Teaching Algorithm Department Concepts in Informatics and Information Technologies on the Computer Imitation Model Basis

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Abstract

The article describes traditional teaching methods shortcomings, ways to overcome them, information technology modern achievements in the education system, existing scientific publications analysis on the software application in the educational process, problems in this area, relevance and purpose of the idea. In "Informatics and information technology" discipline it is recommended to use concepts logical scheme related to the algorithm and, on this basis, a computer simulation model. A logical scheme of the algorithm concepts has been developed, and a computer simulation model has been created, which provides information about each concept. The methodology of organizing lectures on the basis of the created computer simulation model is described. In this methodology, the working process with a computer simulation model and explaining mechanism the lecture lesson are described in the selected topic content description. In the concluding part, conveying the algorithm concepts to students using a computer simulation model provides a great opportunity to reveal their content, essence, i.e., students can re-read the learning material they are learning, change its presentation speed, i.e., choose the desired mode based on their perceptual abilities.

Keywords: Informatics and Information Technology; Algorithm; Educational System; Information Technology; Logical Scheme of Concepts; Computer Simulation Model; Methodology

Introduction

In traditional teaching methods, teaching materials are presented mainly in texts and formulas form, and the chances of presenting teaching materials are not high. Learning materials assimilation presented in this form is largely perceived sequentially by the student, so it is very slow to memorize them.

Educational materials presentation is in images form. The materials given to students to some extent form their opinions, that is, the text given in the literature is re-encoded and takes on a memorable appearance. Such a view requires sufficient time and intellectual ability to create an object model in the students. It is known that this way can be taken mainly by talented young people (students) with excellent grades. The majority students are not always able to form a teaching materials accurate picture provided, which is why teaching materials full understanding level in traditional teaching methods is low (Fayziev, 2008).

The proposed methodology does not burden students with the task of re-coding the given materials and creating their own model. In this teaching methodology, teaching materials are presented not only in the text and formulas form, but also in figurative form. In this sense, when presenting educational materials based on information technology in figurative form, adding elements such as colors, movement, sound to them develops important qualities of students, such as analysis, materials comparison, while increasing the learning process efficiency.

The work analysis which is done in this area shows that the Russian scientist M.V. Sosedko conducted research on the students' activity in educational activities on the basis of new information technologies, L.S. Sauer identified the didactic conditions for the information technology introduction (Dyachenko, 2000). In Uzbek scientists works S.S. Gulomov, A.Kh. Abdullayev (2002) and M.Kh. Lutfillaev (Lutfillaev, 2006). it is shown that the virtual stand and their application creation in the educational process is one of the most pressing issues today.

In recent years, a large number of publications on computer-based teaching aids have appeared, in most of which the authors focus mainly on the methodological and didactic features of the issue and pay almost no attention to its analysis of e-learning tools use in the educational process (Fayziev, 2020). This article discusses the algorithm section teaching the concepts issue on the "Informatics and information technology" subject on the basis of a computer simulation model.

The purpose is to develop the algorithm concept in the "Informatics and information technology" discipline as a teaching methodological problem based on a computer simulation model.

Materials and Methods

In the teaching traditional methodology, the subject "Informatics and information technology" teaching materials are explained mainly by the teacher using chalk on the board. With the help of computers and information technology in " Informatics and information technology" teaching can be explained to students by presenting educational materials in the form of images. Teaching the subject "Informatics and information technology" has a special place compared to other disciplines. This is because the science of " Informatics and information technology" is modern computers and software basis. The sections "Algorithm" and "Operators" of the subject " Informatics and information technology" are in principle the main, and students who master these sections will acquire the necessary knowledge and skills to create software. Therefore, it is necessary to provide students with the necessary theoretical and practical knowledge to master these sections. In the modern education system, various methods and techniques can be used to solve this problem. One of them is the teaching organization process based on the creation of an educational materials computer simulation model on the basis of information technology multimedia tools (Fayziev, 2008). Experiments show that being able to show students that the learning material semantic content presented through concepts is interrelated with other concepts in addition to listing the concepts symbols gives great effect and leads to the concepts logical scheme emergence. The concepts interdependence in this form is called the concepts logic scheme (CLS) (Polat,2004).

Based on the above considerations, the developing issue a concepts logical scheme in the algorithm section teaching in the " Informatics and information technology" teaching and computer simulation model creation to convey their content to students is relevant. We have created the concepts logic scheme in the teaching "Informatics and information technology" subject on this methodology, as well as a computer simulation model that teaches each concept (Figure 1) (Fayziev, 2008).
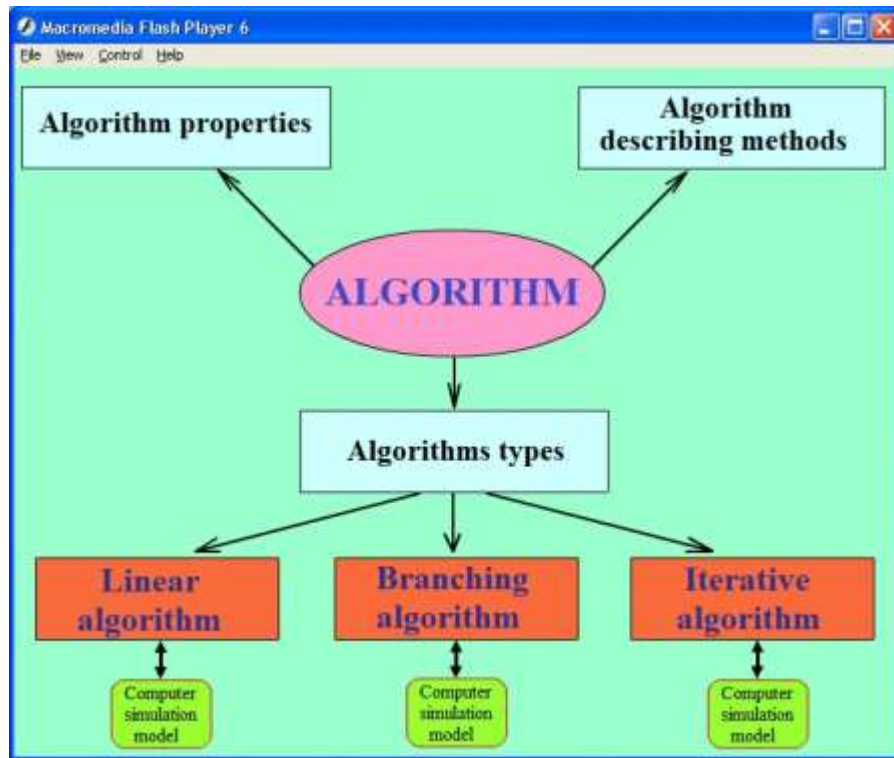

Figure 1. Concepts logical scheme related to the algorithm.

In this logic diagram, algorithm-related concepts are given, and a computer simulation model is created for each concept. For example, in the "Algorithms types" section the "linear algorithm", "branching algorithm", "iterative algorithm" concepts are given, for each of which a computer simulation model is created. To see the computer simulation model of the linear algorithm concepts, the button "Computer simulation model" is activated. The execution process is displayed sequentially on the computer using imitation. This process is shown on the right side of Figure 2.
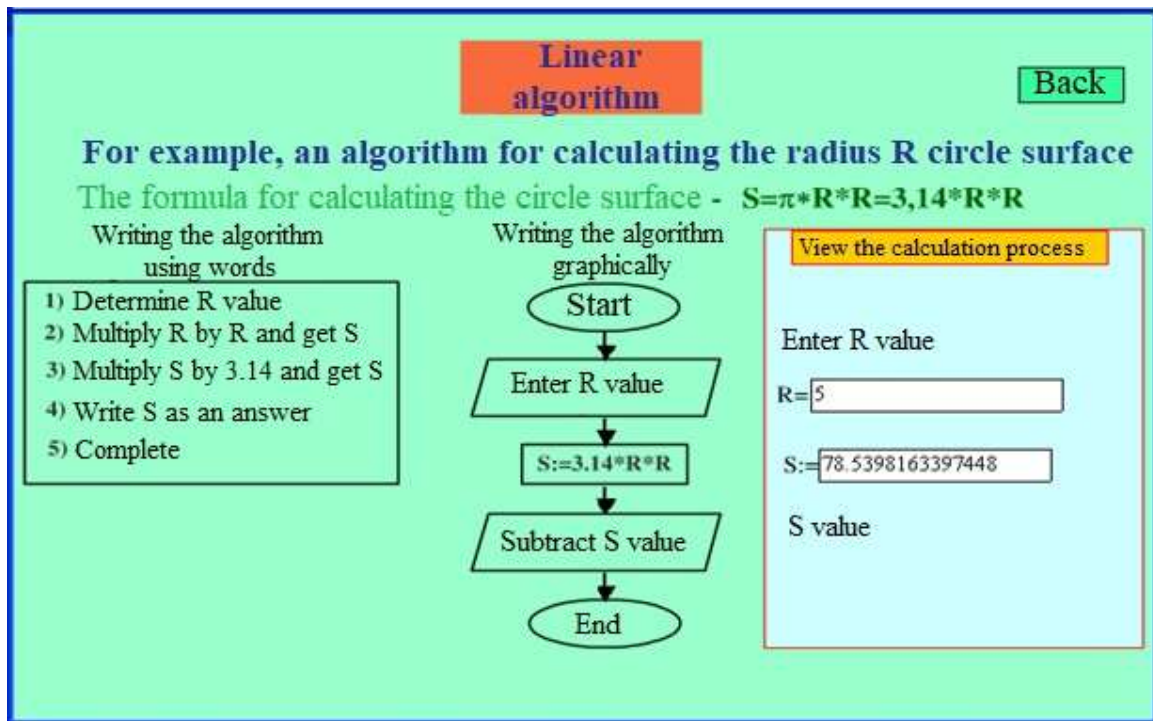
Figure 2. The process of executing a linear algorithm simulation model.

As can be seen from this figure, the calculations expressed in the block diagram are performed using imitation. While this example is not complicated for students, it does help students explain the algorithm concept essence.

A similar branching computer simulation model and iterative algorithms has also been developed. In short, conveying the algorithm concepts to students using a computer simulation model provides a great opportunity to reveal their content and essence. When using this computer simulation model, students can re-read the learning material they are learning, change its presentation speed, i.e. select the desired mode based on their perceptual abilities.

References

Dyachenko S.A. The use of the integrated symbolic system Mathematica when studying a course of higher mathematics at a university: Dis. ... Cand. ped. sciences. - Orel, 2000. -164 p.

Fayziev M.A. Methods of formation of knowledge and skills of students on the basis of computer simulation model (on the example of the subject "Computer Science and Information Technology"): Dis. … Kand. ped. science. -Tashkent: TDPU, 2008. –137 p.

Fayziev M.A. Methods of teaching the "operators" section in the teaching of pascal programming language on the basis of a logical scheme of concepts. Journal of Critical Review. JCR. 2020; 7(6). ISSN 2394-5125 -P. 2056-2060. http://www.jcreview.com/?mno=122738

Gulomov S.S., Abdullaev A.Kh. Virtual benches to simulate the functions of training workshops and laboratory installations. - Tashkent: MVISSO, 2002. -23 p.

Lutfillaev M.H. Integration of information technologies in improving the educational process in higher education (on the example of computer science and natural sciences): Dis. Ph.D. ped. science. - Tashkent: UzDPITI, 2006. –212 p.

Polat E.S., Moiseeva M.V., Bukharkina M.Yu. Theory and practice of distance learning. Study guide for students. higher. study. institutions. –Moscow: Academy, 2004. - 416 p.

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