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Methodology of Increasing and Developing Students' Interest in Teaching Chemistry With the Help of Ict. (on the Example of the Topic, "Types of Crystal Lattices")

Fayzulloyeva Sadokat Furqat kizi*
Teacher at the Asian International University
sadokatfayzulloyeva67@gmail.com

***Correspondence** :
Fayzulloyeva Sadokat Furqat kizi
sadokatfayzulloyeva67@gmail.com

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Abstract
In three articles, the load on chemistry of 8th grade school students was studied. The speed of students' access to information and communication technologies was determined. The emergence of images of atoms, external images, modern pedagogical technologies, which are difficult to create on the topic. Modern education increasingly integrates Information and Communication Technologies (ICT) to enhance student engagement and understanding. In chemistry, abstract topics like crystal lattices (ionic, covalent, metallic, and molecular) can be difficult to visualize. ICT tools help transform these concepts into interactive and engaging learning experiences, thereby increasing students' interest and motivation.

Keywords
diamond, graphite, silicon, boron, non-polar, simple substances

Introduction
Today, information and communication technologies have covered our entire life, and at the same time they are one of the main pedagogical researches in increasing the efficiency of the educational process. This process is a necessary factor in the assimilation of deep knowledge by students. Nowadays, modern pedagogical technology has become an important tool in the development of students' consciousness and has taken a leading place in our social life. It is widely used in the development of the consciousness and worldview of schoolchildren, in the independent implementation of chemical processes, in solving problems, in the classification of inorganic and organic substances [1,2,3].

In the lesson, before explaining a new topic, the teacher asks students questions about chemistry on the topic covered. Students participate in the question-and-answer session based on their knowledge. The design method is widely used to reinforce the task given to the homework, because the teacher assigned the children to collect information about covalent bonds, polar and non-polar bonds. With the help of information and communication technologies, the types of atomic, ionic, molecular and metal crystal lattices were explained to schoolchildren [4,5]. The appearance and physical properties of solids depend on the nature of the chemical bonds between the particles that make up the substance.

In solids, the particles (ions, atoms, molecules) that make up this substance are arranged in a regular manner (except for amorphous substances). In crystals, the regular arrangement of particles that make up this crystal is called a "crystal lattice". Crystal lattices are divided into different types depending on what particles they are made of. Types of crystal lattices:

1. Ionic crystal lattices. Structures in which positive and negative ions are located at the nodes of the crystal lattice and there are ionic bonds between them are called ionic crystal lattices. For example, salts of typical metals (NaCl, KNO3, CuSO4), alkalis (NaOH, KOH, Ca(OH)2) and some oxides [6,7,8].

2.Atomic crystal lattices. Structures in which individual atoms are located at the nodes of the crystal lattice and there are covalent bonds between them are called atomic crystal lattices. For example, simple substances such as diamond, graphite, silicon, boron.

3. Molecular crystal lattices. Structures in which individual molecules are located at the nodes of the crystal lattice are called molecular crystal lattices. For example, simple substances in which covalent non-polar molecules are located at the nodes of the molecular crystal lattice (solid H2, N2, O2, Cl2, P4, S8), molecules with covalent polar bonds (solid H2 O, HCl, CO2, H2 S).

4. Metal crystal lattices. Structures in which individual atoms and positive ions are located at the nodes of the crystal lattice and there are metallic bonds between them are called metal crystal lattices. For example, all metals (Na, Ba, Zn, Al, Cu, Au).[1]

Methods

1. To improve students' understanding of crystal lattice structures
2. To develop visual and spatial thinking
3. To increase motivation and active participation
4. To integrate digital literacy into chemistry learning

ICT Tools and Resources

Use a combination of the following:

1. 3D visualization software (e.g., molecular modeling tools)
2. Interactive simulations (virtual labs, crystal structure simulations)
3. Multimedia presentations (animations, videos)
4. Online platforms (quizzes, gamified learning apps)
5. Augmented/Virtual Reality (AR/VR) (if available)

Teaching Methodology (Step-by-Step)

Stage 1: Motivation and Engagement

Method: Problem-based introduction with multimedia

1. Show a short animation/video of crystal structures forming
2. Ask guiding questions:

"Why do salt crystals have a regular shape?"

"What determines the properties of diamonds vs graphite?" Use animations to spark curiosity and connect theory with real-world examples[9,10].

Results and Discussions

Better Knowledge Retention

Information learned through interactive and visual methods is retained longer. Students can more easily recall and apply knowledge in new situations. The purpose of applying the collaborative learning method in teaching the topic "Types of Crystal Lattices" with the help of ICT is to create an active, student-centered learning environment that enhances both academic understanding and key skills development. • Encourage students to actively participate in the learning process [11,12]. Make lessons more interactive and interesting through group activities and ICT tools

Positive Attitude Toward Chemistry

Students begin to perceive chemistry as: Interesting and relevant. Less abstract and more understandable.Increased likelihood of choosing chemistry-related subjects in the future

In the cluster method, groups take turns explaining the knowledge they have accumulated. They write on the board and explain. The teacher monitors to ensure that ideas are not repeated. The fact that the ideas are interesting and lead to great interest and heated discussions among the participants indicates that the students have mastered the knowledge of the subject well.

In the Eureka method, students are given various terms in a table to test their knowledge. They consolidate their knowledge by combining the terms with their answers.

Information and communication technologies help to explain the topic in 3D format. How students mastered their knowledge is determined by monitoring the students' answers to the questions. Collaborative learning is an instructional method in which students work together in small groups to achieve shared learning goals. When combined with ICT, it becomes a powerful approach to increase engagement and deepen understanding of complex topics such as "Types of Crystal Lattices." The collaborative learning method supported by ICT transforms students from passive listeners into active participants. By working together and using digital tools, students gain a more meaningful and lasting understanding of crystal lattice structures [13].

Students who completed the homework in the group and actively participated in the process of consolidating the new topic were given an excellent grade, and students who participated only in independent work or in the question-and-answer part were given a good grade. There were also students in the group who participated only in the question-and-answer part.

We determined the experimental and test groups in teaching the topic of "Crystal lattice types" in chemistry to 8th grade students of general education schools in the pedagogical technology mentioned in this article, and took a test from them for the expected results [14].

There were 22 students in the groups, and we divided the group into teams, each team fought for its own achievement. They were evaluated taking into account the students' activities during the lesson.

These indicators show the teacher the knowledge gained by the students in the lesson, the level of mastery of the subject. Based on this, the teacher conducts repetition work with students who have shown low indicators in subsequent lessons. Through repetition, the teacher can again increase mastery [15].

In some cases, it is also due to the fact that some students have low interest in chemistry. Numbers with low indicators appear in the group.

Conclusion

The study shows that the effectiveness of ICT integration depends mainly on the adequate training of teachers, reliable technological infrastructure and the resolution of accessibility problems.

The integration of ICT in teaching chemistry, particularly in topics like crystal lattices, significantly enhances students' interest and understanding. By combining visualization, interactivity, and digital collaboration, educators can transform traditional lessons into dynamic and engaging learning experiences.

According to the results of our analysis, the students' mastery of knowledge and skills in chemistry increased by 33% compared to the indicators of the test group students.

We witnessed a significant increase in knowledge and skills when difficult topics in chemistry were taught to students using information and communication technologies and pedagogical technologies.

The application of Information and Communication Technologies (ICT) in teaching the topic “Types of Crystal Lattices” is expected to produce the following outcomes:

Methods to Increase Interest

1. Visualization: Abstract concepts become concrete
2. Interactivity: Students actively participate rather than passively listen
3. Gamification: Learning becomes fun and competitive
4. Real-world connections: Use examples (salt, metals, diamonds)
5. Autonomy: Students explore content at their own pace

Increased Student Interest and Motivation

1. Students show greater enthusiasm for learning chemistry due to the use of interactive tools, animations, and simulations.
2. Abstract concepts become engaging and easier to explore, reducing boredom and passive learning.

Improved Understanding of Abstract Concepts

Students gain a clearer understanding of: Ionic, covalent, metallic, and molecular lattices Spatial arrangement of particles Relationship between structure and properties. 3D visualization helps overcome difficulties in imagining microscopic structures.

Overall, the integration of ICT into teaching crystal lattice structures leads to a more engaging, effective, and student-centered learning process, resulting in both improved academic outcomes and the development of essential 21st-century skills.

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