

MOBILE TECHNOLOGIES AND DISTANCE EDUCATION

Rostislav Fojtik, Hashim Habiballa

Abstract:

Rapid advancement of information and communication technologies enables to produce more mobile devices. Most of distance education students need access to study materials, communications tools and further learning means not only at home and in their working place, but for example on business trips. Therefore it is necessary during the design of e-learning education not to forget also mobile devices and tools. The most used ones are cellular phones, which provide not only voice services but are also capable of data transfers. Further pocket computers may be used - called PDA. In present time the significant popularity focuses to smartphones. These devices besides the communication services provide also capabilities similar to PDA. Also notebooks belongs to the family of mobile machines that enable users to work out of the home and office due to the progress in technologies. Tablet PC's may replace notebooks thanks to better mobility, connectivity and the presence of touch display.

Mobile devices

Mobile computer and communication devices include not only notebooks that provide relatively small level of mobility. These devices are suitable only for transfers. Better mobility is given by mobile machines called PDA (Personal Digital Assistants). They use mostly operating system Pocket PC or Palm OS. The advantages are mainly small dimensions, relatively long working time, instant response to user commands, software and hardware extensibility and communication abilities. Similar devices are called communicators or smartphones. They are cellular phones with sophisticated operating systems like Symbian, Windows Mobile or Palm OS. These devices besides the communication services are capable of similar possibilities like PDA.

Not only mobile computers and communicators are needed for the real mobile work. It is necessary to establish support and infrastructure for mobile connection to communication networks. The recent advancement of data communication systems offers practically usable and reachable tools. At the first place there are the GSM technologies and its extensions GPRS and EDGE. The technology CDMA is also used in Czech republic. The WiFi based data transfer (IEEE 802.11b/g) is also very popular mechanism that could be observed from a large number of hotspots (access point for wireless connection).

Mobile technologies in distance education

At the end of 2004 there was performed a research among 63 distance students of bachelor's degree study program Applied Computer Science. Its objective was mainly getting of information about usage of mobile information and communication technologies. As it was supposed all of the students use cellular phone. 64% of respondents use also mobile PC – notebook. On the other hand the extension of PDAs and smartphones is lesser (Fig. 1).

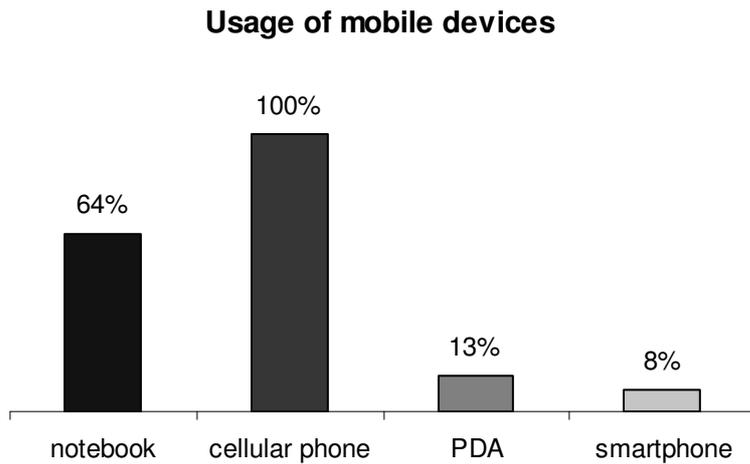
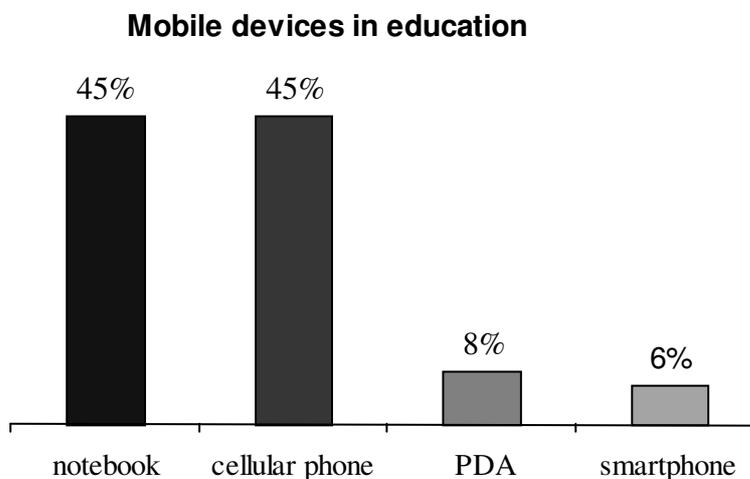


Figure 1: Usage of mobile devices

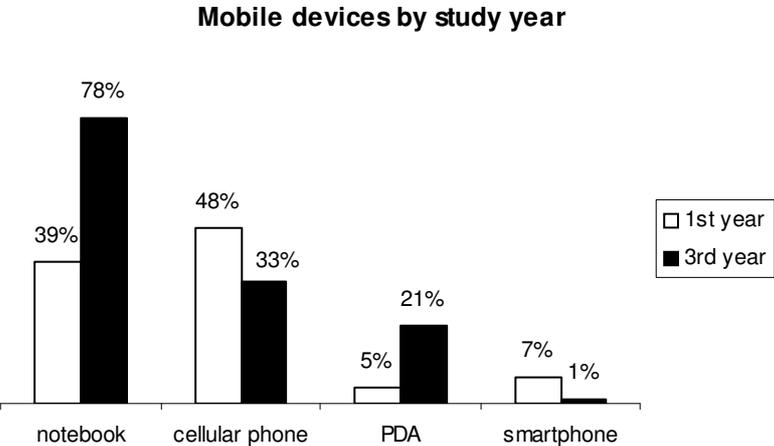
Fig. 2 shows usage of particular devices in learning. It could be observed that the usage in learning is lower than in common life and in work. This fact is caused also by teaching materials, which are not prepared for use with smartphones and PDAs. Another obstacle is higher prices of these devices and lower data transfer rates of devices like GSM phones. Rapid advancement of new and powerful technologies will lead to higher level of



usage of these devices.

Figure 2: Usage of mobile devices in learning

We can also compare the usage of mobile devices between students of first and third year. It could be concluded that students of higher year use these devices more frequently. This fact is also caused by better knowledge of third year students about mobile computer tools and



possibilities of its usage.

Figure 3: Mobile devices by study year

The number of students that plans to buy some of the mobile devices proves the increasing significance of mobile tools. 37% of respondents intend to use these devices in learning. Most of them want to buy notebook and the same number will buy PDA. Next group plans to obtain smartphone, which posses some of PDA functions. The same number prefers other device. Mostly it represents devices for mobile communication and connection to Internet.

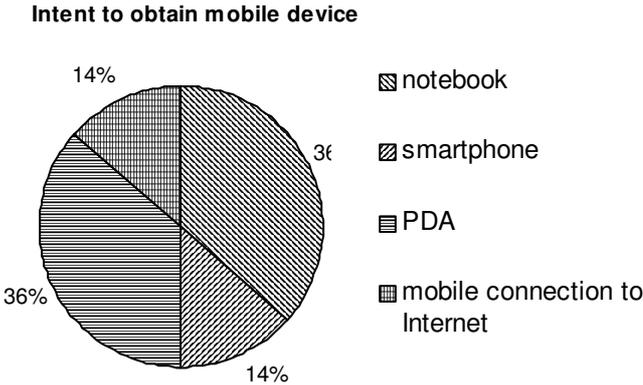


Figure 4: Intent to obtain mobile device

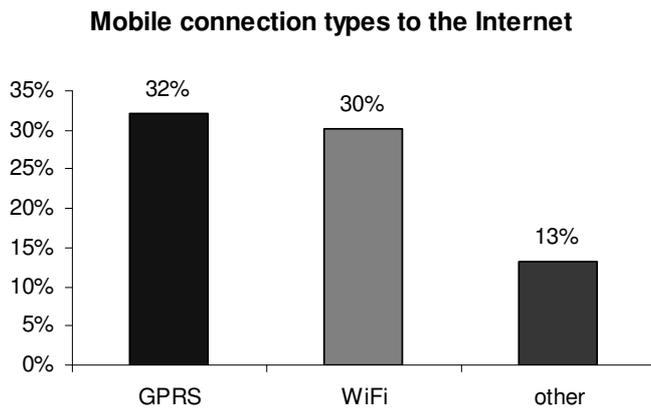


Figure 5: Mobile connection types to the Internet

The most used technology for connection to Internet and data transfer is GPRS, which could be reached by common GSM phone with modem. Further the wireless data transfer based on IEEE 802.11b/g called WiFi. With the increasing significance of mobile communication technologies like CDMA or EDGE it is supposed that its extension will increase among distance education students.

Conclusions

Rapid development of mobile technologies is present not only in technical side but also in educational side. Besides the notion of e-learning it is also introducing the notion of m-learning, which emphasizes usage of mobile technological means also in the educational process. Educating institutes should adapt their methods of teaching for mobile technologies, which will bring distance education students better choices of learning means.

1 INTRODUCTION

The evolution in education and training at a distance can be characterized as a move from distance learning to e-Learning and m-Learning (mobile learning). Mobile technologies are a future in e-Learning technologies. There is little doubt that in the future learning solutions and services will be integrated into a whole host of mobile technologies (for example mobile phones, PDAs, Tablet PC, notebook, smartphones). In the US, Using PDAs in schools and for workers on the move has already been adopted with significant results in terms of improved learning effectiveness. In Europe, mobile learning is beginning to develop. Our universities aspire to promote new technologies in learning and mobile technologies develop quickest. The majority of students use some mobile device for work, education and amusement. M-learning is that it allows on-the-go professionals to connect to training courses anytime and anywhere [5].

2 MOBILE DEVICES AND LEARNING

Mobile devices:

Notebook is portable personal computer. Notebook can have wireless networking (WiFi, Bluetooth, Infra port) and mobile processor.

Personal Digital Assistant (PDA) - a small hand-held computer typically providing a calendar, contacts address list, calculator and notes applications. It may also include other applications, a web browser and a media player. Small keyboards and pen-based input systems are most commonly used as input systems. PDAs use operating systems PalmOS, Windows Mobile or Symbian.

A *Tablet PC* is a wireless PC that allows a user to take notes using natural handwriting with a stylus, digital pen, or on a touch screen. It is similar in size and thickness to a paper notepad. There are two formats, a convertible model with an integrated keyboard and display that rotates 180 degrees and can be folded down over the keyboard, or a slate style together with

a removable keyboard. The user's handwritten notes, which can be edited and revised, can also be indexed and searched or shared via e-mail or mobile phone.

Smartphone is mobile telephone with applications of PDA. A wireless phone with text and Internet capabilities that can handle wireless phone calls and voice mail, send and receive e-mail and fax transmissions, hold addresses, access information on the Internet. Smartphones use operating systems Symbian, Windows Mobile or PalmOS.

Mobile devices can communication with personal computers, networks, databases and server.

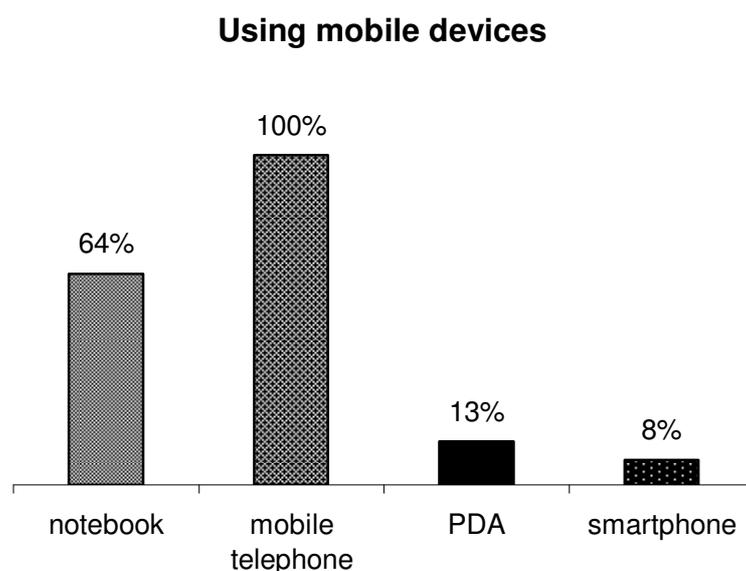
Mobile devices can contain various applications and parts:

- Planning software – assessment, calendar, notes, assignment
- Office software – Pocket Word, Pocket Excel, Pocket PowerPoint, Pocket Access
- Internet – Blazer, Internet Explorer
- Multimedia – mp3 player, video player
- Communication software - ICQ, chat
- E-mail client
- Network, WiFi, Bluetooth, Infraport
- eBook
- Network database

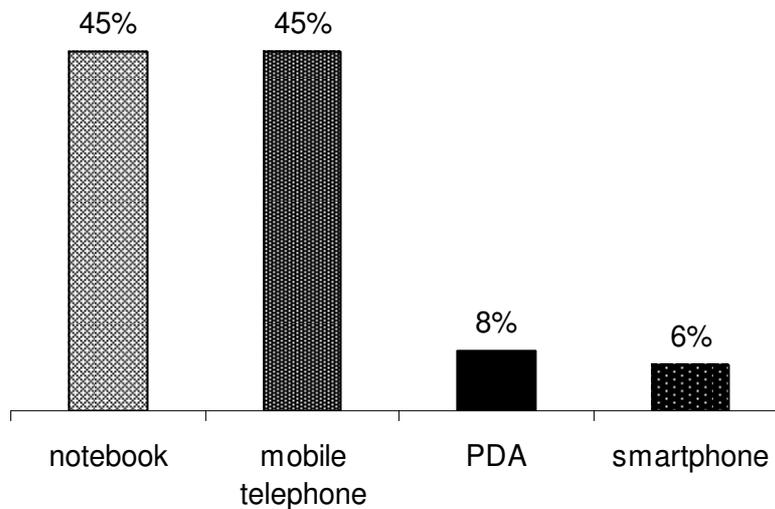
We can describe four levels for using mobile computers in education. [3]

- Level 1 – *Productivity*. Students use basic application in mobile computers (Calendars, Schedule, Contact, Grading). Users are isolated, communication is only asynchronous.
- Level 2 - *Flexible physical access*. Students use so local databases, interactive promptive and just-in-time instruction.
- Level 3 – *Capturing and integrating data*. Mobile library, network database, data collection, data synthesis.
- Level 4 – *Communication and Collaboration*. Real-time chat, annotations, data sharing. Students make groups. Communication - mostly synchronous.

We wanted verify quality of methodical procedures and proposals for preparation and implementation online courses. We made the questionnaire for distance students which study the branch Applied informatics. Students evaluated level and quality of online courses and they describe their using mobile devices in learning.

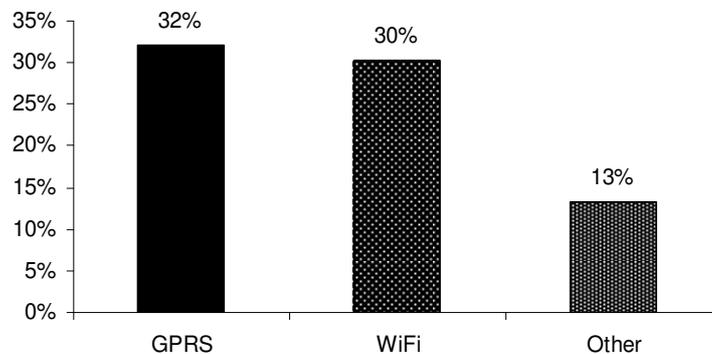


Using mobile devices for learning



Students can use mobile technologies for communication. More students use GPRS (EDGE) technology or wireless technology (WiFi). New technologies (for examples EDGE, UMTS, CDMA, Flash OFDM, UMTS TDD) allow faster broadcast and transfer of data. The speed is from 100 kbps to 10 mbps. This speed is suitable for high-powered applications and for using online courses.

Mobile connecting



3 WHY USING MOBILE COMPUTERS FOR LEARNING?

The main reason given for using mobile computers for learning are that they assist students' motivation, help organizational skills, encourage a sense of responsibility, help both independent and collaborative learning and can be used to help track students' progress and for assessment. Mobile computers can be used anywhere inside an educational institution, or outside, for example on field trips.

- Palmtops offer access to information and promote the development of *information literacy*.
- Palmtops offer the possibility of *collaborative learning*.

- Palmtops offer the possibility of *independent learning*.

4 COMPLETION

Results indicate that students of distance learning want use mobile technologies during learning. If we want verify the quality of online courses, we would do support and assistance for mobile technologies. New online courses have to promote mobile technologies. M-learning allows study anytime and anywhere.