

COLLEGE: A Collaborative On-Line Lecture Environment for Group and Individual eLearning

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Abstract. COLLEGE is a platform for the development and delivery of interactive learning content for individual students or groups and will be built during 2005-2007. Phase I will deliver primarily video- and audio-based learning content together with tools to provide automated assistance and assessment of student progress. Phase II will increase the options for the learning content to include non-time-based media and will increase the level of Just-in-Time support for students. The COLLEGE toolset will be based around virtual metaphors corresponding to traditional tools for learning, recording, interacting with the source of the learning material, and assessment.

1 Introduction

Modern digital environments and affordable broadband Internet connections enable us to re-visit solutions for delivering video- and audio- based learning content over the Internet. We can now also provide automated assistance to students to construct individualised interactive learning experiences. These can also be extended to group and collaborative learning experiences.

COLLEGE, which is being developed at the University of Malta, builds upon work that has been ongoing since 2001. Four BSc IT (Hons) Final Year students and one MSc student have researched and worked on various aspects of a collaborative on-line lecture environment and automatic question-answering system. In 2005, the University of Malta awarded funds to COLLEGE to engage a part-time developer and award a grant to an MSc studentship. The project has two phases. The first phase (2005-2006) will consist of combining existing work ([1], [2], [3], [4], and [5]) under a unifying project and evaluating the result. The second phase (2006-2007), if the funding is renewed, will involve rolling out learning material selected from a variety of certificate, diploma, and undergraduate degree programmes offered by the University of Malta. Further evaluation studies will be carried out, by comparing the progress of different students following the same course through COLLEGE and traditionally. Additionally, alternative non-time-based learning content material will be incorporated into the eLearning delivery platform to reach students who may not have high bandwidth access to the Internet; for learning content that is not best suited to audio- or video-based delivery; and to analyse alternative delivery methods.

2 Further details about COLLEGE

The initial motivation for COLLEGE and its predecessors was to recreate a virtual environment that would mimic a 'real' lecture environment. We wanted the lecture to follow a time-line, with lecture materials displayed to the student at the appropriate time. We also wanted to give students

the ability to interact with the lecturer or his/her proxy, including asking questions, but also taking advantage of the benefits offered by on-demand lecture service.

In COLLEGE, a lecture is primarily driven by a media stream that has a time-line (e.g., video or audio) against which events can be triggered to occur ([3]). A lecture can be subdivided into sections, and the designer of the lecture can decide how students may progress from one section to the next. For instance, although a student's progress will normally be unhindered, it may be the case that a student is required to successfully perform some task in order to proceed. This could take the form of a pop quiz or question that the student must answer correctly. Through these and similar mechanisms it is also possible to monitor individual students' progress in the course.

A lecture may be supported by visual aids, animations, on-line documents, lecture notes, study aids, etc., which are triggered to be made available to the learner at the appropriate time during the lecture.

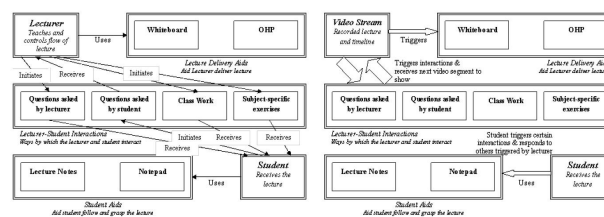


Fig. 1. The role of the lecturer in the classroom (left) is replaced by a video stream (right) (from [3]).

The video stream takes on the lecturer's role of delivering content and controlling the flow of the lecture (fig. 1). However, just as a student may be asked questions, so may a student ask a question. In an educational programme for which the content is relatively stable over a number of years (with different students passing through the course each time it is given), we expect that over time the number of previously unheard (or unseen) questions that students ask will become minimal. For instance, the first time a course is given all questions are previously unseen. Of the questions that are asked in the second year of the course, some may have been asked the previous year. Galea's MaltaQA "stores" answers to new questions and then supplies the same answer to similarly phrased questions in the future [4].

Borg [2] converted Ellul's proprietary lecture delivery platform to a Web-based platform using current W3C (World Wide Web Consortium) standards for synchronised multimedia (e.g., SMIL), and has extended it to support virtual classrooms that can contain students distributed, potentially, around the globe. In this case, a (digitally recorded) lecture is advertised for delivery at a particular time and students can register to virtually attend it. It is also possible for the lecturer to attend, in which case the lecturer may elect to take student questions himself or herself. At the advertised time, the lecture is broadcast to participating students. The toolset required to support these students is extended so that when a student asks a question, all participating students will hear (or read) the question. The lecture must then be suspended for all students so that the question can be answered. The lecturer has the choice of answering the question, asking the audience to provide the answer, or requiring all students to attempt to answer. Unlike non-interactive Internet radio which does not need to cater for listeners to be hearing the same thing at the same time, it is necessary to ensure that all students are synchronised with respect to each other, because otherwise students could be receiving questions which relate to a part of the lecture they have not yet seen, or which was seen several minutes earlier.

Bezzina's PS4School [1] is a Just-in-Time Support System for Curriculum based Learning. This

eLearning platform assumes that the main learning environment is a real (or virtual) classroom, and that the student using PS4School is currently performing a learning task outside of the classroom. Students and tutors connect to PS4School. PS4School knows in which areas each tutor is proficient. A student who requires assistance is automatically connected to an on-line tutor who is in a position to help. PS4School uses policy mechanisms to determine the degree to which a student can seek help. Policies may also be used to ensure a fair distribution of requests for assistance among all on-line tutors who are capable of providing that specific assistance. Spiteri built an open source Web-based version of PS4School and extended the policy mechanisms [5].

3 Future Work

Phase I of the COLLEGE project is expected to run from October 2005 to September 2006. In this phase we aim to consolidate the work that has already been done in [1], [2], [3], [4], and [5], and make it available as a common eLearning platform for delivering video- and audio-based lectures to individual students or groups of students simultaneously. COLLEGE will provide an editor for the development of COLLEGE-based learning content, and toolkits for students to interact with a question-answering system, assessment exercises, the lecturer/tutor, the lecture itself, each other, and to seek and obtain assistance both inside and outside of the virtual classroom. A motivating short course will be developed for delivery through COLLEGE for evaluation purposes.

Phase II of COLLEGE will run from October 2006 to September 2007. COLLEGE will be further developed to include support for non-time-based learning material. Although time-based material, such as video and audio, provides a convenient time-line against which events (such as changing a visual aid) may be triggered, non-time-based material does not. Additionally, some students may not have broadband access to the internet, and some course material may be better suited to a non-time-based delivery mode. Students will still require just-in-time support, mechanisms for collaboration, and interaction with a question-answering system and the tutors, which can all continue to be provided as in Phase I. However, the delivery of the learning content will now centre around knowledge concepts to be learned, the interdependence of concepts, the mechanism for knowledge communication and transfer, and guiding students through a knowledge space consistent with their aims and experience.

4 Conclusion

The availability of relatively cheap broadband access to the Internet makes on-demand lecture delivery viable. COLLEGE will be an on-line environment that mimics a real lecture environment, with a toolset to enable students to participate in lectures either as individuals or as part of a group.

By the end of Phase II (September, 2007), we expect COLLEGE to be a robust, evaluated platform that can be used to develop and deliver University of Malta learning content to students who are unable to regularly physically attend classes; prefer to use alternative mechanisms to learn at their own pace; are resident in other countries; or require additional support to supplement their regular attendance.

References

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