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ANALYSIS OF SOFTWARE ADAPTED TO THE EDUCATIONAL PROCESS AND ITS CAPABILITIES

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Abstract:
In this article, pedagogical software applications can be considered entertainment or social networking applications, but mobile applications have so far proved to be an educational tool. Over time, the development of a variety of programs has made the preparation of a new generation of e-learning resources more meaningful and user-friendly. All of this allows for the rapid exchange and assimilation of information electronically. It is important that the information provided is relevant to the user. With so much information in the world, choosing the right one is becoming a challenge. In order to avoid such situations, many of our teachers create and use e-learning resources in their subjects, which are as basic as possible and important for students to master. enriched with. Of course, the role of programs that create e-learning resources is important in this process. Over time, the capabilities of such programs have expanded and are being put into practice. Inexpensive, easy-to-use, and high-quality mobile learning resources are taking a variety of forms in the market. In this chapter, we have created a mobile learning resource based on Java technologies and analyzed the different methods of using them to create an optimal teaching methodology.

Keywords: Programming languages, mobile applications, web applications, pedagogical software, software, Hybrid applications.

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Introduction

Nowadays, mobile phones are not only a means of communication but also have a place in all aspects of human life. It is no exaggeration to say that the main reason for this is the applications that form the basis of mobile devices. Until recently, mobile applications were just games. also covers rapid images. One of the forms of education in the field of education today is the result of the active development of these mobile applications by M-s. M-learning is implemented through various mobile web applications. Let's take a look at the concept of mobile applications and mobile web applications and web applications. These concepts are almost no different for most users. But they are not only different in appearance but also in scope.

The simplest mobile applications receive computer applications and transfer them to a mobile device. As mobile applications become more reliable, this technology involves the development of a custom mobile environment that takes into account the limitations and advantages of a more sophisticated approach [1]. For example, applications that use location-based functions were originally designed with a focus on mobile devices, given that the user does not have a concept of location on the computer. In particular, native programs have their advantages and disadvantages.

Advantages:

- Geolocation allows companies to adjust loyalty or advertising programs;
- Information about user behavior (or inaction) can be easily collected and analyzed, which helps to evaluate the effectiveness of the entire application or its individual functions;
- native applications usually work better and “feel” better. Sometimes web apps are designed to emulate locals, but they are limited by Internet speed and design capabilities.

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Disadvantages:

- native applications are expensive to develop;
- native apps need to be approved in every app store, and the process of getting users' attention can be difficult (unless the company has an internal app).

Web page - Uzbek pronunciation of the English word “site”. The World Wide Web is a virtual space where specific information can be found and marked with a unique URL. This URL indicates the home page address of the website. The home page, in turn, contains links to other pages on the website or to other sites. Web pages can consist of HTML, ASP, PHP, JSP, graphics, and other files. A browser program is used to open the website. The Website may be personal, commercial, informational, or otherwise [2].

A Web application is a program that is stored on a separate server and delivered to the browser interface via the Internet. According to Web.AppStorm editor Jarel Remik, any component of a website that performs any function for the user is defined as a web application. There is no need to download web applications, as they can be accessed over the network. Users can access the web application through a web browser such as Google Chrome, Mozilla Firefox, or Safari.

Web applications require a web server, a software server, and a database. web servers handle client requests, and the application server performs the required function. The database can be used to store any required data. Web applications provide users with a number of features that can be used by a large number of users at the same time, they can be accessed from different devices with Internet access, they can be accessed using various software tools, the user can download the web application to the user’s desktop [3]. The tooth is the most important action on the information in web applications, that is, it allows you to receive, store, process, and transmit information, and so on. Web applications are created differently for different audiences, and there are commercial, educational, entertainment, and social networking applications based on the interests of the audience. Such applications are tracked by the user based on their interests.

Some important advantages of web applications:

- Internet-based applications are easier to support and can run on any platform;

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- Developers can offer apps without approval from any app store;
- Faster conversion using CSS, HTML, and JavaScript.

Disadvantages:

- Web applications do not have access to the user's device;
- Users have to use them over a network, which significantly reduces security management;
- It can be difficult to search for an application because it does not have a directory and an app store with a search function.

There are two types of web applications:

- progressive web applications;
- Progressive web Applications offer an alternative way to develop traditional mobile applications by delivering an app store and skipping app installation. PWA is an Internet-based application that uses a variety of browser features, such as offline mode, background launch, and the ability to add a link to the device's home screen, making the application user-friendly;
- Hybrid web applications;
- Hybrid mobile applications are created using standard web technologies such as JavaScript, CSS, and HTML5 and integrated into application installation packages. unlike simple apps, hybrid apps run in a "web container," which provides a bridge to browser time and local device APIs via Apache Cordova;
- A hybrid program is a program written using web technologies and attached to a thin web browser. A hybrid application can be quickly transferred to other platforms that use the same basic code base.

Additional advantages of hybrid applications:

- Hybrid applications have the most user-friendly features;
- Developers are not limited to a single platform, instead they can create a hybrid application that runs on multiple platforms (if running as a local application);
- Hybrids are a good choice for programmers who create visually rich applications, such as games (which don't work as well as web applications).

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The hybrid application has some drawbacks:

- Very complex programs are best done;
- Such an application requires extra time and effort to make the local user look and feel (compared to web applications);
- App stores can reject hybrid apps that run smoothly.

A mobile web application is, for some, an application that runs on the Internet and is designed to display correctly on a mobile device, while for others, it is a program designed specifically for a mobile OT that connects to send and receive data over the Internet [4].

Mobile web applications have a number of conveniences that keep the web page offline and allow the user to use the information provided in the application offline. These types of applications provide quality education to students in educational institutions, including the analysis of textbooks using a mobile device during classes, and the ability to find the necessary knowledge using the device search system, which saves students time. While these types of applications create a culture of effective use of mobile devices by students in the classroom, in addition, in the information age, they develop the ability to search for quality and reliable information and avoid information threats. Increases the readiness of young people studying in higher education institutions for the digital age. Not all students currently studying at the university are equipped with personal computers, but it is easy to set up M-education in educational institutions using mobile web applications, where each student has his or her own mobile device.

The Open University (OU) in Milton Keynes, UK, was the first university in the world to introduce distance learning. Currently, there are leading universities in the world for distance education, including the United Kingdom (Open University), Indira Gandhi Open National University (IGNOU), Center for Distance Education, Institute of Management Technology (IMT) Institute of Distance and Open Education, University of Florida, Charles Sterta University. Forms of education develop with the development of science and technology, based on the needs of society. We can see the evolution of education in the following (Fig. 1.)

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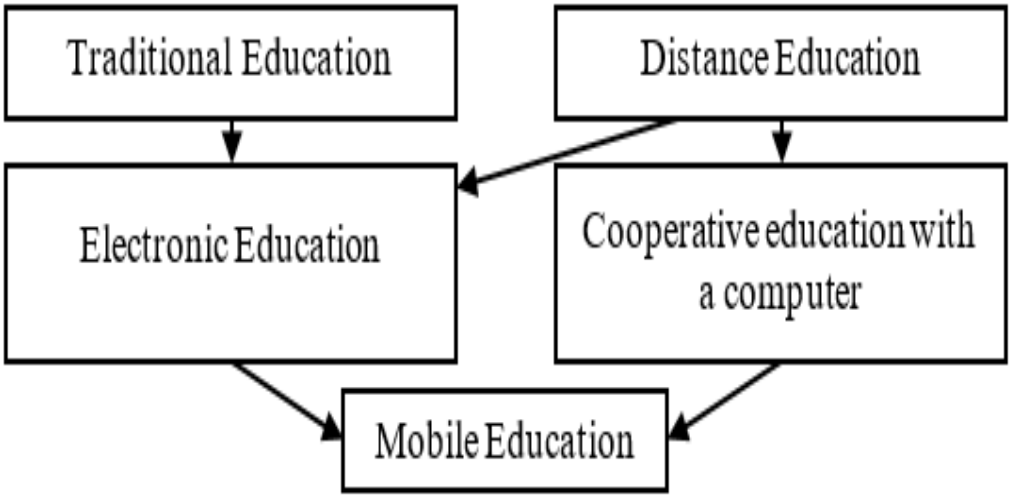

Fig. 1. The evolution of education

Distance learning and mobile learning (Mobile study or M-Learning) is a technology of learning using mobile phones, smartphones and pocket computers. E-Learning, which covers the distance learning system, is the next stage in the development of e-learning technology, which includes a subsystem for access to learning materials and services from various mobile devices, as well as Internet access. takes It's a flexible tool that allows students to learn anywhere, anytime. "Mobile education is a combination of unique opportunities that create new opportunities for a learning environment where mobile technologies can cover time and space." Views on the origins of m-learning as a form of education are contradictory. [5] hypothesized that the mobile type of education is part of the e-learning type, i.e., e-learning is a type of distance learning (Fig. 2.).

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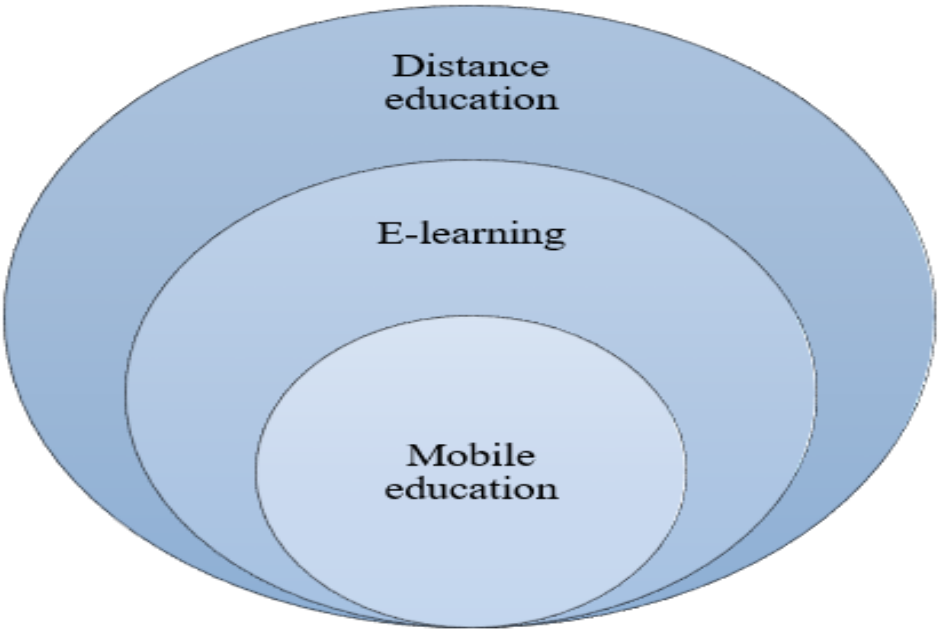

Fig. 2. E-learning system (Giorgiev 2004)

In addition, Kruzov et al. (2012) described distance education as part of "Flexible Learning". Tik (2006) noted in his work that distance education is becoming e-learning due to achievements and innovations in the field of information and communication, where the mobile type of education consists of elements of distance learning and e-learning noted [6] (Fig. 3.).

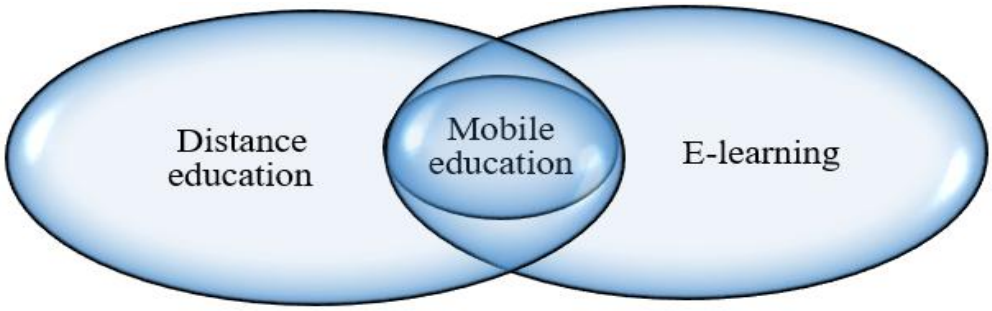

Fig. 3. The relationship between e-learning and m-learning (Tick 2006)

Other experts, such as Eteokleous and Ktoridou (2009), believe that mobile education is the successor to e-learning. They describe e-learning as a form of learning that takes place digitally using electronic means and the media. It can be described as a new tool that expands the distance between learning and teaching,

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providing access to learning materials using a mobile phone anytime and anywhere [7].

At present, a new stage in the process of mobile education Russian scientist D. Pogulyaev describes mobile learning tools in terms of the tasks they perform (Table 1):

a) Analysis of learning materials using a mobile device, including a mobile electronic textbook or book, a mobile dictionary, multimedia tools for television and video broadcasts, etc.;

b) Student communication tools (mobile chats and conferences, mobile email, mobile forums or blogs);

c) As a knowledge management tool (mobile questionnaires and mobile tests);

d) As a tool for building skills (using mobile research, educational games, and mobile training programs);

e) As a tool to support mobile learning.

TABLE I. ADVANTAGES AND DISADVANTAGES

Evaluation criteria	Mobile app	web-app
View hypertext content	×	✓
View and update video and audio materials	×	✓
Working with multimedia presentations	✓	✓
Work with office applications	✓	✓
Communication with other participants via SMS	×	✓
Complete interactive tasks	✓	✓
Easy opening interface	✓	✓
The minimum value of data transfer	✓	×
Ability to work offline	✓	✓
Completing test tasks	✓	✓
Edit application	✓	✓
Free operating system	×	✓

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As can be seen from the table, mobile web applications are the optimal solution for the m-learning form. From this type of mobile web application, the Learning mobile web application includes the following features [8]:

- Save the web page offline and as a result the user will be able to use the information provided in the application offline;
- It will be easier to set up M-learning with the help of mobile web applications;
- Mobile web applications allow students to analyze materials using mobile devices, complete tasks, and master missed lesson materials;
- Able to watch video and audio materials;
- Ability to communicate with other participants via SMS;
- View hypertext content;
- Multimedia presentations are easier to work with;

These mobile web applications not only serve as a single repository of knowledge for the educational institution but also serve as a basis for the formation of a virtual university in the future. Our education system is currently undergoing one of the most revolutionary changes of our time. With the help of mobile learning web applications, students will be able to download almost all information on their smartphones. With the right content for mobile learning applications, the following can be achieved:

- Our university will have a national system of education;
- With the help of these mobile web applications it will be possible to dramatically improve the quality of education;
- The enrollment rate of graduates in higher education in Uzbekistan will increase significantly;

Expands the ability to control the quality of education;

It is known that science was created in response to specific human needs for real, correct knowledge and creation of the world, and in the process of its existence, it has a strong influence on the development of all aspects of social life. The development of science brings various innovations and changes to the life of society. The development of this or that science causes radical changes in various new forms of the educational process [9]. Old forms of education have been rejected, and modern, cheap, high-income alternative methods are now being

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introduced to the masses. Systematic implementation of the knowledge base allows the student to get quality education remotely at a convenient time and place, and to choose the program of his choice based on the student's personal knowledge and skills. Creating a competitive environment for pedagogues, increasing the quality of science through systematization, as well as providing an opportunity for pedagogues to work on themselves and research. Currently, this type of program is introduced for representatives of all fields, and this type of software is effective in forming the ability of students to study independently and work on themselves, which is the main goal of the qualification requirements. The software offers a variety of applications based on the needs of the independent learner. in this article, the methodology of analyzing pedagogical experiences and conducting it was carried out in the following stages.

Material and methods

A group is divided into three (or more) groups according to the level of ability (strong students, medium and weak). In order to organize groups, it is possible to choose other ways (for example, the stability of knowledge interest, reading, new topic and repetition, different aspects of the studied material, practical direction, orientation to the development of various activities, etc.). For each group, the teacher prepares tasks using educational mobile web applications, and representatives of each group work independently with the mobile application for 10 minutes, the main goal of which is to attract the participants to the presented material.

The sequence of tasks for groups can be arranged according to the scheme shown in the table. This sequence can be changed depending on the methodological goals and content of a particular training session (Table 1).

TABLE II. A SEQUENCE OF TASKS FOR GROUPS

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Lesson stage	Working time	Group 1	Group 2	Group 3
1	3-5 minutes	Organizational moment: lesson setting goals and tasks, updating knowledge in the necessary context		
2	10 minutes	Working with educational mobile web application	Preparing to work with a computer	Consolidation of knowledge
3	10 minutes	Summary Release	Working with educational mobile web application	Preparing to work with a computer
4	10 minutes	Other task forms (testing, developing independent tasks, etc.)	Conclusion	Preparing to work with a computer
5	5 minutes	Activity methods for summarizing and combining the learned material, summarizing the lesson, homework		

After the organizational work, the second stage starts at the same time for everyone. All students of the first group sit at the computers and perform the task assigned to them. Meanwhile, the remaining groups used other sources of information (handouts, notebooks, paper textbooks, etc.). The change of stages is individual for each student. Students of the second and third groups know the sequence of working on a computer. A student of the first group should exchange places with a student of the second group, and then the third. This lesson scheme eliminates the system of mandatory control of knowledge (tests take a lot of time) and also requires accurate organization of work on time. As a control method, you can offer to write in notebooks or give a short handout to students for future lessons. However, this type of lesson is very useful in adapting students to changing activities and mastering different ways of working with information.

Result Discussion

Teaching based on the integration of the methodology of using educational mobile applications into the educational process made it possible to solve not only the deep learning of educational materials by students but also the issue of conducting lectures and practical lessons together.

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Effective use of educational mobile web applications by students of higher education institutions is not only the effective mastering of information technology in education but also the effective mastering of any subject. shows that they can show themselves. Experiments were conducted in order to determine the level of efficiency in the organization of science through the teaching methodology using a mobile web application for educational purposes. For the purpose of statistical analysis of the experiment-test works, a certain amount of data was obtained on the mastery indicators in the experimental and control groups. In order to determine whether such data correspond to the theoretically expected data, we performed a preliminary statistical analysis and calculated the average values and their errors. Student's criterion(s) were used to test hypotheses [10].

Statistical analysis of numerical data, taking into account that this data is relative in nature, that is, it depends not on the grading system, but on the composition of grades, for convenience, “average” is divided into 3, “good” Changed to 4 and “excellent” to 5.

During the pedagogical experiment, we conducted the mathematical-statistical analysis in the following order:

1. The average acquisition for each group was determined by arithmetic means, and their relative and average difference coefficients were compared.
2. In order to further compare the results of mastering, the variability indicators were calculated in the experimental groups and conclusions were made about the averages of the main sets corresponding to each group.
3. Each group drew the polygons of sample distributions and checked the hypothesis about the equality of the average value of the main sets based on Student's two sampling criteria.
4. Appropriate conclusions were drawn from the results of the mathematical-statistical method carried out in the above procedure.

Now we present the results of experiments conducted on the methodology of mixed education and training of the subject "information technologies in education" using educational mobile applications.

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In the experimental group of the selected groups, training was carried out based on the use of the mobile application created from the subject "Information technologies in education".

Distance lessons were conducted in the control group based on the teacher's experience.

On the basis of the created mobile web applications for educational purposes, the effect of increasing students' practical skills and knowledge levels with the help of mobile technologies is transferred to the results of the exercises conducted in control groups, the evaluations corresponding to the rating scores. ra is set.

In order to determine the effectiveness of mastering the subject of the proposed educational mobile-web application "Information technologies in education", the results of the control training and summarizing training received from students were analyzed in terms of quality and quantity.

In order to compare the mastery of the experimental and control groups, the average value of the mastery grade in the groups is taken as $_{X = \frac{\Sigma x_i m_j}{N}}$. where x_i – mastery index (grade value), which are 2, 3, 4, 5; accepts values. mj is the number of repetitions of grades, N is the number of students participating in the experiment.

The average value that evaluates the effectiveness of the educational process is the ratio of the average arithmetic values of the grades of the experimental and control groups, that is, the efficiency coefficient.

$$\eta = \frac{X_T^*}{X_H^*}$$

□ □ □□□

is calculated by the formula.

Let's get acquainted with the results of university students who participated in the experimental and control groups.

Mid-term control of all departments in "programming technologies" was conducted, the results of which are as follows

24 students from group 201 participated in the experimental group, and 24 students from group 202 participated in the control group. Evaluation work was

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carried out in these groups as current control and interim control. The assessment was based on a five-point system.

Nizami Tashkent State Pedagogical University and Muhammad al-Khorazmi Tashkent University of Information Technologies conducted experiments and the results were as follows:

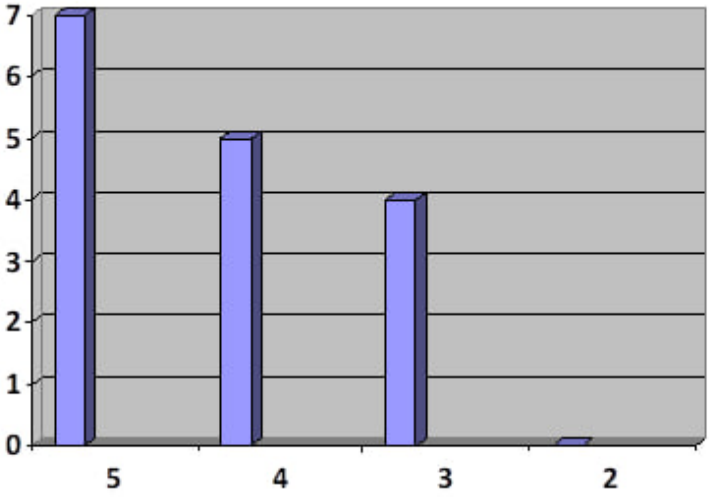
TABLE III. RESULTS OF EXPERIMENTAL WORK

Groups	Number of students	Evaluation criteria			
		5	**4**	**3**	2
Experimental group	24	8	13	3	0
Control group	24	1	11	12	0

We calculate the average mastery index in relation to these results. Mean value of intermediate control in experimental and control groups

$$\overline{X_T} = \frac{1}{24}\left[8\cdot 5+13\cdot 4+3\cdot 3+0\cdot 2\right] = \frac{1}{24}\left(40+42+9+0\right) = \frac{91}{24} = 3.79$$

$$\overline{X_H} = \frac{1}{16}\left[1\cdot 5+8\cdot 4+13\cdot 3+2\cdot 2\right] = \frac{1}{24}\left(5+32+39+4\right) = \frac{80}{24} = 3.33$$



Intermediate results of training of the experimental group

Efficiency coefficient

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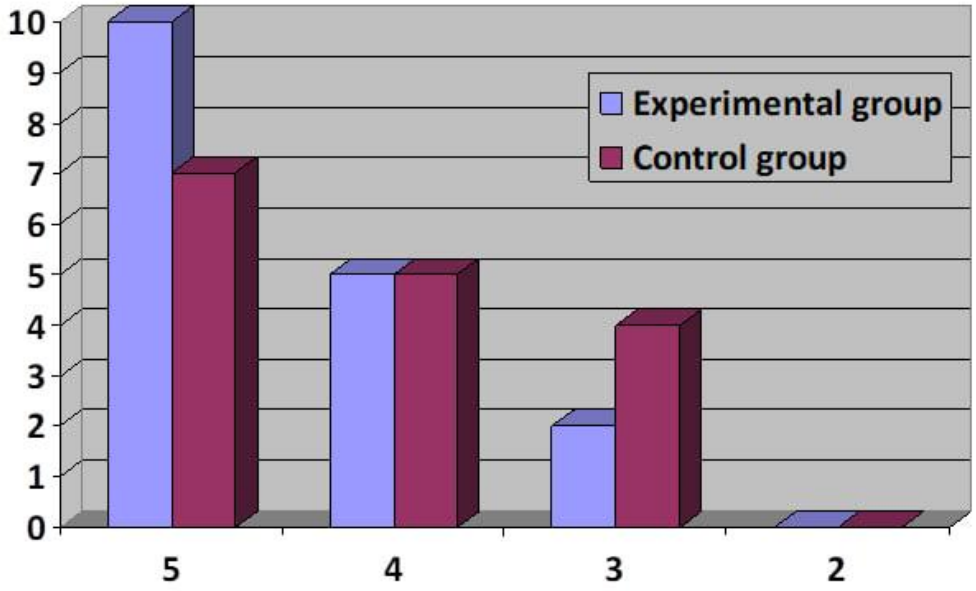
$$\eta = \frac{3.79}{3.33} = 1{,}12$$

So, according to the results of theoretical training, the effectiveness of the experimental group is 1.12 times higher. Here is a Fig.1. of these results:



performance indicator

From the information in the above tables, it can be concluded that conducting lectures, practical classes, and laboratory sessions on the basis of mobile applications in the subject "Information technologies in education" led to students' easy learning of educational materials.

I. Conclusions

This article discusses the advantages and disadvantages of Java technologies in comparison with other programming languages, explores the possibilities and analyzes the applications of the programming language. The Java programming language was found to be an alternative solution to creating applications for mobile devices. Learning mobile web applications and their types were studied. In the introduction of distance and mixed learning, the possibilities offered by mobile web applications for educational purposes were explored. The types of mobile applications presented in practice were analyzed and the importance of

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such applications in overcoming the existing problems in the Higher Education System, i.e. in ensuring the quality of education of students, was studied.

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