

THE USE OF COGNITIVE LOAD THEORY IN THE TEACHING OF PROGRAMMING IN COMPUTER SCIENCE IN SECONDARY SCHOOLS

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Abstract : *In the information age, the urgent tasks of processing, storing and using information have become a key part of life. It is also the main task of every educational institution and teacher to train personnel who can perform these tasks at a high level, to ensure the success of young people in the field of information technology.*

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I. Introduction

In general, the goals of general secondary education are the powers of the state, which form the general principles of its pedagogical policy on the basis of the current legal framework. The purpose of education in Uzbekistan is the formation of an independent, free, cultural, spiritual personality, understanding of duties to the family, society, state, respect for the rights and freedoms of other citizens, the Constitution and laws, people, nations, different races, nationalities, ethnicities, to have a good attitude towards religious social groups.

On this basis, the main tasks of the general secondary school are as follows:

- Mastering the knowledge system determined by the social and industrial needs of students;
- Formation of independence in the replenishment of the scientific worldview, political, economic, legal culture, humanistic values and ideals, creative thinking, knowledge;
- Satisfaction of national and cultural needs of the population, upbringing of a physically and spiritually healthy generation;
- Conscious citizenship of young people, the formation of human dignity, the desire to participate in the work of democratic self-government, responsibility for their actions.

II. Main part

High school is a general education and development, it lays the foundation for all-round development, primary vocational training, every child's education and development of any profession.

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The projected learning outcomes of the school described above can be divided into three main general objectives for the general secondary school system: learning and development goals; practical purposes; educational purposes.

The general goals of computer science are determined taking into account the features of computer science, its place in the system of sciences, in the life of modern society.

The educational and developmental goal of teaching computer science at school is to give each student an idea of the basics of computer science, including the processes of changing, transmitting and using information, and on this basis to teach students the modern scientific worldview. increasing the importance as well as the role of information processes in shaping. technology and computing in the development of modern society.

The school's study of computer science is also aimed at providing students with the basic skills needed to master this knowledge thoroughly and consciously, as well as laying the foundations for other subjects studied at school. The acquisition of relevant skills in the acquisition of knowledge in the field of computer science is intended to have a significant impact on the formation of personality traits such as students' general mental development, thinking and creative abilities.

The practical purpose of the school course in computer science is to contribute to the labor and technological readiness of students, i.e., equipping them with the knowledge and skills that will enable them to work after graduation. This means that the school course in computer science should not only get acquainted with the basic concepts of computer science, but also develop the mind and enrich the child's inner world, but also be practical - to teach students to work on computers and new information technologies.

The educational purpose of the school in the field of computer science is ensured, first of all, by a strong philosophical influence on the student, who is aware of the opportunities and role of computer technology and information technology in the development of society and civilization in general. The contribution of the school informatics course to the scientific worldview of school students is determined by the formation of the idea of information as one of the three basic concepts of science: matter, energy and information, which represents the modern scientific vision of the world. In addition, when studying computer science at a qualitatively new level, a culture of mental labor is formed, and important universal features of man form his ability to plan a task, do it wisely, compare the initial work plan with the process of its implementation. The study of computer science, in particular, the construction of algorithms and programs, their implementation on the computer requires mental and voluntary actions, concentration, logic and advanced imagination from students, which are personal qualities such as determination and perseverance, responsibility, diligence, discipline should contribute to the development of personality traits and develops the ability to think critically, to argue with one's own views and beliefs.

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None of the main goals of computer science teaching listed above can be achieved in isolation from each other, they are inextricably linked to each other. Just as it is impossible to achieve it by ignoring the practical aspects of teaching content, it is impossible to achieve the learning effect of computer science without ensuring that students acquire the basics of general education in this field.

There are many methods and approaches in teaching programming to students around the world. One of the methods described in the work of M. Kaspersen (University of Argus, Denmark) is based on the theory of cognitive loading.

Cognitive loading is the loading of fast memory into the process of thinking, reasoning, and problem solving.

A key axiom of cognitive loading theory is that cognitive outcomes are best when they make full use of the part of the working memory required for effective acquisition of knowledge. Too little or too much workload can lead to poor learning outcomes. Therefore, in order to optimize learning, it is necessary to achieve a balance without reducing the knowledge load to a minimum or a maximum.

Cognitive load (L) is currently divided into three categories that do not intersect:

1. extraneous cognitive load (E) - a load that interferes with reading because it often exceeds the limits of working memory;
2. appropriate cognitive load (G) is a load that helps to learn, not a barrier that helps to acquire knowledge. It is formed by increasing the level of cognitive processes that help in the effective assimilation of knowledge;
3. internal cognitive load (I) - load, the decrease of which leads to a decrease in comprehension. It depends on the relative complexity of the material being studied and the student's level of mastery of the previous material.

The relationship between L, E, G and I can be expressed as follows:

$$L = E + G + I$$

Under such conditions, the task of balancing the knowledge load for optimal learning is reduced to attempts to minimize E and maximize G.

III. Conclusion

The exercises and assignments used in this methodology include areas to help students at some stage in program development. Detailed instructions on how to complete the assignments are given in the early stages of the training, and only brief recommendations are given in the final stages.

In conclusion, the teaching of programming based on the theory of cognitive loading, based on the ability of students to receive knowledge, serves to increase the effectiveness of teaching this subject.

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