Correlation of the traditional approach and information – communicational technologies in training of the future ecologists in Kazakhstan

Kamalbek Meirbekovich Berkimbaev, Madina Murzakhanovna Akeshova, Abdilda Tursynkhanovich Meirbekov and Gulmira Pernebaevna Meirbekova

H.A.Yasawi International Kazakh-Turkish University, B. Sattarkhanov Avenue 29, 161200 Turkistan town, the main campus, South Kazakhstan region, Kazakhstan
shakenovakesheva@mail.ru

Abstract: The students of «Ecology and chemistry» department at A.Yasawi International Kazakh – Turkish University in the course of the subject «Environmental Monitoring» on the theme "Metals" were taught in two ways: the traditional approach and using the information-communicational technologies. Comparative analysis of the statistical results for the experimental and control groups was carried out. The results obtained by the use of the information-communicational technologies show improvements in training of the future ecologists. The use of information-communicational technologies in teaching system shows an increase, which points to a significant improvement and higher achievement by the students. The improvement is also represented in higher average grades of the experimental group and it shows the effectiveness of integration of the traditional approach and using the information-communicational technologies in training of the future ecologists.

Keywords: integration, the information-communication technologies, the traditional approach of training of the future ecologists.

1. Introduction

Kazakhstan has accurately defined a reference point on occurrence in world educational space and carries out modernisation of educational system in a context of the international requirements. The Republic of Kazakhstan has entered a strip of successful realization of principles of Bologna process and its adaptation to modern realities. The Bologna declaration regulates construction of uniform educational space in Europe on the basis of introduction of multilevel system of higher education and credit-modular system of training and modernization of the state system of guarantees of quality management formation, working out of new formats of documents on formation and modernization of schemes of a financing of education.

Nowadays one of the actual problems of training of highly skilled specialists on the international level and increase the efficiency of educational process at credit-modular teaching system at A.Yasawi International Kazak - Turkish University is information of education and use of information-communicational technologies in professional activity of the future specialists on the basis of competence approach.

Information of educational system is considered as strategically important paradigm of the Governmental program of educational development of the Republic of Kazakhstan for 2011-2020, confirmed by the President of Kazakhstan, at transition to electronic training the prime problem-maintenance of an education system by highly-skilled personnel [1].

According to a new Kazakhstan educational paradigm education should be directed on interests of personal development adequate to modern tendencies of social development, and to solve following problems:

• to harmonize relations of the person with the nature through development of a modern scientific picture of the world;

• to stimulate intellectual development and thinking enrichment through development of modern methods of scientific knowledge;

• recognizing that the person lives in a society, to achieve its successful socialization through immersing cultural existence, including technogenic and computerized, environment;

• considering that the modern person lives in conditions of the sated and active information environment, to teach the person to live in its stream, to create preconditions and conditions for continuous self-education;

• in view of integration tendencies of development of a science and techniques, requirement for new level of scientific literacy to create conditions for acquisition of the wide base formation allowing quickly enough to be switched to adjacent areas of professional activity.

Modern formation should be complete, for this reason separate disciplines are considered not as set of traditional independent courses, and are integrated into the uniform cycles of disciplines connected by the general criterion function and interdisciplinary communications. Organizing educational process on the basis of a new educational paradigm it is not necessary to refuse the former standards. Positive experience should be considered with the use of such approach more accelerated quality of educational achievement. However, it is obvious that it is already impossible to be limited as before to dogmatic, explanatory-illustrative or imperative type of training at lecture as basic form of teaching.

One of the basic advantages of the competence approach is that learner is perceived not as passive object of educational influence, but as the active subject getting formation. The teacher does not impose to students' personal understanding of a material, and stimulates their independent activity on mastering. Characteristic for new model of training, cooperation lies on the basis of educational activity.

The traditional educational paradigm basically leads to formation dependent learner as the teacher according to the program gives out the planned material focused on the average learner. Learners are not informed on main objectives and have no control over educational process and access to all material that is taught, guided only by instructions of the teacher and the textbook maintenance, studies in the set rate. It is obvious that educational process cannot generate the specialist with creative skills, professional and critical thinking which will be claimed in a modern society [2].

The educational environment simulated by means of information-communication technologies, allows changing of the situation. The teacher puts the purposes, forms the informational environment creating conditions for individual work. Presence of means for realization of the purposes and problems of educational process, knowledge of ways of the organization of teaching system and control devices are making components of the computer informational educational environment, which forms independent learner.

2. Problems Statement

Educational system of the Republic of Kazakhstan is focused on occurrence in world educational space, therefore the quality of education is considered in the context of conformity of level of received educational services by the world standard and norms. Nowadays the priority is achievement of such quality of training of specialists which gives them the chance to compete on the international laboratory. In the conditions of market relations and complicated requirements to the education, ways of the organization of educational process searches of new reserves of improvement of quality and efficiency of preparation of the future specialists are necessary. Changes in social sphere of a society, information of social processes made a paradigm of formation which was replaced on competence the approach in formation [3].

One of actual problems in system of the Kazakhstan educational process in the course of professional training of the future specialists is interdisciplinary integration. The suggested system of teaching helps to recognize ecology as an interdisciplinary science which is a necessary prerequisite for observing problem from the different angles, and it also allows students to apply knowledge of ecology to study other disciplines, especially biology (chemistry, physics) and other relevant subjects (geography, agronomics) as well as in everyday life.

The organization of educational process with application of informational technology of training, an optimum combination of information-communication technologies and traditional approaches demands the decision of some psychology-pedagogical, methodical and other problems and carrying out of corresponding researches. Having analyzed the literature on research subjects, we have allocated following actual directions of using information-communication technologies in educational process:

- working out of a technique of use of information-communication technologies in teaching system to various disciplines;
- creation of corresponding methodical maintenance;
- an estimation of efficiency of application of informational technology of teaching,
- creation of the unique complex scientifically-methodical approach to a solution of a problem of the usage of information-communication technologies in educational process,
- preparation of the pedagogical staff, capable to carry out training in new conditions and to solve the above-stated problems and tasks.

The urgency of a considered problem is defined, first, by the usage of information-communication technologies assumes presence at the modern, highly skilled expert of new knowledge, abilities, creative style of thinking which will provide necessary social adaptation to changes and guarantee its competitiveness on a labor market; secondly, necessity of perfection of the organization of professional activity of the future specialists in the conditions of information; thirdly, objective requirement of a modern society for preparation of the specialists, capable to be integrated into world

information field; fourthly, tendencies of a national educational policy.

3. Experimental design

Nowadays information-communication technologies are one of the major factors defining intensive and qualitative development of the Kazakhstan educational system.

The usage of information-communication technologies in educational process participate [4]:

- the teacher (defines the maintenance of the program of a course, a choice of the educational literature, teaching methods, style of communication etc.);

- pedagogical collective of educational institution (establishes the general requirements to student, kept traditions of given educational institution, the form of mutual relations of pedagogical and student's collectives etc.);

- the state as public institute (defines the material maintenance as a whole, the social order for formation of that or other system of knowledge and sights).

During the research work we worked out the scheme of integration of a traditional method and information-communication technologies in educational process.

To find the optimum decision on a task in view of process of integration of the traditional approach and information-communication technologies and to receive demanded results of efficiency of application of information-communication technologies, we conducted lesson on a subject «Environment Monitoring» for students of specialties 050608-Ecology on theme "Metals".

The second year students of «Ecology and chemistry» department Engineering-Pedagogical faculty A.Yasawi International Kazakh – Turkish University were involved in experiment

Students of control and experimental group took part in experiment. In both groups lesson on a subject «Environment Monitoring» on the theme "Metals" has been conducted. The control group included 42 students, and experimental group 44 students. In control group lesson on the theme "Metals" was conducted in traditional way, and in experimental group lesson on the theme "Metals" was spent with application of information-communication technologies. In both groups after material granting on the theme "Metals" and its practicing control and total tests were organized and carried out for the mastering, the given material and check of efficiency of process of integration of the traditional approach and usage of information-communication technologies in training future ecologists. After realization of all the activities according to the program and evaluation, the results obtained by the

use of these two concepts were compared and statistical parameters for two groups were established.
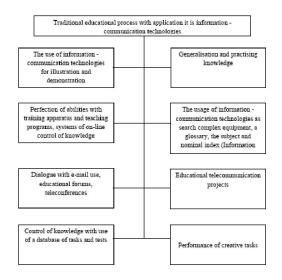

Figure 1. Integration of the traditional approach and information-communication technologies into educational process.

Based on the analysis of the obtained results, advantages and disadvantages of the usage of information-communication technologies and the traditional approach of educational process have been defined, and also efficiency of process of integration of the traditional approach and information-communication technologies in educational process was established.

Leaning against methodological approaches and private experience of the usage of information-communication technologies and traditional approaches of training, we developed the comparative scheme of application of information-communication technologies and the traditional approach on the subject «Environment Monitoring» on a theme "Metals" (table 1).

4. Results and Discussion

Statistical processing of the results

In order to calculate the effectiveness of integration of the traditional approach and information-communication technologies in teaching subject «Environmental Monitoring», the results of students who were taking part in experimental group and results of students, taking part in control group were compared.

For the proof of degree of mastering of the material on the theme "Metals" it is necessary to show that experimental and control samples have significant distinctions on the chosen indicator – to

ability independently to analyze the task, to correlate it with professional work practice. For processing of results of experiment Student's t-criterion was used to establish similarities and distinctions of two empirical distributions.

The mathematical package «STATISTICA» was used. By means of Descriptive statistics mode

Basics Statistics/Tables of this software were the hypothesis about conformity of samples to normal distribution which was checked up.

On these values for each group the mean score and a standard deviation (table 1) have been calculated.

Table 1. Comparative of application of information-communication technologies and the traditional approach on the subject «Environment Monitoring» on the theme "Metals

	Traditional approach	The use of information-communication technologies
Instruction form	Frontal	The individual
	-	Group work
	-	The face-to-face
	Group laboratory work	Group laboratory work
Teaching tools	Board and chalk	Power Point the program
	-	The computer
	-	Projector, the screen
	-	Online system
Methods of teaching	Monologue	Interactive method with application of information-communication technologies
	Dialogue	Dialogue
	-	Illustrative method
	Demonstration method	Demonstration method
	Laboratory work Method	Method of laboratory work
Contents of teaching	The standard	Visualisation and actualisation of the teaching contents with application of information-communication technologies
Metal structure	s-element p-element d - element	s-elements p-elements d - Elements
S-element	The standard	Nutritional importance
P-element	The standard	Usability of p-element in nutritional system The importance in metallurgy
D - Element	The standard	Actions as a part of antibiotics
		The importance in soap manufacture
		The importance in metallurgy
		The importance of antibodies and a blood type
S-elements	Fully achieved	Partially achieved
P-elements	Fully achieved	Partially achieved
d - Elements	Fully achieved	Partially achieved

TABLE 1 MEANS ON EACH GROUP OF THE AVERAGE GRADE AND THE STANDARD DEVIATION.

Numerical characteristics	1st sample (Control group)	2nd sample (Experimental group)
N (Quantity of students)	42	44
M (Average grade)	3,14	3,8
σ (A standard deviation)	0,61	0,32

For the given quantity are trained δf =44+42=83. The received empirical value of t-criterion equal t = 3,376 exceeds critical for *ρ =0,01* (*t* =2,639), but it appears less critical for *ρ =0,001* (t=3,416), hence, it is possible to draw a conclusion on statistically significant distinction of average arithmetic values in two samples and about advantages of the second (experimental) methodical system of teaching «Environmental Monitoring».

The total test spent with students of control and experimental group, is aimed on revealing of efficiency of integration of the traditional approach and information-communication technologies in preparation of the future ecologists. The concept of factor K relative total mastering of knowledge by students of one group is entered. The factor K relative total mastering of knowledge by students of one group is calculated under the formula

$$K\frac{1 \text{ x } N_5 + 0,9 \text{ } x \text{ } N_4 + 0,6 \text{ } x \text{ } N_3 + 0,3 \text{ } x \text{ } N_2}{N}$$

Where K - mastering factor, N5, N4, N3, N2 – the quantity of the students, whose answers are estimated accordingly on «5» - 90-100 points, «4» - 70-90 points, «3» - 50-70 points, and N – total of students in group. The result was estimated on the average by the following parities: "excellent", at $0.9 \leq K \leq 1$; "good", at $0.7 \leq K \leq 0.9$; "satisfactory", at $0.5 \leq K \leq 0.7$; "unsatisfactorily", at K<05;

Results of experiment were processed and tabulated for comparison.

Table 2 – The generalized comparative results of examination of students according to two tests

Groups	K	
	The control test	The total test
The control	0.74	0.62
The experimental	0.88	0.93

From the received results reflected in (table 2) and the histogram (picture 1), and also the obtained results, it is possible to draw a conclusion that experimental work confirmed effectiveness of the process of integration of the traditional approach and information-communication technologies in training of the future ecologists.
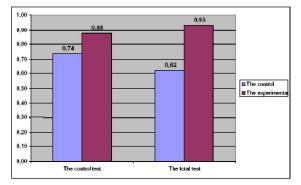

Figure 2. The generalized comparative results of examination of students according to two tests

Students of experimental group have received high scores in total tests;
- Improvements were observed at students who experienced difficulties in mastering of a material with the use of traditional approaches;
- quantity of students, who mastered the material on the theme "Metals" and used this knowledge on other disciplines raised and it influenced on the success of the group as a whole;
- students' results of experimental group were higher, than the results of control group students that proves the effectivness of the usage of information-communication technologies in educational process;
- the usage of information-communication technologies in educational process improved the progress of the future ecologists;
Advantages of the usage of information - communication technologies in teaching process.
During the research work we pointed out some advantages of use of information-communication technologies in educational process.
Use of information-communication technologies in the course of training of the future ecologists at the development present stage allows:
-        to construct the open educational system, own trajectory of teaching methods providing to everyone individual [5].
-        to change radically the organization of the process of knowledge by its displacement towards thinking system;
-        to create an effective control system of information-methodical maintenance of education [6].
-        to organize informative and professional work during educational process;
to use specific properties of the computer, allowing to individualize educational process and to address to essentially new informative means [7].
- to construct, develop and improve systems of remote training of various level [8].

The usage of information - communication technologies in educational process helps to solve a number of didactic problems:

- to study the phenomena and processes in micro- and a macrocosm, in difficult technical and biological systems on the basis of use of means of computer graphics and computer modeling [9].

- to represent in time scale convenient for studying the various physical, chemical, biological and social processes really proceeding with very big or very small speed [10].

Thus knowledge can be received in the declarative way, i.e. focused on a consecutive presentation of portions of the educational information and control of its mastering (electronic textbooks, test and supervising programs, directories and educational databases, educational video films), or procedural, i.e. under construction on the basis of models of studied objects, processes and the phenomena (imitating models, subject-oriented environments and laboratory practical works developed on their basis, training apparatus, game programs).

Economical aspects

• a once well prepared teaching material with the use of information-communication technologies can be used many times and added or changed according to once needs;

• it requires less time if the preparation has made appropriately;

Advantages and disadvantages of the traditional approach.

Positive sides of traditional approach of study:

• systematic teaching process;
• logically ordered, correctly given teaching material;
• organizational clearness;
• constant emotional influence of teacher's personality;
• optimum expenses of resources at mass teaching;

Negative sides of traditional approach of study:

• sample construction, monotony;
• irrational distribution of time during the lesson ;
• only initial orientation in a material is provided, and achievement of high levels is shifted on homework;
• the students are isolated from dialogue with each other [11].
• absence of independence;
• passivity or visibility of activity of the trained;
• weak speech activity;
• weak feedback;
• the average approach;
• absence of individual training.

5. The conclusion

The carried out analysis of works of many researchers show that the use of information-communication technologies in training of the future specialists, for the decision of educational problems, training of the specialists with the critical and creative thinking, capable to function effectively in changing conditions of professional work, becomes the integral component of modern education. In modern educational system the tendency of displacement of accents from mastering of knowledge trained on ability to use the information is traced, to receive it by means of information-communication technologies.

Therefore training of specialists should include system to use of the given technologies in the future professional work, especially in a context of information of a modern society.

Nevertheless, information-communication technologies themselves are not capable to provide optimization and an intensification of educational process.

The traditional approach of teaching totals centuries-old history. And, speaking about information influence on education and the changes occurring in this connection, it is impossible to reject methodical concepts of traditional training. Only joint activity of the teacher and students leads to formation of profound knowledge, professional and communicative competencies. Use of information-communication technologies is important, its advantages are numerous and obvious, but natural dialogue between participants of educational process not less informatively and helps to solve difficult pedagogical problems.

The problem of development of teaching technologies takes an important place in a modern pedagogical science as achievement of peak efficiency of educational process directly depends on presence of competently developed methodical maintenance and definition of a place and a role of information-communication technologies in educational process.

In the conclusion it is necessary to notice that now in the world consecutive and steady movement to construction of an information society which urged to create the best conditions for the maximum self-realization of each person is observed. The bases for such process are intensive development of information-communication technologies and creation of the developed information-educational environment.

Specifying in advantages and lacks of process of integration of the traditional approach and application of information-communication technologies in educational process we sum up that our research can be a guideline for further

development and change of problem of integration of the traditional approach and application is information - communication technologies in an education sphere.

Studying and the analysis of a current state of a problem of their use in an educational sphere, has shown that there are the numerous works considering possibilities, properties, functions, potential of information technology without an accurate substantiation on the basis of the fact sheet received as a result of practical activities, during experiments. The obvious lack of the researches representing theoretically well-founded methodical recommendations and pedagogical working out on their application is traced. The questions connected with development and influence of information-communication technologies on efficiency of educational process is insufficiently worked. There are no the long and extensive researches showing degree of efficiency and expediency of support of various courses at integration of disciplines through the Internet by means of telecommunication technologies.

Corresponding Author:
Dr. Akeshova,
H.A. Yasawi International Kazakh-Turkish University, B. Sattarkhanov Avenue 29, 161200 Turkistan town, the main campus, South Kazakhstan region, Kazakhstan

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