

DEDUCTION OF CHEMICAL THOUGHT

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Abstract: *it is necessary for developing self-education of students at the educational process. On self-education putting the issue, resolution, self-control and assessment of ways should be chosen by the students. It must be developed the features of students thinking to improve critical thinking. The process of lesson is developed by the operations of thinking. It can be done by discussion of teachers with some questions such as "why", "what was the purpose", "what was the reason", "what was the result". Teachers should be eurasiatic, persuade problem case, criticism, discussion of guessing, noticing problems on them independently and create their plans to solve these issues and prevent student's thinking. So it will help to be interesting and efficient for students thinking.*

Keywords: *deductive, pedagogue, chemistry, chemical, component, technology, result, information, experiment.*

ДЕДУКЦИЯ ХИМИЧЕСКОГО МЫШЛЕНИЯ

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Аннотация: *активизация самостоятельного образования учащегося в процессе обучения - актуальная задача сегодняшнего дня. Самостоятельное образование характеризуется постановкой и решением вопроса, выбором и выполнением самоконтроля и самооценки самим учащимся. Для развития логического мышления учащегося необходимо формировать особенности мышления. На основе мыслительных операций активизируется процесс занятий. Реализовать данную задачу можно посредством вопросов учащегося, как «Почему?», «Зачем?», «С какой целью?», «По какой причине?», «Почему получили именно этот результат?». Создание эвристических, проблемных ситуаций, организация критики, сомнений, обсуждений, самостоятельного нахождения и решения проблем, разработки и защиты собственных проектов способствуют содержательности и рациональности мышления учащихся.*

Ключевые слова: *дедукция, педагогика, химия, химический, компонент, технология, результат, информация, эксперимент.*

Acquiring results of the process of education is re-organization internal and external activities expediently. Education- teaching a man to another is to give knowledge and skills. Knowledge, abilities and skills are as a result of the learning process. The problem of the process of acquiring knowledge was learned by P.Ya. Galperin and N.F. Talizina [1, 95]. They developed the process of the theory of the formation of mental actions step by step. The authors gave explanation that mental actions appear with the help of external speech, mental form and idea .The first step of mental actions finds expression in picture. The second step of mental actions consists of an imagination of the students' mental with loud. The third step will appear in the mind of subjects with the help of imagination, concept, law, structure, peculiarity, operation, way. As is generally known, Information which students are presented is being more an incredible speed as well as the need to update their outdated very quickly and becoming self -evidently.

In the fourth step, the actions that done will be carried out without any sound in the action plan.

The fifth step is to carry out their activities mentally [1, 115].

I can be seen distinctly, education which is based on remembering on the basis of materials and keeping in mind is being responsible for nowadays' students partly. Learners are always acquired updated information independently and in order to adapt after the study, one of the rapidly growing scientific and technological property of the development of the ability to give you the opportunity to leave behind the issue of the quality of the content is growing in the first stage. The success of acquisition at the process of education is up to the following [2, 23]:

1. The content of education;
2. The presence of lesson plans, programs, textbooks and educational supplies;
3. The development of educational methods;
4. Teacher's skill;
5. Students individual psychological features.

Researchers have shown that different individual typological features of education for students can not be easy to create optimal conditions. However, increasing the efficiency of the development of education is crucial in using of nontraditional teaching methods [2, 44].

According to educational activities of students as follows, the methods of education are divided:

1. Expository - instruction method. This method is reproductive method, activities are carried out by the teacher on it. Pupils acquire knowledge get acquainted at the process of education.

This method is one of the most wide- spread methods, there is perfect way, this is synopsis - planning education. On reproductive method students restore in memory, accept taken knowledge as copy.

2. Problem teaching method- is organized by teacher, it is productive nature

Students improve their knowledge and skills by this method. One of the perfect ways of this method is to organize efficient games.

3. Partly searching method. It is organized under the teacher. It is productive features, on the method student only works.

4. Researching method. It is organized without helping of teacher. It depends on students' researches, thinking, knowledge, deductive thinking independently.

"National training program" highlights the new technologies into the educational process. Pedagogic technology - is a systematic approach into the educational process, the organization of the educational process technical and human capacity are taken into account and their aptitude will be the basis of creating optimal forms of education [2, 18].

It can be divided the pedagogical technologies as follows:

- Social demands that imposed on the participants of the education and training;
- Training of the members of the cooperation;
- differentiating the educational process;
- Creativeness.

Students make self-educating, self-developmental training is the main duty of today's educational institutions.

It is necessary for developing self-education of students at the educational process. On self-education putting the issue, resolution, self-control and assessment of ways should be chosen by the students.

It must be developed the features of students thinking to improve critical thinking. The process of lesson is developed by the operations of thinking. It can be done by discussion of teachers with some questions such as "why", "what was the purpose" , "what was the reason" , "what was the result". Teachers should be eurasiatic, persuade problem case, criticism, discussion of guessing, noticing problems on them independently and create their plans to solve these issues and prevent student's thinking . So it will help to be interesting and efficient for students thinking.

Each person in general is educated as free-thinking person in democratic society. If pupils don't learn free-thinking, the result of given education will be low. Of course, knowledge needs but the rights to apply the knowledge, thinking independently and making the right decision in any situation are great wealth.

The aim of present educational institutions is to teach young generation to free-thinking. Of course, there are individual differences in thinking. Knowing the thought-human mind.

The mind can be divided into the following features.

1. Meaningfulness (richness, deepness, the richness of judge)
2. The breadth of thinking (broad and narrow) and deepness depend on the continuance of theory and practice. Practice is criterion for truth.
3. The independence of thinking - the ability for using general practice, having personal thinking, making an attitude.
4. The initiatives of mind.
5. The flexibility of mind, function to avoid from the standard solution.
6. The criticism of mind, the ability to evaluate their responsibility, measuring it.
7. The productivity of mind.
8. The sequences of thinking.
9. The speed of thinking.

The thoughts of some scientists and scholars are given.

"The great minds have purposes, others have wishes"(Washington Irving)

"Mind is the system of well - organized knowledge" (K.D. Ushinskiy).

All mentioned features above will change. The independence of thinking and criticizing is necessary in creative work, it provides the productiveness of intellectual activities.

Developing the creative ability and forming imagination is one of the main obligations of modern education.

The Deductive conclusion in chemistry. The chemical deductive conclusion which provides to improve chemical knowledge is used for encouraging students chemistry, following towards the deep philosophical view

of chemistry, getting intention to learn out of questions that are interested as much as possible, using from scientific common literatures during the study.

Chemical deductive conclusion - can be used as written - orally form of controlling students' knowledge. The process of students' thinking is activated on carrying out chemical deduction; the states of the subject are remembered and consolidated. Chemical deduction fills the learning theme with extra information and helps to understand the use of chemical knowledge in everyday life, producing medicine and agriculture.

Chemical deduction provides with the dependence with life of the subject, carries out the relativeness of inter- subjects, broadens outlook and gets motivated to learn it.

Chemical deduction can do not only the way of checking knowledge, but also teaching functions, after having written the comments on topic, it can be self-controlled, controlled each other or organized on the done task. It can be used from multi median presentation on topic in order to do chemical deduction.

The chemical deductive ideas contain in interesting materials, cover one section or several sections. We gave some examples to carry out chemical deduction as follows;

1) The theme «hydrocarbons "from organic chemistry.

It is carried out after turning to such themes «alkenes», "alkanes", "cyclo alkaline", "diene - hydrocarbons". This way is one of the best ways of checking knowledge which students mastered on above themes and helps to consolidate the important concepts such as "homologous and isomers".

Chemical deduction is planned for conducting in one educational lesson and the section of hydrocarbons of organic chemistry is aimed for generalizing the knowledge. Conducting chemical, deduction can be arranged for working with individual and pairs.

Pupils make notes with column form the main concepts of the theme "hydrocarbons". Teacher will read the information which belong to the concept whereas pupils will put a number simultaneously towards each of read information which belongs to the understanding of what you read. Pupils compare their answers with the right answers at the end of the thoughts and then control themselves.

- ▶ alkanes (2, 5, 16)
- ▶ alkenes (3, 8, 9, 10)
- ▶ alkynes (3, 6, 9, 10, 13, 14)
- ▶ diene - hydrocarbons (3, 8, 10, 11, 14)
- ▶ cyclo alkanes (3, 7, 5)
- ▶ isomers (1, 12)
- ▶ homologous (4)

Questions:

1. Any of two or more compounds with the same molecular formula but with different structure (isomers)
2. Another name of this hydrocarbons is paraffins (alkanes)
3. These hydrocarbons have the combination of reaction (alkenes, alkynes, cyclo alkanes, dienes)
4. A series of organic compounds in which two successive members are differ by CH_2 (homologous)
5. One representative of this line is called Marsh gas because it appears on marsh (methane – alkanes)
6. It is important substance to carry out Kucherov's reaction, which do hydrocarbons belong to it? (acetylene - alkynes)
7. Saturated hydrocarbons that have close chain (cyclo alkanes)
8. These hydrocarbons have sp^2 hybrid (alkenes, dienes)
9. Hydrocarbons which get colourless bromal water (alkenes, alkynes)
10. Hydrocarbons which get to polymerase reaction (diene - alkynes)
11. The derivatives of these hydrocarbons are used as raw materials to take synthetic materials (diene)
12. Butane and butadiene are..... mutually (isomers)
13. This substance can be in two ways, one of them is carbide way, which row does it belong? (acetylene - alkynes)
14. There are two π combinations of the structure of these hydrocarbons (alkene diene)
15. Another name of these hydrocarbons is naphthene (cyclo alkanes)
16. The general formula of these hydrocarbons is $\text{C}_n\text{H}_{2n+2}$ (alkanes)

2) On chemical deduction " Generalising the knowledge of the main classes of inorganic compounds"

After having finished the theme "the main classes of inorganic compounds", chemical deduction is carried out the aim of controlling the knowledge of properties of oxides, acids, bases, salts. Pupils develop identification skills of formulas of important classes with the help of this way and consolidate the knowledges of mentioned theme.

- ▶ oxides (2, 3, 5, 12, 13, 15)
- ▶ bases (4, 7)
- ▶ acids (6, 4)
- ▶ salts (1, 3, 9, 11)

► alkalis (4, 7, 8)

Questions :

1. This substance is used for making food in many cases and called common salt (salts)
2. These substances are generated from burning regular substances (oxides)
3. These substances are generated from the reaction of acids and bases (oxides H₂O, salts)
4. Corrosive potassium belongs to these classes (bases, alkalis)
5. They can be acidic , amphoteric sometimes indifferent (oxides)
6. Its combination is generated that belongs to this class while SO₃ is dissolved in water (acids)
7. These compounds consists of metal atoms and group of hydracid (bases and alkalis)
8. Water soluble basis are so called (alkalis)
9. These compounds are devided into 5 groups , they are medium , acid , basic, mixed, complex.(salts)
10. It is called "soda" at daily life (salts)
11. This compound are so called which consists of atoms of metal and acid residuals (salts)
12. General formula of these compounds is R_nO_m (oxides)
13. These compounds are generated from breaking up insoluble basis in water (oxides)
14. All metals don't react with these compounds, metals which stand on the left of hydrogen at the active side of metals can squeeze out hydrogen from them (acids)
15. It can be taken a clean metal by result of the return of these compounds with hydrogen (oxides)

Experimentation and its results. Experimental test has been carried out at the course " Inorganic chemistry "2nd course students of the course of method of teaching chemistry , the faculty of natural sciences of TSPU named after Nizami and course " burning issues of chemistry " students of improvement of pedagogic specialists' skill and re-training courses.

At the first experimental test, the average knowledge indicators are equaled by the indicators of students' progress that was the first course (academic years of 2015-2016) and carried out by dividing into groups. To learn the level of knowledge and mark on average, the notes of subjects which are **inorganic chemistry, physics, the techniques of chemical safety, general psychology** are based on.

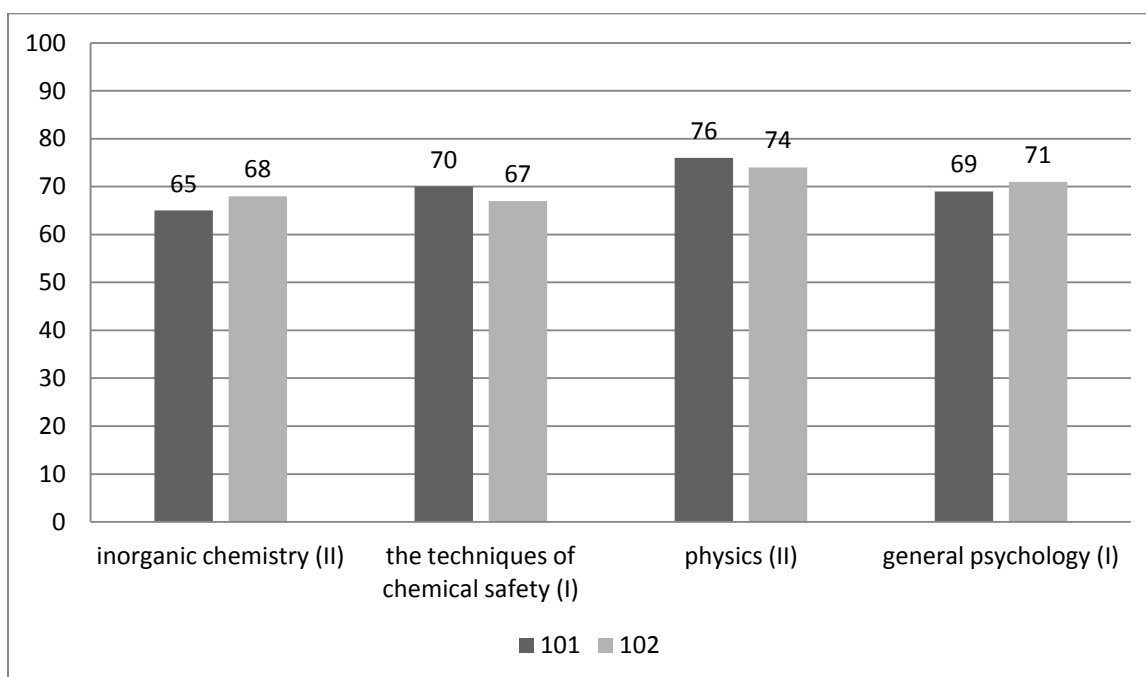


Fig. 1. The test of groups

There is given to ordinate the average scores of the groups at a 100- point system, for testing given subjects of selected groups at abscissa academic year of 2015-2016. There is given average scores of directions 101 KOM in the first column, 102 KOM in the second column at the context of each selected subject. "Chemical safety" and "General psychology" from the first semester, " inorganic chemistry" and "physics" are selected from the second semester of 2015-2016 academic year

For experiment, students were regrouped and called as "control" (H1) and "experimental"(H2). Then test was carried out on inorganic and organic chemistry. The results of the test have been reflected, as follows:

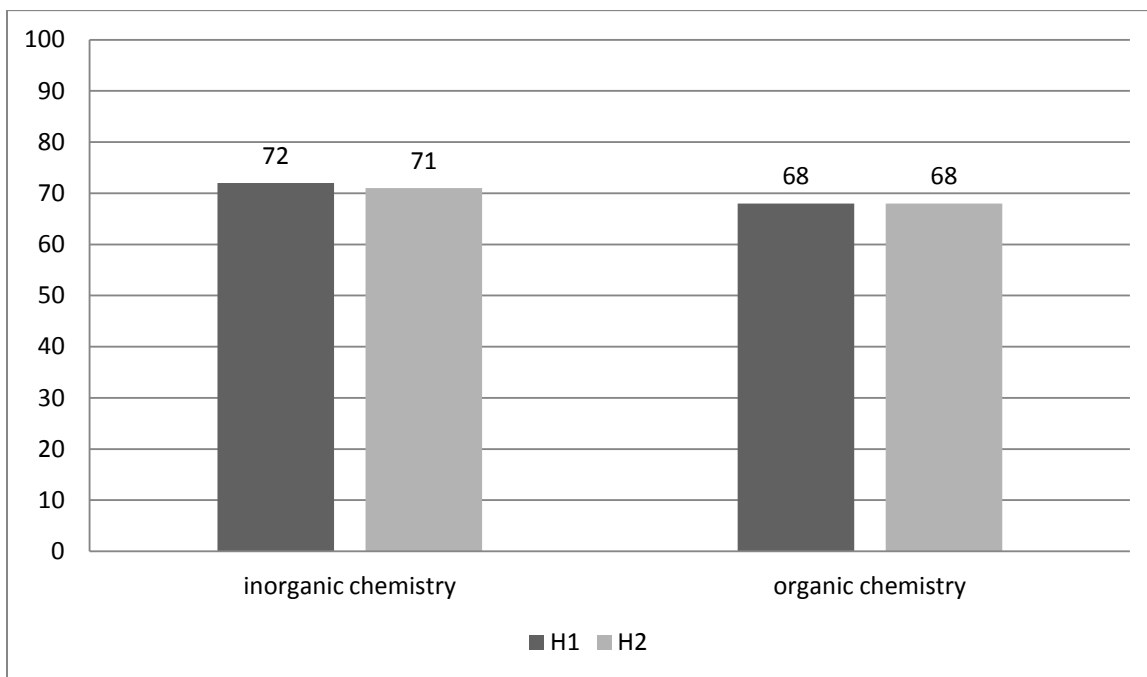


Fig. 2. Test for pedagogical experiment

Regrouped students were retested from "inorganic chemistry" and "organic chemistry" subjects which are taught in 2016-2017 years. In picture 2, an average collected scores are given at 100 scores system corresponding to ordinate and abscissa. Results are showing in accordance with the same average scores of groups.

During November - December in 2016, Chemical deduction was carried out in one week at experimental group. Control group was given task which was to learn by heart formulas.

In 2017, January, experimental test was carried out question-answer orally as a conversation. Checking the response for each question and students' thinking, speech, activeness has been observed. As a result, Experimental group's critical thinking, deductive view, chemical thinking indicated that they improved better rather than control group.

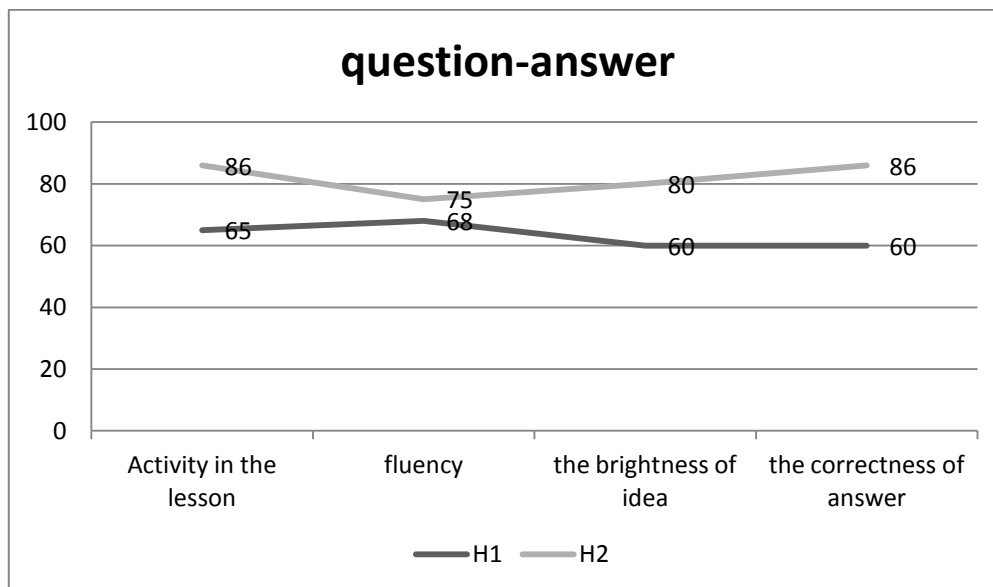


Fig. 3. Results of questionnaire after experimental testing

In picture 3 given percentage in ordinate, criteria in abscissa, indicators of an average percentage of groups are given in diagram in the basis of observing pedagogical experimental test which is carried out in contrasting-analytical method. In this graph, students activity, fluency, clarity are given in the basis of observation on account of an average percentage, whereas the accuracy of the answer is given based on comparison-analytical

method on account of an average percentage. The most important criteria determines the right answer and optimal decision, hereafter lessons will be made activeness and fluency

Second experimental test was carried out students of training course on "burning issues of chemistry". After having carried out chemical deduction, students' opinions were made clear by questionnaire.

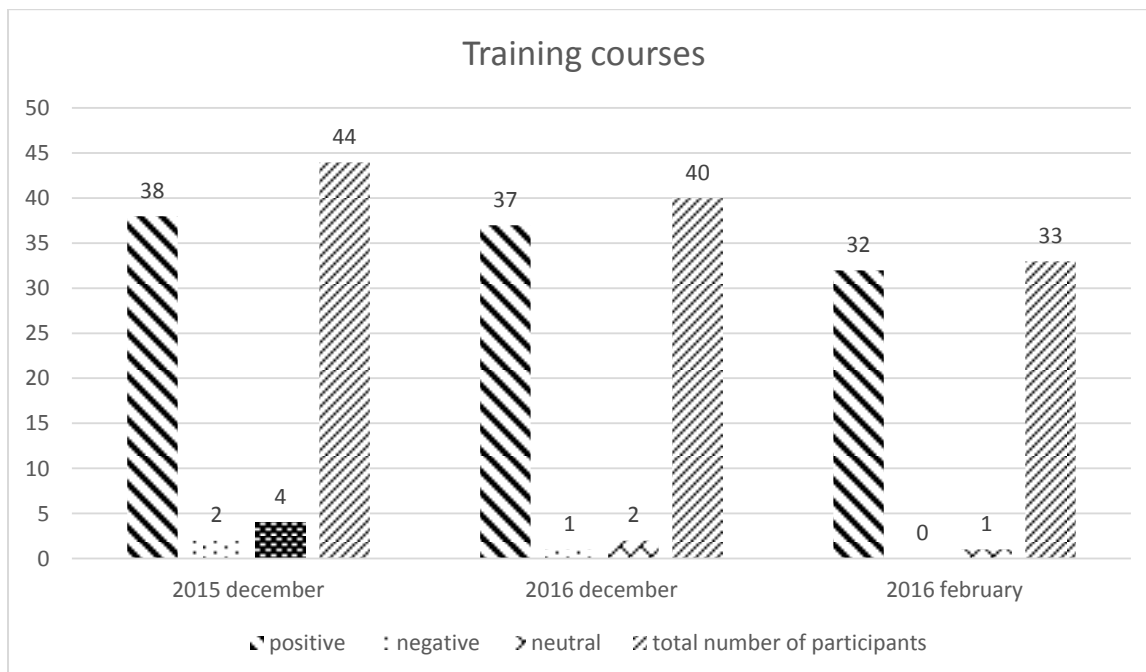


Fig. 4. The results of questionnaire in training students

This diagram is given the numbers of students in ordinate, the numbers of groups who have entered TSPU named after Nizami, PPKT, and MO during the past two years. (in accordance with; the 1st column- positive, the 2nd column- negative, 3rd column- neutral, 4th column- the total number of participants). Because of the fact that this experimental test is taken from chemistry teachers, their opinion polls are divided into three groups: positive, negative, neutral. Students' opinions have been determined by 4 criteria of previous test: activeness, fluency and teaching students to make right decision. According to the results of analysis of students' opinions include the majority of positive comments.

On the results of experiment, the main part of listeners claimed that carrying out chemical deduction would give positive results.

This kind of thinking way can be repeated by students in an unlimited way during course. When questions and concepts at daily thinking game (it can be called like this) are developed, students' thoughts and knowledge will consolidate more about the classes of inorganic compounds and help to learn knowledge of other themes. The results of chemical deduction are checked with the participation of students and recommended to correct mistakes and give explanation to inexactness.

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