DIDACTIC PRINCIPLES OF MODERN MOBILE APPLICATION DEVELOPMENT IN THE SUBJECT «INTRODUCTION TO WEB PROGRAMMING»

Madaminov Uktam Ataxanovich
Teacher of Urgench Branch of TUIT
uktam9527@gmail.com

Abstract
The main content of this scientific article is pedagogical problems in teaching subjects focused on web programming in higher education institutions, innovative educational technologies for organizing training sessions based on mobile applications, modern mobile in the subject “Introduction to web programming” is to create didactic principles of application development. In our research work, the current state and existing problems of teaching subjects, ways to solve problems, the need and requirements for creating mobile applications, including software tools, the fact that software tools are a means of increasing the level of learning of students, the role of mobile applications in improving the educational process. position is analyzed.

Keywords—didactics, mobile applications, pedagogy, modern, education, web, technology, interactive, electronic resource, development, methods

The process of automating and integrating the educational system in higher education institutions, gaining absolute control over the educational process requires the wide application of information technologies in the educational process. Information and telecommunication technologies of education allow students to use computers and mobile devices as a set of methods and methods of information transfer, to check knowledge acquisition, to restore and use the acquired knowledge in real life.

Modern mobile applications are software tools designed to allow students to work independently, facilitate their work, increase the speed of learning and achieve high results. These software tools can be different. For example, software tools designed to conduct a test system, software tools in the form of electronic manuals, software shells designed to facilitate the work of mentors and others [1].

The concept of creating a new generation of educational literature for the continuing education system includes: electronic software tools; electronic textbook; e-learning course; modern e-learning course and others.

Types of e-learning courses are text based on the description of the material, hypertext (presentation in the form of a branched "tree" based on indicators), reference (presentation in the form of a reference, with the possibility of freely referring to the optional part of the educational material to do), there are types such as playful [2].

The requirements for electronic resources and mobile educational applications, electronic textbooks and manuals created using modern software tools should be divided into two groups.

a) didactic requirements - scientificity, ease of learning, problem-solving and comprehensively justified learning, active and conscious participation of the student in the learning process, systematic and step-by-step implementation of learning, ensuring solid assimilation of knowledge, ensuring independent study for the student, interactivity of teaching, ensuring harmony of teaching, systematic approach to the presentation of educational material;

b) psychological requirements - achieving the effectiveness of mobile educational technologies is carried out by taking into account the psychological aspects of interaction with a computer, providing them with educational material in electronic manuals and explaining (cognitive) verbal-logical, sensory-perceptual (feeling) do, feel) and should correspond to the level of expression. Also, psychological processes related to awareness include receiving information (mainly seeing and hearing, feeling), gathering (its stability, concentration, transition from one thing to another, distribution and level of attention), thinking (theoretical concept, practical demonstrative and practical-movement), imagining, memorizing.

Psychophysiological, cybernetic, user-friendly, creative approach to mastering science and ergonomic requirements of creating working conditions for health are also taken into account.

In order to create software tools, including mobile applications, authors are required to be masters of their field, have a good knowledge of mobile technologies, and pay attention to didactic principles in the development of applications [3].

The main problems in the use of mobile educational technologies are not acting on the basis of a clear plan, not systematically developing applications, lack of interactive information and multimedia materials, non-compliance with didactic and psychological requirements, not forming models, and not choosing the right colors and images.

The specific features of creating interactive educational resources are as follows (Fig. 1)

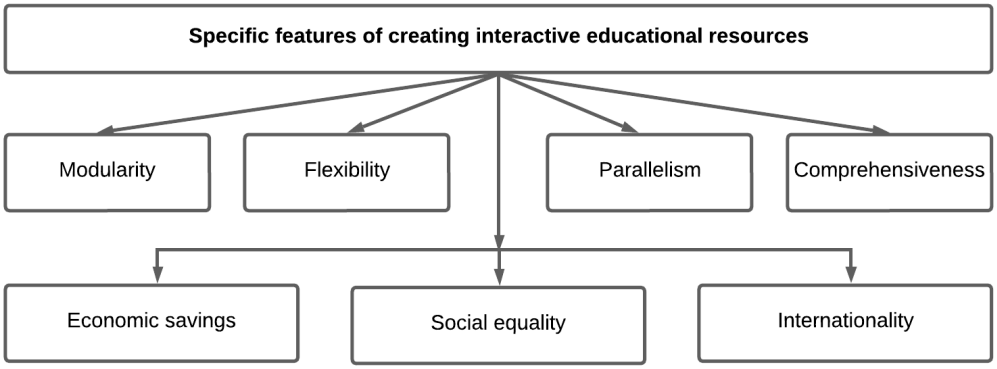

Fig. 1. Features of creating interactive educational resources

And electronic textbooks allow to use these 3 conditions together. The teacher is a psychologist, he intuitively and consciously perceives the character of his students, but this perception can be implemented in an electronic textbook, using software tools, elements of interactive mobile educational technologies.

Electronic textbook materials in mobile applications should not bore students, assignments and independent work should be given at 3 levels: simple, average and complex: high; medium; low [4].

It is known from experience that a person can remember 5 times more information using the visual organs compared to the auditory organs, because the information received from the visual organs, compared to the auditory organs, goes directly to memory without being recoded and is stored.

When visual information is used in the educational process, students' impression is formed 5-6 times faster than when it is presented verbally. A student's impression and surprise from visual information is much higher than verbally delivered information, because graphic information activates the capabilities of the right hemisphere of the brain, develops visual thinking ability, intuition [5].

Special IDEs (Integrated development environment) are used to create software tools. For example, android studio IDE is used to create mobile applications. When preparing applications, it is necessary to choose the optimal option for graphics, design, audio, video and other resources.

The interactive mobile educational resources created within the framework of our research should serve as an assistant teacher, facilitating their learning not only

for students, but also for any users who want to learn. At this point, let's emphasize the technology of creating interactive mobile educational resources: Therefore, the creation of interactive mobile educational resources (IMER) and their use in the educational process is a means of guaranteeing the quality of education and the effective acquisition of knowledge by students.

Reading an interactive mobile learning resource on a computer or mobile device screen is more challenging than reading a regular book, as the screen can quickly tire the eyes. Therefore, it is very important to choose the color of the background and objects, the location of multimedia objects and the compatibility with the device, as well as the harmony of the font color, when preparing the design part of the interactive mobile educational resource [6]. The distribution of educational materials in electronic resources working in mobile educational technologies is presented in Table I, information on the psychological properties and harmony of colors is presented in Table II, the harmony and effect of colors is presented in Table III.

TABLE I. Memorization of information

Text, materials	Multimedia (illustration, graphics, animation, sound)	Graphic design
55-60%	30-40%	5-10%

Distribution of educational materials in a mobile application.

TABLE II. Use of colors.

Color	Psychological properties
Red	Observability, activator
Apostle	Calming, calming of the nervous system
Yellow	Warmth, cheerfulness
Fire	Happiness, bringing joy, increasing activity
Green	Calm, uplifting

	Purple	Equally alienating and charming, and in some cases frustrating
	Black	A mood of oppression, deplorable
	White	Boring, creating a void

Psychological properties and harmony of colors.

When creating a mobile application from the subject "Introduction to web programming", it is necessary to fully meet the above-mentioned requirements, and one of the main tasks of this technology is to fully mobilize lessons, in which students can use them in the order they want (online, offline). possible [7].

It is necessary to ensure that the user interface of the software tool is understandable and that even non-professional users can use it without additional restrictions. [8].

TABLE III. The harmony and effect of colors.

Color harmony	Efficient
Black letter on a white background	Excellent
Green letter on white background	Fine
Black letter on yellow background	Satisfactory
Blue on a white background	Satisfactory
Red on a white background	Satisfactory
Red on a yellow background	Satisfactory
Green on a red background	Unsatisfactory
Red on a green background	Unsatisfactory
Orange on a white background	Unsatisfactory

Color harmony and effect. Education of students based on multimedia tools and retraining of videos is one of the urgent issues of today. In this research, we have developed the following solution to solve the current issues and problems.

Multimedia is a rapidly developing modern information technology in various forms. Its distinguishing features include:

Various types of information;

Work at a certain time

A new level of "human-computer" interactive communication

Teaching students based on multimedia tools has the following advantages over traditional teaching methods:

deeper and more perfect assimilation of the given materials;

increasing the enthusiasm for close contact with new areas of education;

saving time as a result of reduction of training time;

the acquired knowledge is stored in the memory of students for a long time and it is possible to use it in practice if necessary. Use of electronic textbooks, manuals and other teaching-methodical materials created in compliance with the physiological, psychological and pedagogical norms and requirements of mobile technologies and multimedia tools in the educational process, to eliminate boredom among students, to arouse interest in science and work in mobile technologies. shooting allows to prevent damage to the student's health [9].

Student interest in mobile applications developed based on didactic requirements is one of the most important aspects of the perception of mobile education in our research. Indeed, several studies have shown that mobile learning created on the basis of didactic, pedagogical, psychological requirements arouses strong interest among students.

Determining the goal of developing the creation of interactive mobile educational resources in the electronic educational environment, improving the content and determining modern methods and methods, as well as forms and tools that guarantee the effectiveness of teaching, are the basis for the proper organization of the creation of interactive mobile educational resources.

REFERENCES

1. Omnia Saidani Neffati, Roy Setiawan, P Jayanthi, S Vanithamani, D K Sharma, R Regin, Devi Mani, Sudhakar Sengan. An educational tool for enhanced mobile e-Learning for technical higher education using mobile

devices for augmented reality. Microprocessors and Microsystems – 2021. https://doi.org/10.1016/j.micpro. 2021.104030.

2. Di Mo, Weiming Huang. Computer technology in education: Evidence from a pooled study of computer assisted learning programs among rural students in China. China Economic Review. Vol. 36. 2015. https://doi.org/10.1016/j.chieco.2015.09.001.
3. Ashirova Anorgul Ismoilovna, Allaberganova Muyassar Rimberganovna, Uktam Madaminov Ataxanovich, Ollaberganova Muyassar. Creating an application for training science. 2021 International Conference on Information Science and Communications Technologies (ICISCT). DOI: 10.1109/ICISCT52966.2021.9670410.
4. Ching-Leng Liu, Chiu-Lin Lai. An exploration of instructional behaviors of a teacher in a mobile learning context. Teaching and Teacher Education. 2023. https://doi.org/10.1016/j.tate.2022.103954.
5. Joanne Gikas, Michael M. Grant. Mobile computing devices in higher education: Student perspectives on learning with cellphones, smartphones & social media. The Internet and Higher Education. 2013. https://doi.org/10.1016/j.iheduc.2013.06.002.
6. Uktam Madaminov Ataxanovich, Sadikov Mahmudjon Akmuratovich, Kutliev Sardor Pulatovich, Allaberganova Muyassar, Ashirova Anorgul Ismoilovna. Development and application of computer graphics training software in information technology. 2021 International Conference on Information Science and Communications Technologies (ICISCT). DOI: 10.1109/ICISCT52966.2021.9670321.
7. Madaminov Uktam Ataxanovich. Methods of teaching and improving web programming in higher education organizations. 2022 International Conference on Information Science and Communications Technologies (ICISCT). DOI: 10.1109/ICISCT55600.2022.10146962.
8. Bareeq A. AlGhannam, Sanaa AlMoumen, Waheeda Almayyan. Web Development in Applied Higher Education Course: Towards a Student Self-Regulation Approach. International Journal of Computer Science and Information Security (IJCSIS). Vol. 16, No. 9, September 2018.
9. Farrukh Shahzad. Modern and Responsive Mobile-enabled Web Applications. Procedia Computer Science. 2017. https://doi.org/10.1016/j.procs.2017.06.105.