

Just-in-Time Lecture Delivery, Management & Student Support System

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Education plays a very important role in today's society, and it is generally acknowledged as a key towards a more fulfilling and successful career. However, some people, particularly adults may find difficulties pursuing their education to the level they desire. Small communities like Malta may lack highly qualified teachers particularly in newer and/or more highly specialised fields. Also, special physical needs or social boundaries may hinder a student, whether young or adult, from physically attending a regular classroom. For these and other reasons, more people are turning to Distance Education to further their studies.

The main objective of my final year project, which I coined **My Virtual Classroom**, is to provide a prototype platform for preparing and delivering lectures over the Internet such that students using the software get a rich and complete learning experience through the use of interactive multimedia. While traditional distance learning solutions rely heavily on textual material to deliver lectures, this project aims at providing a learning experience that is closer to that achieved in a real classroom, while at the same time allowing students to take their lectures 'on demand' at their own pace and at the time of day that suits them best.



The Lecture Viewer Application

The above screenshot shows a picture of the Lecture Viewer application, which is used by students to view their lectures. In *My Virtual Classroom*, a lecture consists mainly of a **pre-recorded video** of the instructor giving out his lecture as he would normally do in a typical classroom. The video plays in the centre of the screen and may be streamed over an Internet or a Local Area Network.

The system also caters for many of the common activities that typically occur in a real classroom. For example, a lecturer can show **lecture slides** synchronized to the video in a virtual 'overhead projector', as shown in the screenshot at the top left side of the window.

The instructor may also make use of **interactive tools** to further enhance the student's learning experience. In the picture, the instructor popped up a clickable **web link** that the student open to learn more about the topics just covered.

The lecturer may also stop and **ask questions** to the students like one would do in a real classroom, by popping up a dialog box on screen consisting of a multiple choice question that the student must answer before resuming the lecture. In this case, a lecturer may subsequently opt to play a different video clip depending on whether or not the student answers the given question correctly before resuming the main lecture video.

The student has a variety of other tools at his/her disposal. Right below the video is the **Table of Contents**, which lists the various segments (or short topics) covered during the lecture. Clicking on a segment title replays the corresponding part of the lecture, thus providing a convenient way of finding and reviewing segments that the student might wish to watch again.

The application also includes a component that lists the most **frequently asked questions** in the context of the current lecture segment. The list changes as the lecture progresses to reflect the pattern by which students usually ask questions. The concept of this tool is based on the assumption that different students usually ask similar questions at more or less the same place within a lecture. When one clicks on any of these questions, the answer to the question is instantly displayed. The lecture automatically pauses to allow the student to read the answer without losing anything in the lecture. Students may also ask their **own questions**, too. In this case, the system first tries to match the student's question with an FAQ, and then if none of the resulting FAQs answers his/her question, the question is automatically sent to the lecturer who may then reply to the student by email in due course.

An additional set of tools allow the student to **browse supporting course material** during a lecture, such as lecture notes and assignments. These documents can be synchronised to the lecture so that the application automatically scrolls up or down to the section in the notes or assignment that is most relevant to what is being said in the lecture. The student is also provided with a **notepad** tool to write his/her own notes during the lecture. At the beginning of a lecture, the notepad tool automatically adds the lecture title, date and headings corresponding to the segments listed in the Table of Contents, making the writing of notes quicker and easier.

Apart from the lecture player application, the project consists of three more components:

- **The Lecture Builder** provides the Instructor with a Visual Editor to divide a lecture into segments and to define the various events that will occur during the lecture, such as showing slides, asking questions or providing web links.
- **The Course Manager** is used by the Instructor to manage lectures into courses, answer student's queries, organise the FAQ library, monitor student progress and assessment records;
- **The Server** stores student and instructor profiles, questions and answers, course and lecture information, etc and provides a means to view, delete or modify all of the available data.



The Lecture Builder Application

When designing the system, I have paid particular attention to extensibility. Indeed, a simple API is provided to enable external developers to write their own add-ons that can plug into the system and be used to further enhance their lecture experience. For example, a course in music could include a component that asks the student to identify notes; an electrical engineering lecture could include a component that represents a circuit board on which the student would be asked to create or modify a circuit... The possibilities are endless....