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# Technological conditions of mobile learning at high school

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Abstract
This paper reviews the history of mobile learning, provides a definition of «mobile learning». The properties, advantages and disadvantages of mobile learning, areas of its implementation at the Technical University and mobile learning tools were specified.
Key words: MOBILE LEARNING

**Problem statement**

Mobile learning is a new educational paradigm, which also is a basis of new learning environment, where students can get access to learning materials at any time and from any place they like, and which makes the process inclusive and motivates to continuous education and training during the whole life.

**Analysis of the recent studies** has shown that the prerequisites for mobile learning were established in the 70s of the last century when Alan Kay proposed the idea of a book size computer for educational purposes.

In the 90s since the pocket computers have been emerged, the introduction of the mobile learning to the studying process began at the universities, and the first training projects appeared for implementation of mobile learning. The foreign scientists investigated mobile learning in their researches: T. Anderson develops theoretical and methodological principles of e-learning, M. Sharplz and J. Ettevel looked at the impact of mobile learning; M. Ragus studies the Australian state mobile learning standard; J. Traksler examines the prospects for the mobile learning development [1].

At the same time native researches that can systematically describe the technology of mobile learning are limited.

The aim of the article is the analysis of modern state of mobile learning and determination of conditions of its implementation at high technical educational institutions.

**The main material**

The process of mobile learning in the national education system is in its formation stage. Nowadays the following stages of its development are formed, which are based on the availability of the technical means for the mobile learning and the mobile access implementation to educational resources. These steps can be characterized in such way:
The first mentioned about mobile learning occurs in John Dewey's work called "Democracy and Education" in 1916, which refers to the spread of communication channels and mobile society. Speaking about communication, J. Dewey meant not only getting and sending the messages (the informational aspect), but also experience exchange (educational aspect). According to Dewey, communication is the main educational process, where the teacher becomes one of the participants of learning process.

The second phase of mobile learning began from the 50s of the last century, when Alan Kay had started the project of the computerized learning called Dynabook.

On the third stage (70-80s of the twentieth century) theoretical understanding, formation plan of using technical tools and application methodology, and also the ability of using the first local and global network for the portable computers were hold (90s of the twentieth century).

The fourth stage (nowadays) is characterized by the development of the systems supporting mobile learning.

There are many definitions of "mobile learning" in the literature, but the common fact for this studying technology is that the physical connection to the cable network is not mandatory [7]. As noted by S. Semerikov, " mobile learning can be defined as an approach to the studying, where mobile learning environment is being formed based on mobile electronic devices, where students can use them as the means of access to educational materials found in the Internet, in any place and at any time they like"[5, 119].

V. O. Kuklev considers mobile learning as an e-learning using mobile tools, regardless of time and place, using special software on the pedagogical basis of interdisciplinary teaching and modular approaches [2].

The unique properties of mobile learning are:

- The ability to simultaneous interaction both with a single student and the whole group;
- The possibility of dynamical generation of educational material depending on the location of students, studying context and the usage of mobile devices;
- The ability to perform some student’s educational activities in the discrete time at any place and in any time [5, 153-154];
- The possibility of mixed studying implementation [4].

N. Payne identified ten elements of mobile learning; the main of them are [3]:

1) Students are ready to use mobile devices for studying in those cases when they can not use a book or a computer;
2) Mobile learning gives the opportunity to use free time intervals;
3) Mobile applications should be compact and should activate from the place where the work has been interrupted;
4) Mobile applications should be available online and should be synchronized with mobile learning tools.

J. Traksler identifies several directions of mobile learning implementation [10]:

- Technologically oriented mobile learning – separate specific technological innovations included to the educational process to demonstrate technical advantages and educational opportunities;

- Mini electronic learning - mobile, wireless and portable technologies, which are used for the repeatedly implementation of the solutions and approaches, which are already used with traditional e-learning tools and transfer of some e-learning technologies, such as virtual learning environment (VLE), to mobile platforms (MLE);

- Mixed learning - is studying process, where traditional learning technology is combined with the innovative technologies of electronic, distance and mobile learning in order to create a harmonious combination of theoretical and practical components of the studying process;

- Informal, personalized, mobile situational learning – is the mobile technology with additional functionality, for example, those depending on the location;

- Mobile Training – are the technologies, which are used to improve the performance and efficiency of mobile workers by providing the material support "just in time" and in the context of their priorities;

- Remote (rural) developing mobile learning – are mobile technologies used to solve the infrastructure and ecological problems and to support education, where traditional education technology is ineffective.

According to M. Sharplz special features of mobile learning include: common on-line work on the project, moblogging (mobile blogging), personalized learning, and working in groups, online research, and equal access to education [9]. Everything indicated by M. Sharplz shows that mobile learning is a socio-constructivist.

Social constructivism is characterized as an active process based on previously acquired knowledge of constructing mental models of the world and practice, and provides access to a variety of reality descriptions that can teach the ways of constructing knowledge based on the individuality and unique experience of every student [6 ].

The main purpose of mobile learning is to improve person's knowledge in the field he/she wants and in any time it is needed.

The main advantages of mobile learning as compared with electronic learning can be the following:

- The opportunity to learn anywhere and at any time;

- Mobile devices are more compact;

- Continuous access to studying materials;

- High interactive learning;

- An easy use and convenience of mobile services.

The disadvantages of mobile learning can include:

- Fragmentation of studying: studying requires concentration and meditation, when students need to move and such situations may distract their attention;

- The lack of student's well-developed skills and self-control of cognitive activity;

- Small screen size and difficulties with the internet access: mobile devices have smaller screen sizes than traditional PCs, and most of the Web-sites are optimized for screens with the high resolution;

- High cost of the initial investment in the organization of mobile learning: device investing for each student, wireless network, maintenance etc.

Thanks to modern technologies of mobile communication (interaction "student - teacher" is made in high-speed messaging environment) the high level of interactivity is provided with mobile learning and that is crucial thing for education.

It is clear that not all mobile devices can be used in mobile learning. Requirements for an "ideal mobile device for learning" are formulated by M. Sharplz [8]:

- Super portability;

- Individuality and adaptability mobile device for capabilities, knowledge and teaching style, support person-oriented approach, instead of the total work or entertainment;

- Unobtrusiveness, the student should be excited of learning process, but not of the device;

- Available everywhere for communicating with teachers;

- Adaptability to the context of learning and development of skills and getting knowledge by students;

- Stability, suitability for learning management during long studying process; personal resources and knowledge are also available regardless of changes in technology;

- Intuitiveness, ability to use by people without any experience.

**Conclusions**

1. Mobile learning is the logical and innovation process in education system, which is defined as a learning technology, which uses

the mobile devices, communication technology and intelligent user interfaces.

2. The main means of mobile learning are hardware (laptops, netbooks, Tablet PC, Pocket PC, mp-3 players, electronic books, mobile phones, and smart phones) and software (systems support education, mobile PCM, SRS-systems, computer mathematics systems) mobile means.

3. Mobile learning is caused by conditions and level of development of modern information and communication technologies, state of modern education, student's desire to be an active participant in learning process and get knowledge anywhere and anytime.

4. The terms of the mobile learning in high technical institutions are:

- Free Internet access availability;
- Spread of mobile devices among the students;
- Readiness of support mobile learning systems;
- Transfer to a mixed model of learning;
- Development of method of learning systems is based on the mobile technology.

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