

**Review Article**

**CHEMISTRY WEB QUEST DEVELOPMENT FOR STUDENTS OF ENGINEERING SPECIALTIES**

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**Abstract**

The article describes the method of teaching research activities of students of a technical university - a web quest. Based on the methodological literature, the author showed how it is possible to fully organize educational research activities on the basis of a web quest or use it as a motivating stimulus for conducting research in a traditional form, and also highlighted the structure and content of this method, developed and described web quest on the topic: "Classes of inorganic compounds, molar mass." The method was tested for first-year students of the branch of Tyumen Industrial University in Surgut.

**Keywords:** method, web quest, research, evaluation, motivation.

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**INTRODUCTION**

Innovations in higher education are primarily accompanied by the creation of new educational standards, updating and revising curricula, the content of educational and didactic materials, textbooks, forms and teaching methods. One of the most effective and active is the project method. A special type of designing student research based on Internet resources is a Web quest. You can fully organize educational research activities based on a web quest or use it as a motivating stimulus for conducting research in a traditional way.

The term "web quest" was proposed by B. Dodge, professor of educational technology at the University of San Diego (USA) (1995).

It is known that today the web-quest method, thanks to its pedagogical potential in education, is again being introduced into the practice of higher education, publications are appearing devoted to the use of educational projects in various disciplines.

The development of methodological support for the web quest involved many teachers.

Romantsova, Yu.V. offers a Web quest as a way of enhancing the learning activities of students, a method of developing abilities to solve arising independently and in a team problems doing it using the Internet (Romantsova, 2018).

Albegova, I.F., & Shamatonova, G.L. consider the web quest as an innovative information and communication technology in education, as a need, a consequence and indicator of the development of the information society (Albegova & Shamatonova, 2009).

The use of web-quest technology in the independent work of students of a pedagogical university in the disciplines of the professional cycle, reveals the specifics of the independent work of students of a pedagogical university, describes the technology of working with web quests Osadchuk OL (Osadchuk, 2012).

Mirnova, M.N., Kolomiytsev, M.A., Asaturian, M.G., & Starikova, K.V. use web-quest technologies in extracurricular activities of schoolchildren, the authors developed and implemented methodological support extracurricular and extracurricular activities of students in distance learning (Mirnova, et al, 2016).

The experience of foreign colleagues is also interesting.

Chang, C. S., Chen, T. S., & Hsu, W. H. Attempted to integrate WebQuest with mobile learning for the environment (Chang, et al, 2011).

Allan, J., & Street, M. Described a methodology for integrating web quests in higher education (Allan, & Street, 2007).

All teachers note the positive contribution and potential of the web quest for integration into the educational process and came to the conclusion about the potential of the web quest as a reference-oriented interactive teaching and learning tool. Web quest allows you to motivate students to study any problem with an ambiguous solution, thereby developing their ability to work both individually and in a group to search for information and transform it into more complex knowledge.

Web quest (webquest) is a problematic task with elements of a role-playing game, for which information resources of the Internet are used. It is a project based on finding information on the Internet. Paying tribute to the development of theoretical and applied aspects of the problem, we note that the web quest for chemistry lessons as a means of forming the professional competence of students and, in particular, the future engineer, has not yet been the subject of independent research.

The purpose of the study is to develop an example of a web quest for chemistry lessons in a higher educational institution with the aim of developing the research skills of engineering students.

**METHODOLOGY**

The research base is a branch of the Tyumen Industrial University, Surgut Institute of Oil and Gas. Participants - 1st year students of the faculty of "Oil and Gas Business".

We describe the methodology for conducting a chemistry chemistry web quest on the topic: "Classes of inorganic compounds, molar mass."

Stage 1. Introductory part. Preparatory work is being carried out: getting to know the topic, posing the problem, updating knowledge, getting to know theories and hypotheses. The distribution of roles.

Students are motivated by including them in research and solving socially and personally significant real problems.

Stage 2. Description of the research algorithm. The task should be clear, interesting and doable. It consists of questions-tasks, the answers to which can be found on the proposed sites; spelled out the problem that needs to be solved; the position that needs to be protected is defined, and other activities that are aimed at processing and presenting the results based on the collected information are indicated.

Stage 3. Main part. The task necessarily includes a hypothesis, which is verified by data, as a result, a scientific report is drawn up.

A detailed description of the steps that students must follow when completing the assignment. Indication of the main thematic links that will help you find the information you need. Providing supporting materials to help organize search work more efficiently.

Stage 4. Assessment Stage. At this stage, the understanding of the task, the reliability of the information used, its relation to a given topic, the consistency, structured information, certainty of positions, approaches to solving the problem, and professionalism of the presentation are evaluated. Both teachers and students participate in evaluating the results through discussion or interactive voting. All the results are evaluated, showing not only the learning outcomes, but also the efforts made by students to construct new knowledge, and their progress in learning. Types of assessment can be individual and group.

## RESULTS

Based on the methodological literature that we studied, we present an example of a chemistry chemistry web quest that we conduct for first-year students at a branch of the Tyumen Industrial University.

Theme of the web quest: "Classes of inorganic compounds, molar mass"

Stage 1 gives a brief description of the classes of inorganic compounds, theoretical material and indicates the purpose of the web quest - to consider the classes of inorganic compounds, to learn how to calculate the molar mass.

At stage 2, questions-tasks are offered for all microgroups:

1. Write down to what class of inorganic compounds these substances belong and give them the names:

№	Formula	Class	Title
1	Fe <sub>2</sub> O <sub>3</sub>		
2	FeO		

3	HCl		
4	K <sub>2</sub> SO <sub>4</sub>		
5	Al(OH) <sub>3</sub>		
6	H <sub>2</sub> SO <sub>4</sub>		
7	Fe <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>		
8	Na <sub>2</sub> SiO <sub>3</sub>		
9	Mn(OH) <sub>2</sub>		
10	Mg(NO <sub>2</sub> ) <sub>2</sub>		

2. Formulate the following compounds:

№	Name	Formula
1	Aluminum sulfide	
2	Sodium carbonate	
3	Iron (II) orthophosphate	
4	Hydrobromic Acid	
5	Nitric oxide	
6	Nickel (II) hydroxide	

3. Calculate the molar mass of potassium carbonate, silver bromide.

4. Calculate the molar mass of the equivalent of sulfuric acid, calcium hydroxide.

5. Calculate how much 2 moles of carbon monoxide (II) occupy under normal conditions, what is their mass, and how many carbon monoxide (II) molecules are in this volume.

Each team is encouraged to formalize the result of the study in a specific form, for example, in the form of a PowerPoint presentation or essay. A number of questions are proposed to help, which will help prepare a report.

In the section "Operation" explains what order it is desirable to complete a web quest. First, individual or group forms of work are offered, then, verbally or in writing, it is necessary to present the point of view of a microgroup, which can radically differ from other opinions. In this case, each microgroup must answer the fundamental question posed in the review.

Again, only in the form of a list, options for presenting the results of discussions in microgroups are indicated: PowerPoint presentation; multimedia presentation; oral presentation and essay.

Students need the following tools: PowerPoint program for preparing slide shows, links to Internet resources, an encyclopedia, additional resources.

At the assessment stage, an assessment form is proposed, the form includes a list of students, assessment criteria and a general assessment: "satisfactory", "good" and "excellent".

Table 1 Web quest rating

NAME	UNDERSTANDING OF THE ASSIGNMENT	TASK PERFORMANCE	RESULT	MARK

## CONCLUSION

Thus, such chemistry web quests allow teachers to:

- organize educational and research activities in a non-traditional form;
- allows each student, in spite of teamwork, to choose for himself a convenient individual pace and style;
- develops the research position of students based on active teaching methods, etc.
- develops the skills of human information activities;
- develop the creative potential of students;
- implement the principle of intersubject communications in training;
- connects the solution of research problems with life surrounding social and physical reality;

- to form a positive emotional attitude to the process of cognition, increase the motivation of learning, the quality of assimilation of knowledge on the subject;
- form universal educational activities;
- Forms teamwork skills (planning, distribution of functions, mutual assistance, mutual control).

This method allows the teacher to create conditions for the effective use by students of the information found on the network, the formation of professional competencies: mastering the methods of collecting, processing and interpreting the information obtained using modern information technologies; methods of protection, storage and presentation of information, skills to work with various sources of information for the purpose of self-education and development of already acquired knowledge, skills, taking into

account changes in society and technologies (Shepelyuk, 2017).

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