THE USAGE OF THE VISUAL PROGRAMMING ENVIRONMENTS FOR TEACHING COMPUTER SCIENCE

Irina MAISTRUC

CZU: 004.4'236 *iramaistruc@bk.ru*

Currently, the basics of computer literacy and the use of the Internet, information and computer technologies have become a regular part of the life of every modern inhabitant of the planet Earth, as the ability to write and read. In the last two decades, there has been a sharp increase in interest and demand for programming. It is due to the development and implementation of information and communication technologies in everyday life. Science and technology are developing so rapidly that education often does not keep up with them. In primary school, the interests of children undergo significant changes, and most often, most of them are far removed from the educational process due to a lack of motivation to learn and to teaching irrelevant knowledge. Therefore, the most severe problem is the study of possible approaches to the organization of the educational activities in computer science in primary schools. When studying programming, children develop logical, algorithmic and creative thinking, which is necessary not only in computer science but also in the daily life of a younger schoolchild. Logical thinking that contributes to the better assimilation of the school curriculum, the child needs from the first days of school. The solution to the above problem can be the use of visual programming environments in computer science training. Many programming languages are designed to perform specific tasks, but only the Scratch visual programming environment meets these criteria for learning in elementary school. While admitting the Scratch learning environment for teaching children to code, American scientists tried to ensure that it was understandable to any child.

The following research hypothesis was put forward: if children are taught programming from primary school, it will increase the effectiveness of computer science training. This knowledge may help them in solving various educational tasks by developing logical and algorithmic thinking. The purpose of that research was to develop skills of project activity for obtaining knowledge in the field of programming; to study the basics of the Scratch programming language and explain

its capabilities using the example of the tasks set. The object of research was the visual programming environment Scratch, and the subject was teaching elementary school students the basics of programming in the Scratch visual programming environment.

Scratch is much easier than all traditional programming languages such as Pascal, Basic or C. Its technology allows you to learn how to create cartoons, games, slideshows by yourself. It is entirely free and can be downloaded from the developers' website for Windows, Linux, etc. It is called a warming language – training before learning more complex languages. During the lesson, students install the Scratch environment on a PC or work in the web version on the site https://scratch.mit.edu/ .

Learning to program in Scratch, students develop not only logical and algorithmic thinking but also multimedia skills and create conditions for active searching, learning and various programming. They learn to understand and create computer programs and use the computer to solve various jobs.

Four examples of lessons were developed and presented. They were devoted to introducing primary school students aged 7 to 10 years with the basic algorithmic structures, developing logical abilities of students based on the Scratch programming environment:

1. Introduction to the Scratch visual programming environment.
2. Familiarity with animation, development of creative imagination and logical thinking.
3. Working with the definitions "Algorithm", "Performer", "Cycle", creating the game "Catch the chicken!".
4. Scratch and its add-on Scratch 3.0 has extensions: game tools and reels, you can draw with sprites, motion detection with a camera, you can talk to your projects, you can connect Scratch to LEGO WeDo, LEGO WeDo 2.0 and Mindstorms EV3, you can connect Micro:bit.

The purpose of these lessons was to form students' understanding of programming languages, algorithmic constructs and performers, and to teach students how to work in the Scratch programming environment. The lesson tasks were of the following types:

1.**Training**:

- training in algorithmic constructions and their types;

- training in skills of working with the Scratch program interface;
- training in script programming in the Scratch environment.

2.Developing:

- develop computer literacy skills;
- develop creative and logical thinking;
- develop group work skills.

3.Educating:

- foster interest in computer science classes;
- foster a culture of communication between students.

Younger students can create projects that do not require a complex algorithmic structure. At the same time, they can Express their creative abilities in writing a project script, preparing graphics and audio components. For high school students, the Scratch environment can be used in introductory classes on high-level programming languages to demonstrate the basic concepts: variable, variable value, logical condition, data types, and control structures.

Summing up the results, we can conclude that the goal of the study was achieved, specifically, the Formation of project activity skills for obtaining knowledge in the field of programming. Learning the basics of the Scratch programming language and illustrating its capabilities using the example of the tasks set. The students learned the following skills:

1. Ability to think logically.Scratch contains a lot of logic blocks that will help you learn the laws of logic.
2. Mathematical skills.
3. Ability to remember a large amount of information.
4. Ability to plan your actions.
5. Ability to draw with the help of a graphic editor, to fantasize.

Analytical skills that help you understand other people's projects.

As a **result of the study**, all the tasks were completed, which indicates the correctness of the following hypothesis: if you teach children to program from primary school, it will increase the effectiveness of computer science training and will contribute to the use of knowledge from the field of programming in solving various educational problems by developing logical and algorithmic thinking.

Bibliography:

1. АВЕРБУХ, В.Л. К теории компьютерной визуализации. В: *Вычислительные технологии*, 2005, т. 10, №4.
2. ХАРВИ, Брайн. *О стиле программирования на Лого*. Москва: Бином, 2005.
3. ЛЕСНЕВСКИЙ, А.С. *Объектно-ориентированное программирование для начинающих.* Москва: Бином. Лаборатория знаний, 2005. 232 с. ISBN 978-5-94774-251-0. (УДК519.85(023) ББК 22.18)
4. SHELLY, Gary B., CASHMAN, Thomas J., HERBERT, Charles W. *Alice 2.0: Introductory Concepts and Techniques.* ISBN 1-4188-5934-6.

Recomandat:
Victor CIOBU, dr., conf. univ.