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Improving The Effectiveness Of Lecturesby Using The Methods Structuring The Composition Of The Programming Discipline

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Abstract: The method developed by us with trukturizatsii the example theme "Algorithmic and programming simple cyclic computational processes" section " Basics of algorithms and programming " course "Programming is, " on the basis of logic, in eq with the experimental verification has shown the effectiveness of this educational technology training and demonstrated Improving the systemic knowledge of elementary school students. The results allow to outline prospects for further and with investigations of the problems associated with the use of a structured educational material as an information and methodological means of improving the educational meters of tivatsii students, organization and management of cognitive activity; technology for the preparation and use of electronic textbooks.

Keywords : Structuring the educational material, the semantic graph scheme, algorithms and programming, activation of the learning process, information and methodical th means , m a tivatsi I students, management of cognitive activity of the student .

1. INTRODUCTION

The problem of selecting and structuring the components of educational material has long been widely discussed by educators, specialists and scientists. Currently, there are many models that represent the logical structure of educational material. Despite the fact that the nature of these different models, has successfully passed experiments in real pedagogical process based on applied onn 's methods and approaches, giving positive results. As a result of the analysis of the essence of the educational process, many authors argue that it is bilateral in nature [1, 2 , 3, 4, 5].

The content of the structure of educational material, particularly in the discipline of programming , characterizing employed in the form of "problem s " in developmental

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education essence and related organizational and didactic e structures s Expressing th tsya in the form of a chain of issues facing students . Given the problematic nature of thinking, it is advisable to build the essence of a particular subject or section as follows, that is, “in the form of a logical sequence of cognitive questions, and the educational process as a chain of learning situations, its questions as its core of knowledge, and essence is a joint, harmonious work students in solving the problem using teaching methods and various means of education " [4, 5, 6, 7, 8, 9].

Effective sequence material created using logical-graphic scheme [1, 3, 4, 5, 8] n a basis structuring section " Basics of algorithms and programming " discipline "Programming" , categorized special tasks , test marketing tools , designed in-depth study disciplines for students of a technical university, on independent education, on improving the efficiency of the educational process, and ultimately aimed at creating automated systems . Using established pedagogical software student studying texts of lectures, seminar s , laboratory e work s , independent e work s and practically e specifying I'm on the subject, check your knowledge with the help of specially classified examples of test tasks .

Methods of using the logical-graphic scheme, creating th based on the structure tion section " Basics of algorithms and programming " discipline "Programming" , a classroom lecture consists of step 7 s and consists of the following [4, 5, 10, 11, 12] :

FIRST STAGE . When preparing for a lesson, it is important, first of all, to prepare students for a specific lesson, knowledge of the theory related to the topic of the lecture, use of information and communication technologies; knowledge of certain information; checking homework for correct execution. In addition, at this stage, it is desirable to activate the theoretical knowledge that students need in lecture classes. To do this, the same information is displayed to all students simultaneously on all parallel displays, i.e. frames are transmitted one after another.

The teacher runs a series of files on the topic. Students, on the other hand, focus and observe the activities of the teacher. The main goal at this stage is to focus the students' attention, and this may be limited to 5-10 minutes when doing current work.

SECOND PHASE. At this stage, the teacher announces the topic, introduces students to the goals and objectives of the subject, thematic plans, basic concepts, content of the lecture, expected results. Links the current topic to the previous one. Students listen to the information provided by the teacher at this stage, and the teacher must form a strong motivation for the information provided to the students. This step takes 10 minutes.

THIRD STAGE. At this stage, the teacher explains the topic to students using a logical graph scheme created on a structured basis. To increase the effectiveness of training:

- abandon the uniformity of methods used in training;
- the use of adequate elements of the program in the classroom;
- ensuring the rational use of time in the classroom;
- wider use of problematic learning elements;
- It is advisable to use more video and multimedia tools in the classroom.

In this case, the teacher’s speech should be simple, understandable, emotional. The focus should be on explaining new concepts, key phrases, rather than using unnecessary words. The main goal of this stage is to systematically provide students with scientific

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information, develop their creative curiosity, and social partnership. This step takes 25 minutes.

FOURTH STAGE. At the stage of analysis, the teacher creates the conditions for an intensive analysis of the ideas presented by students. Students will be able to identify certain aspects of the information and determine the most appropriate ideas and opinions by intensively analyzing the ideas and opinions included. At this stage, students are required to study during the lesson, increase their educational activity, boldly express their personal opinions, develop free, logical thinking. Students use every opportunity to correctly understand the essence of the problem, to think broadly logically. This step takes 15 minutes.

FIFTH STAGE. At the control stage, students are tracked by the basic concepts of a lecture, computational algorithms, and methods of obtaining new knowledge. In this case, the teacher uses examples, tests, broken down by complexity into electronic (via computers) or paper (handout) options. Students study the basic concepts, algorithms on the topic, and develop a sense of activity, creativity, a desire to correct their mistakes and gain better knowledge in them. This step takes 15 minutes.

SIXTH STAGE. At the stage of the assignment, students will be shown examples of typical algorithms for solving problems, and will also be given the task to independently solve the corresponding examples. In addition, tasked to collect from the Internet needed on materials, their analysis and application, the name of useful sites on the topic, creating a logical graphical design solutions example n and based on the basic concepts of the subject. At this stage, students should understand the tasks and feel responsible for their implementation. This step takes 5 minutes.

SEVENTH STAGE. At the last stage, the teacher gives a summary of the topic and completes the lesson. This phase of the lecture will focus on the analysis and discussion of the work done. On this, this student assesses his success , that is, in the electronic version, the teacher can send his requests and suggestions or answer the questionnaire, give methodological instructions for the next lesson.

Using the method of a logical diagram of a graph created on the basis of structuring the structure of science in practical studies is a science for the technical sciences - this is an exercise and solving problems in order to strengthen theoretical guidance and improve skills. Using this method, it is difficult to develop universal guidelines for all types of practical and laboratory training.

Nevertheless, regardless of specific circumstances, practical and laboratory exercises have a common logical structure, each of which consists of 7 stages: preparation for the lesson, trial lesson and explanation, tasks, tasks and activation of knowledge, analysis, assessment and there are similar steps for concluding and laboratory sessions.

In the section "Fundamentals of Algorithm and Programming" on the topic "Programming" we will consider the methodology for using structured logic in lectures on the topic "Algorithms and Programming Simple Integration Ion Computing Processes".

The teacher will be provided with a technological map of the subject and a presentation on the topic. The student is given the text of the lecture: plans, basic concepts, theoretical part,

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control questions, literature on the topic, documentary form of the lecture, audio and video lecture form, examples on the topic, tests and basic concepts.

The educational goals of the course are to provide students with information on "Algorithmization and Programming of Simple Interactive Computing Processes," a description of integrator ion computational processes, types of integrator ion algorithms, basic flowcharts, basic concepts, and the use of OTHJAD in solving important life problems.

The educational goal of the course is to give students deep knowledge about their professional activities, to instill a sense of duty and responsibility towards society.

The objectives of the course are to form students' ability to apply knowledge, develop logical thinking and independent work skills.

Expected Learning Outcomes.

Teacher: instill new knowledge, manage wisely, do not get bored, constantly monitor and honestly evaluate, achieve a lot in a short time, increase students' heuristic activity, logical thinking.

Student: acquire new knowledge, improve the ability to systematize acquired knowledge, strengthen and evaluate, develop the ability to work in a team, learn to think independently, logically and courageously.

Course format: lecture (80 minutes).

Course Method: Computer Training.

Course:

1) Organizational moment. Motivation: arouse interest in creating effective algorithms and task programs;

2) Activation of knowledge: all students are given a creative task.

Equipment: computer, projector, electronic version of the topic, presentations, simple typical examples, tests and answer sheet (on paper).

Course:

Stage 1.Preparation (5 minutes).

Teaching Activities:

1) Launches an electronic version of the theme.

2) Launches presentations on the topic.

Student activity: concentrates and supervises the activities of the teacher.

Expected Results: student concentration.

Stage 2.Summary of the previous topic and introduction to the new topic (10 minutes).

Teacher Activities: briefly repeats the previous topic, explains the test results and its statistical analysis. Announces a new topic, introduces students to the goals and objectives of the subject, thematic plans, basic concepts in it, the contents of the lecture, expected results. In the following slides, the teacher explains the purpose, objectives, and other topics of the course, as well as their relationship to other subjects and the importance of the topic.

Student Activities :

They get acquainted with the content, essence, goals and objectives of the stages of algorithms and programming of repeating computational processes, the role of algorithms and programming in the development of our society, software development, software requirements, software requirements and modern means of their implementation.

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Expected results: the formation of students' strong motivation for algorithmization and programming of practical tasks.

Stage 3. The theme is explained and students are activated (45 minutes).

Teaching: Explains to students the essence of algorithms and programming, the formation of a database for any enterprise, the classification of automated information processing systems and the prospects for the development of information systems.

Provides an understanding of simple integrations of ionic computing processes. The number of repetitions of N, and options for determining the initial value of the argument are explained using the following table 1.

Tables a 1

No.	Border a argument a	The number of repetition N	The initial value of the argument
1	$a \le x \le b,\ h$		$x = a$
2	$a \le x < b,\ h$		$x = a$
3	$a < x \le b,\ h$		$x = a + h / 1000$
4	$a < x < b,\ h$		$x = a + h / 1000$

Feedback organizes the input of feedback by the audience, monitors their activities. Students are asked questions about: “algorithm”, “program”, “algorithmization”, “programming”, “block diagram”, “program code”, “ integration ”, “types of integration ”, “preparation for integration ”, “ integration elements ” , “Body of integration ,” “Conditions for continuing repetition,” “Parameters that make up repetition.” Several students answer questions. The teacher summarizes the answers and explains with examples.

Student activity : students express their opinions and feedback, acquire new knowledge.

Expected results : improving students' skills in the successful application of logical concepts in practice, algorithms and programming of repeating computational processes, the development of creative curiosity, logical thinking, teamwork, social cooperation.

3rd stage . The teacher asks students questions such as “repetition process”, “preparation for repetition”, “repetition argument, parameter”, “repetition body”, “conditions for continuing repetition” (Fig. 1).

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By Lassi Ceska structure repetitions	Private repetition structure

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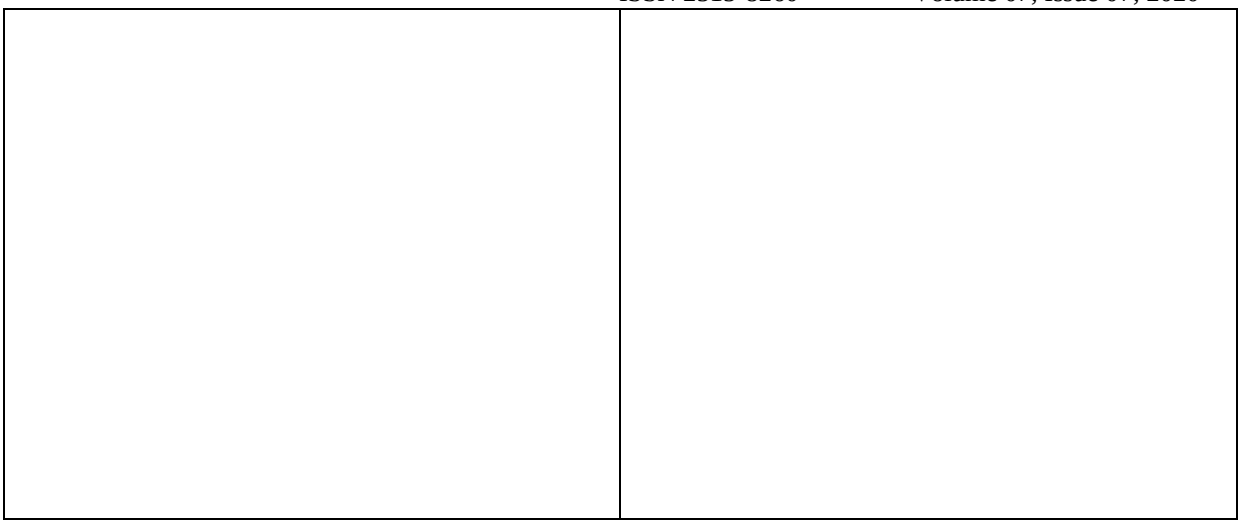

Figure 1.Typical organization structure of repetition.

1st student : In computational processes, when the initial data is given to a mathematical function, this is a computational process (tabulation) with a constant step in a limited area of the argument.

Teacher: What types of repetitions do you know?

1st student : classical repetition algorithm, special repetition algorithms, repetition organization with a variable argument value, repetition organization using a counter, etc.

2nd student Organization of repetition using conditional statements **if, for, while, do ... while** .

3 rdstudent : There are different algorithms, the structure for the organization in the form of repetition "to ...", "... before."

Teacher: Give an example of the process of organizing repetition in the calculations? Student 3: Make a table of a mathematical function in any area of the argument.

4th student : Create a table of values of trigonometric functions with a constant step for finite values of the argument. Calculate the total amount of a set of numbers. The process of calculating the monthly salaries of professors and teachers.

Figure 2 . Instructions that make up the

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Teacher: explains in detail the algorithms for organizing repetitive computing processes using slides in the form of 12 structures, as well as in the form of program code. Explains the differences between algorithms and program code, its essence using simple examples.

Teacher: explains the basic structures of algorithms and programming of computational processes (Figure 2) and their essence using the electronic version of the topic, presentations (Figure 3).

Figure 3. Classification of the organization

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In a specific example, we will consider the creation of various structures of algorithms and the programming of simple integrator ion computing processes.

Example:
The specifications of the semantic graph on the topic are given in Table 1, the structure of the semantic graph in Figure 4 [4, 5, 11].

Table 1

Subject	Nodes count iki	Training elements s . Basic concepts
1. Algorithmization and programming of simple cyclic computing processes	1.1	Preliminary information : *a, b, c, d, h*
	1.2	Preparing the repeat process : ***x = a, i = 1, n = [(ba) / h] +1***
	1.3	Repeatbody , calculation core :
	1.4	Changing the value of the parameter , organizing repeated : ***i = i + 1***
	1.5	Repeat continuation condition : ***i ≤ n***
	2	Organizing a Repeat Using an IF Conditional
	2.1	From structure **“ to ... ”** using a calculator
	2.2	From structure **“ to ...”** using argument
	2.3	With the structure **“ bye ...”** using a calculator
	2.4	C structure **“ bye ... ”** using argument
	3	Organizing a Repeat Using the F OR Command
	3 .1	With a repeat structure using a direct calculator
	3 .2	Repeat structure using inverse calculator
	3 .3	Repeat structure using argument growth
	3 .4	Repeat structure with decreasing argument
	4	Organizing a Repeat Using the WHILE Command
	4 .1	The structure of the repeat with the command WHILE on sprouting argu- ment and
	4 .2	The structure of the repeat with the command WHILE on sprouting calculator
	5	Organizing a Repeat Using the DO ... WHILE Command
	5 . 1	The structure of the repeat with the command DO ... WHILE for sprouting the argument cop and
	5 .2	Repeat structure using the DO ... WHILE command for calculator sprouting
	Σ	Knowledgecontrol

Didactic materials (textual, graphic, animation, multimedia) are prepared for each educational element, logically completed concepts explaining the essence of the content.

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Didactic materials (textual, graphic, animation, multimedia) are prepared for each educational element, logically completed concepts explaining the essence of the content.

Figure 4. With emantik o- graph nical scheme topics

Explains in detail, analyzes the structures of the organization (option up to ...) of the process of calculating a simple repeat with this example using the classical method with the help of a calculator with the **if** command .

Computing algorithm PROGRAM

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```
// IF buyrug'ibilan
#include <iostream.h>
#include <conio.h>
#include <math.h>
int main ()
{
   float a, b, c, d, h, x, y;
   int i, n;
   cout<<"a, b, c, d, h ="<<endl;
   cin>> a >> b >> c >> d >> h;
   cout<<endl;
    n = int ((ba) / h) +1;
  i = 1;
    x = a;



 m6: y = d * sin (x + c);


   cout<<"i ="<< i <<"x ="<< x <<"
       y = "<< y <<endl;

   i = i + 1;
    x = x + h;


   if (i <= n) goto m6;


 return 0;
}
```

Figure 4 . Option with truktur s organizations repeat a class -algebraic method with means of the calculator with a team of **the if** (until ...) .

The remaining 11 variants of the structure of the organization of the repetition process are explained in detail with the help of a presentation and commenting on the differences of the structures from each other , they are analyzed , and the advantages of using the structures of repetition are described under what conditions.

Teacher : What are the advantages and disadvantages of the structure used with the **if** command in organizing simple computing processes ?

5th student : The advantage of this structure s is , that the value of the composite parameter s replay can menyazh as much as necessary in the course of repetition , and deficiencies in , that in the problem of the organization consistently neskolko repetitions with the

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team **if** to return to the replay is used, not contingent transition team **" Goto m "** , this command in most cases can be a source of error . Programmers are advised not to use, to the extent possible, not contingent transition e teams u .

Teacher: What are the advantages and disadvantages of the structure used with the **for** team to organize simple computing processes?

6th student: In the integration structure used by the For command, the value of the parameter that makes up integration cannot be altered at all during integration , since the **for** command is initialized here . However, I like to create integrations using the **for** command .

Teacher: What do you think of structures that use the **while, do ... while** command to organize simple iterative computing processes?

7 th student : I think that the use of the team The while , do ... The while is the best structure for the organization of computing processes of repetition, because repetition is represented in a simple manner and at any time you can change the values of the parameters that make up the repetition (beginning, end, step changes).

Teacher: It is explained that algorithms and programming today play an important role in the efficient organization of the process of informatization of society, in solving technical and economic problems that arise at various manufacturing enterprises and organizations. It is emphasized once again that the use of modern technologies in every industry today, the development of their software is one of the most pressing problems.

Teacher: In the future, automation of control in almost all enterprises, organizations and departments will become one of the most important problems, and its foundation will be explained by real examples of algorithms and programming. Emphasizes that the purpose of algorithms and programming is a detailed study of the methods for constructing algorithms and software development processes, as well as solving problems that arise directly during the development of programs.

Thus, the object of computer science, which includes all the methods, elements, technical means of algorithmization and programming, mathematical, algorithmic, software, linguistic support, means of communication with people, is extremely complex.

Particularly complex engineering problems arise with the help of telematically artificial thinking systems in the form of "human" productions and technologies that combine organizational "human-computer" systems, "robotic" systems, and the latest communication tools based on programming algorithms and methods.

4th stage. Analysis (10 minutes)

The teacher answers the students' questions. explains technical concepts as much as possible with real examples. At the same time, students themselves answer the tasks, the teacher summarizes.

5 thstage . Control (10 minutes)

The teacher distributes the tests, and students mark their answers on the checklist and answer sheet.

Tests are based on the basic concepts structures of the Algorithm and Programming Fundamentals section.

1. The number of computational algorithms?

a) 5, b) 3, c) 4, d) 7.

2. How many properties does the algorithm have?

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a) 6, b) 3, c) 8, d) 4.

3. In which answer are the names of computational algorithms correctly indicated?

a) search algorithm; sequential computing algorithms; Inverse Computation Algorithm.

b) computer algorithms; branching process algorithms; sum calculation algorithm; algorithm for finding the largest number.

c) thealgorithmization of branching computing processes; sequential computing algorithms; Algorithmization of repetitive computing processes.

d) algorithms for processing information systems; algorithmization of reversible computing processes; feedback calculation algorithmization; linear algorithm.

4. What construction is used to represent the conditional operator?

A) if (expression) {...}

B) do {...} while (expression_shart)

C) if (expression_shart) {...} else {...}

D) while (expression_shart) else {...}

5. In which paragraph are the properties of the algorithm indicated correctly?

A) Discretion . Performance . Popularity . Efficiency .

B) Discrete ivnost . Performance . Popularity . Accuracy .

C) Effectiveness . Popularity . Directivity . Clearness .

D) Discrete ivnost . Accuracy . Purposefulness . Directivity .

6. How many repetitions for (int i = 1; i <20; i ++) are performed in this loop?

A) 20; B) 19; B) 18; D) 21

7. How many integrations for (int i = 1; i <20; j ++) are performed in this loop?

A) not executed; B) 21; IN 1; D) infinite

8. The following expressions: $x = ay + c$; $y = a + 2c^2$; $z = ax / b - y^3$;

$u = (x + y) / q + d$; Determine the source data for calculating $q = (2x + 3y) / (2 + z2)$?

A) a, b, c, x, y; B) x, y, a, b, c, d, q; C) a, b, c, d ; D) x, y, u, q, a, b, c, d.

9. What is the number of repetitions on the value of the parameter of the variable x (if $2.3 < x \leq 6.2$, step $h = 0.2$)?

A) 20 B) 18 C) 21 D) 19

10. Which answer correctly indicates the elements that make up integration ?

A) 1. Preparation cycle. 2. The cyclic body. 3. Condition. 4. Change the value of the parameter that makes up the integration .

C) 1. The body of the cycle. 2. Cyclic parameters. 3. Change the value of the parameter that makes up the integration . 4. The counter.

C) 1. Preparation of the cycle. 2. The cyclic body. 3. Repetition management. 4. The condition for repetition.

D) 1. Preparation of the cycle. 2. The cyclic body. 3. Repetition management. 4. Change the value of the parameter that makes up the integration .

Test results on the topic "Algorithms and Programming Integrated Ion Computing Processes".

*F.I. About .*_____ ___ *group* _____

Questions	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**1 0**
Theanswers										

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The teacher collects the answer sheet, analyzes it and shows the wrong answers. The correct answers are displayed on the slide. Students retrain their answers to errors.

Evaluation criteria for test answers : 6-7 tests - a "satisfactory" rating; 8 tests - a “good” mark; 9-10 tests - "excellent".

At this stage, students learn the basic concepts of the subject, students develop a sense of activity, creativity, their desire to correct their mistakes and get better knowledge is increasing.

6 thstage . Task (3 minutes). Students will be given a brief explanation of the homework assignments with the assignment address in the Moodle system.

7 thstage . Closing (5 minutes). The topic is summarized and the lesson is completed. At the end of the lesson, the teacher tells the students to write their thoughts and comments on the questionnaire. A specially designed questionnaire is filled out by students, and the lesson is evaluated in writing . Theteachercollectsquestionnairesandfinishesthelesson.

2. CONCLUSIONS

Thus, the presented methodology of teaching students in elementary courses of a university, on the basis of the developed logical structure of the topic (discipline, section, module, block) of the discipline, programming contributes to the implementation of the modern concept of education in the field of information technology, the development of modern teaching methods. The created base of modern electronic resources, based on the logical structure of the discipline, will not only increase the interest of elementary students in the subjects studied, but will also allow the teachers themselves to preserve the invaluable achievements that are available in the arsenal of any teacher.

In our method with trukturizatsii the example theme "Algorithmic and programming simple cyclic computational processes" section " Basics of algorithms and programming " course " Programming is, " on the basis of logic, in eq with the experimental verification has shown the effectiveness of this educational technology training and demonstrated improvement in system knowledge of elementary students of a university.

Selection and structuring of the contents of modern educational mater and ala theme " Algorithmic and programming simple cyclic computational processes " (a set of terms and concepts, facts, types of teaching and research activities) provide interaction between the methodology of science, industry knowledge of the subject and methods of teaching.

Pedagogical conditions of realization with a temporary requirements for structuring the content of the discipline, in particular , "Algorithmic and programming simple cyclic computational processes" (rad about educational knowledge voltage taking into account the patterns of teaching and learning activities of students; the adequacy of the content of the material and the logic of its construction Zaya at the right level of education; orientation of the educational material to the formation of an integrated system of professional and educational skills) ensures the quality of higher professional education, allows us to consider the academic discipline as a systemic integrity , specify the teaching methodology , and contribute to the development of co-creation of students and teachers. The results allow to outline prospects for further and with investigations of the problems associated with the use of a structured educational material as an information and methodical means of increasing educational

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meters of tivatsii students, organization and management of cognitive activity; Getting the technology of reparation, etc. hostname of electronic textbooks.

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