Czech
Journal of Multidisciplinary Innovations
Volume 20, August, 2023.
ISSN (E): 2788-0389
Website: www.peerianjournal.com
Email: editor@peerianjournal.com

Use virtual laboratories and information technology to teach chemistry in academic lyceums.

Badalboyeva Dilorom Sobirjon qizi
Teacher of chemistry at the Andijan State Medical Institute in Andijan region

Annotation. This article explores the integration of virtual laboratories and information technology (it) in teaching chemistry within academic lyceums. It studies the benefits of using virtual laboratories, defines the methods of their implementation, presents the results of their application, discusses their consequences and provides conclusions and suggestions on the optimization of chemistry education.
Keywords: Virtual laboratories, information technology, chemistry education, academic lyceums, interval education.

In recent years, thanks to technology integration, the education sector has witnessed significant progress. One of the most notable programs is the use of virtual laboratories and information technology to improve the teaching of subjects such as chemistry. Academic lyceums, secondary education institutions can greatly benefit from introducing these tools into teaching styles. This article is devoted to the use of virtual laboratories and horses in the context of chemistry education in academic lyceums.

Integrating virtual laboratories and information technology in chemistry teaching involves several basic methods:

- Virtual Labs: Virtual labs simulate real experiments in a digital environment. Students can control variables, track reactions and collect data, reproduce traditional laboratory experience without the need for physical equipment.
- Simulations and Interactive Software: It facilitates the use of simulations and interactive applications, allowing students to visualize complex chemical concepts. Interactive animations help to effectively explain abstract theories, molecular structures, and dynamic reactions.
- Online resources: online platforms offer a lot of resources such as video lectures, ebooks, and interactive quizzes. These resources are compatible with different teaching styles and provide opportunities for self-study.
- Collaborative tools: it allows you to learn together by editing online discussion forums, videoconferencing, and collaborative documentation. Students can participate in group projects, discussions and peer evaluations, which will promote a sense of community even under virtual circumstances.

The introduction of virtual laboratories and horses in chemistry training has yielded promising results:

In recent years, the use of virtual laboratories and information technology to teach chemistry in academic lyceums has become increasingly common and effective. These tech tools offer a wide

Czech
Journal of Multidisciplinary Innovations
Volume 20, August, 2023.
ISSN (E): 2788-0389
Website: www.peerianjournal.com
Email: editor@peerianjournal.com

variety of benefits that improve the learning experience for both students and teachers. Some methods of virtual laboratories and it is being used in chemistry training:

- Presence and flexibility: Virtual labs allow students to access experiments and simulations from anywhere they are connected to the Internet. This flexibility is especially beneficial for students who cannot enter physical laboratory facilities or who need to consider experiments beyond their usual classroom hours.
- Safety: some chemical experiments involve hazardous materials or conditions. Virtual labs provide students with a safer environment for risk-free learning related to working with hazardous substances.
- Economic efficiency: the establishment and maintenance of physical chemistry laboratories can be costly. Virtual labs significantly reduce the costs associated with the purchase and storage of lab equipment and chemicals.
- Visualization: Virtual laboratories can provide complex imaginations of molecular structures, reactions and events that can be difficult to observe in traditional laboratory conditions. This strengthens students' understanding of abstract concepts.
- Repeating the experiment: in virtual labs, students can repeat the experiments several times to track the effects of different variables. This helps to enhance learning and deepen our understanding of experimental procedures and outcomes.
- Real-time Feedback: Virtual laboratories often provide instant information about students' movements and decisions during the experiment. It helps students learn from their mistakes and make adjustments in Real Time.
- Strengthening the concept: interactive simulations and animations help to strengthen theoretical concepts taught in the classroom. These visual weapons make it easy for students to understand complex ideas.
- Remote learning: Virtual laboratories are especially important during a pandemic or in remote areas with limited resources, where personal lessons are not possible.
- Data Analysis: Virtual labs often produce large volumes of data. This allows students to develop the skills to analyze and interpret the information they need in modern research.
- Preparation for higher education: when students move to higher education, they may encounter virtual laboratories and simulations used in advanced chemistry courses. Getting acquainted with these tools in previous education can better prepare them for university education.
- Teacher Resources: Virtual laboratory platforms often come with pre-designed experiments, teacher guides, and assessment tools. This helps teachers save time in customizing and evaluating experiments.
- Participation: the interactive nature of virtual laboratories can attract students more effectively than traditional lectures or static textbooks. This active engagement can lead to a growing interest in the topic.

However, it is important to note that virtual laboratories are not fully a successor for practical experimentation in a physical laboratory. Some skills, such as manual epoch and direct monitoring of chemical reactions, can only be achieved through traditional laboratory work. Therefore, a

Czech
Journal of Multidisciplinary Innovations
Volume 20, August, 2023. ISSN (E): 2788-0389
Website: www.peerianjournal.com Email: editor@peerianjournal.com

balanced approach that integrates virtual labs with occasional physical experiments is often recommended for comprehensive chemistry education.

When performing virtual laboratories and horses in chemistry training, teachers must ensure that the selected tools match the curriculum's educational goals, provide specific instructions for students and provide technical support when needed.

Understanding concept: complex concepts become more accessible through visualization and interactive models. Students can observe molecular interactions and dynamic changes, which leads to better understanding and retention.

Convenience and flexibility: IT-integrated learning provides students with the flexibility to learn at their own pace and access resources from anywhere. This is especially useful for academic diverse classes.

Advanced training: students will have the necessary technical skills in the digital era, such as data analysis, critical thinking in experimental design, and the ability to use information technology tools for educational purposes.

The addition of virtual laboratories and information technology to chemistry also brings important points:

Digital literacy: both teachers and students need adequate training in the efficient use of virtual laboratories and information technology tools.

Additional role: although virtual laboratories enhance the learning experience, they should complacency, not replace traditional practical experiences, because practical skills are of decisive importance.

Equality: Ensuring equal access to information technology resources is essential to preventing the creation of educational imbalances based on students' technological capabilities

Conclusions and suggestions:

In conclusion, the integration of virtual laboratories and information technology into teaching chemistry within academic lyceums has many advantages, including increasing activity, understanding concepts, adaptability and developing skills. Its effectiveness optimization:

- Invest in training: provide teachers with the right training to make the most of virtual laboratories and information technology tools.
- Hybrid approach: Combine virtual labs with traditional practical training for holistic learning experience.
- Equal access: make sure all students use the necessary technologies to prevent imbalances.

By adopting these proposals, academic lyceums can use the power of virtual laboratories and information technology to create an environment of stimulating and effective chemistry education that prepares students for the demands of the modern world.

Adaptations.

1. A.A. Petrov, A.T. Troshchenko, H.V. Balyan. Organic chemistry. Moscow. "Higher School" 1987 For students of chemistry. technological specialties.
2. A.I. Artemenko Organic chemistry M. "Higher School". 2002.
3. I.R.As karov, Yu.T.Isaev, A.Gh.Maksumov, Sh.Kyrgyzstan. Organic chemistry. Publishing house named after Gofur Gulom. Toshknt 2012.

Czech
Journal of Multidisciplinary Innovations
Volume 20, August, 2023.
ISSN (E): 2788-0389
Website: www.peerianjournal.com
Email: editor@peerianjournal.com

4. N.G.Rakhmatorov, X.T.Omonov, SH. M.Mirkomilov "Methods of Teaching Chemistry" T., "Teacher" 2013.
5. R.SH. Berdiqulov, F.A.Alimova, SH. M.Mirkomilov Vozmojnosti kompьyuternых texnologiy pri izuchenii osnov texnologicheskix protsessov ximicheskogo production. Voprosы gumanitarnых teaching. Nauchnыy jurnal No2(46), Moscow, 2010 g
6. Virtual chemistry laboratory (version 1.6.4). The IrYudiumproject's. founded by the National Science Foundation 2010.