Integrating a Note-Taking Learning Companion within the WebCT Virtual Learning Environment.

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Introduction

This work forms part of a larger project which seeks to address socially related educational problems inherent in inner-city Leeds. It is being carried out at the Computer Based Learning Unit, University of Leeds in conjunction with Chapeltown and Harehills Assisted Learning Computer School (CHALCS). We have hypothesised that the development of an Internet based Physics module in Astronomy and Optics will work towards solutions to the educational problems. The module is being implemented using WebCT together with an appropriate pedagogy and trickle-down training. Subsequent partial evaluation of the implementation’s effectiveness and an analysis of emerging factors has led to required further support in the form of a Learning Companion.

Context

The Chapeltown and Harehills district of Leeds faces the problems often associated with inner-city ethnic minority areas, notably poor housing, single parents and high unemployment. These factors combine to create a culture of crime such as vandalism and drug abuse. These social problems in turn create educational problems such as truancy and low aspirations. CHALCS was established in 1987 to attempt to address these educational problems by providing extra-curricular tuition for English, Science and Information Technology [1].

There are a number of research aims pertaining to the success of the CHALCS project. Firstly, there are those concerned with the evaluation of the project, that is identifying effective models of the collaborative use of Information Communications Technology (ICT) within an educational context and subsequently investigating emergent factors affecting learning in terms of both problem-solving and the key employability skills (e.g. communication, information handling and task management). Secondly, we see it as crucial to foster trickle-down training in the use of ICT within CHALCS so that staff will be able to maintain and develop courses utilising this technology themselves.

Pedagogy

We are proposing a three tiered pedagogical framework for the successful implementation of a Virtual Learning Environment such as the one at CHALCS [2]. These three stages are known as Acquisition, Argumentation and Application. Acquisition is concerned with the students obtaining the requisite knowledge from

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the course material and/or the tutor/peer interaction. The next stage, **Argumentation**, is concerned with the students corroborating internalised knowledge by seeking evidence, comparing or explaining, possibly in a social context. Finally, **Application** emphasises skills, of both quantitative and qualitative problem-solving in an attempt to reinforce student’s newly acquired knowledge.

**Implementation**

A number of off-the-shelf environments and component solutions were surveyed for the implementation of the course. WebCT was chosen as it seamlessly integrated the required features, was platform independent and had a favourable licensing arrangement. The three pedagogical stages are mapped onto the tools provided by WebCT (plus face-to-face sessions and MS Word). For example, students will use the compilation tool to select their own notes in the acquisition phase, asynchronous chat will be used for group based explanations and judgements in the argumentation phase and the shared whiteboard will be used for collaboratively constructing model answers to problems in the application phase. The outcome is a genuine Physics Virtual Learning Environment based on the underlying pedagogy. The course can be found at: [http://chalcs.org.uk:8900/](http://chalcs.org.uk:8900/) It has been used by A Level students to supplement their school learning at CHALCS.

**Pilot Evaluation**

Pre-test questionnaires were completed by the three CHALCS subjects, one male (age 16) and two females (age 17). All subjects had good public examination results and are currently mostly studying Sciences. Furthermore, the questionnaires indicate that the subjects are comfortable with computers, realise the importance of employability skills and would like further help with them but presuppose encountering problems with using the Internet even though they have never used it in an educational context. Video and audio footage of subjects’ on-screen interactions and dialogues was gathered and transcribed. Also, observational notes, on-line data and artefacts were captured.

Preliminary data analysis indicates that the students soon become accustomed to using the WebCT facilities. During the first session the students had a mean score of 33 accesses to the course notes pages with 3 articles read or posted to the bulletin board increasing to a mean score of 43 with 24 articles read or posted in the follow-up session. Chat was used to effectively develop arguments with the human tutor and peers. However, inappropriately placed postings were made to the bulletin boards indicating that the concept of fora and threads were not properly understood. It became apparent that the Acquisition stage is best carried out in self-study time since it required little classroom tutor intervention and by using self-study time for this phase face-to-face sessions are freed for the more interactive Argumentation and Application phases. Tutor intervention was, however, periodically required during the Acquisition phase to guide the subjects through the use of notes or to encourage them to use the on-line encyclopaedias. The ‘own notes’ facility provided by WebCT proved cumbersome to use to create and structure course notes, cut and paste extracts and annotations from course notes and especially to gather images. Consequently the students used Microsoft Word to produce and critique each others notes. However, Microsoft Word has its own limitations for these purposes and additional support would be needed.

**Further Support**
To provide such additional support a (limited) Learning Companion [3] is proposed. Future versions of WebCT will provide an interface to enable communication with external applications such as the Learning Companion. One possibility is to provide Agent-based support at the level of each of the tools, e.g. a peer to chat to or use the bulletin board with, a coach for use of the whiteboard or the bulletin board, a guide to course notes navigation and own notes construction and a tutor to aid dialogues in all three pedagogical stages. Of particular interest is the role of guide which will support a more scaffolded approach to own notes construction in the form of question-based organisers utilising appropriate schema derived from course content, model answers and expert summaries. The current focus of the further support effort is to utilise dialogue analysis techniques and other qualitative methodologies to inform the design of the companion. This will involve deriving an appropriate ontology as well as interaction style such as informal and colloquial dialogue which is apparent in current human interactions. It is hypothesised that a guide companion will support acquisition of prior knowledge necessary for Argumentation and Application phases of learning. If successful other personifications could be designed to test the generality of the approach.

Summary

The development of an on-line Physics module at CHALCS will lead to a suggested model of implementing ICT-based courses within a learning community such as the one found in inner-city Leeds. Additional functionality, such as the Learning Companion, is necessary to supplement WebCT by improving its underlying pedagogical model in terms of interactive, collaborative and student-centred learning. Currently, data gathered from initial trials is informing the design of the Companion.

Key References

