USE OF DIGITAL EDUCATIONAL TECHNOLOGIES IN TEACHING INFORMATICS

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ABSTRACT

The use of digital technologies in various fields of education today is one of the most important trends in the educational process in the world. Such technologies allow making the learning process better and more interesting because by using media and interactive tools the teacher can interest students by implementing different methods of classroom work: the method of projects, research, developmental educational games, and more. That is why the article considers the possibilities of using various digital educational resources in teaching computer science to primary school students. Examples of using Google cloud services (Google Docs, Google Sheet, Google Classroom, YouTube, Google Knol, Google Site, etc.), cloud-based learning management systems (because LMS has all the basic functionality that scientists relate to the educational environment of the educational institution), cloud-based smart card creation services, mass open online courses (because they provide the opportunity to create and maintain a forum of registered users, where students can communicate and get answers to their questions from teachers or more competent users of IOC), specialized tools for teaching computer science: online compilers, automated systems for checking programming tasks (ALGOTESTER, NetOI Olympiad, e-olymp Internet portal, because with their help students have the opportunity to solve problems and prepare for classes, as well as check their solutions without the help of a teacher, compare the level of their skills with thelevel of other users, which, in turn, stimulates the increase of knowledge in this field and promotes the development of self-esteem), games for learning programming languages(CodeMonkey, CodeCombat, CODINGAME). It is established that in the process of the digital transformation of the learning process there is an active interest of students, as there are relevance and novelty of content, clarity, disclosure of knowledge, game technology, practical research, and problem-based learning

Keywords: educational technologies; digitalization; digital educational technologies; computer science education.

INTRODUCTION

Statement of the problem. The conceptual framework of digitalization of Ukraine 2020 states that "the rapid and profound consequences of the transition to "digital"will be possible only when the "digital"transformation becomes the basis of Ukrainian society, business, and government agencies, becomes commonplace and every day, will become our DNA, our key agenda on the path to prosperity, will be the basis of Ukraine's prosperity"(Digital Agenda of Ukraine–2020).The Law of Ukraine "On Education"also states that the formation of information and communication competence in students is mandatory (Law of Ukraine "On Education"), as digital competence is recognized as one of the keys by the European Union. As a result, as indicated in the conceptual framework

of digitalization of Ukraine, "target audiences in the implementation of the state program on"digital literacy "are a primary school, secondary school,vocational school, and higher education"(Digital Agenda of Ukraine–2020).

Digitization of education is a modern stage of its informatization, which involves saturation of information and educational environment with electronic and digital devices, tools, systems, and electronic communication between them, which allows integrated interaction of virtual and physical, i.e. creates cyber-physical educational space. The key to the successful course of these processes is the achievement of scientific and technological progress, the implementation of the paradigm of human-centeredness in educational systems, and the use of modern information and communication and digital technologies in education (Bykov, Spirin&Pinchuk, 2017).

The use of digital technologies in various fields of education today is one of the most important trends in the educational process in the world. Such technologies allow making the learning process better and more interesting because by using media and interactive tools the teacher can interest students by implementing different methods of classroom work: the method of projects, research, developmental educational games, etc. (Digital Agenda of Ukraine–2020). That is why today the main problem of digitalization of education is the development of various digital educational resources and the actual development of methods for their appropriate use.In the context of European integration and development of the education system, the problem of developing a creative personality of a teacher becomes especially important. In such conditions, each educational institution must take significant steps towards the use of a new paradigm –cloud technology.

Analysis of recent research and publications. The issues of computerization and informatization of the educational process are considered in the works of V.Bykov, O.Burov, Yu.Goroshko, A.Gurzhii, M.Zhaldak, T.Koval, A.Kolomiets, V.Kremin, Y.Mashbyts, V.Oliinyk, S.Rakov, O.Spivakovskii, N.Talyzina, A.Yatsyshyn, S.Yashanov, etc. Many scientists such as E.Ablialimova, A.Kobylin, L.Medzhitova, V.Oleksiuk, Z.Seidametova, Yu.Tryus et al. The works of V.Kompaniets, K.Makovoz, O.Chudak, V.Shadkhinaand others are devoted to the safety of cloud technologies. Cloud technologies of open education are covered in the works of M.Leshchenko, Yu.Nosenko, V.Kukharenko, V.O.Udovenko. Cloud tools for teaching computer science disciplines are presented in scientific research by O.Adamenko, T.Bodnenko, L.Panchenko, A.Striuk, M.Striuk, O.Tregub, Yu.Tryus, O.Kharchenko, I.Chemisova, V.Chernova and others.

The article aims to describe the possibilities of using digital educational technologies in teaching computer science to primary school students.

Results of the research.

Cloud services are those services that are "designed to make user-friendly application software, storage space, and computing power over the Internet"(Vakaliuk, 2018).

In his work, the teacher can use existing cloud services, including Google services in the following areas: creating lesson outlines (Google Docs), surveys (Google Form), and processing their results (Google Sheet), where it is possible to filter results as in regular Excel; keeping electronic journals and diaries; use of online services for the educational process, communication, testing; use of distance learning systems, libraries, media libraries; file

repositories, sharing for teamwork on a team project; to create your classroom online (Google Classroom), create multimedia presentations (teacher or students) on Google, Slideshare, Calameo, or Prezi –to illustrate the material and to interest students; use of the YouTube cloud service to post your videos, use Google Knol –a wiki-encyclopedia to clarify concepts, to create sites (including teachers'portfolios), etc.

To solve the problem of deploying educational systems in the network and to design a cloud-based learning environment, specialized platforms are constantly being created, called Learning Management System (LMS) –learning management systems. They are used to develop, manage and disseminate online learning materials. Materials are placed in thelearning environment indicating the sequence of study. The LMS includes various individual tasks, projects for working in small groups, and learning elements for all students, focused on both the content component and the communicative (Vakaliuk, 2018).

LMS has all the main functionalities that scientists relate to the educational environment of the educational institution: the possibility of distance learning, to use of online services for the educational process; online knowledge testing and assessment; the ability to keep electronic journals; conduct correspondence, a library of books, manuals, textbooks, media files; file storage; video conferencing, etc.

The use of intelligence cards is possible in any sphere of life, whereyou want to improve the intellectual potential of the individual, which is achieved through learning or solving a variety of intellectual problems.Among the most famous are the following tools for building mental maps: Bubbl.us, Mindomo, Mindmeister, coggle.it. (Spirin& Vakaliuk, 2017). When working with smart cards, you should know that the main elements of cards are keys or triggers: terms, ideas, and pictures that symbolize a particular idea or thought, and contribute to the emergence of new ones.

Intelligent maps serve as a demonstration method for the teacher to understand and illustrate topics, and concepts, and also allow in the form of a logical chain of ideas and facts to organize all the theoretical material in a convenient form; mental maps allow you to memorize more material and focus better (Spirin& Vakaliuk, 2017).In particular, Fig. 1 shows a sample of the solution scheme, which can be used to conditionally notice the block diagram, which is quite simple to do with mind maps.

Mass open online courses (MOOCs) are online courses with open access via the Internet and large-scale user participation. Such courses are hosted on specially created MOOC platforms and contain traditional study materials (video lectures,self-study materials, and related tasks), as well as the opportunity to create and host a forum of registered users where students can communicate and get answers to their questions. teachers or more competent MOOC users.

Coursera –The advantage of Coursera is that the founders of this MOOC platform have adapted existing courses from the world's leading universities (Stanford, Michigan, Berkeley) to take these courses online. Also, all the courses available inthis MOOC platform require knowledge from users at the level of 7-10 grades of secondary school. There is also a breakdown by level of knowledge –that is, there are courses for beginners, and there are advanced courses to study.

Udacity –In this MOOC platform courses are created from the beginning, not based on courses from well-known universities.

Udemy –In this system, there is an opportunity to create the teacher's courses.Also, a feature of all these MOOC platforms is that programming tasks are automatically tested (as in automated systems for testing programming tasks). Also, if you need some additional knowledge to study a particular course, the authors add the necessary material

Students'work with MOOC provides:

-elaboration of theoretical material on a certain subject;

-implementation of research projects using the acquired knowledge and skills;

-implementation of joint projects with their subsequent presentation.

In the process of learning computer science, students learn programming languages. In particular, C ++, Php, Java, Python, etc. However, if you install all the necessary software on your computer, the studentwill work with different

environments, and each time you need to configure it to work with a new compiler. To solve this problem, Web-oriented compilers with support for various programming languages began to be developed (see Fig. 2).

Also, when teachingprogramming, each teacher has repeatedly faced the problem of checking the correctness and efficiency of the algorithm. After all, such a process is not easy and time-consuming, and also takes a lot of time if you do it manually.

Here are common use web-oriented automated systems for testing programming tasks: ALGOTESTER, NetOI Olympiad, Internet portal e-olymp.

With their help, students have the opportunity to solve problems and prepare for classes, as well as test their solutions without the help of a teacher, and compare the level of their skills with other users of the site, which, in turn, stimulates knowledge in this area and promotes self-esteem.

Games for learning programming languages

You can learn to write code in a programming language just by playing games. These resources are little used due to ignorance of their existence and ignorance of the language. Most of these resources support the interface in English, but students do not know English very well, which is an obstacle to using these games to learn programming. But there are Russian-language games that are worth paying attention to if you decide to start learning programming (Spirin& Vakaliuk, 2017; Vakaliuk& Stepushenko, 2018).

CodeMonkey is a simple online game (see Fig.3), in the process of which it is possible to learn the basics of the Python programming language. The learning process is divided into different levels. During the game, the user controls a little monkey, whose task is to walk on the playing field and collect bananas. To do this, the player will have to assemble chains of commands on the right side of the screen and run them to run. The complexity of the tasks is gradually increasing.

CODINGAME is the best option for learningEnglish programming (see Fig.4). The game is a large set of challenging games for programmers. If the user wants to improve their programming skills, the game CodinGameis just what you need to combine the pleasant with the useful. The game supports more than 20 programming languages.

CodeCombat is an HTML5 role-playing game that will teach you the basic concepts of programming. In CodeCombat, the player's task is to guide his character through different levels of the game by writing code in a specific programming language. The user has the opportunity to choose the language he wants to learn: Python, JavaScript, and experimental versions of JavaScript. But the main thing in this game is not the language you have chosen, but the understanding of the principles of programming. Game levels are built as a good programming course with a gradual increase in task complexity.

Conclusions. In the process of digital transformation of the learning process, there is an active interest of students, as there is relevance and novelty of content, clarity, disclosure of the importance of knowledge, game technology, practical research, and problem-based learning. Prospects for further research include testing the effectiveness of these types of ICT in educational activities.

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