

## THE ROLE OF THE LABORATORY IN TEACHING CHEMISTRY

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### Abstract

In this article, the author points out the need to build a bridge between industrial centers, technologies and the educational process, to equip educational centers and to implement the idea of laboratories equipped with the necessary equipment. According to the researcher, students will be able to combine their theoretical knowledge with practical experience and develop the spirit of creativity and innovation.

**Keywords:** laboratory, technology, teaching, chemistry, equipment, practical experience.

### Introduction

The author of the article raises the question of creating a bridge between the industrial hubs, technology and training, and the need on the one hand to put the training centers and, on the other hand the only way to create an incarnation, this is even more important, laboratories and equipment. According to the researcher, only in this case students will be able to combine practical experience and mental activity and create a spirit of creativity.

Experimentation is one of the most important ways to understand the fundamentals of science. The results of the experiment obtained by students make them think, stimulate discussion and allow them to draw conclusions. All of this together optimizes the learning process. The use of very simple tools often aids learning and makes it easier to master the material. If the information is not conveyed correctly at the beginning, it will be more difficult to understand the subsequent material because there is no connection with the previous information, making it difficult for students to think and their confidence in the scientific facts will be weakened.

In fact, they begin to feel that it is difficult to understand science, they lose interest, they lose the wealth of knowledge acquired during the theoretical course, which is a disaster for education. Humans are naturally curious and always searching, and the laboratory is a good place to satisfy this curiosity. During laboratory work, students have the opportunity to check the accuracy of the theoretical content, which structures their thinking and increases their thinking skills and interest in science.

In a laboratory environment, everyone can experience their work and compare it with others to achieve optimal results. Unfortunately, their number is decreasing due to disputes and considerations regarding practical and laboratory work, which not only reduces the quality of teaching, but also worsens the practical skills of students.

The chemistry laboratory is a self-contained laboratory equipped with all necessary equipment, chemical racks and chemical dishwashers. The laboratory is also equipped with safety

equipment such as a fire extinguisher and a first aid kit that can be used in case of danger. Laboratory plans should be provided for both teachers and students.

Sometimes the teacher himself conducts experiments and shows them to the students. This happens if the experiment is hazardous to health, the experiment requires high concentration, or expensive materials are used in conducting the experiment. Many experiments are carried out by groups of students. Meanwhile, students can record their observations in their diagrams and watch the teacher conduct the experiment. Before starting the experiment, the teacher instructs the students about the necessary precautions.

Sometimes instead of laboratory work, the teacher uses films and other video materials and uses virtual methods. Such methods are permitted, for example, if there is a lack of time or materials for laboratory work. Nowadays, students have the opportunity to learn theoretical chemistry, they have access to books, but they often cannot properly connect theory with practice.

Skills that help apply the theoretical knowledge acquired at school and explain certain phenomena can only be acquired in the laboratory. The need to use appropriate methods to understand and consolidate the theoretical content of the lesson is therefore clear. Some concepts in chemistry are easier to understand thanks to different experiences. According to experts, students currently have the opportunity to receive fully qualified training, which allows them to solve not only the problems envisaged during training, but also new, unforeseeable, potentially existing problems.

The experience of developed countries shows that for complete learning it is not enough to study science only with the help of textbooks. Such a method cannot cover all the goals of science teaching (exam content, teaching and learning methods, evaluation methods). However, this deficiency by no means excludes the study of theoretical teaching materials. The goal of science education is for students who have learned the basics of science to be able to apply them comprehensively in their professional activities. For this purpose, equipment and facilities are used that enable students to complete a course of study. Laboratory experiments are necessary so that he can live and work independently in the future. Nowadays, in addition to teaching aids, various media resources, video films, computers, laboratory equipment, etc. are used. Most countries have invested heavily in this sector.

These universal methods support the learning process, the speed of consciousness creates motivation, which leads to an increase in the quality of learning. These methods can be called tools used in teaching students. The correct use of such tools in combination with theoretical teaching material and laboratory exercises strengthens students' mastery of subjects such as chemistry.

The purpose of laboratory work. Research courses in the field of education and training should be organized so that teachers can properly conduct their laboratory work and properly monitor students' work. Laboratory work is a multifunctional event.

The main objectives of laboratory work are:

Review and strengthen the knowledge acquired in the study of theoretical sciences;

Increase the ability to think and think scientifically;

Stimulating students' interest in empirical knowledge;

Development of work skills to solve problems in everyday life;

Optimal knowledge transfer;

Develop a sense of collaboration;

Learning through active and effective action rather than memorization and modeling the use of innovative technologies and production methods;

Increasing the level of knowledge and practical skills of teachers to ensure deeper mastery of science.

The main purpose of laboratory tests and research is to demonstrate in practice the knowledge acquired in textbooks. Often the teacher spends hours explaining the topic in class, but the end result is not satisfactory. However, reinforcing the content through a simple experiment will optimize the result.

Many topics in the chemistry curriculum can easily be completed with laboratory work. For example, by defining a group of properties and periodic properties of elements; electrical conductivity of aqueous solutions, ionic compounds, determination of cations, thermometry, determination of characteristic values, simple experiments make learning much easier. In order to carry out the experiment, you must first provide the necessary equipment and materials for preparation. Then experiment and repeat. Experience helps students develop skills and intelligence. In addition to testing theory, the practical interest helps in acquiring much-needed skills.

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