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Utilisation of Problem-Based Learning Methodologies in the Context of Quality Education in Schools is a Subject That Merits Close Examination

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Abstract: *The paper provides a precise description of a problematic situation and demonstrates methods of implementing problem-based learning. Furthermore, the updated requirements for the professional competence of the teacher when utilising this approach are emphasised.*

Keywords: *problem-based learning, teacher, knowledge assimilation, learning difficulties, student.*

Introduction: While there has been a discernible surge of interest in problem-based learning in recent years, a unification of perspectives concerning this pedagogical approach remains elusive. To facilitate a more nuanced understanding of its practical implementation, it is advantageous to examine its application in the context of specific tasks. The ability of the teacher to apply its techniques in various disciplines is perceived by many as a real art that requires deep knowledge not only of the subject itself, but also of teaching methods and the peculiarities of students' thinking when mastering new material.

Methods: Reproductive assimilation of knowledge is the most familiar method of acquiring the accumulated experience of humanity. Historically, educators have always emphasised the importance of forming a holistic system of knowledge in students. This pedagogical approach is predicated on the theory of step-by-step formation of mental actions, the essence of which is the rapid, fairly stable, but passive assimilation of material meticulously prepared by the teacher.

In this pedagogical approach, students' cognitive engagement is primarily constrained to the reception and repetition of the imparted material. The quality of assimilation is then assessed through an attempt to reproduce the acquired knowledge independently, derive formulas, identify patterns and formulate conclusions. [1]

Despite its necessity, this method is regarded as a preliminary stage of knowledge accumulation, without which further creative development in the chosen field is impossible.

As has been established for some time, productive activity is fundamentally different from reproductive activity in that the learner, relying on their own understanding, independently applies existing knowledge in new conditions. This process entails the pursuit of novel knowledge and, consequently, novel approaches to problem-solving. It is noteworthy that certain researchers in this field have identified productive activity with creative activity, although these are not entirely congruent concepts.[2]

Throughout the history of cognition, periods of overcoming difficulties in learning have been identified, which arose in connection with the development of social practice. These difficulties were termed problem situations, and in the contemporary context, they represent the fundamental concept underpinning the notion of problem-based learning.[3, 4]

A problem situation is defined as an intellectual difficulty where an individual, based on their existing knowledge, is unable to explain a phenomenon that has arisen or achieve a desired result using familiar methods. This, in turn, stimulates the individual to embark on a search for novel explanations and knowledge.

The fundamental objective of the problem-based learning method is to cultivate the capacity to identify problems, formulate inquiries, and seek solutions to these problems. Consequently, when devising a lesson plan, it is imperative to identify the questions that engender a problem situation.

It is evident that a question to which the learner already knows the answer, or a question that requires knowledge that the learner does not already possess, cannot create a problem situation. From a scientific perspective, such a scenario emerges when there is a contradiction between existing knowledge and unknown elements. The recognition of this discrepancy, the comprehension of the interrelationships and feedbacks, and the acknowledgement of knowledge gaps are integral components of a problem situation.

Results and Discussion: It is therefore imperative to recognise that for a problem situation to stimulate thinking, it must be perceived by students as a problem to be solved, which is only possible if they have the basic knowledge relevant to the subject area. It is only in this manner that the problem situation is transformed into a genuine problem.

In the field of problem-based learning, experts distinguish three main approaches that differ in the degree of involvement of students in thinking activities.

The first approach is characterised by the method of problem presentation,

the second by the method of partially searching activity,

and the third by the method of independent research.

The fundamental objective of the problem-presentation method is to facilitate the presentation of new material by the instructor and to promote active student learning. A variety of techniques are employed for this purpose, including:

These include: the disclosure of the history of the problem and the algorithm of its solution;the disclosure of the incompleteness of the study of certain aspects, the existence of different points of view on the issue, the expression of one's own position while preserving the freedom of choice of opinion for the student;the suggestion to continue the study of uncompleted research;the formulation of questions that can only be answered after studying the literature or conducting experiments.

* posing problem questions that contain a clear contradiction, stimulating deep reflection on the essence of the question;

* proposing problem problems with several solutions, allowing students to determine the most correct and effective approach;

* identifying gaps in students' knowledge with the help of questions to arouse their interest in the topic and material.

The fundamental approach of the partially-exploratory activity method is predicated upon a meticulously formulated structure of lectures, practical classes and seminars.

In the context of lectures, students are typically presented with novel knowledge in a specific domain, often accompanied by the tacit assumption that conclusions, rules or recommendations remain incomplete. [5, 6]

Consequently, a scenario is established that necessitates the implementation of this knowledge to ascertain the most optimal course of action. Ideally, each student should encounter a unique situation. However, in situations where the problem is ambiguous, a single scenario may be constructed in which each student proposes a different solution from their neighbour's, based on their individual understanding of the problem and their unique perspective on the situation.

The emergence of contradictions between novel conclusions and established ideas about the subject of research serves as a catalyst for the pursuit of new knowledge.

Seminar classes have the potential to contribute significantly to this goal, provided that they are meticulously organised in accordance with two fundamental principles:

Firstly, the majority of questions posed to students should be of a problematic nature. Secondly, discussion of the seminar topic should encourage students to formulate new questions for the instructor.

In contemporary pedagogical practice, a question is deemed problematic if it fulfils the following criteria:

It is imperative that questions are logically connected to previously acquired definitions and fundamental concepts, as well as those that are to be studied in the future. Furthermore, questions should contain an element of cognitive complexity, with clear delineations between known and unknown. Finally, questions must stimulate interest when comparing new material with existing ideas. [7]

It is widely acknowledged that personal motivation is the key factor for successful application of the method of independent research activity. Without sincere interest, students will not have sufficient incentives for independent research. However, it is important to note that interest alone is not sufficient to guarantee success in independent research.

In order to facilitate independent research activities, students must be equipped with the ability to identify a problem, formulate it clearly and competently, and they must be taught how to do so.

Primarily, instruction should be provided on the formulation of pertinent inquiries. As the well-known adage asserts, "He who does not ask, shall not receive."

The ability to formulate effective questions is not merely an academic skill, but also a tool for discerning the fundamental issues, thinking critically, and establishing the link between a query and any inconsistencies in existing or novel information.

The act of question framing is governed by two fundamental criteria:

1. The question must capture the essence of the controversy.

2. The question must be appropriate to the scope of the problem being investigated, and three types of errors can be made here:

- Asking a question that does not elicit enough information;- Asking a question that requires more information than is available;- Asking a question whose answer is already contained in the conditions of the problem.

In the event that it proves unfeasible to stimulate students' interest in formulating questions on the topic, the instructor is advised to propose significant questions and furnish answers to them. This pedagogical approach enables the following: firstly, to guide students' independent work on the lecture material; secondly, to illustrate how to formulate effective questions to identify complex and interesting problems; and thirdly, to identify areas of research that students can undertake in term papers and diploma theses. [8]

Problem-based learning should be oriented to solving problems arising in the real professional activity of graduates. During the problem-solving process, and upon completion, the educator should meticulously analyse the students' search behaviour, potential alternatives, and the efficacy of the solution, in conjunction with the students. These analyses fulfil the function of feedback, which helps to correct the learning process.

It is noteworthy that even a single problem situation can serve as an exemplar of the problem-based learning method. However, the ideal is a system of problem situations and tasks covering all sections of the course, enlivened by the novelty and spontaneity of emerging problems.

Conclusion: In conclusion, it is important to note the new requirements that problem-based learning places on the professional level of the teacher.

It is imperative that educators possess a comprehensive understanding of the knowledge methodology and the discipline itself. They must be able to formulate and disclose the problem, ask the right questions, organise feedback and correct the presentation of the material.

In the event of students encountering difficulties, the teacher must be able to break the problem down into smaller subtasks, assess the level of their independence, and gradually guide them from simple reproduction of knowledge to independent discoveries.

The ability to create a problematic situation, which inevitably reveals contradictions in the analysis of existing knowledge, stimulates the formation of new problems and areas of research, remains the most fundamental condition for a successful problem lecture.

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