

## ON GENERAL PROFESSIONAL SCIENCES ELECTRONIC SOFTWARE OF THE EDUCATIONAL PROCESS

**Gulomjon Gafurovich Kurbonov***Bukhara State University**PhD student of the Department of**Mathematical analysis**e-mail: gulomjonqurbonov8@gmail.com*

**Annotation.** *In this article, we are talking about electronic software and methodological support for teaching students of higher education institutions in the field of information systems and technology on the basis of a mobile application on the subject “Numerical Methods”. It is scientifically based that the mobile application serves as an excellent electronic didactic tool to increase the level of development of students’ knowledge and skills.*

**Key words:** *digital learning, mobile learning, concept, synchronous, multimedia, cognitive, metacognitive, hypertext.*

**Introduction.** Innovative electronic didactic forms of education - taking into account the abilities and interests of learners. It is a system of interaction between teacher and student based on general pedagogical, didactic and individual methodological procedures aimed at designing the content of education in accordance with the purpose of education and the application of pedagogical, digital technological methods, forms and teaching methods [1].

In general, the fact that the content of education meets the following requirements leads to the full development of students in accordance with the needs of the level of knowledge acquired:

- be a tool for developing students' knowledge;
- be the basis for the development of students' practical experience;
- formation of students' critical, independent, and creative abilities.

Depending on the level of content, goals and objectives of education, there is an opportunity to implement e-learning resources in the learning process.

**Literature review.** On the evolving mobile education of today, the British scientist S. Trongtortam in his scientific work gave a generalized description of mobile education. New methods of learning using mobile phones, smartphones, tablets and mobile devices have been introduced to help students develop and improve their methods in mobile education. Mobile learning technologies are intended to be used to facilitate, support and improve the learning process and teaching, which can be attractive to teachers and students [2].

Mobile learning helps students to actively participate individually on issues that are achievable, useful, relevant, and encouraging in solving system problems.

Adaptation to mobile learning requires teachers working at all stages of education to master the software tools of modern technology in order to use mobile learning in the learning process. However, we know that even in societies with a good socio-economic environment, there are some problems in this process. These include issues such as lack of teaching aids and relevant manuals for teachers, as well as the lack of competence to use mobile learning [3].

In turn, it is necessary to study the requirements and principles of distance, mobile education, based on the requirements of today's educational process.

To date, it has been researched by several scholars to base the resource content used in digital education on the following principles:

- multimedia principle;
- the principle of continuity;
- the principle of comprehensibility;
- the principle of conformity;
- the principle of interactivity;
- the principle of communication between text and graphic data;
- the principle of focusing on creating a connection between media elements and cognitive structure.

Based on the above principles, digital education is prepared from audio, video, text data in the preparation of the order of educational material without departing from the level of normative documents of science. Simple, clear and concise information is provided in the context of the topic, based on the ability of students to receive visual information. At the same time, it is necessary to take into account the continuity of science topics in the interaction between educational resources [4]. As digital education technologies evolve rapidly today, we will try to explore these changes as the above principles are self-updating.

Based on the above-mentioned principles of foreign scholars, we need to show that mobile education is based on the following principles:

- the ability to use a variety of methods to present information helps to reflect complex processes and events in a way that is unimaginable in real life;
- should be located on a single interface as much as possible in a format associated with a single concept element. This allows the user to learn the object (process, event) from different angles and different methods of manifestation;
- information such as audio, graphics and text should be used in an ordered synchronous view. This allows the user's perception not to work with overload, and also contributes to the multifaceted perception of the object (process, event);
- the form of mobile learning material should be relevant to the content of education and the purpose of the curriculum;



- it is necessary to take into account the pedagogical and psychological approach to the simultaneous use of text, visual and audio forms of presentation for mobile educational material;

- complex concepts and processes are presented through a single medium, followed by two or more media outlets;

- take into account the knowledge and cognitive characteristics of students;

- facilities should be created so that students with a high level of metacognitive skills can easily find links and any information through hypertext.

Analysis and Results. Pedagogical experience from the principles of this mobile education shows that the use of digital technologies in the teaching of general disciplines in the field of “Information Systems and Technologies (by industries and sectors)” in higher education plays a significant role in further improving the effectiveness of education. Mobile software training tools play a special role in this [5].

In this regard, it is important to further improve the quality of training teachers for innovative professional activities by developing software for the subject “Numerical Methods” in the general education block of the curriculum of higher education institutions 5330200 - Information Systems and Technologies (by sectors and industries).

In providing theoretical insights on the subject of “Numerical Methods”, the teacher in the introductory instructions, explains the requirements for the implementation of the task step by step, stating only the purpose of the task. Based on the developed software-based sequence of tasks and practical instructions on how to perform them, students have to learn virtually independently. The advantage of this methodology is that the teacher has the opportunity to devote special time to students who have not mastered the topic and provide them with practical assistance. The result can be determined by observing how well the students are doing the tasks and how well they understand them. Methodological guidelines have been developed for the implementation of practical training tasks, which include: the purpose of the work, the necessary theoretical information about the work, the requirements for sample developed results, independent practical tasks and test tasks for control.

Brief theoretical information about the mobile application of the subject “Numerical methods”

The mobile application of digital science has been developed using innovative E-learning technology. Innovative technology of E-learning combines traditional education with distance learning. This mobile application allows students, as well as independent learners, to further strengthen the classroom education, make it easier to work on themselves, set their own ratings, increase the learning outcome by 75-90% using a personal mobile phone or smartphone.

The developed software includes all the content on the subject, the content of lectures and practical sessions, theoretical information for each lecture, glossary,

independent assignments, a bank of thematic tests, sample solutions for practical training, videos, virtual boards, list of references and brief information about the author.

When you enter an application installed on your mobile phone, the application's main window will appear. The mobile application of the subject "Numerical methods" consists of the following content. The mobile application includes a homepage, application information, content, lectures, practical exercises, glossary, thematic and finally a complete science test bank, list of references, and a brief description of the author (see Figures 1 and 2).

The mobile application is radically different from other mobile applications in that it is easy to install, easy to understand, contains all the necessary information, tutorials and control tests are designed separately for each topic, and is designed for all android devices. In order to improve the ability of students to learn independently and develop individual performance skills in the subject "Numerical methods" in the general science block in the curriculum of 5330200 - Information systems and technologies (by industries and sectors), a mobile program, recommended for use by students and professionals, was developed and implemented. As a result, in the process of mastering the content of general professional subjects, students are not limited to traditional education, but also increase their knowledge, skills and abilities on the basis of software tools based on digital technologies.

Conclusion. In the process of teaching using a mobile application, the level of development of students is assessed objectively with automatic detection. The program is distinguished by the fact that methodological recommendations have been developed and put into practice, with the selection of indicators and criteria that allow to control in practice and use them as a tool for objective assessment. In the process of full mastery of theoretical materials, students develop practical skills. The resulting mobile application is intended to serve as a perfectly programmed electronic didactic tool for e-learning and methodological support of teaching.

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