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Research Article

ALGORITHMIC LINE IN TRAINING FOR THE FORMATION OF ALGORITHMIC COMPETENCE IN FUTURE PRIMARY SCHOOL TEACHERS

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ABSTRACT

The article outlines the algorithmic line in training and provides the main directions. And the sequence of tasks of the algorithmic line in teaching mathematics, native language and natural sciences in the training of future primary school teachers has also been determined.

KEYWORDS

Algorithmic line, typical problems, linear algorithms, calculations using formulas, cyclic algorithms, algorithmic line problems, algorithmization process.

INTRODUCTION

The algorithmic line in teaching includes several aspects aimed at developing algorithmic competence in students. The main directions of the algorithmic line are content and methodological support.

The training content must include standard tasks that gradually complicate the structure of solution algorithms. At the first stage of training, linear algorithms that do not contain feedback should be present. This includes calculations using formulas, the use of ready-made linear algorithms, operational actions, algorithms for constructing and transforming graphs using initial and final data. [1]

At the second stage of training, auxiliary, branching and cyclic algorithms with feedback should be

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included. Tasks at this stage require checking conditions, breaking them down into subtasks and using auxiliary algorithms using initial, intermediate and final data.

Thus, the sequence of tasks of the algorithmic line in teaching mathematics, native language and natural sciences can be determined as follows.

In teaching mathematics:

1. Tasks on the use of ready-made algorithms.

2. Problems of composing linear algorithms using branching.

3. Problems using auxiliary algorithms.

4. Tasks that require division into subtasks using loops.

In teaching your native language:

1. Tasks on drawing up linear algorithms: drawing up a plan for writing a story or essay; description of the sequence of actions to perform a specific task or process; drawing up an algorithm for writing a letter or email.

2. Tasks on the use of branching: description of cause and effect in a certain situation; drawing up an algorithm for composing an essay with argumentation and refutation.

3. Tasks using auxiliary algorithms: compiling an algorithm to create a dictionary or reference book on a specific topic; drawing up an algorithm for writing a resume or autobiography.

4. Tasks for dividing into subtasks using cycles: drawing up an algorithm for writing a story or story using repeating elements; drawing up an algorithm for planning and executing a research project or scientific study.

When determining the sequence of algorithmic line tasks in teaching natural sciences such as natural history, the following approach can be used:

1. Tasks on observing and describing natural phenomena.

2. Tasks to analyze and explain cause-and-effect relationships in nature.

3. Tasks on classification, comparison and sorting of objects in nature.

4. Tasks on building models and predicting natural processes.

5. Objectives for research and assessment of human impact on nature.

In the process of algorithmization, it is recommended to use the construction of flowcharts if this will be useful for clarity of the algorithmic structure. There are methodological techniques for implementing the algorithmic line in teaching computer science, which were developed by M.P. Lapchik . In this study, we refine these methodological techniques.

Various approaches are used in training future primary school teachers using special methodological techniques aimed at developing algorithmic thinking.

In teaching mathematics:

1. Using mathematical packages to solve problems. It allows students to apply mathematical tools and methods to analyze and solve complex problems, and also speeds up computational processes.

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2. Visualization of mathematical objects, plotting and graphic illustration. Visual representations of mathematical objects help students better understand abstract concepts and the connections between them. It also promotes the development of graphical thinking and the ability to represent data visually.

3. Providing alternative solutions using mathematical packages. Allows students to explore different approaches to solving a problem and compare their effectiveness. This approach develops critical thinking and the ability to analyze and evaluate various solutions.

4. Checking the correctness of decisions. Students must be able to check their solutions and analyze errors. This helps them develop self-control skills and improve their algorithmic skills.

5. Creation of mathematical models and development of algorithms for their solution. Students must be able to transform real-world problems into mathematical models and develop efficient algorithms to solve them. This develops creative thinking and the ability to abstract from specific situations.[lapchik]

In teaching your native language:

1. Using tasks and exercises for logical thinking. This allows students to develop the ability to analyze information, isolate what is important, find logical connections, and solve problems within constraints.

2. Working with text and analyzing it. Students are offered texts of various genres and styles, which they must analyze, extract information, highlight key ideas and structure of the text. This approach helps develop analytical thinking skills.

3. Development and use of techniques for the logical construction of text. Students learn to construct logically coherent arguments and analyze connections between arguments in their written work. This approach develops the skills of argumentation, structuring information and consistent presentation of thoughts. [2]

In teaching natural sciences:

1. Real world exploration and experimentation. Students can study various natural phenomena and conduct experiments to study their properties. This helps develop the ability to analyze data and extract patterns.

2. Use of computer models and simulations. Students can create computer models to study various phenomena and processes in nature. This helps them develop abstract thinking and data representation skills.

3. Working with graphs and diagrams. Visualizing data and research results can help students better understand and interpret the information they receive. It also promotes the development of graphic thinking.

4. Application of statistical methods and mathematical data processing. Students can learn statistical methods and use them to analyze data obtained from experiments. This develops logical thinking skills and the ability to interpret results.

5. Application of multimedia and interactive technologies. The use of interactive learning materials, videos, and other multimedia allows students to better visualize and understand complex concepts and processes.

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6. Organization of project work and collective research. Conducting projects and group research allows students to apply their knowledge in practice, develop algorithms and research methods, and develop communication skills when working in a team. [3]

The formulated conclusion implies that in order to develop the algorithmic competence of students, it is necessary to structure the content of the educational material as follows:

1. It is necessary to pay special attention to students in the process of solving problems using algorithms, as well as to individual elements of the algorithms themselves. This allows them to develop their cognitive and axiological competencies, in accordance with the principles of expediency and science. Directly involving students in active activities when solving problems using algorithms helps them realize the importance of these skills and the significance of this area of knowledge. This contributes to the development of their cognitive processes and the formation of value ideas about algorithms, which in turn contributes to the development of their algorithmic competence.

2. Here is a sequence of task sentences related to the topic being studied:

- Problems involving the use of existing algorithms
- Problems on composing linear algorithms
- Tasks on combining ready-made algorithms, including the use of branches and loops
- Tasks on developing and applying your own algorithms, including auxiliary, branching and cyclic algorithms.

3. When working on problems, it is recommended to analyze the result obtained in order to verify the correctness of the solution. You should also choose the optimal solution algorithm and provide a rationale for choosing this solution. This helps develop practical and reflective skills in algorithmic competence.

Having identified all of the above, we can conclude about the potential of the disciplines of mathematics, native language and natural sciences in the development of algorithmic competence of future primary school teachers.

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