

NMOBTEC-ENVEDU: M-LEARNING SYSTEM FOR ENVIRONMENTAL EDUCATION

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ABSTRACT

This paper introduced the implementation of a New Mobile Technologies and Environmental Education System (NMobTec-EnvEdu) designed for m-learning environments. The NMobTec-EnvEdu system has been developed to provide environmental education in a collaborative framework to undergraduate students through the Internet using mobile phones. The study investigated the results of integrating mobile technology with e-learning and traditional classroom environments; specifically, the use of mobile telephones and data services (i.e., WAP, SMS, MMS, e-mail). System features have been evaluated by instructors and students. The system pre-evaluation test shows that NMobTec-EnvEdu is a useful m-learning environment. Initial results of the system are encouraging for the further development of the system. The web based system has been to value-add to the anytime and anyplace flexibility of m-learning. Several tools were used to develop this system. The system includes JavaScript and PHP as script language, MySQL as database, Dreamweaver and Flash as an authoring tool, and Apache as a web server.

Keywords

Mobile telephones, m-learning, environmental education, e-learning, mobile technologies.

INTRODUCTION

Mobile learning, a relatively new concept, has gathered momentum and attracted the interest of educators, researchers, and companies developing learning systems and instructional materials. Mobile devices will be used in education and they will change situations and environments. Seppälä, Sariola and Kynäslähti [10] defined mobile learning is learning through mobile computational devices, such as notebook computers, Personal Digital Assistants (PDAs), tablet PCs, smart phones, cellular phones etc. The important features of mobile learning environments are based on wireless connections via these devices, which are bringing about a change of paradigm in the learning model [9]. The most common mobile device is the cellular phone.

Muhlhauser and Trompler [8] underlined within educational environments, students frequently move from place to place, but their mobile telephones are characteristically immediately accessible throughout the day [3]. At the other hand, Berger [2] listed the implications that mobile technology can bring to teaching and learning:

- Better realization of “anywhere, anytime”,
- Freedom of organization in and out of the classroom,
- Collaboration among students separated geographically,
- Transparent connection to nets,
- Remote sensing and integration of information,
- Shift from “anywhere, anytime” to “everywhere, everytime”.

BenMoussa [1] identified several benefits of using mobile applications, which generally permit users to control or filter the flow of information and communication using individualized or personalized devices.

The role of education in understanding, protecting, and solving environment problems has been universally recognized since 1970 [11]. Since 2000, researchers have considered the use of environmental education in schools, colleges, and universities [7, 5, 4]. Somehow, detailed review of the academic literature was conducted, but the need for a contemporary perspective meant that there were very few research articles on m-learning available and, therefore, limited reference has been made to peer-reviewed academic publications [6]. For this reason author was developed the web-based mobile system for education.

A principal goal of this study was to develop a suitable system for environmental education via mobile technologies together with computer technologies. Wireless devices have the potential to provide instant gratification to students by allowing them to interact with instructors and students and access study materials from any place on earth.

In this study the desire to work collaboratively and share information has been built into a group activity that encouraged learners to develop a virtual map by attaching pictures, text, and audio clips they gathered during a mobile activity such as exploring a geographical area (see figure 1). For this, the exploratory study investigated the results of integrating mobile technology with e-learning and traditional classroom environments; specifically, the use of mobile telephones and data services (i.e., WAP, SMS, MMS, e-mail).



Figure 1. NMOBTEC-EnvEdu System

NMOBTEC-ENVEDU SYSTEM ARCHITECTURE

Software Requirements: This experimental study has been carried out at the Near East University, Department of Computer Education and Instructional Technology (CEIT). In order to send the comments using the SMS and the pictures using the MMS, a web-based environmental education system has been developed by the author on one of University servers, called the New Mobile Technologies and Environmental Education System (NMOBTEC-EnvEdu). Several tools were used to develop this system. The system includes JavaScript and PHP as script language, MySQL as database, Dreamweaver and Flash as an authoring tool, and Apache as a web server.

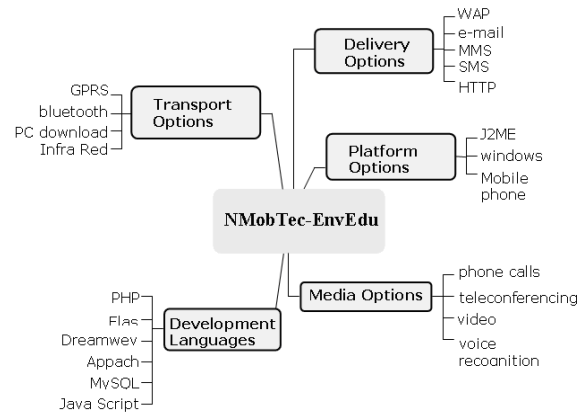


Figure 2. Factors to consider in implementing NMOBTEC-EnvEdu System

System Configuration: The Web-based environmental education system developed by the author consists of three modes: student mode, researcher-moderator mode, and administration mode, where each can log in the system through his/her mode.

Student Mode Design: Students can log on the system via their own mobile telephone using GPRS connection and identify the current study progress. After that, they can take pictures of the environment where they think there are environmental problems. They send individual solutions via mobile telephones and also interact with other students to get ideas for problem solving. This study process enables students to acquire knowledge and they can find solutions to existential environmental problems so that their conceptual model and value system about environment are established.

Researcher-Moderator Mode Design: The researcher-moderator can log in the system, select the pictures posted by students and provide advice to students. Also, he/she controls and organizes the student studies and can search students' study progress whenever required.

Administration Mode Design: Administrator of the system can log in the system to control and organize the posted pictures. The administrator then uploads the selected pictures to the system's website.

APPLICATION

Self-directed study is possible as environmental problems are shared through the interaction among students via mobile telephones using internet communication tools. The characteristics of the proposed system can be explained step by step as follows:

- Students use their mobile telephones to take pictures of environmental blights and social events taking

place in their surroundings. Students send their pictures to the researcher-moderator via MMS.

- The researcher-moderator selects environmentally useful pictures, numbers them and sends them to the administrator.
- The administrator uploads these pictures to system's website.
- Students connect to system's website using their mobile telephones and review the pictures displayed online. At stage students are expected to make comments on pictures and send their comments to the researcher-moderator using simple SMS text messaging.
- Comments are uploaded to the system website.
- Students use the Windows Live Messenger, which is a software package available free of charge on mobile telephones for organizing group discussions. Discussions usually last for 30-60 minutes and they take place at pre-arranged dates and times. Students review the pictures collaboratively and suggest solutions for overcoming environmental problems. The researcher-moderator also participates in discussion sessions to help students who may encounter problems.
- All the discussion sessions are saved on researcher-moderator's laptop for future reference. The researcher-moderator can prepare study reports for students.
- Study reports are uploaded to system website.
- Finally, students can follow the reports about their studies on the web site.

Figure 3 summarizes operation of the system.

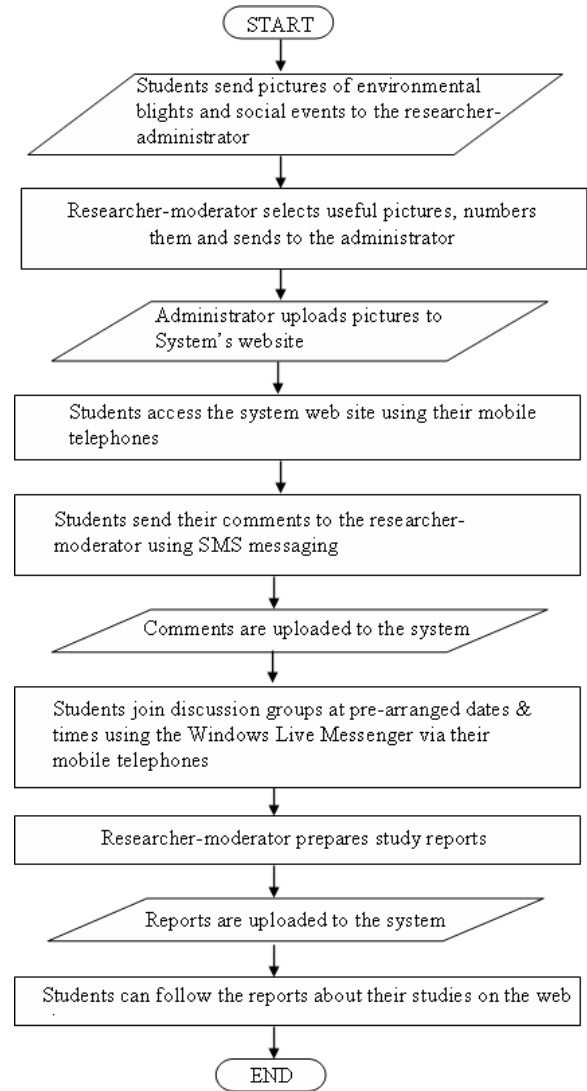


Figure3. The characteristics of the proposed environmental education system

CONCLUSIONS

Mobile learning or m-learning, a relatively new concept, has attracted the interest of educators, researchers, and companies developing learning systems and instructional materials. This study investigated the use of integrating mobile telephones, SMS/MMS/e-mail/GPRS services and multimedia messaging to increase students' use of mobile technologies and to develop environmental awareness.

In this study, working collaboratively and sharing information was built into a group activity to encourage undergraduates to create a virtual map by transmitting snapshots and text gathered while exploring a

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geographical area in North Cyprus. In addition, the students who participated in this study have persuaded their friends to be more aware about their environment and to do something useful to the environment.

Furthermore, the paper may assist researchers in other countries interested in the creation and use of new educational technologies. Moreover, the overall goal of this system has been to value-add to the anytime and anyplace flexibility of m-learning, too.

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