

TRENDS IN IMPROVEMENT OF THE EDUCATION IN BIOLOGY

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ABSTRACT. Our XXI century is marked with rapid advance in science and technology, development in information technologies, globalization. Information (postindustrial) society is formed. These changes in society require fundamental changes in education as well – young people should prepare themselves actively adapt to the continuously changing reality, they should learn to find, analyze and assess information and thus using it to predict, to take articulate decisions, to find the most suitable methods, to work well in team, to develop the intellectual and creative character of personality.

The aim of the present research is to describe some of the trends in the education in biology on the basis of the analysis of common processes in the changing society and education. These trends may help overcome „the shock from the unknown future“ (11) and may assist for our European Integration.

For the determination of the new educational trends comparative analysis of the educational paradigm in the industrial and information society is made. Having in mind, the analysis of the aims of the compulsory curriculum, defined in the Law for the educational degree, compulsory curriculum and educational plan (3) can be ascertained, that they correspond to the humane-individualistic paradigm and are orientated to the preparation of young people to live in information society. This trends correspond directly with the fulfillment of the new aims, namely: *humanization* of the education in biology; *individualization* that support the development of t each student; *computerization* of the education. They affect the school curriculum, the educational technologies, methods, means, structure and organization. They even go beyond the class-lesson system. An appropriate laws and rules, finances, and most important well trained and motivated teachers are the prerequisites for fulfillment of these goals.

KEY WORDS. education, teaching, humanization, individualization, computerization

INTRODUCTION

Our XXI century is marked with rapid advance in science and technology, development in information technologies, globalization. Information (postindustrial) society is formed. In Prof. M. Belova's opinion „there are economic, scientific and socio-cultural processes, which shock, confuse but also provoke the unlimited human abilities with their rapidness, extraordinariness and unpredictability. And now the human world makes a huge and new step in the whole human history.“(1). These changes in society require fundamental changes in education as well – young people should prepare themselves actively adapt to the continuously changing reality, they should learn to find, analyze and assess information and thus using it to predict, to take articulate decisions, to find the most suitable methods, to work well in team, to develop the intellectual and creative character of personality.

Materials and methods

The aim of the present research is to describe some of the trends in the education in biology on the basis of the analysis of common processes in the changing society and education. These trends may help overcome „the shock from the unknown future“ (11) and may assist for our European Integration.

For the realization of this goal the following methods are used: analysis of the publications of pedagogues and psychologists, observation of the pedagogical reality, interviews with teachers, school and university students.

Results

For the determination of the new educational trends comparative analysis of the educational paradigm in the industrial and information society is made. For this aim the publications of the most popular pedagogues and psychologists (1, 4, 5, 7, 8, 9, 10, 12, 13 etc.) and the opinions of students and teachers are examined. The results are presented in Table1.

Table 1. Comparison between the educational paradigm of the industrial and information society.

Indexes of comparison	Society	
	Industrial	Information
Aims of the education	Static knowledge – gain of definite amount of knowledge and formation of abilities for industrial production that are enough for the whole human life	Ability for development, change, permanent learning, ability to learn the necessary mechanism for flexible and active adaptation
An ideal for a type of personality – moral and social values	„Organized person“ - basic qualities: disciplined, obedient, to obey the rules, to avoid taking decisions	To accept and approve the personality as a value. Bloom of individuality, of difference and of creativity. Competent, ingenuous, tolerant and undertaking
Organization system and basic organizational forms	Class-lesson system; Lesson, extracurricular forms	Alternative schools, based on the humane-individualistic paradigm. Flexible educational system; decentralization, de-standardization, readiness of the schools to engage in projects; freedom to choose (develop) educational plans and programs
School curriculum	In accordance with the National Standards for school curricular, developed in educational programs and school textbooks	The gaining of knowledge should not be the only aim, but also an instrument for student's development; finding of necessary information independently, preparing computer data bases of this information. Consideration of students' interests
Educational technologies	The student is an object of education; the teacher teaches, and the student gains knowledge; domination of authoritarian spirit, educational process is oriented to the ordinary student	The student is a subject of education; humanization of educational process; pedagogy of the cooperation, team-work, project methods etc. Education that recognizes and develops the individuality and the uniqueness in the student's personality

Having in mind, the analysis of the aims of the compulsory curriculum, defined in the Law for the educational degree, compulsory curriculum and educational plan (3) can be ascertained, that they correspond to the humane-individualistic paradigm and are orientated to the preparation of young people to live in information society.

The aims of the Cultural-educational area- Natural science and Ecology are described in the Code for the State educational requirements for the educational

curriculum, Supplement Nr.5. The accent is on „the formation of system of knowledge and abilities including the relationship and attitude to nature, preservation of environment and health, tolerance to any creature. Those are obligatory for the education of modern man.“ (6).

From the interviews with teachers and students as well as from observation of the educational reality is determined that there are many difficulties and problems in the realization of the new aims, referred to in the law and other rules. These problems can be united in three groups: **organizational** (a huge educational curricular, which makes impossible the use of interactive technologies; insufficient knowledge and training of many of the teachers to use the new technologies etc.); **financial** (insufficient equipment); **methodical** (shortage of methodical literature and motivation in some of the teachers and students). Many modern and positive trends in the education in biology can be laid down. This trends correspond directly with the fulfillment of the new aims, namely: **humanization** of the education in biology; **individualization** that support the development of t each student; **computerization** of the education.

DISKUSSION

Here we would like to present each one of these trends in the education in biology.

The humanization can be considered in three ways:

- Humanization of the relationship teacher-student. In the Prof. P.Petrov's opinion this can be obtained through „modernization of the class-lesson system, use of new, more efficient methods, means and forms of education, of alternative educational technologies“ (7). Some of them are already used in the education in biology – team-work in free chosen educational subjects; project-methods (in education in ecology, for example „Grassing and planting the school area“, in the preservation of the environment „Recycled paper – saved forest“ etc.); discussions on interesting for the students issues, for instance „Hypothesis for the origin of life“, „Salvation of the human genome – achievement of medicine or a threat for humanity“, „Moral and ethic problems of the cloning“;

- Humanization of the relationships between students and their incorporation in common values. Team-work and debates are useful for the realization of this activity. The debate, for example, during studying of the subject „Race and racism“, can help students be tolerant, gain ability to follow and listen closely and to adduce arguments on their thesis. The situation methods (judge a case, incidents, role-games) are suitable and applicable. In this case the student is placed in a real life situation and has to take well-grounded decision and to make his/her choice. This helps for the education of special attitude and behavior in the formation of health and ecological knowledge.

The „Pedagogy of cooperation“, where the student stands in the center of the educational process, as well as the formation of the constructive ideas, that stress on activity approach and on learning in and trough experience, assist for the realization of optimal pedagogically communication between teacher and student and between

the students. In P. Petrov's opinion self-knowledge and self-development can be accomplished on this way.

- *Humanization of the relationship man-nature*. Here the education in biology is of extreme importance. The education for preservation of the environment and for steady development is the basic accent. The methodical experiences vary –trips in the country-side, video films, essay writing“ Me and my world in 20 years“. These experiences develop prognosis abilities and ability to assess the consequences from human activity. In order to preserve nature, men must have knowledge of it. Doesn't that mean that annually in hundreds of school dissections of frogs will be made, for example? G. Sheffer(2) takes into consideration the ethical side of the question. I believe that during the basic educational degree the biology classes must be held using humane methods – the real dissection should be replaced with video films. In this way, not only many „frogs' lives“ will be saved , but tolerance , emotional-aesthetic and moral attitude to the nature will be educated (during excursions students can feel the harmony in the nature, can even see the beauty in the frogs' choir).

The *individualization* is the second trend and its origin lays in the humane-individualistic paradigm. The personal development of the student, the development of his personal qualities can be reached by individualization and differentiation of the education. The reformation of the system brought differentiated educational plans and schools. Thus the possibilities for a free choice of students for school curriculum, organizational structure, school and why not even teachers have broadened.

The *computerization* is the third trend. Its origin lays in the fact that in the industrial society the information continuously renews. This makes computers-irreplaceable not only as an information source, but also as a new educational environment. During the education in biology, computers can be used a source of information, illustration, communication, correction, evaluation of students' knowledge, distance learning, etc. Extremely valuable assistant in the education can be the simulation games of biological thematic. They can form in the students skills to take decisions, to make long-term prognosis about the results of human activity for the preservation of biological equilibrium in environment and for steady development. Having in mind this basis, virtual competitions can be organized.

CONCLUSION

Despite the hindrances, the reformation of the education in biology in our country has already started. The new goals, that can be found in the educational laws and rules, correspond to the requirements of the information society, of the globalization and of our European home. The humanization, individualization and computerization of the education assist in achieving these goals. They affect the school curriculum, the educational technologies, methods, means, structure and organization. They even go beyond the class-lesson system. An appropriate laws and rules, finances, and most important well trained and motivated teachers are the prerequisites for fulfillment of these goals. The universities, as well as all departments of the Ministry of science and education are of great importance for the improvement of the teachers' qualification.

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