

FORMATION OF STUDENTS' PROFESSIONAL COMPETENCES IN THE PROCESS OF CHEMISTRY TEACHING BASED ON A CREATIVE APPROACH

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Abstract

This article examines the stages of creativity, independent learning, and the use of interesting and historical information and modern educational methods in the formation of pedagogical compensations for future chemistry teachers, as well as the organization of non-traditional chemistry lessons and increasing students' interest in teaching chemistry, improving the methodology, its structural structure and content, and introducing it into educational practice. Also, the level of mastery of skills and competencies in designing lesson plans based on a creative approach among future chemistry teachers, and similar information is provided.

Keywords: Pedagogical technology, interactive teaching methods, pedagogical competence, creativity, information technologies, design, organizational-management, explanatory-motivational, cognitive, technological map, skills.

Introduction

The 21st century is recognized by the world community as a world of knowledge, including in our country, where great work has been done to train comprehensively mature and well-rounded individuals, and the education system has become a priority area of development for the state and society.

It is known that the education system serves to fulfill the social order in all periods of development. Today, the social demand placed on the education system by society is to educate and bring up a comprehensively developed, well-rounded individual. In this, special attention is paid not only to his physical, but also to his mental, moral, spiritual and emotional development. The huge reserve of advanced ideas, views, theories and teachings formed in the process of global informatization and ideological struggles that are trying to "conquer" the individual's consciousness has the opportunity to educate in the spirit of the highest universal, national ideas, and to train qualified specialists for the fiercely competitive labor market.

The educational and cognitive activity of students directly reflects the need for them to be active in thoroughly mastering theoretical knowledge in general and specialized subjects, enriching their worldview, and acquiring competencies, skills, and qualifications that allow them to effectively and successfully organize professional activities. The personality, including



students' educational and cognitive activity, means that they are both physically (organizing practical actions) and mentally (psychologically) active.

The ability to quickly receive educational information transmitted directly or indirectly by the teacher during the educational process, to master its essence in a short time, to effectively process and use it in practice, to act systematically in completing educational tasks, to clearly set goals and to achieve them in a short time represent students' physical activity. Students' positive or negative attitudes towards educational material and educational information, their enthusiastic or passive acceptance of them, whether they consider the educational process interesting or boring, and whether they feel comfortable or uncomfortable during classes directly affect their mental activity.

Based on the results of theoretical analysis and pedagogical observation, as well as the above-mentioned points, our research work revealed that the following factors have a significant impact on ensuring the active participation of future chemistry teachers in their professional training:

- ✚ the student's attitude to the educational process, the subject, and the educational material;
- ✚ clear definition of the educational goal;
- ✚ thorough justification of the educational content;
- ✚ effective, interesting organization of the educational process;
- ✚ the teacher's competent and creative approach to organizing the educational process;
- ✚ the correct formulation of the educational material in accordance with the level of knowledge and preparation of students;
- ✚ appropriate, purposeful and effective use of didactic, modern technical and information and communication tools in the educational process;
- ✚ the correct selection of acceptable methods by the teacher to fully reveal the essence of the educational material;
- ✚ the effective organization of the lesson based on the needs, desires and interests of students;
- ✚ the teacher's sincere relationship with students, respect for them, and the ability to form motivation for learning in them;
- ✚ taking into account the individual, personal characteristics of each student, as well as their mental (psychic) activity during the lesson;
- ✚ the relationship between the participants in the educational process - the teacher and students - is based on mutual cooperation and solidarity;
- ✚ the clear definition of the expected result in accordance with the educational goal.[2, 120-122]

Thus, the learning and cognitive activity of students depends on many factors that play a priority role in the educational process. This, in turn, requires future teachers to take these factors into account when organizing their lessons, only then will the learning and cognitive activity of future biology teachers be achieved and its manifestation at a high level.

The effectiveness of a lesson is related to its effective organization. A lesson that is not well planned, not thought out enough, hastily constructed and not adapted to the capabilities of





students cannot be of high quality. A lesson is the development of activities that organize the educational process, ensuring the achievement of the highest final result in specific conditions.

The following three stages are important in a teacher's preparation for a lesson based on a specific subject:

- in the diagnosis, the teacher clarifies all the conditions under which the didactic process takes place, determines its results. The teacher's diagnosis reveals the students' abilities to acquire knowledge, their activities and behavior, motives, needs and abilities, interests and abilities, level of knowledge, control and correction of knowledge, skills and qualifications.

- forecasting is the teacher's selection and evaluation of various options for the effective organization of a future lesson and the selection and application of the most appropriate option for organizing the lesson in accordance with the accepted criteria.

- planning is the creation of a program for managing students' learning activities, which is the final stage of preparation for the lesson. A project (management program) is a short and clear, freely structured activity that allows the teacher to determine for himself the management process (whom and when to ask, when to use methods, where to introduce the topic, how to move to the next stage of the lesson)[5, 56-57]

In our study, we present examples of methods used in the educational process and practice that demonstrate the uniqueness of a creative approach to improving the pedagogical preparation of future chemistry teachers:

When designing chemistry lessons, always allocate an interesting page such as "Did you know", "This is very interesting", "Good to know", "This is interesting to you" and enrich this page with information related to the lesson topic or interesting life events. This increases the interest of the student. If it is organized using information from ancient sources that have been passed down from generation to generation, high efficiency is achieved and the teacher achieves the intended goal of the lesson.

Here are some interesting information and facts for chemistry lessons.

How to make homemade toothpaste?

Start by adding ½ cup of room temperature coconut oil to a bowl. Then add 4 tablespoons of baking soda. Add 15 drops of peppermint essential oil.

Mix until you have a nice, smooth paste. Transfer the toothpaste to an airtight container.

Do you know what substance is used to store and transport bananas for a long time? This is ethylene gas. For this, bananas are placed in special polyethylene bags and filled with ethylene gas, then transported in special boxes. If ethylene gas escapes, bananas cannot be stored for more than 2 days. Bananas should be stored at a temperature of about 12 ° C, because they ripen faster if they are too warm.



What 4 elements are used to make coins? The bronze alloy used to make coins today is typically 95% copper, 4% tin, and 1% zinc. The new coin, the Sacagawea dollar, looks like a gold coin. It is actually made of an inner core of copper surrounded by an outer layer of manganese copper (an alloy of copper, zinc, manganese, and nickel).

A silver oxide (clock) battery uses silver oxide as the positive electrode (cathode), zinc as the negative electrode (anode), and an alkaline electrolyte, usually sodium hydroxide (NaOH) or potassium hydroxide (KOH). Silver is reduced from Ag(I) to Ag at the cathode, while zinc is oxidized from Zn to Zn(II).

Watch batteries contain mercury, lithium, or silver oxide. However, most countries have banned the sale of mercury batteries. Lithium is the most common chemical found in watch batteries today. It is important to consult a doctor about any health concerns before following the health and safety information in this article.

Mercury is often used in watch batteries because it prevents the build-up of internal gases that can cause the battery to expand and explode. The chemical creates a stable environment that allows batteries to last longer before needing to be replaced.

Lithium batteries come in many different types. The main difference between the different types is the cathode material. You will find six types of lithium batteries on the market. These



include:

- Lithium manganese oxide
- Lithium cobalt oxide
- Lithium iron phosphate
- Lithium nickel manganese cobalt oxide
- Lithium titanate
- Lithium nickel cobalt aluminum oxide

Lithium manganese oxide is the most popular among watch batteries. This material is safer to work with and is non-volatile. It produces a higher voltage than other types, but it has the shortest lifespan of all lithium batteries (two to three years).

If you've ever wondered what chemicals are found in watch batteries, now you know. The three chemicals you'll find are mercury, silver oxide, and lithium. Mercury is the most toxic of the three chemicals and is banned in most countries.

Silver oxide and lithium, on the other hand, are safer options. However, they should be handled with care as they pose serious health risks if they come into contact with the skin, eyes, and gastrointestinal tract (if swallowed).

Silver oxide is the main chemical used to make alkaline watch batteries. Silver has a low toxicity level and is highly resistant to corrosion from water seeping into the battery compartment. These chemicals are only harmful if they leak. Therefore, it is very important to ensure that the battery compartment of your watch is sealed.

In teaching chemistry, each subject must be taught in a specific and modern way. In teaching each lesson to young students, additional types of education and training are also provided.



Teaching chemistry using research and teaching results in the process of teaching gives very effective results in students' theoretical and practical knowledge. This leads to 15-20% positive results compared to ordinary teaching methods.

Therefore, from the above considerations, it can be concluded that the teacher's task during the training process is to organize the activities of students in such a way that they, as much as possible, apply the knowledge they have acquired in their general and specialized subjects in practice, mobilize them to form skills to perform the assigned tasks. At this stage, processes are designed, from explanatory notes, drafts of working materials to the final one, which serves to improve the professional quality of students.

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