

SCENARIO DEVELOPMENT FOR A MOBILE LEARNING COURSE

H. Ferhan Odabaşı
fodabasi@anadolu.edu.tr

Cem Çuhadar
ccuhadar@anadolu.edu.tr

Abdullah Kuzu
akuzu@anadolu.edu.tr

Anadolu University
Faculty of Education
Department of Computer Education & Instructional Technologies
Eskişehir, Turkey

Abstract - Recent technological developments in the mobile field along with the improvements in phone figurations provided mobile phones with the potential to become a learning tool of the future. As a result of these improvements including rich multimedia capabilities linked by highly accessible communication networks, mobile phones turned out to have a large base of users. This revolution removes time and location boundaries making anywhere, anytime learning possible. This of course helps a wide spectrum of learners as an appropriate concordance between the personalized nature of mobile devices and diverse learning purposes of mobile learners is realized. This study covers the scenario development stage of a project, IBEM, a two year project supported by The Scientific and Technological Research Council of Turkey (TUBITAK) addressing the use of PDAs in the education of students with hearing disabilities from as early as deciding on the course to the last point of carrying these scenarios to the mobile platform. There have been numerous initiatives to use PDAs with people with disabilities; however, the literature is mostly concerned with assistive technologies. Indeed, the instructional use of mobile technologies keeps the higher potential for people with disabilities, which helps them to overcome the barriers of access to a normal education.

Keywords: M-learning; Contextual learning; PDA

INTRODUCTION

Technological advancements have provided human beings with a large and multifarious set of assistive devices to support learning and teaching applications, particularly at the second half of the 20th century. Internet and portable technology tools can be considered as milestones in this development continuum as they allow individuals to access information regardless of the time and place they are in. These technologies have reflected themselves on learning as well, which created the notion of mobile learning (i.e. mobile e-learning). Mobile learning (m-learning) is a type of computer assisted learning realized through portable computers. It is not different from existing e-learning and distance learning applications, rather, it can be considered as a new version of these applications (Georgiev, Georgieva, Smrikarov, 2004).

Mobile technologies can be used as assistive technologies to help special students in terms of both daily use and instructional purposes. When individuals who need special education are in question, technology is employed as assistive technologies such as hearing or orthopedic walking aids. However, students with special needs can and should employ technology in their instructional practices as well. As indicated by Wenglinsky (2005), the digital divide can only be eliminated when every section of the population is able to benefit from technological developments. The abundance of multimedia resources in instructional settings along with time and place flexibility provided by mobile technologies serves as a rich learning potential. However, the most advantageous aspect of mobile technologies is that they challenge the monotonous one-dimensional learning paradigm and provide learners with individualized and purposeful learning contexts (Basaeed et al., 2007). In this respect, the appropriateness of mobile technologies with the needs of special students is clearly justified.

Within the above mentioned framework, the current study describes the unique contextual structure of a project entitled “Mobile Technologies for Students with Hearing Disability” (İşitme Engelli Bireylerin Eğitiminde Mobil Teknolojiler – İBEM, project number: 107K022) with a particular emphasis on planning and development. The project whose implementation process still continues is being supported by the Scientific and Technological Research Council of Turkey (TUBITAK). This study describes the instructional, technological, and methodological contexts of the project, and provides the readers with steps of scenario development for a mobile learning course.

IBEM: Foundations and the Contextual Structure

IBEM is a two-year project funded by TUBITAK. The primary goal of the project is to help special students to use mobile information and communication technologies effectively and independently, and provide them with learning and communication opportunities enriched through mobile technologies. In addition, it is also aimed to investigate the ways to overcome learning and communication problems faced by special students, which are mostly difficult to be eliminated through known methods and procedures. The project is being implemented through a multidisciplinary perspective in which instructional technologists, special education experts and research methodologists participate.

The processes of planning and development involve determining the unique contextual characteristics of the research, and developing the implementation agenda based on these characteristics. The instructional context is defined as situations and conditions surrounding instruction (Basaeed et al., 2007). Along with the designation of the instructional objectives, contextual and environmental analyses carry utmost importance (Davidson-Shivers & Rasmussen, 2006). The post-positivist learning approach, which maintains that information and reality are not independent from individuals, is also taken into account. That is, information is not described as an objective entity, rather, it is considered as being constructed by learners in order to explain and feel notions (Jonassen et al, 2003).

Special students have unique learning needs stemming from their physical handicaps. Early and proper diagnosis along with the use of appropriate assistive technologies at an early age carry importance, but these alone cannot solve the problem. Hearing impaired students should be equipped with proper hearing aids first, be provided with appropriate language experiences, and be exposed to robust instructional endeavors to develop their hearing and listening skills through effective use of their residual hearing abilities. In this respect, technology provides special individuals with supportive and assistive tools to enrich their daily routines and learning skills. Thus, it is important to analyze the contextual structure peculiar to hearing impaired individuals’ education, and design instruction accordingly. The unique contextual structure of the IBEM project is summarized in Figure 1 and examined under the headings of instructional context, technology context and methodological context.

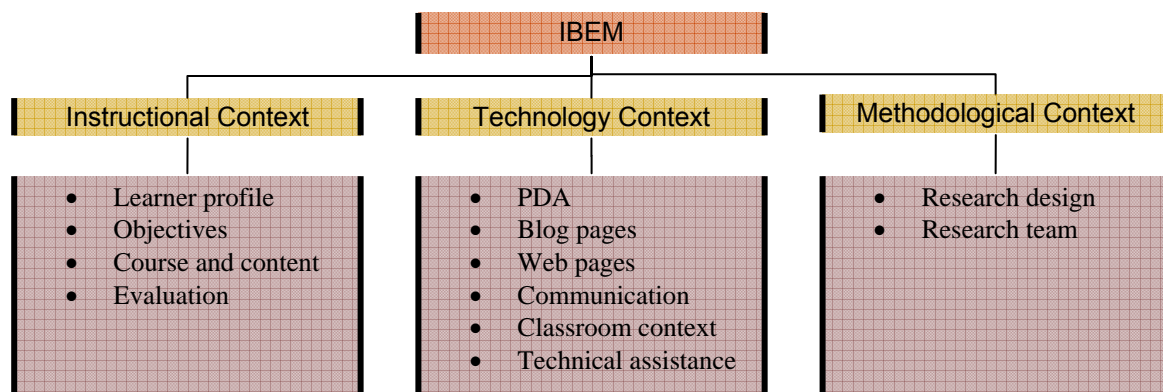


Figure 1. Contextual Structure of the IBEM project

Instructional Context

The instructional context should be clearly identified and described in detail in order to develop a sound instructional design. This context involves several dimensions such as learner profiles, instructional objectives, instructional content and context, and evaluation. Şimşek (2000) maintains

that in order for instructional practices to be successful, it is crucial to have sufficient and detailed information about the individuals who will make use of that instruction such as gender, age, prior knowledge, and learning styles. Twelve students with different levels and reasons of hearing impairment participated in the current research, eight females and four males. As of 2007 Fall semester, participants pursue their education at the Graphic Arts Program at the Department of Applied Fine Arts at Anadolu University School for the Handicapped.

The research has been designed to investigate the ways to implement mobile technologies in the education of hearing impaired students. These students' language and speaking insufficiencies prevent them from perceiving the societal practices and making use of educational opportunities properly (Girgin, 2003). Thus, it is important to implement technology supported practices to enrich special students' experiences on a social and instructional basis. IBEM participants have been selected from hearing impaired undergraduate students in order to address the need to enrich their social and instructional experiences. The purpose is to provide these students with effective communication and learning experiences through enriching their daily communication endeavors and learning contexts via mobile technologies. Participants of the current study were at the beginning of their bachelor degree, that is, their social relationships are supposed to be at an elementary level, which is another reason to select them. The social and instructional inexperience in the undergraduate level is considered as an opportunity as the purpose of the current research is to ameliorate both instructional and social experiences of the participants.

The framework is primarily based on investigating the opportunities and guidelines to improve hearing impaired students' learning and communication experiences through the use of mobile technologies. A mobile learning environment has been developed where students are able to follow the content of the course and continue their social interactions through their personal digital assistants without being affected by time and place boundaries. Rather than creating a manipulated experimental context, the natural learning and interaction experiences of special students were supported through authentic means. Thus, one of the core courses of their current program entitled 'Fundamentals of Information Technology – I' was selected for the implementation of the research. The contents of the course were modified by the course instructor and the instructional design team in accordance with the unique needs of the students.

Technology Context

The technological infrastructure of the research was planned in accordance with both hardware and software dimensions. The most important component of the hardware dimension is the PDA (personal digital assistant), handheld computers which have wireless Internet access function. PDAs constitute the basic elements under investigation within the framework of this research. These devices help hearing impaired students carry their class notes wherever they go, access the course website, and communicate with each other and their teachers. In m-learning contexts where PDAs are used, these devices can be considered as the miniature counterparts of desktops, which have the technical capacity to carry and display the course content everywhere.

During the planning phase of the research, it was not considered possible for hearing impaired students to interact with each other and their teachers, and take down the notes of the current subject matter simultaneously. Thus, a digital board is located in the classroom which can transform the teachers' notes into the electronic format, and transfer this information to students PDAs through wireless connection.

During the implementation phase, course instructor's handouts, presentations and other electronic contents were shared, and communication enriching applications like e-mail and blog were employed through wireless communication protocols. In order to provide participants with uninterrupted communication opportunities, a device called Wireless Access Point was used within the School for the Handicapped. In order for students to benefit from wireless communication opportunities, meet the communication requirements of the course, and interact with both each other and the course instructor outside the school, a GSM line is installed in each PDA. Students made use of the GPRS connection which helped them to benefit from Internet protocols regardless of time and place boundaries. In addition, Bluetooth and infrared communication opportunities were resorted for in class interaction endeavors, which did not require high access speed and allowed students to share relatively smaller files.

Considering the financial dimension of the research, students were asked to make use of wireless connection, Bluetooth and infrared functions before resorting to GPRS connection realized through GSM lines. This is because the cost of GPRS connection is estimated according to the amount of data transfer, which makes this type of connection relatively expensive. In addition, GPRS is somewhat slower and ineffective in terms of file sharing in comparison to wireless connection.

The software dimension of the technological infrastructure involves course web pages and the course blog. Contents of the 'Fundamentals of Information Technology - I' course were given to the technical staff during the planning phase. The technical staff prepared the web pages in accordance with the technical features of PDAs and suggestions of the instructional design team. Two criteria were primarily taken into account while preparing and publishing the web pages. One of them is the screen size of PDAs used in the research (HP iPAQ hw6915). The low resolution display of the PDAs (240x240 pixels) urged the technical team to prepare the web pages accordingly. The second one is the type of web browser employed by PDAs. As the PDAs operated with the mobile version of Internet Explorer, HTML tags supported by this version were used while preparing web pages.

One of the important criteria to maintain that the research study has pursued its purpose is to make sure that students access course web pages and follow the contents through their PDAs. Thus, necessary algorithms and scripts were developed by the technical team to ensure that course web pages can only be accessed through PDAs. In addition, participants were provided with user names and passwords to follow the contents of the course.

One of the purposes of the research is to sustain that social and instructional interaction endeavors are enriched. To make sure that hearing impaired students interact with each other and with their instructor in asynchronous contexts; an open source Weblog software called Wordpress was implemented. Blogs are Internet-based tool which are basically employed in web supported instructional contexts to improve and enrich in-class interaction. They allow users to create web pages without any knowledge on coding or scripts, deliver their ideas on these pages, respond to other users' messages and add comments to existing contents (Çuhadar & Kuzu, 2006). Blogs support asynchronous interaction among Internet users. Thus, they allow students to continue their discussions outside the school. As emphasized in the social constructivism, social interaction and active participation in learning has an important place in assigning meaning to information and appropriating it. In this respect, it can be maintained that blogs are quite useful tools which provide students with a context to reflect and publish their own meanings and opinions (Ferdig & Tammell, 2004).

The contents of the blogs were organized in accordance with the instructional objectives and contents. In addition, activities addressing instructional and social interaction were deliberately included within the contents. In order to publish course web pages and blogs through PDA in an uninterrupted way, the research team resorted to professional hosting services. A web space of 500Mb was allocated to the research project and a unique domain name (<http://www.bil151.info>) was used for students to access course blogs easily.

Methodological Context

The methodological context of the research is dealt with within the dimensions of the research design and the research team. The implementation of the IBEM project was designed as an action research study. Mills (2003, p.5) defines action research as 'any systematic inquiry conducted by teacher researchers, principals, school counselors, or other stakeholders in the teaching / learning environment to gather information about how their particular schools operate, how they teach, and how well their students learn'. Johnson (2005) maintains that the primary purpose of action research is to improve instructional applications and enrich the functionality of schools.

While choosing the type of the research design, rather than reaching generalizations based on quantities obtained from manipulated environments, in-dept descriptions of the natural process and experiences were sought for. To realize this, the research was designed as an action research. Action research has emerged within the framework of post-positivist perspective, whose primary features are to be sensitive towards natural context, understanding, explaining and improving. Explaining the use of mobile technologies for hearing impaired education in special students' unique and natural learning

contexts, and improving this context through strategic decisions based on accumulated information are only possible through conducting an action research.

The process of action research requires systematic data collection in order to determine potential problems of the instructional contexts, and suggest solutions to these problems. The data collected during the research endeavor should describe the context clearly and in detail. In this respect, the current research made use of several qualitative data collection techniques including observations, reflections and semi-structured interviews. In addition, personal information forms, research diaries, course web pages, forum and e-mail messages, video recordings and exam results constituted other sources of data to describe the context in detail.

A research team consisting of experts in different fields was formed to deal with the complicated process of instructional design, to collect the comprehensive data, and to evaluate the data. The research team consists of eight scholars including instructional technologists, special education experts and scholars experienced in action research. The responsibilities and potential contributions of each researcher were determined during the planning phase. Instructional designers have selected the participant students, organized the instructional context, designed instruction, developed instructional materials, evaluated these materials, and conducted interviews during data collection. They are also expected to prepare a report of the data collected. The technical team has prepared the web pages and blogs of the course, updated contents, sustained uninterrupted access to these resources, solved technical problems and transferred the instructional content to electronic environment based on the suggestions of instructional designers.

Conclusion

Contemporary applications require the use of information and communication technologies for instructional purposes. Mobile technologies provide learners with the opportunity to access, retrieve, and manipulate information without time and place boundaries, as they are both portable and compatible with wireless communication applications. To develop sound instructional endeavors with the help of mobile technologies, there is an increasing need for research studies evaluating the instructional and social context of mobile learning environments. Thus, the current study aimed to provide hearing impaired students with effective communication and learning experiences through enriching their daily communication practices via mobile technologies.

The research has been conducted through a multidisciplinary approach. Real learning experiences of students were examined, sensitivity to natural context was sustained, a student-centered approach was assumed, and a technology-supported environment was created. Within the aimed framework, the unique contextual structure of the project was dealt with through focusing on planning and development. The instructional, technological, and methodological context of the project was described each sheltering further subtitles. The instructional context included learner profiles, instructional objectives, course and content, and evaluation. Technology context included PDAs, web pages, blog pages, communication, classroom context and technical assistance. Finally, methodological context included the research design and research team. Each context has been planned and developed according to unique features of these dimensions. Followed by a comprehensive planning and development process, the implementation of the project was realized in the Fall semester of 2007. The processes of data transfer to electronic environment, data analysis and interpretation are the following steps of the research which still continue.

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