Mobile Computing in Education

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K.3.1 [**Computers and Education**]: Computer Uses in Education—*Computer-assisted instruction, Collaborative Learning*

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1. MOBILE COMPUTING IN EDUCATION

A recent poll with CS freshmen at our university showed that over 90% of our students possess a PC, about 50% possess a browsing-capable wireless computing device such as a PDA, and more than 25% own a laptop. As mobile devices are often brought along to the university, they can be used during lectures. However, students in lectures are usually only observed reading mails, playing games, and surfing or chatting if Internet access is available.

We believe that an effective integration of any technology into education requires a sufficiently large and widely varied set of participating educators. Any evolution – let alone a revolution – should start in the established class rooms with their tradition as social meeting points in universities. Drastic modifications of such class rooms may frighten away many educators. Small changes that keep the spirit of the lecture hall without restricting the educators are more likely to be accepted.

Our approach revolves around *Digital Lecture Halls* [1] (DLHs). A DLH acts as an enhanced lecture hall infrastructure usable by educators willing to change their lecture routine - and by those unwilling to do so. Basically, the following technological features can be included:

- *Wireless network support* lets educators and students communicate and access the Internet,

- *Electronic whiteboards* replacing chalk and blackboards,

- *Tablets* support writing while facing the audience,

- *Video streaming* for archiving (parts of) a lecture,

- A *Virtual Multiboard* which simulates sliding blackboards.

The transition to the DLH is easy for educators. Classical lectures can be held using the tablet and the Virtual Multiboard software. Computer-based lectures require only our add-on software or the designated presentation server.

We also integrate students with different personal learning styles and equipment into a "local learner loop":

- *On-site evaluation and question queuing* supports anonymous feedback and question submission,

- *Quick knowledge tests* and *decision polls* [2],

- *Steered Internet access* improves the access to lecture resources and optionally restricts Internet access,

- The *ToGather* software supports generating and sharing lecture annotations within learning groups,

- *Lecture tagging* lets students select interesting segments of the recorded lecture for later access,

The basic functions require only a wireless mobile web-capable device, e.g. a WAP phone. Other applications require Java and need more computing power, e.g. a laptop. As the technology is by no means restricted to computer science education, we also strive to recruit educators from other fields to use the DLH platform.

Our project began in May 2002. The first term with enhanced lectures has just ended and is currently being evaluated. The evaluation is done by our project partners from the university's didactic team who also advise us during the term. First indications show that our students are highly interested in the project. We even had to turn away about half of the evaluation volunteers because of far higher interest than we had hoped for - and could handle.

2. REFERENCES

[1] Mühlhäuser, M., and Trompler, C. Digital Lecture Halls Keep Teachers in the Mood and Learners in the Loop. *Proc. E-Learn 2002, Montreal, Canada* (2002), 714–721.

[2] Trompler, C., Mühlhäuser, M., and Wegner, W. Open Client Lecture Interaction: An Approach to Wireless Learners-in-the-Loop. *Proc. 4th International Conference on New Educational Environment, Lugano, Switzerland* (2002), 43–46.