

Ministry of Education and Science of Ukraine

***Odessa National Academy
of Food Technologies***



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Information Technology, Automation and Robotics

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Odessa National Academy of Food Technologies, 2021

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**MOBILE STUDY APPLICATION
INFORMATICS OF SCHOOLCHILDREN**

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***Abstract.** Along with the development of information technology, their role and use in education is also growing. The introduction of ICT, in particular mobile technologies, provides such advantages as improving the learning process, continuity of education and increased efficiency of education, ensuring quality mastery of software with maximum approximation to modern technical capabilities of the student. The use of mobile technologies is gradually being introduced into the educational process of schoolchildren. The advantage of using mobile applications is that each student has their own mobile device, which instead of carrying a distraction, becomes a full-fledged learning tool that is available at any time. Therefore, the teacher is faced with the task of how to most effectively use the capabilities of mobile applications for a quality learning process during the lesson and the whole learning process.*

***Keywords:** Mobile applications, educational programs, lesson organization, educational process organization, computer science lesson.*

I. INTRODUCTION

Today it is important to use such teaching methods that would facilitate and accelerate the transfer of knowledge to students, intensify the process of learning, teach them the techniques of independent work with the material, could also increase the productivity of educational work and teacher work. All these methods can be implemented through the use of information technology.

Modern information technologies include not only the use of computers, interactive whiteboards, electronic libraries, etc. Prospects for the use of mobile technologies are also opening up. The popularity of smart mobile devices is growing rapidly. These digital devices represent a new generation of technological tools, which are equipped with a touch screen, camera, microphone, have Wi-Fi connectivity and, last but not least, high-speed access using 3G technologies to provide Internet access, also support the connection of removable media and long operation without connecting the device to the network. Such tools offer excellent access to content, as well as opportunities for creative use by students of all ages. Learning with mobile devices primarily provides students with the opportunity to learn no matter what time it is and where they are, it also gives people with disabilities the opportunity to learn, and teachers the opportunity to provide maximum flexibility in computer science and diversify learning tools. [1]

The use of mobile technology provides such opportunities as the implementation of joint work of students at any time of the lesson, because now students can quickly move with their device around the classroom; also now students

can present their works on a media projector using the Miracast function; students have the opportunity to use mobile textbooks instead of using a book or computer, which significantly reduces the time to find the information they need; mobile applications, depending on their purpose, can be used to learn new material, consolidate acquired knowledge, when assessing the knowledge and skills of students and others. [2]

Based on the above, it is not difficult to see that even these opportunities are enough for full-fledged work in the learning process using mobile applications.

II. LITERATURE ANALYSIS

2.1. Analysis of the feasibility of using mobile applications in the learning process

Mobile learning is a technology used to increase the productivity and efficiency of learning material, to provide students with information that is always freely available and arrives on time in the context of its immediate priorities.

Scientists (NV Babichev, EN Vodostoeva, ON Maslenikov, N. Sokolova) defined the didactic functions of mobile learning:

- cognitive (satisfaction of intellectual, professional, information needs);
- diagnostic (determination of inclinations and abilities of students, identification of the level of preparedness, level of individual psychological abilities and directions of personal development);
- adaptive (development of information culture, basics of professional management, ability to design an individual learning trajectory);
- propaedeutic (implementation of pedagogical support in the educational process, the choice of the most effective technologies taking into account the individual capabilities of students);
- Orientation (formation of students' inner readiness for conscious and independent construction of professional prospects for their development, practical preparation for professional activity);
- the function of managing educational activities (implementation of flexibility, adaptability and accounting for cognitive abilities of students);
- control (detection of gaps in the preparation, implementation of pedagogical tests);
- prognostic (forecasting the potential capabilities of the student in the development of new material). [3]

The use of mobile applications in the learning process provides great benefits for students, namely:

1. Endless learning - With the help of mobile learning applications, the learning process is not limited to a textbook. Students also have the opportunity to learn at their own pace at any time.

2. Improved interaction - Most mobile applications promote the use of audio-video and media materials that turn learning into an interesting process.

3. Cost savings - Due to the fact that each student has access to mobile learning programs compared to access to computer programs, students can receive materials

on time and improve their learning opportunities.

4. Accessibility 24/7 - Students have access to mobile learning materials around the clock, which speeds up the learning process

5. Personalization of learning, instant feedback and evaluation of learning outcomes, effective use of time in the classroom.

6. Support of situational learning; assistance to students with disabilities and much more

7. Ensuring communication between formal and non-formal learning. [4-5]

2.2. Analysis of developed mobile applications

Unfortunately, the technology of using mobile applications is underdeveloped, so there are also a limited number of developed training programs, but of those that have already been developed, examples that can be used in the educational process in computer science lessons are:

- Mobile application "Algorithms: clear and animated".

- Algorithm City;

- «SoloLearn»

- Google presentations, Microsoft PowerPoint and PhotoAlbum will help in lessons for creating and editing presentations, and others.

All these applications have an interesting interface and help students gain basic knowledge. This type of mobile application is very good for extracurricular learning.

Mobile learning should be easy in content, and it should be used to provide students with access to materials, participation in surveys, conducting or reviewing abstracts, testing the acquired knowledge.

To find the best characteristics of the created information system, consider similar systems, their pros and cons.

1. **SoloLearn** - a guide to different programming languages and a programming simulator. It is offered to study languages at interactive lessons, and to program - in the mobile console;

Advantages of this system:

- Ability to choose a programming language;

- Ability to write run and publish real code directly on the mobile device without any additional settings and preferences.

- Theoretical material and practical tasks

Disadvantages:

- All functions only on a paid basis

- It is not possible to track the progress of students

- Tests for checking the studied material are not presented

2. **“Algorithms: clear and animated”** - a program that can be used to study toFigs such as simple algorithms and animated schemes.

Advantages of this program:

- Interactive learning

- The application has different modes where you can both learn and model your algorithms

Disadvantages:

- The system does not allow access to the publication of information;
- Designed for the user to already have knowledge of algorithms.

3. “**Algorithm City**” - a mobile game for learning the basics of programming. This is an exciting and innovative programming game that teaches the basics of programming and algorithms. He teaches programming through fun games with animals.

Benefits:

- Learning through play;
- Quick understanding of programming principles, basic coding concepts such as sequence of commands, functions and loops

Disadvantages:

- Program in a foreign language;
- The same type of tasks;
- There are no theoretical materials.

After analyzing the existing analogues, their advantages and disadvantages were identified, which serve as a basis for the formation of requirements for the development system necessary to achieve this task. The formulated requirements to the developed system are necessary for construction of functional model of the developed system. [6]

III. OBJECT, SUBJECT, AND METHODS OF RESEARCH

Purpose: to substantiate the feasibility of using mobile applications as one of the means of teaching students in computer science lessons and implement it.

The object of research is the use of mobile applications as one of the means of teaching students in computer science lessons.

The subject of research is the implementation of its own mobile application that will meet all requirements.

Based on the researched sources, we will identify the requirements for a mobile application that will be used in the process of teaching computer science.

The following theoretical and empirical methods were used in the study:

- Analysis of scientific publications;
- Analysis of the basic concept of mobile learning;
- Method of processing actual data
- Method of secondary analysis of research results;
- Analysis of the results

IV. RESULTS

Based on the study, the requirements for the developed system were identified:

1. The mobile application should provide convenient operation of educational and test materials.
2. The educational system should have an analysis of students' learning outcomes.
3. The mobile application must have a user-friendly interface.
4. The application must perform the following functions: automated input of training and test materials, the ability to edit them; automatic formation of test results; formation of statistics of performance of test tasks by students.

To implement a mobile application that will meet the requirements covered above, was chosen React Native - JS-framework for creating cross-platform applications for iOS and Android, which allows you to develop mobile applications for iOS and Android using only one programming language - JavaScript, and also use in these two applications a significant part of the general code. The Microsoft Visual Studio Code development environment was also used.

The mobile application was designed in such a way that React components wrap around existing proprietary code and interact with proprietary APIs through the paradigm of the declarative React and JavaScript user interface. This allows you to create your own application and allows existing groups to work much faster. [7]

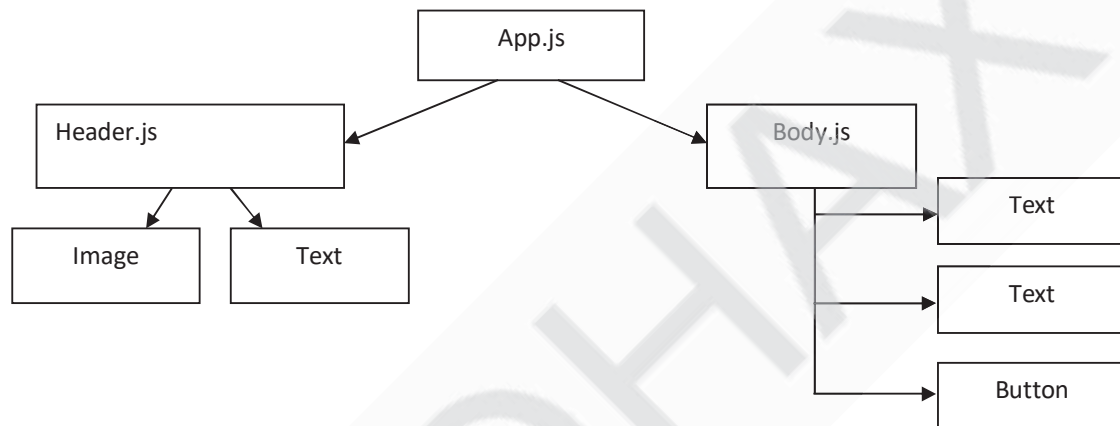


Fig. 1. Diagram of the application implementation using the React native way

The mobile application consists of several screens, the start page presents our program and offers to start learning. The interface of the application is designed to be intuitive, readable and not visually repulsive.



Fig. 2. Application start page

The first page the user enters is the login to the student's account, which has its own id code and password. After entering the student sees his profile and his achievements in the course. Also on the profile page the user has the opportunity to

continue learning after clicking "Continue Learning".

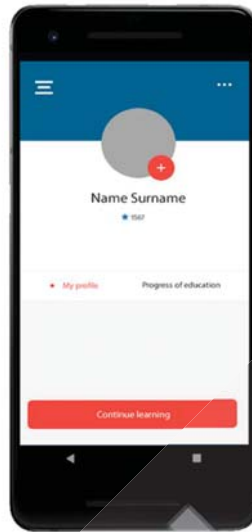


Fig. 3. User page

If you want to view theoretical materials on any toFig or use certain functions, the user can use the menu, which opens after clicking on the "burger menu" in the header of the screen.

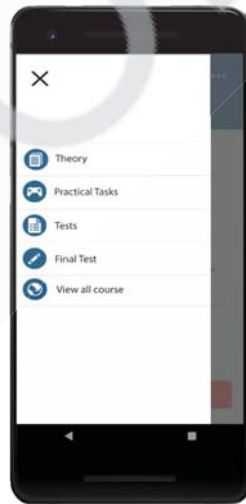


Fig. 4. Menu page

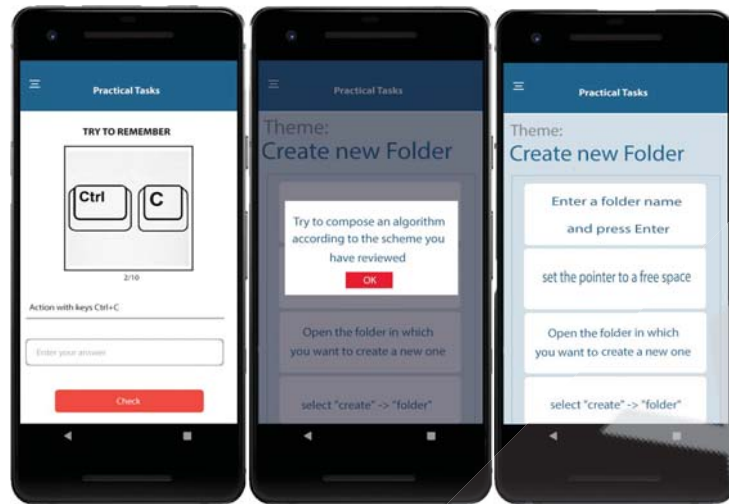


Fig. 5. Practice tasks in application

- a. Learning of Hotkeys, b. explanation of the task, c. task "make an algorithm of actions"

General functions performed by the mobile application "Informatics":

1. Step-by-step training, in which for each toFig theoretical material, interactive tasks and tests to test the acquired knowledge are offered.
2. Review of theoretical material on the selected toFig
3. Passing interactive tasks on the selected toFig at your own pace and an unlimited number of times
4. Passing current tests on the selected toFig
5. Passing the final test, if you have passed previous current tests
6. View the course and progress of user training.

Such functions allow students not only to understand new material, but also to consolidate knowledge with practical skills and check how well new skills have been mastered.

V. CONCLUSIONS

Thus, we can conclude that the use of "mobile learning" technology in the study of many toFigs in the course of computer science secondary school increases the effectiveness of training students in computer science by personifying cognitive interest, increasing the importance of independent work, focus on functions, needs, abilities of each student.

Also, after analyzing the sources, it was found that we currently have a limited number of applications that can be used to teach students.

Our developed application solves a number of problems that teachers face during the learning process and has the following properties:

- Can be used at many stages of the lesson;
- Replaces all the main components of the educational process, including teaching materials, tests, practical tasks;
- Allows you to learn at your own pace;
- Allows you to use the application on devices of different sizes using the

ReactNative framework;

- Allows you to use the application on devices of different operating systems;

In summary, we can say for sure that our mobile application allows to increase the efficiency of the educational process of students in computer science lessons and in extracurricular activities.

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Environment for teaching children the Kazakh alphabet. Author: <i>Sagyngaliyev Renat</i> , Advisors: <i>Zhakhiena Aizat, Bazarbayeva Ainur</i> , Zhangir khan University (Kazakhstan)	402
Monitoring and managing system of microclimate indicators in educational facilities. Authors: <i>Viesielovskyi Danylo, Ivashchenko Oleksii</i> , Advisor: <i>Ischenko Mykola</i> , Kryvyi Rih National University (Ukraine)	414
Development of electronic payment systems and security of their functioning. Author: <i>Anna Severenchuk</i> , Advisor: <i>Lyudmila Polovenko</i> , Vinnytsia Trade and Economic Institute KNTEU (Ukraine)	426
Use of K-Nearest neighbour method in analysis of student data from surveys. Authors: <i>Ekaterina Konstantinova, Kamen Kalchev</i> , Advisor: <i>Tsankov Tsvetoslav</i> , Konstantin Preslavsky University of Shumen (Bulgaria)	435
Mobile study application informatics of schoolchildren. Author: <i>Sofia Ruslanovna Cherednichenko</i> , Advisor: <i>Evgeniy Oleksiyovych Shakurov</i> , KHNPU named of G.S.Skovoroda (Ukraine)	438
Organization of international cargo delivery in a digital economy. Author: <i>Yelyzaveta Arkhanhelska</i> , Advisor: <i>Olga Katerna</i> , National Aviation University (Ukraine)	446
Victory Manipulator Universal Robots in the line sorting of finished products of the wine industry. Author: <i>Igor Kotsur</i> , Advisor: <i>Volodymyr Honhalo</i> , Одеська національна академія харчових технологій (Ukraine)	457
Automation of positioning of pneumatic actuators by means of introduction of the Phoenix Contact controller. Author: <i>Dmytro Makletsky</i> , Advisor: <i>Serhii Kovtun</i> , Одеська національна академія харчових технологій (Ukraine)	473
Kinematic analysis of the hinge-lever mechanism of the gripping device anthropomorphic robot. Author: <i>Vladyslav Borysov</i> , Advisors: <i>Yevgen Mykhaylov, Oleksandr Kniukh</i> , Odessa national Polytechnic University (Ukraine)	480
Robotic packaging system products from primary to secondary packaging. Author: <i>Vlad Sydorov</i> , Advisor: <i>Serhii Kovtun</i> , Odessa National Academy of Food Technologies (Ukraine)	491
Modern SSDs: a high-tech solution to the obsolete HDD systems. Author: <i>Ekaterina Konstantinova</i> , Advisor: <i>Tsvetoslav Tsankov</i> , Konstantin Preslavsky University of Shumen (Bulgaria)	498
Complex system of AI interactions in social simulation of a city infrastructure. Author: <i>Ildar Sabirov</i> , Supervisor: <i>Olga Olshevska</i> , Odessa National Academy of Food Technologies (Ukraine)	505
System of automated detection of ceramic disc surface defects. Author: <i>Bohdan Konechnyi</i> , Advisors: <i>Maksym Semenchenko, Roman Velgan</i> , Lviv Polytechnic National University (Ukraine)	513

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