"DEVELOPING CRITICAL THINKING SKILLS IN COMPUTER SCIENCE EDUCATION: USING PROBLEM-BASED LEARNING METHODS"

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Annotation

The text discusses the use of problem-based learning methods to promote critical thinking skills among future computer science teachers. It highlights the importance of collaborative learning, practical exercises, and self-directed learning in the development of analytical, problem-solving, and decision-making skills based on logical and reasoned approaches.

Keywords: problem-based learning, critical thinking, collaborative learning, practical exercises, self-directed learning, computer science education, analytical skills, problem-solving skills, decision-making skills.

Modern society demands not only knowledge from people but also the ability to analyze information, make informed decisions, and find non-trivial solutions to problems. Therefore, the development of critical thinking is one of the most important tasks of education. This is especially important for future computer science teachers since information technology is becoming an integral part of people's lives. One of the effective methods for developing critical thinking is the use of problem-based learning.

The use of problem-based learning in the formation of critical thinking in future computer science teachers is a relevant and effective innovative technology that promotes the development of students' ability to analyze, evaluate, and solve problems in the field of information technology.[1] Problem-based learning methods allow for taking into account the peculiarities of students' information perception, stimulate critical thinking, and develop skills in independent information search and analysis, which increases the effectiveness of the learning process. The application of problem-based learning methods also contributes to the formation of students' creativity, independence, and responsibility skills. [1]

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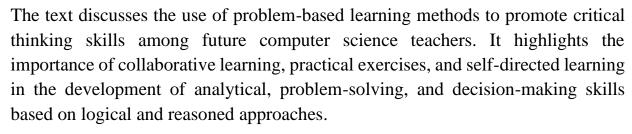**Hosted online from Plano, Texas, USA.**
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For effective implementation of problem-based learning methods in developing critical thinking skills among future computer science teachers, it is recommended to use real-life situations from their professional practice and encourage students to work collaboratively and exchange opinions. It is also important to give students the opportunity to make decisions and evaluate their own results, which contributes to the development of critical thinking skills. [2]

Practical recommendations include organizing teaching based on problem-based learning methods, including solving real problems and project work. Teachers should be prepared to apply problem-based learning methods and be supported in working with students. Students should be encouraged to study the material independently and find solutions to problem tasks.

Examples of using problem-based learning methods in developing critical thinking skills among future computer science teachers could include:

Algorithm learning. Students are presented with a complex problem, such as writing a program that will search for specific information in a large amount of data. During their work, they should study various algorithms, choose the most efficient one, test it in practice, and evaluate the results. Throughout the work, students encounter problems that require critical thinking, such as choosing the most efficient algorithm, analyzing results, and assessing its applicability in real life. [3]

Problem formulation. At the beginning of the course, students may be presented with problems related to computer science, which they will solve throughout the semester. This may involve developing software, creating a database, or solving mathematical problems. Each problem should be carefully selected and formulated in a way that stimulates student thinking and helps them develop their skills in computer science.

Feedback. Problems should be considered in groups or on an individual level, and the teacher should provide feedback. Students can discuss their ideas, solutions, and receive recommendations from the teacher.

Collaborative learning. Working in groups or pairs can also contribute to the development of critical thinking. The collaborative approach helps students exchange knowledge and experience, make and discuss decisions, and learn from each other.

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Practical lessons. Programs of practical lessons can be built around specific problems that will be solved by students. For example, students can be offered to develop a Python program to solve a specific mathematical problem.

Self-learning. The teacher can encourage students to self-education by providing additional materials such as articles, books, or video lessons that will help students deepen their knowledge and skills in the field of computer science and solve problems independently.

Conclusion:

The use of problem-based learning methods is an effective approach to developing critical thinking skills in future computer science teachers. It allows students to develop skills in analysis, problem-solving, and making informed decisions based on a logical and argumentative approach. It is recommended to use problem-based learning methods in computer science courses to develop critical thinking skills in future teachers.

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