

Multimedia Opportunities in the Teaching of Chemistry

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Abstract— *The development of society and transition to the new education system requires to the improvement of content, method and form of the training. Solution of the applied problem of new pedagogical technologies is based on the education. Opportunities of application of the same technologies, in particular, use of multimedia in the lessons means was investigated in this article. Its effective ways was indicated and experience for the application was given in the lessons. The use of electron textbooks and other technical means in the lessons is high the quality of training and the interest of learners increases to the science. The work of teacher is facilitating in the teaching, provides to learn more knowledge and skills for a short time.*

Keywords: *chemistry, electron textbooks, knowledge, multimedia, technology, skill*

I. INTRODUCTION

The development of society is dependent on the formation of educational system, uses opportunities of training technologies, and corrects directions of learners' knowledge and skills. One of the main positions in new education system is also grown as the personality of pupil and students. Therefore, the ability to use of modern training technologies is to be developed, the self-consciousness and self-assessment habits are to be created and the new form and methods fulfilled positions as strengthening of civic mission in them are to be used. Youth should master to the ability to use of all technical equipments in the top of the development of techniques to carry out modern method and forms. World pedagogues came to a conclusion that, it must be used of "e-learning" the new training technologies (electron-training) in its all fields for increasing of quality in the training. Electron textbooks, which is one of them increases the education abilities in youth and creates the living environment in information society in them. Also, use of multimedia means speeds the activities such as mastering of pupils to learning, knowledge, ability and habits in training (Hamzhebegi K.T., 2013, p.36).

One of the important and necessary problems in educational system in modern period is creation of interest in youths to the education and increasing it much more. As other subjects, it is also necessary to use multimedia means to create an interest in pupil to the subject of chemistry. It is an undeniable truth that, even pupil, who is a weak in the class, has high interest to the computer. It is possible to direct the attention and interest of pupils to the science and development by protecting them from additional influences and using of just this interest. It is very interesting for pupils to solve individual tasks or quiz in computer, to demonstrate different laboratory works. Pupil sees, hears, applies and analyze the objects and events when he/she uses of computer during education. As other subjects, there are several priorities of the use of computer in the education of chemistry:

- Correct use of multimedia opportunities of computer technologies in the education of chemistry creates condition for use of several channels of information at the same time. The pupil sees, hears training material and also is attracting to its mastering actively. These factors cause to increasing of mentality activity of pupils.

- Use of modern equipments in educational process changes the manner of mentality of pupils completely on one hand and creates several conveniences for them on other hand: creates condition to save time spent for search of actual information, to get speed information by pupils, decreases physical load of pupil, that is releases them from necessity to carry heavy books.

- Multimedia means help pupils to achieve great successes in the education, parents see that, their children use of technique independently and believe in their successes.

- By getting ready didactic material, teachers gain wide opportunities for application of new methodical ways in their lessons.

- The supply of the detailed information in a short period about chemical processes, which visual observation is impossible in the educational process, is provided.

By use of electron textbooks in the education of chemistry, pupils:

- observe chemical experiences by means of computer, perceive topics easily;

- master to the abilities to use new information technologies for useful purposes;

- Observe some chemical reactions, which must be conducted in ventilating cases, master topics and are not associated with harmful substances being out of reaction.

- Observation of the course of chemical reactions by means of electron textbooks is very useful from ecological point of view. Because of harmful substances being out of reaction, especially gases do not pollute the weather.

- Pupils, who have speech defect and difficulties in summarizing and expressing his/her opinion, answer questions by means of computer and solve tasks.

- Pupils engage in animations and entertaining games given in electron textbook in free times, develop their knowledge and abilities and intellectual levels in chemistry.

Multimedia means increase activity in lesson and develop logical and creative mentality in pupils. They increase intensity in education and improve the quality. Thus, use of new pedagogical technology means and computer models in the education of chemistry causes to find connection among separate parameters, determine the regularity of this connection and finally, mastering to material well. The pupil acquires the opportunity to follow any chemical dependence in computer, to change parameters, to compare and analyze results and to come to common conclusion. For example, pupil uses of model made in Microsoft Excel program for dependence of the speed of chemical reactions on temperature, changes the temperature coefficient of

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reaction speed and follows changing method of reaction speed in different temperature interval.

The following types of activity are to be conducted in the education of chemistry during application of multimedia means in the education:

1. The acquaintance of pupils with processes occurred in environment and experiments conducted chemical laboratories;
2. Writing of chemical equations on the basis of experiments conducted, the description of formation of chemical connections with symbolic models;
3. Acquiring of pupils the opportunity to observe any experiment repeatedly with multimedia visualization conducted during application of information and communication technologies.

Activities are to be conducted by means of electron textbooks, which is one of the information technology means. Work plan is to be made with electron textbook on topics during preparation to the lesson on the basis of thematic plan. New and perfect education is achieved on the basis of plan. For example, the corresponding plan of the one of topics studied in the 8th class may be as follows:

Topic: Oxygen – as element and common substance.
Allotropy

Purpose: It explains the difference between chemical element and common substance. It explains the conception of allotropy in the example of allotropic modifications of oxygen. It develops the abilities to work in group, cooperation and mutual assistance habits, observation and discussion.

Resources: Electron textbook from non-organic chemistry I part, computer network system, projector.

The structure of lesson:

1. Grouping of pupils with free system;
2. Opening of topic learned in network system in computers
3. Listening of corresponding topic of electron textbook on the basis of instruction of teacher, following of animations accompanied with topic and discussing of those learned and coming to conclusions;
4. Sending of the topic of educational material to the pupils' computers related to the topic (spread in the Earth by discovery of oxygen or mix by indicating the oxygen as common substance as element, common substance as element, also by breaking corresponding sequence of the topic) in the mixed electron textbook separated to the part in advance by teachers and lining up of the mixed parts of the topic in sequence by pupils, sending to teacher's computer;
5. The comparison and discussion of activity of pupils and other groups by help of projector on the board.
6. Estimation of the pupils' activities

Organization of training with electron textbooks should be carried out in such a way that the principles will form the efficient life activity in pupils and condition is to be created for getting of abilities conforming to development of community.

Such principles are to be conducted in organization of education with electron textbooks that, condition may be created for getting of affective important abilities for formation of efficient life activity in pupils and its conforming to our present life, which being on development constantly.

If application of active educational methods and organization of work with electron textbooks is conducted with the following principles, great achievements may be

obtained in education:

- Organization of computer and projectors for use of electron textbooks;
- Learning of the rule for use of electron textbooks;
- Acquaintance of teacher with materials related to the subject in advance;
- Restoring of part to be used in lesson to ready condition;
- Solution of tests given in electron textbook;
- Preparation of independent work for pupils according to the subject;
- Bringing of innovations related to the subject to the lesson via internet;
- Creation of intra and inter-disciplinary relationships;
- Organization of pupils' work with group;
- Giving of independence to pupils;
- Creation of cooperation between teacher - pupil and pupil - pupil;
- Discovering the pupils' talents;
- Analysis and submission of materials obtained related to the subject;
- Assessment of the pupils' knowledge by using of electron textbook;
- Check of the pupils' knowledge by means of tests.

Teacher must determine how school and class is provided with ICT means in advance to conduct the first two principles and must create his/her work according to it. There are classes where network system is established in very little part of secondary schools. Each pupil has his/her own computer to use them freely in such type of classes. Thus, teacher may create a connection with network pupils easily. A textbook is given for each computer in network classes separately, pupils use of them in the form of group or freely. In most of the schools, one computer is used in each class.

Only one textbook is used in classes having a computer. In each cases, it is necessary to know the rules for their use to derive benefit from electron textbooks. Therefore, teacher teaches the rules for use of electron textbooks to the pupils. It must be noted that, interface is made in the form understood clearly in the textbooks and subject's sections are connected interactively. Thus, it is possible to access to proper section in any time and to get information. Interface appears on screen in four parts visually. The names of subjects included in contents appear in the left part of the screen. It is possible to reanimate the debates to be taught on subject, animations, achieve materials, pictures, experiences, tests and other information when access to the contents. There are pictorial sites conforming to the subject in the left part in the lower side of screen. There are control buttons in the right part of upper side:

In the left part	in the right part
Contents	.Scientists
	.Vocabulary
	.Achieve
	.Test

It is possible to look at video clips in the main screen accessing to the corresponding sections by means of these buttons, experiences in the little screen in the right part, pictures in the little screen in below and to collect the necessary information.

It is necessary to access to the section according to the **contents**, to select the

necessary subject from that section and included to the screen. In this case, subjects you entered cover a chapter and separate texts of the chapter are animated and explained with the voice of announcer by touching to 1,2,3,4 and other indicated buttons with numbers in the below of the screen. It is possible to look at animations, to listen explanations, to save pictures, to return back, to zoom or diminish and to continue again in any time.

It is also possible to open the subjects in the contents by using of search button in the below of interface, in this case, it is possible to select the subjects in the chapter separately.

When you entered to the section of **scientists**, you will see the capital letter of the name of chemical scientists on whom you want to get information. The name of scientists you want is to be selected from scientists found.

It is possible to acquaintance with explanation of chemical terms and concepts by means of **vocabulary** window. Also, it is possible to collect brief information about formulas of chemical substances.

By means of **Achieve** button it is possible to access to the sections of subjects' **texts, experiences** corresponding to the subject, **animations** and **pictures**.

In the section of **Texts**, text is to be sound by announcer unlike contents, simply is to be reflected widely and in written form.

In the section of **Experience**, there are names of experiences separately belonging to each subject on screen; indicator is to be kept on the experience, which you want to look. Experience is to be demonstrated on screen with explanation of announcer. It is possible to observe these experiences by using of reactions button in the animations.

In the section of **Animation**, occurrence scheme of chemical processes according to the subject, production for processing of substances in the industry, synthesis processes and schemes of plants, mechanism of chemical reactions and such other processes are showed lively.

In the section of **Pictures**, pictures about minerals, ores and rocks of substances in the subject found in the nature are shown and also brief information (lively) is given about them. Processing of pictures in the form of slide gives an opportunity to stop their action in any time and to pass the appearance forward or backwards. Pictures in slide may

be enlarged by touching to the mark of positive (+) in the lower part of little screen.

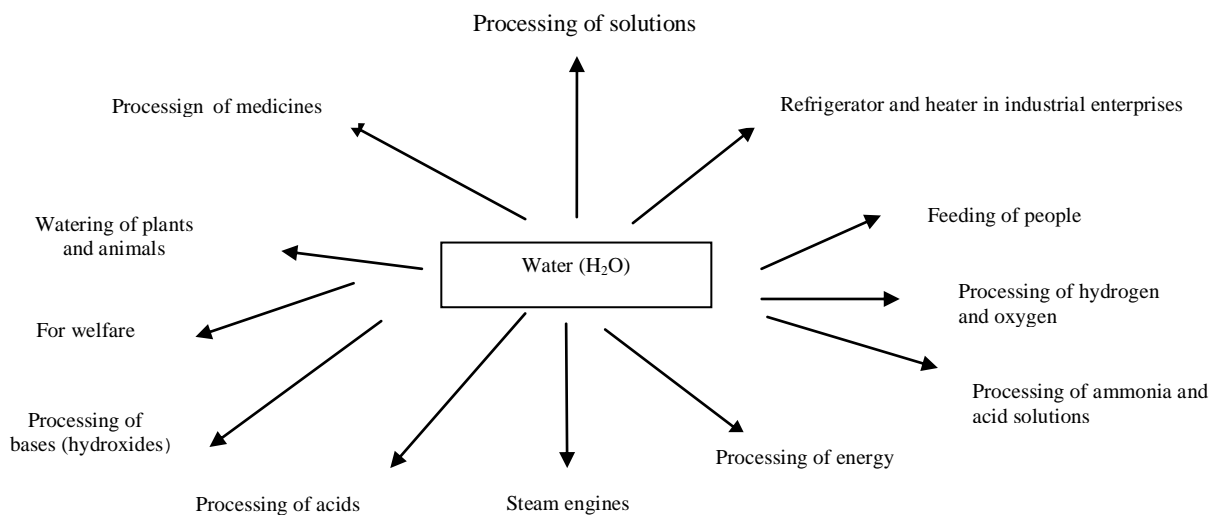
Knowledge is checking by using of **Test** window. There are test tasks on each sections that, grades answered to the questions of tests on ten questions are collected on the window and total results are shown. Pupils may use of electron textbooks easily after mastering these. Then, teacher gives certain tasks to the pupils related to the subject and invites them to start to the work. He/she takes control over their use of disk correctly. Also, he/she gives instructions to the pupils to buy disks from sale and use them at home easily.

For example, teacher organizes the study of the topic "Characteristics of water, its finding in the nature and cleaning", the division of "Water, Solutions" in the 8th class with electron textbook as follows. He/she starts to the lesson with words of wise about water.

He/she creates condition for each pupil to declare their knowledge about importance, characteristics, purity and protection of water. Material related to water is heard upon electron textbook after total motivation. The scheme and working mechanism of water treatment station is explained to the pupils by means of electron textbook. Here, the ways for making of water treated by physical and chemical ways to drinkable water are indicated at the same time. Also, the schemes for spread of drinkable water to residential places are demonstrated. These processes, whose performance is impossible at the class, are followed by means of electron textbook.

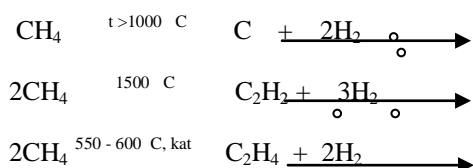
Pupils know importance of water treatment and perceive its difficulty. They understand the importance of water for human life, harms of water pollution and dirty water use for health. Material on characteristics and application fields of the water is also followed on electron textbook. Those of experiments which are possible are conducted by pupils in the laboratory. It reflects the ability to conduct free experiment and to implement those they saw. While observation of chemical characteristics of the water in electron textbook, it is necessary to note reactions indicated there by pupils in their copybooks. The completion of the topic with different scheme, picture and diagrams yields good results.

SCHEME I

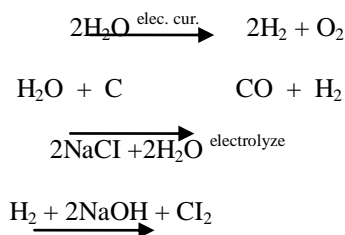


In some cases – for example, conducting of reactions such as keeping of

substance mass, processing of H₂ in law and observation of reactions conducted with it, especially processing of H₂ from converse of natural gas (CH₄) with water steam in the industry:



creates difficulties. But, it is possible to observe their processing in industrial field in electron textbook.



If electron textbook is used with intervals in the education of subject, pupils' active attention will be lasting. Pupil will not get tired when he/she listen material of textbook, as teacher breaks off and creates condition for independent activity of the pupils. Necessary matters are discussed. In this case, pupils will not get tired and their opportunity to put forward an idea will not be limited. They comment on those they see and hear, they note those they see in their copybooks and make efforts to keep in memory. Then, they write reactions mastered by them on the board according to their memories. In short, they possess to the opportunity to master the subject completely, they ask those, which are unknown, from teachers for them or listen subject once more and learn those unknown parts. It will expedite their activities such as knowledge, ability and mastering to habits.

It is possible to determine an impact of the use of electron textbooks to the quality of education with conducting and generalization of pedagogical experiment in schools. Therefore, pedagogical experiment is organized, methods of work about use of electron textbooks in the education of chemistry are made and its impact to the quality of education is checked.

The condition of use of electron textbooks in the education of chemistry is limited in schools in primary stage of pedagogical experiment. Work practice of teachers, who made efforts to solution of problem and used of them in creative work, is learned. It was observed that, problem's solution is not satisfactory and it had objective and subjective reasons. In no all of the schools, electron textbooks are used in necessary level in education of chemistry. Methodical recommendations are given about elimination of difficulties of teachers in this field and method is used in the direction of problem's solution. It is attracted to the discussions and its application in education is considered. Textbooks are prepared about organizing and conducting of chemistry lessons with electron textbooks on VIII and IX classes in the second stage of experiment and delivered to the teachers of different schools. Method prepared in the third stage of experiment is tested and its utility is certified. For this purpose, schools are selected, chemistry teachers are instructed, experimental and control

classes are determined. VIII^a class is determined as control, VIII^b class is determined as experiment in the school No 23. Electron educational supplies are not used in VIII^a class in the education of the subject "Oxides, classification and processing of oxides". Teacher spent more labor to mastering of the subject. He/she large wide information to the pupils about oxides classified them and showed their processing methods. Lesson is conducted on electron educational supplies in VIII^b class. Then mastering percentage of both classes is checked. In a result, mastering percentage was 95 in experimental class and it was 77 percentages in control class. It was known that, use of electron educational supplies in the lessons increases the mastering up to 15-20 percentages. Hereby, positive impact of the work to the quality of education by electron textbooks is certified.

Modern multimedia means give opportunity to eliminate possible shortages provided to keep all positive features of traditional educational forms, increase interest for lesson, increase the quality of training and simplify the mastering. Teacher gives chemical knowledge and abilities to pupils in study of proper topics by using of opportunities of electron textbooks. Demonstration of electron textbooks by computer in chemistry lessons based on such type of modern technologies creates condition for pupils to look at object and event at a short distance, to see their different sides, to hear information about it and to follow processes in sequence.

II. CONCLUSION

Use of scientific-methodical system tested, conforming to these and based on application of Information Communication Technologies, preparation of methodical recommendations related to use of electron means (electron textbooks, distant textbook, etc.), organization of supply system with electron methodical-educational materials, creation of internet variants of electron educational means, educational television programs and its settlement for open access is one of the main terms. Also, including of textbooks made in electron form from chemistry, electron methodical means, information inquiry systems, developing games, electron tests and other to education portal increases the intensity in educational process, improves the quality and provides growing of pupils as creative personality for community.

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