

# VIRTUAL UNIVERSITY GOES MOBILE – EXPERIENCES WITH MOBILE EDUCATION AT THE UNIVERSITY OF HAGEN

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In order to gather first experiences with the possibilities and limitations of mobile education at the University of Hagen, in 2002 a first mobile learning offering was designed that represents the subjects of a graduate course. The particularities of the ideas to learn with a mobile device demand a radical change in concepts of mobile education offerings due to the new teaching and learning concepts associated. This means, that not learning new content is the main educational aim but rather a check of how far learning has progressed already and to enable an exchange between students themselves and between students and teachers. This paper presents current learning scenarios on mobile end devices and support tools for teachers to supplement mobile learning to educational offerings. Furthermore, it discusses ideas for new didactic and technological developments in the field of mobile learning and presents the research activities of the Mobile Education Center of Excellence ([www.mobile-education.de](http://www.mobile-education.de)).

## 1 INTRODUCTION

The so-called mobile learning – which means to study using a mobile phone – and in particular teaching with the help of mobile devices (Mobile Education) are one of the main research focuses at the department of business administration and economics, chair of business administration, organisation and planning, at the University of Hagen since 2002. The positive response from students on the mobile courses, the broad and very positive public and media response to the presented outcomes as well as the constant increase in penetration with mobile devices in the population (cp. Lehner 2002, p. 5) are the main reasons for the research activities being bundled and intensified in the Mobile Education Center of Excellence ([www.mobile-education.de](http://www.mobile-education.de)). This research and development center considers both technological and didactic-methodical facets of the different forms of learning and teaching in the mobile internet. Besides the observation and documentation of current and future developments, the chair continues to drive forward its own research work with mobile education.

## 2 MOBILE EDUCATION IN ADVANCED COURSES OF ECONOMICS

### 2.1 TRACING THE LEARNING PROGRESS

In order to gather first experiences with the possibilities and limitations of mobile education, by the end of 2002 a first mobile learning offering was designed that represents the subjects of a graduate course. The particularities of the ideas to learn with a mobile device demand a radical change in concepts of mobile education offerings due to the new teaching and learning concepts associated. This means, that not learning new content is the main educational aim but rather a check of how far learning has progressed already and to enable an exchange between students themselves and between students and teachers.

The concept of mobile education is based on the assumption that students have already worked through the educational content with the help of lecture notes, workshops or the internet. Further to this it was already said that mobile educational offerings are especially apt for narrowly timed learning situations. With this in mind, short modules in the shape of clozes, multiple choice and wrong/right tasks are being prepared to test the current state of learning. The clozes are based on term definitions where the student must enter a certain term associated with a given explanation. Multiple choice questions, however, are based on a question with a choice of several answers where the correct one must be chosen. Right/wrong tasks are based on the confrontation with a statement that is to be evaluated for its correctness.



Figure 1: Multiple choice questions

The questions are being presented in groups of ten chosen from a pool containing about a hundred questions chosen by the system in random order. By doing so, students can repeatedly work through questions on a particular chapter while being confronted with new tasks all the time.

### 2.2 EXCHANGE BETWEEN STUDENTS

Furthermore, the concept of the mobile educational offering puts special attention to the increase of communication between all participants. For this purpose, on the one hand a synchronous communication mechanism was implemented. The integration of a comprehensive course chat enables not only an exchange between students but also allows the teacher to participate actively in the discussion if there's any need to do so. For asynchronous conversation, an electronic bulletin board for questions and points for discussion was established inside particular chapters.

Students can always use this communication instrument to ask the group questions. Answers to these questions and discussion can – in opposite to chat – also be given at a later point of time. The main advantage of a bulletin board is the question- or issue-related documentation that may serve as a reference for other students later.



Figure 2: Communication between students



Figure 3: Course with video elements

Students also get the chance to make dates for a learning group in the study centres or at self-chosen places using a meeting planner. For this purpose, one or more meeting places and times will be suggested and the suggestions will be spread automatically to a pre-defined distribution list – which contains for example all current participants in a certain course.

The system can handle messages as well as consents or declines via email or SMS. When all students have given their feedback (or a certain point of time was reached), a date and time will be given out that is favoured by most of the students. The suggested participants may now again accept or refuse to attend this appointment or intervene manually to do changes. After all, a message confirming the final appointment will be sent out to all students.

### 2.3 LEARNING NEW COURSES

As already described, long passages of learning matter or data intense elements like audio and video sequences are not (yet) suitable for mobile learning offerings. Nevertheless, explorative issues demand that the entire learning matter in the form of text and chosen video sequences from the related CD-ROM are transported to the mobile learning units. What's particularly of interest for future development here is the research in different learning scenarios in mobile learning as well as the examination of technical restrictions of different mobile end devices.

First results of the study indicate that students use the whole learning matter text not for learning but as a way to look things up in particular if there are uncertainties in the answering of questions. Due to the comparably high restrictions imposed to current handsets it is easy to understand that students do not prefer to study a whole course for the first time using their mobile device. On the one hand, reading a 100 pages teaching letter on a small display will be quite exhaustive and impractical if the student for example wants to switch between particular passages or search for certain terms. On the other hand, most visualisations are hard to read on a small display.

Additional textual descriptions to the shown coherences or an enlargement functionality that highlights certain elements on the screen can be seen as first approaches to solve these issues. Also the necessary amount of data of approx. 350 KB for text and 1 MB for all imagery is associated with long download times and therefore high costs – depending on the transport method that is underlying.

Despite the fact that playback of audio sequences with the learning matter or additional information to it is coherent to significant amounts of data it is however sometimes considered useful in some situations. Like with an audio CD, the student can for example consume the learning matter without exhausting his eyes. Despite the comparably unsatisfying image quality, video sequences are considered positively by students. Suggestions for improvement show that these video technology options are not only used to additional explanations to the learning material but also for the broadcast of course specific training sessions like lectures or exam preparation courses. A so-called live streaming transmission of courses is possible already today, however their realisation requires an extensive technical equipment that is bound to significant costs.

### 3 FURTHER DEVELOPMENT IN MOBILE EDUCATION

Prior to the transfer of more educational texts, existing mobile learning offerings should be extended by more content and functions. In parallel to this, a higher and more intense participation of students and teachers in this development process is being aimed for. All learning scenarios newly developed within this project should be discussed inside the target group at an early stage to prevent false outcomes and minimize inhibition thresholds. Not only is the consideration of students' wishes and experiences but also the ideas and visions of teachers interesting – it's an urgent requirement. A profound debate around issues of mobile education should not only comprise an evaluation by the chair; surveys and discussions with external partners are also being initiated. For this purpose, the exchange with experts is aimed for during lectures and exhibitions.

In terms of content, mobile learning offerings are to be extended by glossary and index of terms to compensate for students' desire to look up specific terms directly. It is also being considered to allow students to post own, new questions in the form of closes, multiple choice items or right/wrong questions alongside existing material that they can use themselves or make available to other students.

Furthermore, the formulation of free questions is designed to intensify the engagement in the content and increase the number of available questions for self tests after evaluation by the teachers. The interactive involvement of students will also be extended by still to be designed feedback mechanisms for the teachers. Through this feedback, suggestions to the con-

tent but also for the didactical and methodical concepts can be collected for the further development of the educational offerings.

#### **4 CONCLUSION AND PERSPECTIVES**

Mobile education as a new way of learning cannot replace current ways of learning (cp. Schwabe/Frohberg 2004, p. 1077), but it can be seen as a valuable addition. It offers the highest possible amount of flexibility. Students can practice according to their individual time budget and use empty times on the way spontaneously as learning times – without their manuscripts, books or a PC. Also, the increasing repetition of learning matter significantly increases the learning success.

Despite first positive impressions of the students that tried learning on their mobile phone, further research in mobile education must be performed. First of all, today's mobile learning offerings must be tested in practice and be evaluated. The technical possibilities have not been exploited by far and the technological progress keeps offering new chances continuously. Besides the learning offerings for the advanced university education, special focus should also be put on undergraduate school education. It is evident that in this field there may be more versatile learning offerings than with adult education due to the greater affinity of the target group to new technological developments. More application fields could be in the tourist sector. Using other mobile technologies like location based services (cp. Turowski/Pousttchi 2004, p. 74-80) enable learning scenarios in cities as well as on larger areas like fun parks or botanic gardens.

Besides learning scenarios, also business models for mobile education are of particular interest. The research in, the further development of and the live operation of mobile learning offerings form a significant cost factor. Only an economically feasible progress in the implementation of mobile learning material can manifest its permanent existence in practice. Due to their increasing convergence that becomes obvious today, analogies between the stationary and the mobile internet may offer hints on mobile education. The technological convergence and the assumption that mobile education is not a replacement for but an addition to existing ways of learning furthermore point to the special importance a connection of the education media and its forms has to further developments.

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