DEVELOPMENTAL FACTOR OF CHEMICAL THINKING OF FUTURE CHEMISTRY TEACHERS

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ABSTRACT

In this article is written about continuous educational system, the difficulties of students' learning some knowledge and notions in inorganic chemistry course and the ways of solving them.

Keywords: Deductive, inductive, pedagogue, chemistry, chemical, component, technology, result, innovation, modernization, information, case, designing, experiment.

INTRODUCTION, LITERATURE REVIEW AND DISCUSSION

High educations gain first place on fundamentals of educational science which are belong to introducing new laws, theories, concepts and terms as well as providing future pedagogues perfectly, organizing educational purposes in demands of the times way to train perfect specialists.

In today's day, a lot of scientific-researches have carried out and been in progress in order to improve results of educational process. Observations have shown that the main attention is paid how to deliver available chemical knowledge which published and demonstrated literatures to anyone and in this area is being achieved excellent results. On the other hand, there are lacks of mastered knowledge which are demonstrating in practice.

While explaining properties of elements, mostly inductive teaching gains the main place. It needs to pay attention bellows at teaching elements.

- emanating valency in the generation of molecules;
- Causes of stable and unstable molecules;
- Special position of molecules;
- The state of being hybridization in the formation of molecules;
- The magnetic properties of the substances, electrical and thermal conductivity, solidity and softness of metals;
- explaining quantum numbers;
- Causes of movements or excited state of electrons in atoms;
- Chemical activity or reactive capability of elements.

On teaching these properties, firstly it creates difficulties for teacher, secondly pupils and students face difficulties to acquire the knowledge. Exactly, this kind of concepts will serve as the foundation of the chemical science. As a matter of fact, in the above mentioned and the meaning of many other properties, there is the basic theory of chemistry "the doctrine of atom structure "and "the theory of chemical connection". There are two theory of chemistry in teaching knowledge and concepts of elements of chemistry.

The formation of components of future chemistry teachers helps to be well educated specialists. Because chemistry teachers who do not have components when entering well equipped room,

they cannot achieve the result. In today's day, innovational educational technologies which are being invited may not give results.

Therefore, utilizing innovation technologies to learn chemical knowledge in modern way is the main problem of today's.

On the theme "Principles of deductive formation skills of future chemistry teachers in the modernization of the education" theoretical concepts of teaching inorganic chemistry at the scientific research that is being carried out modernization on the basis of informational communication and modern innovation technology. They are carrying the tasks of improvement to teach elements.

As is generally known, nowadays the capacity of scientific knowledge, concepts and imagination is growing rapidly. On one hand, this is providing the formational differences of new section and fields, on the other hand, it has destroyed ruling limits and creating integration process.

Due to the fact that, the directions of education "undergoing difficulties" such as the process of differentiation and integration are not able to reflect in education, causing some problems in the system of education. In particular, among the reflecting of education and scientific information comes into breaking.

In high education, this kind of interruption is being attempted to prevent by learning some special courses.

However, in lower levels of education (school, academic lyceum, colleges) in " space" educational programs " cosmetic repair" the development of scientific and methodological recommendations on individual topics, in some cases, it can be seen them trying to fill by relying on the results of scientific research. So it has to be gained them as episodic character, noted that the high level of efficiency is not enough. By this way, the formation of education materials is based on the principle of the encyclopedic nature of teaching is carried out on the basis of such kind of teaching principle may come across some difficulties as a result of the increase and collection of scientific information will be difficult to achieve the purpose of improving the process of learning.

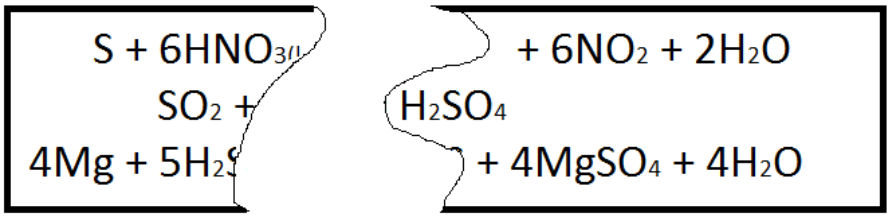
At present developing information and communication technology and using on a large scale are the global direction of world development. New technologies are developing day by day, as information process is growing rapidly in the world, preforming information resources is being paid attention particularly in education field.

For this reason, amendents of orientations of organizing educational process in particular, improving educational materials are needed. Establishing modern information technologies to educational process and using them are the most effective way to achieve the goal.

The methods " cluster, " brainstorming", "Pinboard" and technologies " case" and " designing" is the results of initial resources which demonstrate education process of chemistry have shown the main factor of improving the effectiveness of the course and carrying out independent education. Technology "case" can be used for teaching the themes of chemistry, when problematic situation, questions on topic which given to students that create a problematic situation in the process of lesson. This technology gives high efficiency. Therefore, to create

problematic situation and make questions it is recommended to use from extra materials such as producing from Republic natural chemical reserves, interesting scientific news, materials based on the history of chemistry, discovers of well-known chemists, chemical elements and its functions of organism.

For instance, problematic situation can be carried out, as follows:
After the exam, teacher found a billet from under the table which was written chemical reactions but the main places were torn up.



Task: restore these reactions which are space. It will be given 10 minutes.
The true answer.

$$S + 6HNO_{3(kons)} = H_2SO_4 + 6NO_2 + 2H_2O$$
$$SO_2 + H_2O_2 = H_2SO_4$$
$$4Mg + 5H_2SO_{4(kons)} = H_2S + 4MgSO_4 + 4H_2O$$

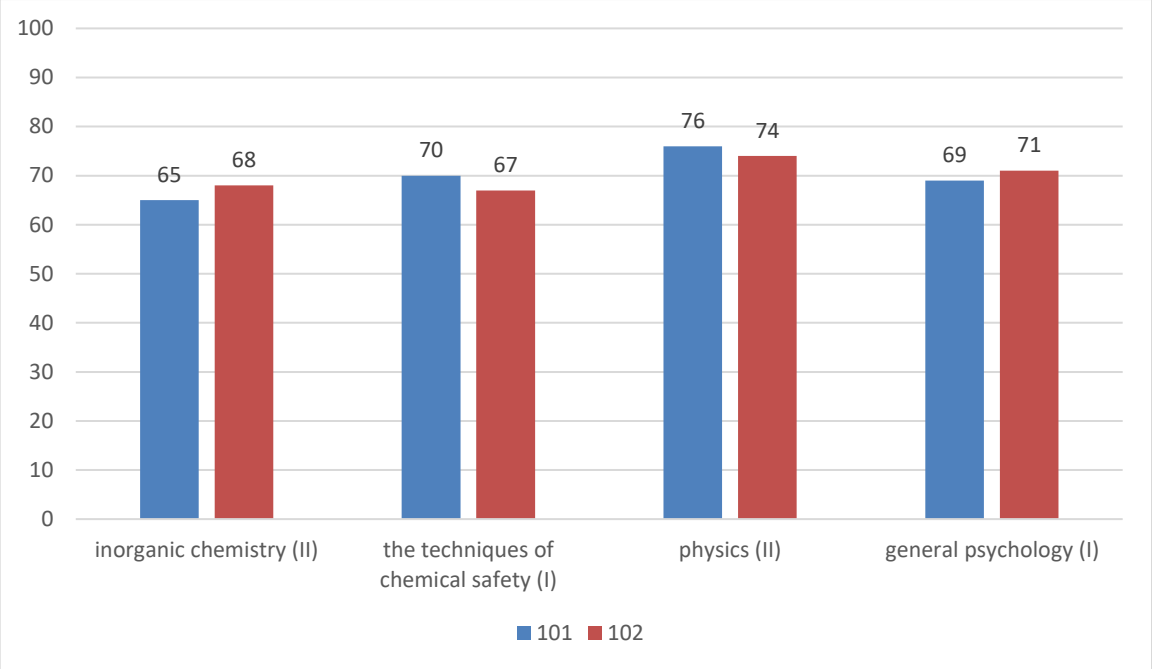
After having done knowledge of new theme from "cluster" technology. It can be used for forming previous theme. "Cluster" technology helps to learn deeply the theme, teaches to collect relatively concepts and ideas of theme, broadens thinking.

Demonstrating the method of "designing" to the process of teaching chemistry is the most important to carry out the developmental functions of teaching chemistry. Because it connects objects as a result of showing the method to the lesson. While doing "designing", skills and thoughts of students independently will develop and be acquired knowledge about genetic links between substances.

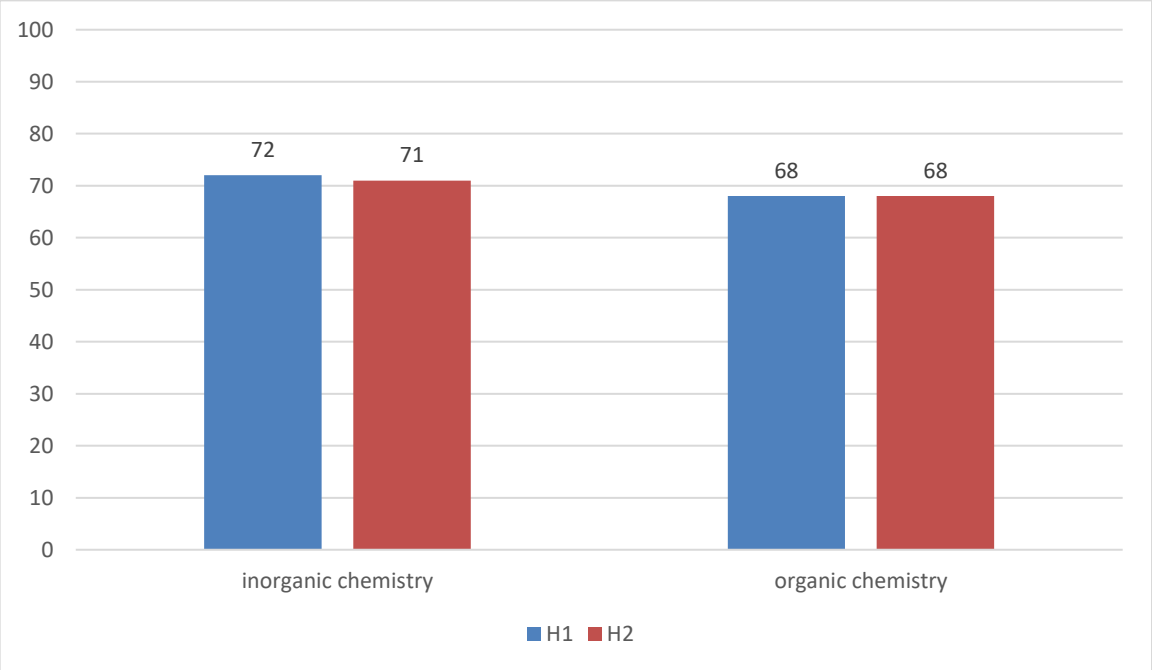
It is recommended that creating different methods of innovation technologies which are available for the features of topic to teach different topics of chemistry that chemical experiment and impossibility of the use of information technology.

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.

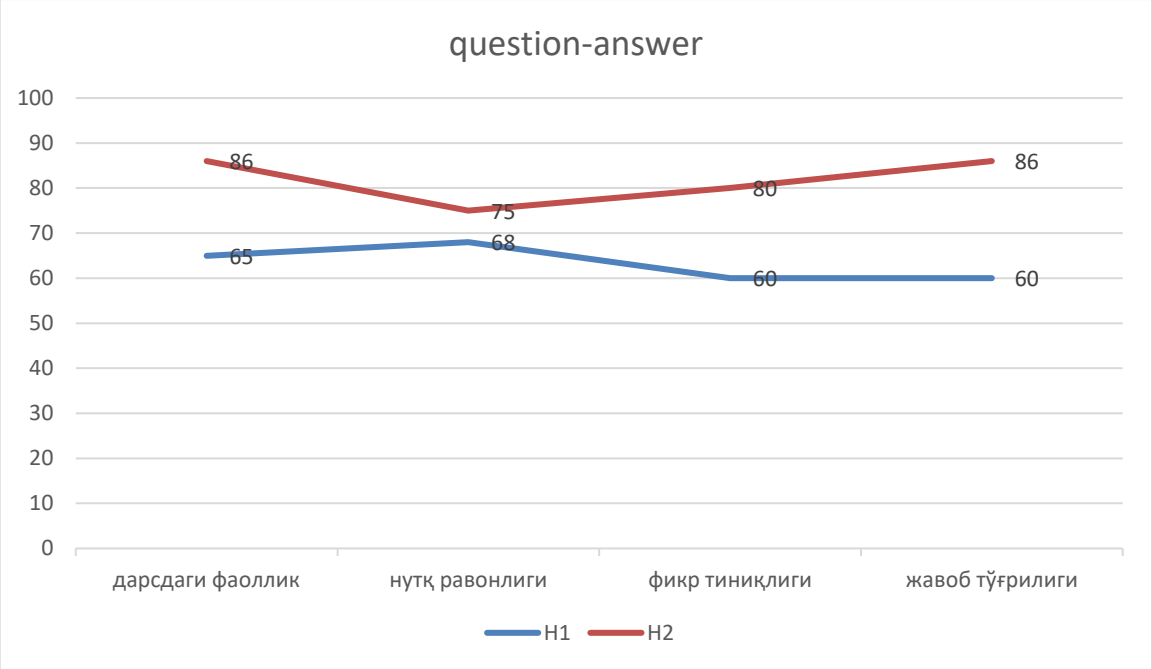


For experiment, students were regrouped and called as "control" (H1) and "experimental"(H2). Then test was carried out on inorganic and organic chemistry. The results of the test have been reflected, as follows:

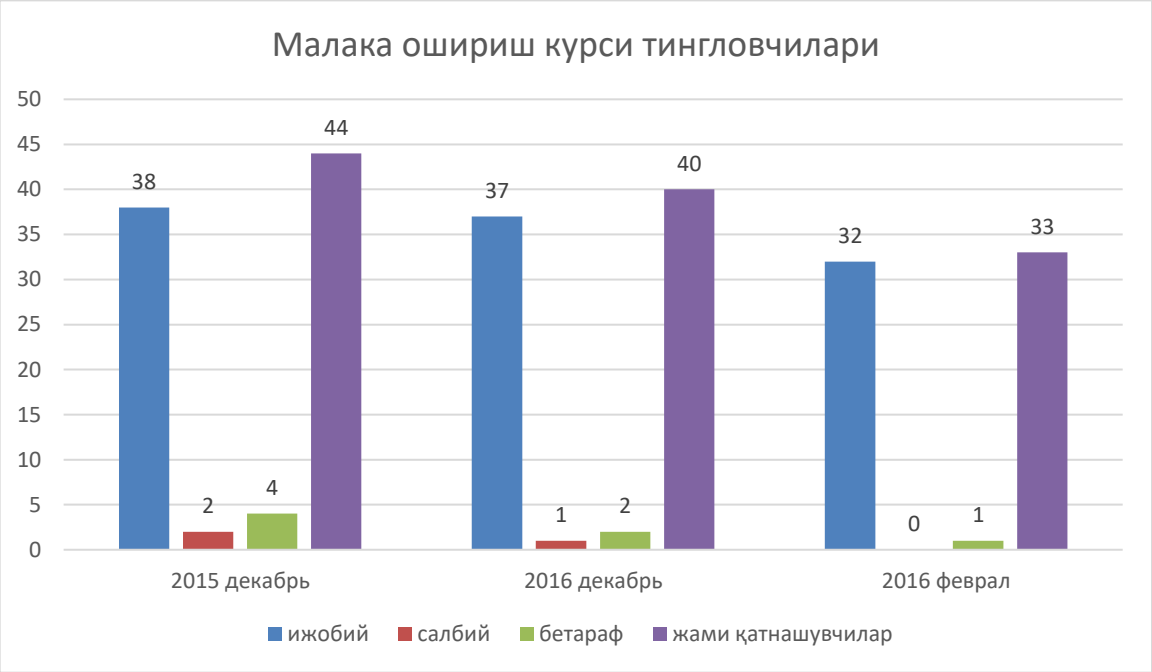


During November - December in 2016, Chemical deduction was carried out in one week at experimental group. Control group was given task which was to learn by heart formulas.

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.



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.



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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Необходимое количество печатных экземпляров: 1