

Theoretical Foundations of Using the Possibilities of Mobile Learning in the Educational Process

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Abstract

The article describes the current state of mobile education, pedagogical foundations of mobile education, development trends, and the use of mobile technologies.

We know that since the 30s of the twentieth century, there was a correspondence form of education. At the same time, according to the experience of foreign countries, distance learning methods have been introduced into the education system using radio lectures (1932), radio courses (1943), and television lessons (1960-1970). Since 1970, Uzbekistan has been conducting special television lessons in mathematics, physics, biology and other subjects, as well as sports lessons in chess [6, p.1].

INTRODUCTION

The article describes the current state of mobile education, pedagogical foundations of mobile education, development trends, and the use of mobile technologies.

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To increase the efficiency of learning, Alan Key in the 70s of the last century came up with the idea of bringing the computer to the size of a book. Since the 1990s, the creation of

handheld computers has led to the creation and development of mobile student learning. The first educational applications for such an educational environment have been created [7, p.1].

Today it is impossible to imagine young people without mobile phones during the day. Young people have the opportunity to receive various information anywhere and at any time. But is our youth taking advantage of this opportunity?

The use of mobile devices in the educational process helps to increase the motivation of students and develop the ability to study independently. It is desirable to introduce mobile learning into education.

Mobile learning is a specific form of learning that integrates individual, group and team learning into classroom and extracurricular learning experiences using mobile technology.

In the educational process, the term "mobile learning" can be interpreted as follows:

- Educational device (additional mobile devices and network technologies);
- Trainer (during training, the device can be located both in the classroom and outside it);
- Application to the learning process, depending on the type of lesson (virtual teacher on the Internet from another school, city or region).

Thus, from a technological point of view, mobile learning - using WAP or GPRS technology, can access and retrieve educational materials on an additional portable mobile device with Internet access, as well as search and retrieve materials, answer questions on the forum and test.

Mobile learning is a new educational and informational reality, where a student, using a mobile device, gets instant access to educational materials and necessary information and has the ability to communicate (with a teacher or other students) in synchronous and asynchronous modes to organize personally meaningful independent learning activities. [2, p.161]

As J. Trakhler notes [3, p.11]: "Mobile learning changes the whole learning process.

Education becomes adequate and individualized in a timely manner. "

To introduce mobile learning into the educational process, it is necessary to pay attention to the following organizational and pedagogical requirements:

- Organization of mobile classes based on tablets, netbooks and laptops in educational practice;
- BOYD training (bring your own device) (students bring their personal mobile devices to the training).
- To provide free Internet access in an educational institution, it is advisable to create special zones not only in the assembly hall, but also in the corridors, library, hall of activists.

Benefits of mobile learning:

1. Allows students to move freely;
2. Provides an opportunity for students with disabilities to study using mobile devices;
3. No need for a personal computer and paper textbooks;
4. The use of modern wireless technologies contributes to the distribution of training resources between users (WAP, GPRS, EDGE, Bluetooth, Wi-Fi);
5. Multimedia content is used in mobile learning, that is, information is expressed in various forms: text, graphics, audio;
6. Ability to control participation (Monitoring participation);
7. Encouraging nature of the educational process;
8. Unified control of the level of knowledge of students;
9. Accelerate the exchange of information between participants in the educational process;
10. Flexibility of mobile devices with an individual approach, taking into account the individual psychological and physiological

characteristics of students (Individual approach).

In this case, the effectiveness of learning and memorizing learning resources increases, students develop learning motivation. If the students are interested in completing assignments, then the volunteer teacher will be able to say without hesitation that the audience will liven up, the motivation for learning will develop, and the effectiveness of assimilation will increase.

The main goal of implementing mobile learning:

- Improving the quality of education;
- Implementation and support of ICT integration in education;
- Increasing the effectiveness of the assimilation of the material by students;
- Formative assessment (self-assessment, self-assessment) and the introduction of differentiated learning technologies in the educational process;
- Improving the performance of standardized tests;
- Access to lifelong learning for learners;
- Establishment and development of relationships "educational institution - family - educational institution".

UNESCO research has shown that using mobile devices, teachers can better use their time in class. When students use mobile technology to solve problems on passive or rote memorization, for example, listening to lectures or mastering new material at home, they free up time to discuss ideas, exchange their own interpretations of the knowledge gained, work together and conduct laboratory work in school or other educational institutions

... Mobile learning does not lead to separation of students, but helps them to develop skills for effective teamwork [5, p. 18].

The student may have a different approach to the process of using mobile technologies when designing lessons in traditional full-time education. For example, A.

Amirov, A. Ashimbekova, A. Temirova [1, p.13] divided the use of mobile devices in the learning process into the following groups:

- Multimedia training - demonstration of web resources (audio files, videos, graphics, maps and images);
- Provide quick access to training sites, resources, reference books, dictionaries;
- To ensure communication in the learning process (SMS messages, Twitter, Telegram, webinars, etc.).

Yu. Shishkovskaya [4, p. 1519], speaking about several ways of using mobile devices for educational purposes, listed the following:

- Firstly, this is self-education, here we also include the organization of autonomous work. This becomes possible due to the fact that the technology of mobile learning is based on such general pedagogical principles as accessibility and ease of use of the material, interactivity, as well as, thanks to special applications, the possibility of self-control and self- assessment.
- Secondly, m-Learning ideas can be used in both school and university traditional educational process.
- Thirdly, mobile learning can be an effective complement to distance or corporate training course.

Mike Sharpal, professor at the British Open University, analyzes mobile education in his research paper. In 2002, in Birmingham, Mike Sharpal spoke about the three pillars of mobile learning: building, communicating, and supervising. That is, to create mutual understanding between the teacher and the student, communicate between them and control the learning process from the teacher.

According to the study, UNESCO analyzed a number of advantages of mobile learning [5, p.11]:

Allowing access to education to expand opportunities and materials.

Smart mobile devices used around the world give students more freedom, which means that by increasing learning motivation, students can only move forward at their own pace and manage their personal interests.

Instant feedback and assessment of learning outcomes.

Mobile technology accelerates the assessment of learning outcomes and allows students and teachers to track their progress faster. In the past, students had to wait a long time for grades, reviews, and guidance on their knowledge. Now, in practice, it is clear that the results of assessment using the interactive functions of mobile devices are instantaneous.

The use of mobile technologies as a result of the automation of the process of collecting, analyzing, and distributing assessment documents increases the productivity of teachers. Plickers, Socratives can be called mobile applications that quickly assess student knowledge.

Training anytime, anywhere.

Mobile devices have the ability to organize the learning process regardless of place and time.

There are two reasons for mobilization: firstly, if a teacher cannot participate in a physical education institution, there is an opportunity to implement educational programs at the teacher's discretion. On the other hand, modern technology allows you to learn, especially through cloud storage. In this case, the student can replace the personal mobile device, but all of their learning materials will have access to cloud storage. He can also use various technical devices to accomplish tasks.

Effective use of time devoted to training and classes.

UNESCO research shows that teachers can make the most of their time using mobile devices. If students are studying new material at home, the lesson will provide an opportunity to analyze, discuss, and internalize the material together.

Help for disabled students.

The benefits of mobile technology, such as text scaling, voice transcription, text-to-voice, and geolocation, can help improve learning for students with disabilities.

Cambridge to Africa (Cambridge to Africa) has developed a special program for hearing impaired students in Uganda. Students learn about the curriculum and collaborate with teachers using a mobile device and an innovative SMS system.

Improving the quality of management and communication.

With messages delivered faster, more reliably, with better quality, and at less cost than mobile operators, students and educators are increasingly using mobile devices to communicate.

Teachers will be able to ask students for answers to assignments, and parents will be able to track information about the achievements of their children. Accordingly, to organize mobile learning in educational institutions, it is necessary to have access to all information resources of the institution 365 days a year, 7 days a week, 24 hours a day through web browsers, web clients, special mobile applications, as well as secure Internet access. and information resources.

Now we need to think about which application to choose for the session and in which part of the session to use it. As you prepare for this lesson, keep in mind that it is not recommended to use the mobile app throughout the lesson. Therefore, you can select such an application and use it as part of the lesson.

It is important to pay attention to the following:

1. Application capability.
2. Ability to install the application on various mobile devices.
3. Possibility of free access.
4. When was the last time the program was updated.
5. Consider negative reviews and reviews left for the application.
6. Has the application been tested on a personal mobile device? Mobile apps can be used in any educational environment:
 - Learning a new topic - application of educational material (electronic textbooks)
 - Self-Study - Content Creation Apps
 - Research Activities - Virtual Lab Applications
 - Self-test or control - exercise apps.

It is also worth noting the attitude of students towards mobile learning.

Let's give an example such as mobile platforms Android, Windows Phone, iOS (Table 1):

Table 1

Mobile phone operating system statistics	%	Mobile phone operating system statistics	%
Android	70,43	Tizen	0,02
iOS	29,06	Series 40	0,02
Samsung	0,16	Nokia	0,02
KaiOS	0,11	BlackBerry OS	0,01
Windows	0,07	Linux	0,01
Other	0,09		

The Android platform supports Wi-Fi Direct, NFS and allows you to transfer multimedia files. Also, via the USB port, you can connect smartphones and tablets based on this operating system: cameras, TV tuners, flash memory devices. Installed and updated security system prevents acceptance of uncertified and malicious programs. Android 4.3 (JellyBean) version supports Bluetooth smart functions, which allows you to communicate with any Bluetooth devices without a headset, and you can work with OpenGL ES 3.0 app.

With the release of Windows Phone 8, users will be able to integrate their smartphones, tablets and PCs into a single system (which allows mobile app developers to move apps across devices). The main difference of this platform is that it can run programs in the background and independently manage the amount of RAM.

The iOS mobile platform has a simple and intuitive interface, and the software is fast and efficient. Having a reliable security system prevents suspicious programs from running and thus damages the system. The disadvantages of this platform are that it does not support NFS

and Wi-Fi Direct technologies, so music can only be downloaded via iTunes.

Today there are a number of mobile applications that can be successfully used for educational purposes. For teachers, we'll take a closer look at some of the resources that can be helpful when using mobile technology in the classroom.

Today, with the development of mobile technologies, smartphones have become good friends, giving their users amazing opportunities to read e-books at any time, learn the secrets of their area of interest, in short, study ...

Smartphones are versatile devices. Of course, reading e-books will never be their main goal. However, they are very useful as they allow you to read the book anywhere and anytime.

Textbooks and manuals in the form of mobile applications provide students with the following benefits:

- First, there is no need to carry heavy books with you. All the necessary textbooks, books and teaching aids will be at hand at any time;
- mobile books will not be lost, torn or worn out;

Mobile tutorials are very easy to use, and when you use them, you can tweak the options to your liking, for example, view the text in a larger font, enlarge images, customize the sticks where needed, keep reading where they are from, etc.;

- Mobile textbooks and study guides help to study the topic on their own and consolidate knowledge.

Analytical agency Nielsen conducted an experiment on the use of applications on mobile

devices in the educational process and analyzed detailed statistics. The study found that mobile app usage was high in all countries, including an average of 85% to 99%.

Initially, mobile textbooks were intended to provide electronic textbooks in .pdf, .doc,

.docx formats using special software on mobile devices, but now the creation of special books for Android is gaining popularity. An e-book for Android is a book made in the form of .apk applications.

You can list some programs that create mobile books of this type:

- Site 2 APK Builder;
- Flip Pdf Professional;
- Book Creator;
- Flutter.

Site 2 APK Builder is a robust app that makes it easy to build offline website tracking apps for Android system. If you want to keep the data on the website in its original form, it's Java, this tool allows you to convert the whole page to an APK file that works on Android devices. Build a program from a website or URL. Website 2 APK Builder is easy to use, simple and lets you create Android apps in seconds. All you have to do is select the mode you want to work in by downloading your local site folder or URL. You need to choose a title for your application and then the format of the start page.

Fig-1. Site 2 APK Builder Icon

Supported directory page formats include HTML, PHP, HTM, JS, and CSS. In addition, if you choose web URL mode, you must provide the URL and the correct prefix - HTTP or HTTPS. The wrong choice can lead to incorrect program operation. Website content is available for offline viewing. After applying all the site elements on its own, the application maintains a stand-alone site. When working with local websites, you should specify the folder in which all content files are stored: photos, text, media, and other information.

FLIP PDF Professional is a professional version of Flip pdf with many functions. With

this program, you can post video, audio, text, various shapes, pages, photos, Flash, YouTube videos in ebook with 3D pagination effect.

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You can easily manage existing projects like PDF, CWF files, add images or remove selected pages, and even change the page layout. The program offers many ways to host your e-book. You can publish eBooks in HTML format without restrictions on site domain location.

Fig-2. FLIP PDF Professional interface



You can also email publications, burn to CD / DVD or flash media as a ZIP archive, as a MAC app, write in FBR format (Flip Reader is easy to read with a free app), on mobile devices (iPhone , iPad, iPod Touch and even Android devices) or .exe, and you can also create eBooks.

Book Creator is a very easy to use ebook creation tool. It can be used both on iPad and over the Internet.

It is useful for users to read the user guide provided by this program before creating their first personal e-book. The e-book has the ability to place not only text, but also a picture, video and audio information.

When you're done with a book, you can also print it to iBooks, share the finished mobile resource with others via email, Air Drop, Google Drive, Dropbox, and more.

With Book Creator for iPad, you can create .pdf eBooks and read and even print them on almost all platforms. The main advantage of this program is the ability to edit a project not only on a computer, but also on the tablet itself in cloud technologies. The disadvantage is that information is presented in a linear order and direct hyperlinks are used to navigate to sections and points. It should also be noted that there is no interface in Russian.

Flutter is Google's open source software development kit (SDK) for building mobile apps, used for developing Android and iOS apps, and the only way to develop apps for the Google Fuchsia operating system.

The first version of Flutter was called Sky, and only Android apps were created. It was unveiled at the 2015 Dart Developer Summit at 120fps. On December 4, 2018, the first stable version 1.0 was announced on Flutter Live. Flutter is written in the Dart programming language. Using Flutter - Desktop Embedding runs on Android as well as the Dart VM,

which is the Flutter JIT compiler on Windows, macOS, and Linux. Due to the limitations of dynamic code execution in the App Store, Flutter uses AOT compilation for iOS.

One of the main advantages of the dart platform is fast reloading, and the change in application code is applied to the software application that starts without restarting it immediately.

The Flutter engine is mostly written in C ++ which supports low-level visibility using the Google Skia graphics library. It can also interact with the platform-specific SDKs for Android and iOS.

UI design for Flutter apps usually uses a lot of widgets. A Flutter widget is a permanent description of certain parts of the user interface. All objects such as text, shapes and animation are created using widgets. By combining simple widgets, complex widgets are created.

Flutter has two sets of widgets: Material Design for designing Android OS apps and Cupertino for designing Apple iOS apps according to specific specifications.

Considering all the possibilities and disadvantages of the software applications for creating mobile learning resources presented

above, Site 2 APK Builder was determined as the most effective tool to use. We can safely recommend the use of this program not only to computer science teachers, but also to other science teachers.

Today the practice of home schooling based on the use of mobile devices for educational purposes, the use of video lessons prepared by the university, advanced training, as well as additional training in other areas and capacity building for personal interests is widely used abroad.

It should be noted that in connection with COVID-19, since March 2020, quarantine has been declared in all countries, including Uzbekistan. At Namangan State University, he organized online distance lessons for all students in the platform (www.mt.namdu.uz) and in the Zoom system, and most of the students conducted classes on mobile devices. In this regard, a survey was conducted taking into account the fact that some of the lessons were conducted using a mobile application. Their results in a survey on mobile and app use in the classroom were as follows:

- Teaches basic IT skills - 81%

- Awakens curiosity - 77%
- Helps to learn about local and global events - 74%
- Creates new ways of interacting with others - 70%
- Teaches to be responsible - 69%
- Develops creativity - 64%
- Increases motivation to learn - 63%
- Teaches to solve problems - 63%
- Teaches to unite with other trainers around team activities (tasks) - 58%

- Teaches not only the use of content, but also its creation - 57%

- Helps students understand the rules - 52%

Key takeaway from students: Mobile devices and apps develop creativity and life

skills.

During the survey "Can I study with mobile devices?" When asked about content,

80.9% of students answered: "Yes, you can study using mobile devices." Some students also mentioned that they use mobile technology for educational purposes, especially in language learning.

The development of mobile technology education has a number of unique features:

- In mobile education, the concepts of time and place are not important. That is, mobile education is an opportunity to study anywhere and anytime using mobile technologies;

- The use of mobile technologies for educational purposes is a custom tool to increase student motivation to learn;

- Mobile education is a way of introducing innovative methods, and not just placing educational materials on mobile phones;

- Mobile learning - the exchange of information between the participants in the process will be possible with the help of modern wireless technologies (Wi-Fi, Bluetooth, WAP, GPRS, etc.);

- Mobile education provides access to education for people with disabilities;

- Activates the capabilities of students and increases the efficiency of their independent work.

The use of mobile technologies in education, the introduction of mobile technologies in the current period of the pandemic, especially at a time when online learning continues in educational institutions, will help our students take advantage of such opportunities.

Conclusion.

It should be noted that the introduction of mobile technologies into the educational process is the most promising teaching method, which makes it possible to introduce new forms of education into the traditional educational process.

As of March 2020, the majority of our online students are learning using mobile devices. Practice shows that mobile technologies are ideal for the learning process and make it even more effective. Many experts in this field are confidently talking about the rise of the concept of using mobile technologies in the educational process to a new standard in the field of education.

Students love mobile technology and use it regularly in their personal lives. Therefore, it is not surprising that young people want to work with mobile devices in order to make their learning process more interesting and personal.

Technologically rich activities and lessons have been found to support higher levels of student work and peer collaboration when compared to less technology-rich activities. Thus, the demands of today's 21st century learners show that teachers need to use mobile devices and technology to improve learning efficiency, improve learning environments, and fill gaps in planning and educational goals.

For the country's development, we need to educate the next generation of educators, programmers, scientists, inventors, engineers and entrepreneurs.

Mobile learning allows an educational institution to expand the conditions for organizing lessons from the level of opportunity, to go beyond the established time frame. We all know that in educational institutions it is impossible to provide every student with a computer. Unfortunately, a large amount of money is required from the educational institution to provide each student with access to a computer and the Internet.

But most young people have a telephone, and this is a real opportunity to change teaching, improve the learning environment. It even allows students to receive educational resources from home, interact with teachers, and work with their peers online as a team. In the learning process, the value of mobile devices is measured by the ability of learners to use, communicate, collaborate and create digital-oriented learning resources.

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