T. ALEYNIKOVA, A. SHERBAF
VSU, Vitebsk; Belarusian State Pedagogical University named after Maxim Tank, Minsk

COMPUTATIONAL THINKING AS A PROBLEM-SOLVING PROCESS

Nowadays the pedagogical community shows a great interest in the relatively new concept of "computational thinking". Professor of the Columbia University Jeannette Wing formulates computational thinking as a thought processes involved in the formulation of problems and their solutions, the solutions are presented in a way that can be effectively solved with the help of information processing tools.

Calculations being earlier the tools for solving various kinds of mathematical problems, data analysis, and business process management have become new scientific concepts. Active developments in the field of artificial intelligence and machine learning, robotics, nanotechnology, 3D printing, genetics and biotechnology are associated with computing. They penetrated into all spheres of human activity, became new methods for solving the problems of the world, and, as a result, new approaches to learning, to becoming a person with the knowledge and skills of the new millennium.

Computational thinking is essential to the development of computer applications, but it can also be used to support problem solving across all disciplines, including the humanities, math, and science. Being able to problem-solve computationally will help students begin to see a relationship between academic subjects, as well as between life inside and outside of the classroom.

According to education specialists, today, an ordinary person needs to have a number of special skills and abilities that help him to find his place in a changing world. The formation of a digital society requires the young generation to acquire skills for self-mastering new information and computer technologies and assessing their capabilities, abilities for the existence in online / offline reality, the constant updating of knowledge and the acquisition of new competencies.

The article aims to consider the emerged concept of "computational thinking"; to show the need for the formation of computational thinking of younger generation; to discuss possible ways of introducing computational thinking into the educational practice as an essential component of the digital competence.

After the adoption of Decree No 8 "On the Development of Digital Economy", in the Republic of Belarus, the transformation of education is getting started one of the goals of which is developing skills and habits of the 21st century for the younger generation. A large number of publications that have appeared recently contain a detailed analysis of the current state of affairs and suggestions for further adaptation of education to the needs of the emerging digital society. As practice shows, in a comprehensive school, technical and personnel support significantly limits the possibilities for solving the problem that has arisen, in other words, forming Computational thinking of schoolchildren. As an alternative, commercial educational services began to actively develop (centers, schools, academies, etc., de facto – courses in programming and robotics).

The IT community also understands the need and expediency of the formation of computational thinking from the early childhood, because it is interested in the mass preparation of future specialists for their field. As an example of the active participation of IT specialists in teaching

schoolchildren is the joint educational project of the High-Tech Park and the Ministry of Education of the Republic of Belarus "Programming is the second literacy". The aim of the project is the formation of basic ideas about programming languages, the development of algorithmic and logical thinking, the formation of certain skills for future professions related to IT.

Twenty years ago, mastering programming languages was not available to many students. The Basic and Pascal languages specially created for teaching programming were too abstract for the child. Scientists, educators and specialists in the field of artificial intelligence made numerous attempts to "visualize" the programming process for beginners and thereby make the programming process more accessible to children's perception.

Scratch was developed in 2007 at the Massachusetts Institute of Technology's Media Lab under the guidance of Prof. Mitchel Resnic. It is not only a block programming language, but also an online community in which you can share various interactive media projects with like-minded people from around the world.

Experience shows that Scratch can be successfully used to bridge the gap between «school» and "real" programming. The capabilities of this Scratch environment allow students to make acquaintance with various paradigms and programming technologies. Scratch popularity surpassed all expectations.

In Belarus, many events are held to popularize Scratch and introduce it into the educational process. In 2016 on the initiative of the companies-residents of the High-Tech Park under support of the Ministry of Education, a joint educational project on teaching Scratch programming for school-children of classes 2-6 to has been launched.

There was developed curriculum for elective courses; an experiment on the introduction of Scratch programming in a number of schools was organized. The Belarus Scratchers online community which is an association of teachers, parents and young developers in the Scratch programming environment who exchange useful information, provide all possible assistance to each other, and share their ideas has been created. The republican competition "Programming in Scratch Environment" and other numerous tournaments and competitions are held regularly.

When studying programming in Scratch environment not only logical and algorithmic thinking (as an integral part of the computational thinking) of schoolchildren is formed, but also their ability to work with various applications, multimedia, and new computer tools. Children learn to develop computer programs for solving new problems of the world around them, to use their knowledge and skills in the study of other school subjects.

Г.Г. БЕЛОВСКИЙ
Минск, Белорусский государственный педагогический университет имени Максима Танка

ДИСТАНЦИОННАЯ ЛЕКЦИЯ

Рассматривая содержание образования как транслируемую часть культуры, преследуется цель сохранения интеллектуального наследия поколений. В наше время к этой задаче добавляется еще одна не менее важная. Чтобы быть успешным в современном мире,