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POTENTIAL OF PROBLEM-BASED LEARNING TECHNOLOGIES IN SHAPING CRITICAL THINKING

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Abstract: Problem-based learning technology plays an important role in developing students' critical thinking skills. It is based on the stages of creating a problematic situation, forming hypotheses to solve the problem, and verifying the solution. In this process, students develop skills such as analysis, comparison, generalization, and drawing conclusions. As a result, their independent and critical thinking abilities are formed and improved.

Keywords: problem-based learning, problematic situation, critical thinking, creative thinking, cognitive activity, analysis, synthesis, comparison, generalization, drawing conclusions, independent thinking, pedagogical technology, learning process, intellectual development.

Introduction

Problem-based learning technology plays an important role in developing students' critical thinking skills. It is based on the stages of creating a problematic situation, forming hypotheses to solve the problem, and verifying the solution. In this process, students develop skills such as analysis, comparison, generalization, and drawing conclusions. As a result, their independent and critical thinking abilities are formed.

Problem-based learning technologies are built upon the intensification of student activity. The core foundation of problem-based learning technology stems from the principle that human thinking begins with resolving a problematic situation, and that humans inherently possess the capability to identify, investigate, and solve problems. Problem-based learning holds serious significance in growing students' creative thinking and creative abilities. The ultimate goal of problem-based learning is to ensure that students fully comprehend the problems related to the subject being studied and to teach them how to solve these problems. One of the primary issues in applying problem-based learning in practice consists of creating a problematic situation connected to the topic under study. Teachers across various academic disciplines must foresee the creation of problematic situations and the methods for solving them during their lessons.

Literature Review

Methods of creating a problematic situation:

1.The teacher explains to the students a contradictory situation related to the lesson topic and suggests finding a way to solve it.

2. The teacher presents diverse points of view regarding a single issue.

3. The teacher proposes solving tasks that contain insufficient or redundant data, or situations where the question is posed incorrectly, among others.

4. Levels of resolving a problematic situation:

5. The teacher poses the problem and solves it themselves.

6. The teacher poses the problem and finds its solution together with the students.

The students themselves pose the problem and find its solution.

Methods applied in solving a problematic situation: Studying and analyzing the problem from different perspectives. Comparison and generalization. Identifying and contrasting facts. Drawing

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conclusions dependent on the situation. Posing specific questions by the students themselves, and others.

Problem-based learning technology has been taking shape since ancient times. Problematic question-and-answer methods were widely used in Ancient Greece, while problematic debates and discussions were prevalent in ancient India and China. Problem-based learning was applied by the American psychologist, philosopher, and pedagogue John Dewey in the experimental school he established in Chicago in 1894. In the 1960s, research was conducted in this direction, and by the 1970s–1980s, it was widely implemented into practice. The main idea of problem-based learning is not to present knowledge to students in a ready-made form, but rather to ensure its acquisition based on students performing educational research on problems related to the lesson topic. In Uzbekistan, the Socratic question-and-answer method was extensively used in schools and madrasahs over many centuries for the application of problem-based learning. This method developed students' alertness, quick-wittedness, speech culture, and logical as well as critical thinking. The Socratic question-and-answer method still remains one of the most effective educational methods today. In this approach, the teacher guides the student into a process of independent and active thinking, identifying errors in their reasoning and directing them toward corrections.

The stages of a Socratic dialogue are as follows: Determining the student's level of knowledge and thinking capacity through questions and answers. Adapting the content of the topic to the student's motivations. Engaging the student in active communication. The teacher posing questions while acting as if they do not know the answer. Encouraging free expression of thoughts by praising correct ideas. Identifying erroneous thoughts along the way. Explaining errors on a logical basis and guiding the student to the right path. While this method yields high results, it demands extensive knowledge, creative thinking, a high culture of communication, and pedagogical skill from the teacher. Stages of the Problem-Based Learning Process

The problem-based learning process is divided into the following three main stages: Creating a problematic situation. Forming hypotheses to solve the problem. Verifying the correctness of the solution (by systematizing the information related to the obtained solution).

In creating a problematic situation, the following aspects are taken into account: Problems can be theoretical or practical in nature. The problematic situation created in class and the problem proposed for students to resolve must increase the students' interest, or at the very least, arouse curiosity. Otherwise, the expected result cannot be achieved. The problem must correspond to the students' level of knowledge and intellectual capabilities.

The direction of assignments for resolving a problematic situation:

1.It must be directed toward the acquisition of new knowledge.

2. It must be aimed at identifying and clearly formulating the problem.

3. It must be geared toward executing practical assignments.

Students' understanding of a problematic situation is shaped as a result of perceiving its underlying causes and connections. This, in turn, enables them to independently formulate the problem. In forming hypotheses to solve a problem, the student performs mental activities such as observation, comparison, analysis, generalization, and drawing conclusions. The quality of cognitive activity is determined by its logicality, independence, creativity, scientific validity, groundedness, interconnectedness, speed, analytical and comparative nature, and the abilities of generalization and particularization. The quality of the thinking process is connected with the level of intellectual development, where the speed of memory, imagination, and comprehension processes also holds significant importance. If the level of intellectual development is high, the efficiency of resolving a problematic situation among students will also be high. Consequently, students develop the capacities to perceive, identify, find a solution for, and verify a problem.

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Three stages of resolving a problem:

1.Proof — determining the connection of the problem with causes previously accepted as correct.

2. Verification — justifying that the problem was correctly generated based on the selected cause.

3. Explanation — justifying why the solution is correct.

Theoretical Foundations in Problem-Based Learning: To utilize problem-based learning effectively, it is expedient to rely on B. Bloom's taxonomy (six levels in the cognitive domain) and H. Gardner's theory of multiple intelligences.

The Theory of Multiple Intelligences (H. Gardner): According to this theory, every individual possesses at least eight types of intelligence: Verbal-linguistic intelligence - vocabulary, speech, and writing abilities. Logical-mathematical intelligence - calculation, logical thinking. Visual-spatial intelligence - images, diagrams, and spatial reasoning. Bodily-kinesthetic intelligence - physical movement, sports, and practical activity. Musical-rhythmic intelligence - perceiving and performing music and rhythm. Interpersonal intelligence - communication, ability to work with others. Intrapersonal intelligence - self-awareness and working independently. Naturalistic intelligence - understanding nature, animals, and the environment. One or several of these intelligence types may be dominant in each child. Appropriately developed intelligence, in turn, allows for achieving high results in the future.

Conclusion

Problem-based learning technology ensures that students do not receive knowledge in a ready-made form, but rather acquire it through processes of independent inquiry, analysis, and problem-solving. Lessons organized on the basis of this technology develop critical and creative thinking in students, activate their cognitive performance, and shape their skills for analyzing problematic situations and finding solutions. Consequently, the level of students' independent thinking rises, and the effectiveness of applying knowledge in practice is enhanced.

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