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DEVELOPMENTAL FUNCTIONS OF LABORATORY CLASSES

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Abstract
This article analyzes the developmental functions of laboratory classes from a scientific and pedagogical perspective. In the educational process, laboratory work is viewed not only as a means of consolidating theoretical knowledge but also as a tool for developing students' thinking, fostering their creative abilities, and enhancing independent and critical thinking skills. Furthermore, the article highlights the role of laboratory classes in learner-centered education and their relevance in modern pedagogy.

Keywords: Laboratory classes, developmental functions, educational process, theory and practice, independent thinking, creative thinking, learner-centered education.

Introduction

Nowadays, laboratory exercises play a significant role in the educational process by strengthening students' theoretical knowledge, integrating it with practice, and developing creative thinking. In the current era of rapidly advancing science and technology, limiting the educational process to theoretical knowledge alone is insufficient. Through the developmental functions of laboratory exercises, students develop skills for independent thinking, problem analysis, and conducting experimental research.

The relevance of the topic lies in the fact that modern education requires a person-centered approach. This means taking into account students' interests during laboratory sessions, fostering their creativity, promoting innovation, and expanding their scientific worldview. Furthermore, developmental laboratory exercises not only facilitate knowledge acquisition but also enable the application of this knowledge in real-life situations. Therefore, this topic is highly relevant from pedagogical and methodological perspectives.

Indeed, laboratory exercises are an integral part of the educational process. They are a practical form of instruction aimed at applying theoretical knowledge in practice and forming the practical skills and competencies necessary in various fields (natural sciences, medicine, engineering, information technology, and others). Their primary goal is to develop students' scientific thinking, research abilities, and professional competencies. In this sense, laboratory exercises perform developmental functions within the pedagogical process [1; 2].

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The developmental functions of laboratory exercises can be divided into the following main groups:

1.Cognitive and Intellectual Functions:

One of the most important developmental aspects of laboratory exercises is their cognitive and intellectual function. This primarily serves to deepen the students' knowledge acquisition process, develop their thinking, and form skills for drawing evidence-based conclusions.

First, laboratory exercises are of unparalleled importance in deepening and reinforcing theoretical knowledge. Merely learning a formula or law theoretically is often insufficient; observing and applying them in practice through experiments allows students to understand the essence more profoundly and retain the concepts in long-term memory. For example, learning Ohm's Law is not just about studying it in a textbook; measuring voltage, current, and resistance directly in an electrical circuit allows for much more effective consolidation of knowledge [3].

Second, laboratory exercises help develop the abilities to analyze, compare, and generalize. Through the process of recording experimental results, presenting them in tables or graphs, creating diagrams, comparing data, and drawing final conclusions, students develop logical, systematic, and critical thinking skills [4]. Such activities not only enhance their analytical potential but also develop the skill of linking theoretical concepts with real-world processes.

Third, through laboratory work, students gain the opportunity to master the fundamental stages of scientific research. Specifically, through processes such as observation, hypothesizing, conducting experiments, recording results, and their scientific analysis, learners assimilate scientific methodology. This lays the groundwork for conducting independent research, creating innovations, and forming an innovative approach in the future [5].

Fourth, laboratory work fosters responsibility and carefulness in students. Working with reagents, electrical instruments, or complex measuring equipment during experiments imposes a high degree of attention, discipline, and responsibility on the students. Since each practical task requires precision, students learn to be meticulous and cautious in their activities. These skills are important not only in the educational process but also in their future professional work.

Thus, the cognitive and intellectual functions of laboratory exercises enhance the effectiveness of the educational process, guiding students not only to acquire theoretical knowledge but also towards logical thinking, a scientific worldview, critical analysis, and a responsible approach.

2. Practical (Skill-Forming) Functions:

The next crucial developmental aspect of laboratory exercises is their practical function. They play a significant role in the process of enabling students to apply theoretical knowledge in practical activities, form professional skills, and prepare them for use in real-life situations.

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First, laboratory exercises are the most effective means of forming practical skills and competencies. During experiments, students directly engage in measuring, calculating, experimenting, and operating devices and equipment [6]. This process transforms theoretical knowledge into live activity, creating a foundation for more solid and life-relevant knowledge to form in their minds.

Second, practical sessions develop skills necessary for professional activity. For instance, in the natural sciences, laboratory work provides students with practical experiences such as taking precise measurements, modeling physical or chemical processes, and documenting results [7]. In technical fields, professional qualities such as adjusting equipment, using it correctly, and observing safety rules are developed.

Third, laboratory exercises strengthen students' problem-solving and decision-making abilities. Every experiment requires achieving a specific outcome. When unexpected situations or errors arise during the process, students are compelled to make independent decisions based on their existing knowledge. This fosters responsibility, quick thinking, and the skill of solving problems through a creative approach.

Fourth, practical training is highly significant in preparing students for real-life professional activities. The skills acquired in a laboratory setting can later be effectively applied in various fields such as manufacturing, scientific research, medicine, engineering, and pedagogy. In this regard, laboratory exercises play a special role in aligning education with the demands of the labor market.

Fifth, during laboratory exercises, students develop teamwork and collaboration skills. Conducting experiments in groups, distributing tasks, and discussing results collectively teach students to communicate, work cooperatively, and share responsibility.

Furthermore, the practical functions of laboratory exercises not only serve to apply theoretical knowledge but also form professional competencies in students, prepare them for real-life situations, and develop skills for independent and collective work.

3. Creative Functions

Another important developmental aspect of laboratory exercises is their creative function. In the current era, one of the main goals of the educational process is to unlock the individual's creative potential, form innovative thinking, and steer them towards generating new ideas. From this perspective, laboratory exercises serve as an effective tool for developing students' creative abilities.

First, laboratory exercises help shape students' innovative approaches. The process of experimenting, which involves applying various methods, comparing results, and seeking non-traditional paths, awakens a spirit of creative inquiry in them. Such activity is not limited to merely repeating existing knowledge but also provides an opportunity to propose new ideas.

Second, laboratory work encourages students to engage in independent exploration. Conducting experiments requires each student to observe, evaluate results, and draw conclusions. During this process, students not only utilize existing knowledge but also strive to develop their personal perspectives and generate original thoughts.

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Third, laboratory exercises form the skills for solving creative problems. When unexpected results or errors occur during experiments, students seek creative methods to resolve them. This fosters flexible thinking, the ability to view situations from different angles, and the capacity to propose alternative solutions.

Fourth, laboratory exercises contribute to the formation of innovative thinking in students. Success in modern science and technology is closely linked to the ability to create innovations and implement them in practice. The processes of independently designing experiments, using new methods, and creatively interpreting results in laboratory work are crucial factors in developing these abilities.

Fifth, creative functions enhance student motivation. The process of creating something new generates a sense of satisfaction in students, which strengthens their interest in the educational process and encourages them to engage in more active exploration.

In conclusion, the creative functions of laboratory exercises develop students' abilities not only to apply theoretical knowledge in practice but also to think innovatively, approach problems originally, develop alternative solutions, and propose innovative ideas. This process guides students toward independent inquiry, analytical thinking, and making creative decisions. As a result, their abilities to strive for innovation in professional activities, demonstrate scientific and creative initiative, and find effective solutions to pressing problems are strengthened.

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