# USING SYNCHRONOUS AND ASYNCHRONOUS ONLINE LEARNING IN COMPUTER SCIENCE COURSES

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***Abstract*** *- This paper describes an experiment we conducted using both synchronous and asynchronous online tools in computer science courses at the Open University of Israel. We believe that computer science courses are appropriate for investigating on-line learning because many of them deal with processes (algorithms, queries on databases, etc.) which are much easier to learn through animated presentations than through written explanations. The success of this experiment encourages us to widen the experiment in the coming semesters.*

*Index Terms – Synchronous online learning, Asynchronous online learning, Computer science courses.*

## INTRODUCTION

The Open University is a distance learning institution that offers over 500 courses in many fields and a variety of study programs towards undergraduate and graduate degrees. The learning method is self-study (students receive the textbook and other learning materials by mail) and is accompanied by face-to-face tutorials. Students submit assignments and take a final exam.

In the fall semester of 2003, most of the face-to-face tutorials in the course "Data Structures" were replaced by online synchronous tutorials (via the Internet). This and the experience of others (eLearn magazine [1], Lupo & Erlich [2] and many others), provided us with some insights regarding integrating technology into traditional distance learning. We present three different viewpoints: that of the student, that of the tutor and that of the university.

## THE STUDENT'S VIEWPOINT

The ability to participate in the tutorials from the student's home (or office) is a big advantage to students who cannot leave their house (or work) for any reason. One student said that the "partial anonymity" gave him the courage to ask questions and actively participate in the tutorial.

Still, not many students participated in the online tutorials, which indicates that the majority of students prefer, at this stage, the traditional method of learning: reading the textbook and attending face-to-face tutorials.

One of the features of the system was the ability to record the tutorial while it is taking place. The recorded lessons were available for download by all students in the course. Many students who did not take part in the online tutorials, downloaded the recordings.

This frees students of the need to write everything down during the tutorial and enables them to view the tutorial again and again, stop in the middle, go back, etc. This ability was praised by virtually all the students.

## THE TUTOR'S VIEWPOINT

Clearly, the tutor must invest effort in learning to use the new technology and must adapt his (or her) teaching methodology to the synchronous online medium. This new technology enables the tutor to include video, audio, application sharing and much more, in one medium, using one interface. This enriches the tutorial and provides added value to the regular tutorial sessions.

The time invested in preparing course materials for the new medium seems to balance out with the time saved by the fact that the tutor can do all the work from home. The ability to record the tutorials makes it possible for tutors to observe their own performance and improve it.

## THE UNIVERSITY'S VIEWPOINT

We will not go into budgetary issues here, but refer only to issues of pedagogical quality. Recordings of the tutorials may be used as asynchronous learning material by all the students in the course, and can be given to students who for any reason could not attend the tutorials. These recordings can also be used for training new, inexperienced tutors by showing them how an experienced tutor teaches the tutorial.

## CONCLUSIONS

Despite the fact that it seems that students still prefer f2-f tutorials, we were encouraged by the other findings, and plan to offer a group of students taking "Digital Design" both synchronous and asynchronous online learning materials and eliminate all face-to-face tutorials. We ran this experiment in the Spring semester of 2003, and will report on our findings in the future..

## REFERENCES

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**0-7803-7961-6/03/$17.00 © 2003 IEEE** **November 5-8, 2003, Boulder, CO**