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THE NEED FOR THE DEVELOPMENT OF MOBILE TECHNOLOGIES IN COMPUTER SCIENCE

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Abstract

This article analyzes the relevance and expediency of using mobile technologies in computer science lessons, taking into account the modern development of society and computer technologies, the organizational and technological foundations of school computer science classes. The school determines the possibilities of using mobile technologies in computer science classes. In the article, the use of smartphones as a "second screen" in the performance of practical work, the methodology of creating targeted platforms for studying algorithmic and programming topics, training for schoolchildren to work with devices capable of providing a system of repeating educational material outside of class skills are highlighted. Furthermore, the advantages of using mobile devices as a convenient means of accessing cloud services for organizing joint student activities are highlighted.

Key words

mobile education; mobile technologies, mobile devices, program, programming, smart technologies.

Introduction. The description of the problem of the current informatization process ensures the transition of the society from the stage of post-industrial development to the "information" stage. The rapid development of technology over the past decades has led to the fact that computer technology is available to everyone and has become an integral part of everyday life for the majority of modern society. At the same time, there is a clear tendency to move from stationary personal computers to more mobile, portable devices - notebooks, netbooks, tablets, smart phones. The widespread use of mobile devices, electronic gadgets with the ability to access the Internet anytime and anywhere, will lead to a change in the priority of "need to know" and "need to have information" in society. However, not working with information, "teaching by rote" is still common in schools. Thus, the problem of informatization of society and high-quality teaching of computer

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science in the context of requirements for computer literacy skills and information culture of a person in the local education system, taking into account modern development trends, information and communication technologies are gaining importance.

In accordance with the curriculum for educational institutions of the Republic of Uzbekistan, the subject "Computer science and information technologies" is studied in grades 5-11. The peculiarity of organizing "Computer science and information technologies" classes along with "Foreign language", "Technology" and "Physical culture" subjects is that during the lesson the classes are divided into two groups: in secondary schools, 25 or groups of students are formed in classes with more students. In grades 5-8, the number of weekly hours allocated to the subject "Computer science and information technologies" is 1 hour, in grades 9-11, the number of hours allocated per week is 2 hours.

Reference for the technological basis of teaching computer science at school Decision of the Cabinet of Ministers of the Republic of Uzbekistan dated March 15, 2017 No. 140 "On approval of the regulation on general secondary education". The equipment standards required for general secondary education institutions should be approved in accordance with the appendix. The list includes hardware and digital learning resources that the computer room and installed software should use. From a technological perspective, the global trend of moving from stationary computing devices to mobile devices is weakly related to current school equipment policies. The high pace of development of information technologies leaves no room for timely modernization of computer equipment within the appropriate budget. Thus, existing technological limitations lead to a situation where students do not have the opportunity to develop practical skills in working with mobile devices, despite their increasing role in society. One of the solutions to these problems can be the use of mobile technologies in education.

There are several definitions of mobile education in the scientific and pedagogical literature, we will list some of them:

- “Mobile Learning: e-learning through mobile devices that is not limited by the learner's location or change”.

- Mobile learning (m-learning) refers to the use of mobile and handheld devices. Information technology devices such as PDAs (Personal Digital Assistants), mobile phones, notebooks and tablet computers in teaching and learning.

- Mobile education is a form of educational process organization based on the use of mobile computer devices and wireless communication.

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- Mobile education is any educational service in which the only or primary technical tool is a portable or hand-held device.

Analyzing the different approaches of researchers to the definition of the term "mobile education", it is easy to distinguish the following aspects that are most typical for most definitions: the use of mobile (non-stationary) devices, o independent use of students' knowledge, location, use of wireless communication technologies. In contrast to the above definitions, where the use of mobile devices is primary, this work is devoted to the use of mobile technologies in the teaching of informatics from the point of view of organizational-didactic expediency. Thus, mobile technologies become secondary to didactic goals and objectives.

The potential for using mobile learning is huge, but its implementation is "very slow due to the lack of an underlying pedagogical theory." As I. N. Golisina noted: "Despite the fact that the number of modern mobile phones and communicators is several times greater than the number of personal computers, mobile devices are more convenient than personal computers, and the power of modern mobile devices exceeds the power of modern mobile devices of the world. At the beginning of the 1990s, mobile phones were rarely used for educational purposes in our country." E. V. Vulfovich said that "many educational institutions limit the use of mobile devices in the classroom, because teachers and students perceive them as an electronic chat sheet".

Thus, despite the high potential of using mobile technologies in the educational process, their use by teachers is limited by a number of factors:

- A weak level of information and communication technologies (ICT) competencies of teachers, which makes it difficult to introduce mobile education independently;
- insufficient number of high-quality mobile educational resources and software products (except for foreign languages);
- lack of pedagogical foundations of mobile education.

The use of mobile technologies in the educational process is a relatively new trend, so they are at the stage of developing a theoretical framework. Local and foreign research in this field corresponds to individual scenarios of using mobile technologies. Let's take a look at some of them.

1. Microblogs. With the help of mobile devices connected to the Internet, an additional communication channel can be established between the audience and the teacher during lectures through microblogs.

2. Mobile applications of augmented reality. A number of foreign publications are devoted to the use of augmented reality programs for smartphones and tablets

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in the study of computer science, biology, astronomy, physics, mathematics and other subjects. Considering the potential of augmented reality technology as an educational tool, researchers say it gives students the opportunity to see the world around them in a new way and solve real problems in the context they are already connected to.

3. Podcasting is another use case for mobile devices. A podcast is a method of creating and transmitting audio or video content on the Internet. Podcast technology is mainly used in teaching foreign languages.

4. Mobile survey system. Using mobile devices as elements of survey organization systems is more effective from an organizational point of view than using separate panels for responses. In this case, students' mobile devices allow them to remotely receive questions, assign answers to them, and transmit voting results.

5. Email. Provides text and other embedded data transfer to a single user or group of users. This technology is used in the implementation of projects aimed at the development of written language and socio-cultural competences.

6. Blog - user's electronic diary. It allows publication of copyrighted material in chronological order, where data in different formats can serve as content.

7. Webinars and video calling technologies provide an opportunity to organize video communication between users in real time, regardless of their distance from each other.

8. Sources of information. Using the Internet on a mobile device allows you to access encyclopedias, dictionaries, reference books, media and other resources anytime and anywhere.

9. Cloud services. Using a mobile device as a means of accessing cloud services allows students to quickly exchange information and perform joint activities.

It is not difficult to see that the given examples of the use of mobile technologies do not reflect the specific characteristics of computer science. In addition, the use of ICT tools in teaching should be justified and offer clear advantages over traditional teaching. Thus, in B. E. Starichenko's opinion, when making a decision to use one or another ICT tool in education, teachers should follow the following principles:

- The use of ICT should provide a significant improvement in any aspect of the educational process, due to the conservatism of the established educational system, it is logical to introduce innovations in didactics. It makes sense only if it provides clear advantages over traditional approaches in solving educational practice issues.

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- Dominance of didactics over technology: the main thing is not technology, but didactic task; technology should provide a known and more successful solution than traditional methods.

- Economic expediency - undoubtedly, first of all, it is necessary to develop and implement the ways of using ICT in the educational process that will give the greatest didactic effect with less cost and time spent by the teacher.

According to the results of the monitoring of the educational process by S. S. Arbuzov, it was found that the use of podcast technology in "teaching computer networks" helped:

- individualization of education
- activation of educational activities
- interactivity of training
- saving time to explain the theoretical material and characteristics of the use of technologies related to the design, creation and adjustment of computer networks
- more visual and colorful teaching material
- creating favorable educational conditions

In computer science classes, mobile survey technologies allow the teacher to reduce dependence on the use of personal computers with the same degree of automation of the calculation of test control results. In addition, testing systems based on mobile devices and the use of the Internet allow the discussion of problematic issues when the class is asked to answer a question with no correct answer. One of the most important components of computer science classes at school is the formation of skills for working with various software products and information systems. When doing practical work on the computer, the student often has to switch between windows, maneuvering between the program he is working on and the instructions for performing the task or work. Using a mobile device as a "second screen" allows the student to focus on the program being studied and eliminate the need to switch between windows. This approach is designed to reduce the emotional stress of the student and helps create a more comfortable learning environment. In addition, the second screen allows the reader to perform actions on the main computer in parallel with a video demonstration of the correct operation on the smartphone. A mobile device is essentially a portable computer, sometimes surpassing the capabilities of school computers, so in computer science classes, mobile devices can be used as a tool for practical work (for example, in connection with the Internet and information transfer in studying related subjects). Mobile devices (along with personal computers) can be used as a

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target platform for learning algorithmic and programming fundamentals. The modern development of mobile technologies is closely related to cloud computing. According to I. N. Golisin "cloud technologies allow organizing access to various types of social software, using all the advantages of this type of information technology in the educational process, they can serve as a platform for organizing mobile education ". Using mobile devices together with cloud services allows:

- organization of joint activities of students both during the lesson and when doing homework;
- providing a single repository of information resources developed by students;
- Use of science materials at any time and in any convenient place;
- to increase the level of cooperation among students through the implementation of collective project activities;
- Provide communication between parents and the school (for example, by providing parents with access to the cloud).

Thus, mobile technologies provide a high level of cooperation, provide networking tools for joint problem solving, and organize discussions on educational issues. Due to its compactness and wide range of applications, mobile devices belong to the class of wearable gadgets and are close to a person during the day. This function allows you to create a system for repeating educational material through an application on a smartphone that performs the following functions:

- reminding of the need to repeat the learned material;
- show a summary of the material studied in the lesson;
- conducting a test in educational mode, which includes showing the correct answer and a detailed explanation in case of an error;
- Recording student responses for teacher analysis of classroom data.

This approach is especially relevant due to the limitation of training hours and specific characteristics of data memorization.

Based on the specific characteristics of certain types of mobile technologies, it is necessary to emphasize the importance of a systematic approach to planning their use in the teaching of computer science, so the following is necessary:

- Planning the use of different types of technologies based on didactic expediency (for example: mobile technologies)
- Creating the necessary educational content
- Development of application method mobile technologies
- Use of mobile technologies in working with schoolchildren.

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Currently, we are conducting a study on the possibilities of using mobile learning technologies in the study of computer science in the 9-11th grades of the school. The main areas of work include:

- use of mobile technologies in students' independent work;
- use of mobile technologies to monitor students' knowledge (in class and extracurricular activities);
- organization of students' project and research activities based on mobile technologies;
- organization of joint activities of students using mobile and cloud technologies.

Conclusion. Mobile technologies are one of the part of information and communication field, despite the fact that it creates great opportunities for increasing the activity of students' learning, currently there are no theoretical approaches and practical experiences on the use of mobile devices in computer science lessons at schools. Based on this, it can be concluded that it is appropriate to develop and theoretically justify a system of mobile learning methods in the computer science class at school.

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