning room, namely:

- **FIRST** scenario. Utilization of the room for presenting educational material in slide form or in video with the guest speaker within the room to an audience located in the room with the ability of recording the lecture. This is the simplified scenario.
- **SECOND** scenario. The following scenario is an elaboration of one more possibility of the MCU room's. With this scenario people are able to watch live the events that take place in the e-learning room of the T.E.I., from any place.
- **THIRD** scenario. With this scenario persons have the ability to watch live the events that take place in the e-learning room of the T.E.I., from any place. The picture which is sent over the internet is the one which is sent by the remote speaker to the MCU. Then MCU projects this to the audience located in the room and to the distant speakers and rooms.

These scenarios for distance learning, are used during communication (text, pictures, graphics and sound with other multimedia), in combination with each other so that we obtain the best possible guidance for the educated. This can be defined as “Distributed Education”, which means the combination of technologies of information transmission on teaching and learning. ([10] Steiner, 1996)

Each scenario includes technical requirements (HW – SW) and the e-learning setup (methodologies, e-learning material)

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Below we report en brevity the more important scenarios that were used in the e-learning room. Depending on the needs of the events different of scenarios can be used.

2.1. FIRST scenario of using the e-learning room

Utilization of the room for presenting educational material in slide form or in video with guest speaker within the room to an audience located in the room and the possibility of recording the lecture. It's the simplified scenario. For this scenario can take place with a set of slides presented by a speaker (MS PowerPoint/OpenOffice.org Impress), DVD projection or a physical presentation of an object. The recorded video is streamed to a SMIL presentation (Synchronized Multimedia Intergraded Language) with the presenter to be shown in a window in the down-right corner of the screen and in left side we show the transparencies. The we can also have direct recording of presentation (video and transparencies) with use of choice PIP (Picture In Picture) in the video mixed.

Hardware requirements are a camera, a computer for the recording and process of video and microfonic/sound installation. Optionally a mixed video and a camera for the public.

Software requirements are video recording program (RealProducer) and a text editor for the creation of a SMIL presentation.

Minimum requirements for the internet users are a quite fast Internet connection (at least 64Kbps) and to have, Real Player 10.5 installed on their computer. In case they fulfil the above requirements the only thing they have to do is to open Real Player and type the URL, which is given to them previously or the can visit the Internet site and click on the link instead. During the event, participants will have the ability to change some of the projection choices of the event apart from the ability to terminate the connection the moment they want to do it.

The advantages of these scenarios are the low load work for the room operator, maximum amount of distant connections, maximum reliability and the low requirements for the audience.

The disadvantages of this type of connection are low quality of picture and sound (for slow PSTN connections) and the most important is there is no interact between the participants.

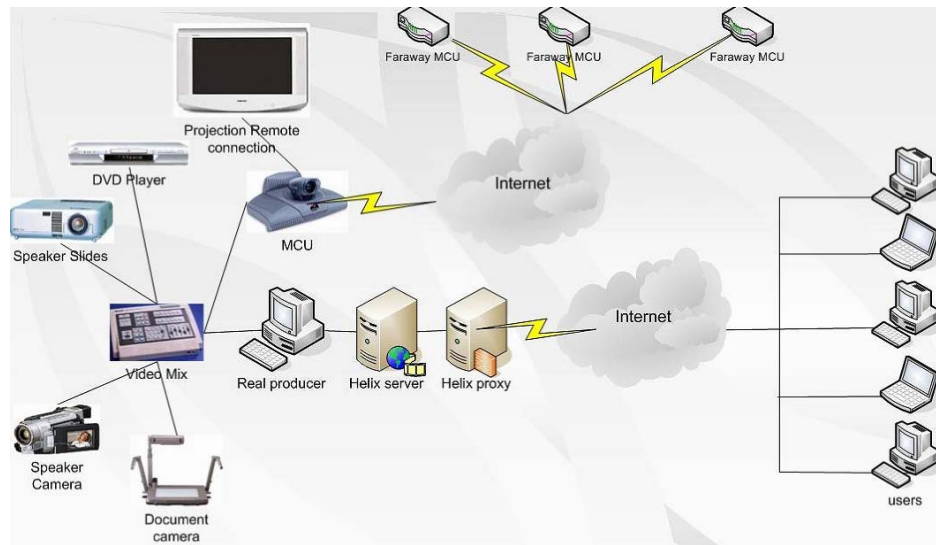
This first scenario was applied to support distance learning for one graduate course offered by the the department of "Applied Informatics in Management and Finance", a graduate course from the department of "Administration of Co-Operative Organisations" and three seminars from the T.E.I. of Messologhi. Also, with the first scenario there was support for one national conference and three meetings. Finally fourteen hours of lectures and sixteen hours of synchronized lessons (S.M.I.L. / H.T.M.L.+T.I.M.E. - Timed Interactive Multimedia Extensions-) were moved to our Video On Demand Servers (Helix Server, Internet Information Services).

2.2. SECOND scenario of using the e-learning room

The following scenario is a presentation of one more capability of the M.C.U. (Multipoint Control Unit) of the room. Within this scenario people have the ability to watch live the events that take place in the e-learning room of the Technological Education Institution, from whatever place they are. The picture which is streamed over the Internet is the one which the operator of the room sends from the computer using "Real" programs. The users that watch from Internet see live the SMIL presentation in a window in the right of the screen and in the left there are the transparencies or the presentation (video and transparencies) with use of PIP (Picture In Picture) in the mixed video.

Hardware requirements are a camera for reception of picture of the presenter, monitor for the projection of remote connections, MCU for the transmission to the distant e-learning rooms, sound installation and two computers for the process and transmission of video. Optionally a mixed video and a camera for public.

Software requirements are the programs for recording and transmission of video (RealProducer, Helix server, Helix proxy). Optionally PresenterOne.



Minimum requirements for the distant e-learning rooms are camera for the transmission of picture of the participants, microfonic/sound installation, MCU, and a monitor for the projection of remote connections.

Minimum requirements for the internet users are: a quite fast Internet connection (at least 64Kbps) and to have Real Player 10.5 installed on their computer.

Programs settings.

The person in charge for the room should configure the programs just before the beginning of the event. There is the option of choosing the quality and the speed of the transmission for any of the different types of connections (PSTN, ISDN, ADSL, and LAN). Using PresenterOne is possible to have a live transmission of the slides together with the reproduction from Real Player at the same time with the speaker's video. It includes also timing of slides, URL's and interactive multimedia content including voting, makes and evaluations. Real Producer and PresenterOne send the videos and the slides to Helix Server, which transmits them in collaboration with Helix Proxy.

The advantages of this connection are the maximum amount of distant connections, high quality of picture and sound (for distance e-learning rooms), low requirements for the audience (internet users) and high interact between the participants fin the distant e-learning rooms.

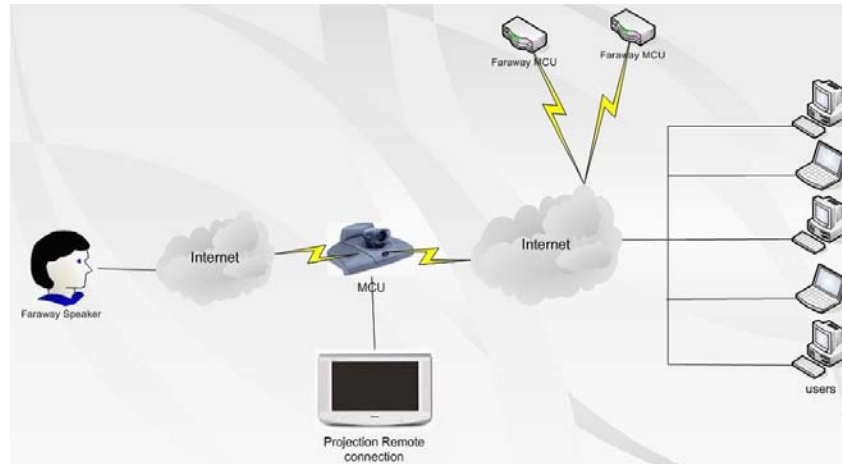
The disadvantages of this type of connection are, low reliability (there are many programs interjected), low quality of picture and sound (for slow PSTN connections), low interact for internet users and the maximum equipment requirements for distance e-learning rooms.

At seminar with title "Education-Instruction technician at e-learning", organized by Greek Universities Network (GuNet), the Network Operation Center of T.E.I. of Messologhi participates with two lectures using second scenarios at the e-learning room.

2.3. THIRD scenario of using the e-learning room

The following scenario is an utilization of one more possibility of the M.C.U. of the room and could be a contribution to the previous scenario. With this scenario people have the ability to watch live the events that take place in the e-learning room of the Technological Education Institute. The picture which is projected on the internet is the one

which is sent by the remote speaker to the M.C.U. and M.C.U. projects this to the audience located in the room and to the distant speakers and rooms.



Minimum requirements for the speaker: should be connected to the internet, have a microphone and Microsoft Net-Meeting installed. For better results he should have a web camera and a Broadband connection.

E-learning room requirements for internet users and distant e-learning rooms are same as SECOND scenario.

The advantages of this connection are that it is not necessary for the speaker to be in the room and the low workload for the room operator.

The disadvantages of this type of connection are low reliability (the person in charge is not in control of the presentation).

With the third scenario there were supported four seminars from an external educational organization.

3. E-learning room Tools

The **S.M.I.L.** (Synchronized Multimedia Intergraded Language) and the **H.T.M.L.+T.I.M.E.** (Hyper-Text Markup Language + Timed Interactive Multimedia Extensions) are languages that were created by the World Wide Web Consortium, they are open source and they are used widely for interactive multimedia/rich-media material.

Smox Editor is a tool, for the easy creation of synchronization material

Microsoft Producer is an add-on tool for Microsoft Office PowerPoint. Can help you easily capture, synchronize, and publish audio, video, slides, and images.

Real Producer is the basic tool for the creation of RealMedia files and live transmissions (Live Broadcasts) from audio and video sources.

PresenterONE Live offers to the content authors, the capabilities of live creation or On Demand presentations for RealPlayer.

Helix Server is used for the transmission of material in the internet in real time (Live Streaming) and for the educational synchronized material on demand (VoD).

Helix Proxy is a software solution for the reduction of bandwidth costs associated with content entering your network by eliminating redundant requests for streaming media.

Conclusion

The papers discussed the potential of usage an e-learning room, for higher educational institutes. We presented our results of deploying a modern learning methodology. The usage and our experience with the e-learning methodology, led to the following conclusions:

Advantages:

- Globalization saving time and costs
- Efficiency, better planning and structure, storyboard
- Access to a lot of content on the Web, which this can be used for learning/teaching
- Flexibility, short-notice decisions, possibility of being combined with other types of teaching (the flexibility is greater when students use their home-based computers rather than gathering in the college computer rooms)

Disadvantages:

- Lack of human contact
- Lack of co-students and student collaboration
- Lack of interactivity, static and monotonous
- Difficult to support problem-based learning
- No possibility for “hands-on” experience
- Sensitive technology a great deal of previous knowledge and preparations are required
- High cost investments.

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