

Psychology

Didactic Principles in the Development of New Textbooks and Programs for Educational Process Using E-Learning Technologies

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ABSTRACT. The paper deals with didactic principles in the development of textbooks for university educational process from the perspective of modern didactics. Teaching manuals, methodical complexes including general pedagogical laws and e-learning technologies in education and professional training are discussed in the paper. The methods of practical application of innovative methods for improving the quality of students education are presented. The paper summarizes the results of the studies of the main problems in the educational process, shows the role of textbooks in teaching, the development of intellectual and creative abilities of the students and the role of innovative educational technologies in the use of textbooks. © 2017 Bull. Georg. Natl. Acad. Sci.

Key words: didactics, teaching methodical complex, E-learning technologies

Modern principles of didactics stipulate the requirements for all the components of the educational process: goals, form of content, choice of forms and methods, promotion, planning and analysis of the achieved results. It is necessary to define the didactic principles while compiling new textbooks and manuals. The books should be considered according to specific functions. The importance of innovative educational technologies and teaching methods should be noted. However, positive experience of the past integrated combined with the latest general pedagogical, didactic, methodical and methodological approaches should be the basis of a new educational paradigm forming the structure of the modern

educational process. Joining the world educational system Kazakhstan pays special attention to the use of innovative technologies in education and preparation of modern textbooks and teaching materials.

Materials and Methods

Modern concepts of the development of textbooks, pedagogical theories of educational modernization, the fundamental provisions of secondary and higher education theory of teaching, education and development of students during the educational process, scientific basis of information and communication technologies in education were the methodological basis of the research. The sources of research were

state documents on education, the works of national and foreign scientists, periodicals published in Kazakhstan and abroad, materials of scientific and practical conferences.

Theoretical Part of the Study

The provisions of the classic didactic heritage are developed and supplemented by modern scientists creatively considering national and regional approaches. In modern research the innovative pedagogical developments, the issues dedicated to the continuity of the educational process are proposed. One of the most important aspects of modern educational paradigm is to study the ways and means of information-communicative competence of a person in the educational process. Modern pedagogical community researches the most important directions in the field of education system identifying the priority trends in educational processes according to [1-3].

Considerable material on the formation of new educational literature is systematized the “didactic requirements for the development and review of the programs, textbooks, teaching and elements of teaching methodical complex (TMC)” [4]. As the core of teaching methodical complex and as a means of teaching, the textbook clearly defines the role in the implementation of educational objectives, content development, and implementation of the basic didactic and methodological curriculum units. The textbook is a materialized carrier of the educational content and the organizer of the learning process of the contents. Before the developers of the textbooks and teaching methodical complexes the authors put extremely clear task for the presentation of the basic concepts and leading ideas of the subject, taking into account advances in science and practice, paying great attention to the practical work and demonstration of the application of laws, laws on a particular subject in practice.

The study of the newly established textbooks and all teaching methodical complexes showed us that they correspond to basic didactic requirements in accordance with a number of important positions in the development of textbooks, educational and me-

thodical complexes provided by the state program of preparation the educational materials of modern education. Scientific and methodological orientation of drawing up textbooks of a new generation is based on modern approaches and theories of the development of new generation textbooks. Modern textbook cannot develop in isolation from the entire education system, from new research in the field of fundamental didactics. On the development of textbooks the principles of developmental education, student-centered learning and humanistic pedagogy are considered. From the content of the textbook the problematical character is not excluded not only in tasks and issues, but also at the level of the main text [5].

In the development of teaching materials in the subject areas it is necessary to consider didactic principles and laws of the learning process. The formulation of didactic principles implies from the laws of the learning process, which is based on the scientific analysis of education. Some of didactic principles of compiling textbooks can be discussed.

1) *The principle of educational training* means that no subject, no textbook can contain the sum of knowledge, separated from educational objectives. In teaching, we educate our students. It is an axiom that does not need any evidence and arguments.

2) *The principle of scientific character*, requires that the content of education introduces students to an objective scientific facts, theories, laws, to reflect the current state of science. The implementation of this principle is reflected, above all, in the curricula and textbooks, in the selection of the studied material. Students are introduced to the elements of scientific research.

3) *The principle of connecting training and practice* requires stimulation of the students in the learning process, to use the knowledge in solving practical problems, analyze and transform the surrounding reality, applying knowledge in life and develop their own views. The case studies and real-life situations, teaching the students with the structure of the state, public institutions and other objects of modern society are used.

4) *The principle of system and sequence* involves teaching and learning in a specific order, the system requires logical construction, both the content and the learning process that is expressed in a number of rules:

- studied material in thematic direction should be clearly planned, divided into logical partitions, and it establishes the procedure and method of work;

- in each academic theme the informative centers must be installed. The main concepts, ideas must be highlighted, subjecting them to all the other parts of the lecture or a lesson, as well as structuring the training material;

- external and internal communication between theories, laws, facts are constructed by learning.

5) *The principle of availability* requires consideration of the students' development peculiarities, analysis of the material in terms of their capabilities and organization of training, so that they would not experience the intellectual, moral, and mental overload.

6) *The principle of using visual aids* means that learning process is necessary to allow students to observe, measure, conduct experiments, work practically in order to get knowledge. Modern learning tools (television, computer technology, audio-video equipment) can actively use visual aids. With this in mind, developers, textbook authors should pay considerable attention to visual materials. Use of visual aids in the study of the exact sciences (chemistry, physics, mathematics, etc.) should facilitate the transition from concrete thinking to the abstract, verbal and logical thinking.

7) *The principle of cognition and activity* of students is one of the main principles of modern didactic system, which stimulates cognitive activity of the students, subjects of educational activity. This is reflected in the fact that students realize the goals of studying, plan and organize their work, are able to check themselves, showing an interest for knowledge, explore challenges and know how to find their solution. The realization of this principle is able not only to form the students' knowledge, but also their

social growth. This principle should be considered in the development of textbooks with new content, focusing all teaching works on the active forms and methods of teaching.

8) *The principle of strength of knowledge* is one of the most important training principles. Knowledge must be thoroughly fixed in the memory of students, become a part of their cognition, the foundation of habits and behavior. It is known that the storage and reproduction depend not only on the material, but also on its connection. The main rule of this principle is that strong learning occurs if the student shows the intellectual and cognitive activity. Lasting assimilation requires proper organization of the number and frequency of the material, considering the individual characteristics of students. The strength of knowledge is achieved when the material is structured, allocated importantly, it establishes a logical connection. In addition, the strength of the knowledge is provided by the systematic control of the learning results of their regular testing and marking [6].

Analyzing the realization of the didactic principles in the development and use of the textbooks in the educational process of higher school, it may be noted that the principles of fundamental didactics can only be effective, if they are applied in unity and cooperation. The realization of one of them is inseparably linked to the implementation of others. For example, the activity and system are connected with the strength availability, scientific character and so on. Modern teaching aids are intended not only to transfer certain skills, but also to teach the students to get by themselves, to help them to develop cognitive and creative abilities, find interdisciplinary communication, that is to provide the realization of all the didactic principles. [7].

It becomes obvious that the project of a model textbook cannot be formed without accounting didactic functions of the textbook. Let us analyze basic functions of textbooks and teaching aids.

1) *The information function* is aimed primarily at the formation of information culture of the students and contributes to the accumulation of the knowl-

edge base that will be necessary for future graduates. Therefore the content of the textbook should be based on live information. However, the amount of information must be limited in accordance with the age of the students and their abilities of perception the information. The information should be presented in logical order considering priority of the problems. Also it is necessary to distinguish the levels of materials in the training books so it is vital to separate more important, basic information.

2) *Transformational function* is based on the fact that theoretical knowledge and methods of science, characteristics of professional activities in the training book are not just tolerated, they are processed, converted for the purpose of mastering with minimal spending. Thus, methodical and didactic processing of information is realized. This processing takes place systematically, if the content of the textbook is systematized.

3) *Revision and monitoring functions* are necessary to learn the material, the rational organization of educational work, self-mastery of the knowledge and skills. This feature is realized through the creation of the unit of organization of learning material in the textbook.

4) *The function of self-study* means that textbook material should be structured to work independently. Matched tasks and exercises should be of interest and easy to be searched.

5) *Didactic-educational function* finds itself in learning tasks which are directed on the full and harmonious education of personality, development of a scientific outlook, as well as civil liability.

6) *Control function* is manifested in the fact that the textbook should not only “fit” in educational process, but also differ in their structure and feeding theoretical and practical material, which should correspond to the structure of the educational process. Textbooks and teaching aids must help the teacher to organize both classroom and extracurricular activities of students.

7) *The function of organization the interdisciplinary connections* due to the fact that the content of any textbook should have a connection with other

disciplines, it must be built in accordance with the scientific picture of the world, reflected the integration of modern scientific processes. The content of textbooks should not duplicate the information from other books on other subjects. This function allows the student to take academic disciplines as the part of system, to understand the universal nature of scientific principles and methods of cognition.

In the textbook theory the set of features is called as a complex or system of pedagogical functions of the textbook. The content of authors' textbooks must involve didactic principles and models of learning as well as the methods of presentation and its logic and structure of the textbook must obey didactic basis.

General principles of didactics are realized at the pedagogical process which helps to achieve effective and resulting training [8]. Among them we should highlight *the principle of educational training* aimed at developing human cognitive abilities, communication skills, enrich the spiritual world, *the principle of scientific training*, promoting systematic familiarizing students to the methods of science; *the principle of the connection of theory and practice*, ensuring the application of knowledge in practical work, having personal experience in self-searching; *principle of systems* in the assimilation of knowledge, which is manifested in forming conceptual connections in the mind of the student and the reflection of the links that exist in reality itself; *the principle of using the visual aids* that requires inevitable use of visual aids in the classroom; *the principle of availability of training*, which is under the content, nature and volume of studied material and the level of students' knowledge. These principles should be implemented fully in the textbooks and teaching aids as the basic means of the educational process.

Training method clearly defines the place of textbooks in the learning process. The method is understood as a way of transferring knowledge, forming skills and abilities, when on certain segments of the pedagogical process the use of the same means or methods of training are observed. The teaching method can be regarded as a model of organization

and holding certain kinds of educational works. The most common models of the implementation of the educational process are the following logical sequences of training classes, “lecture – notes – textbook”, “lecture – textbook” “textbook – lecture – notes – textbook” “textbook – lecture – textbook”, “lecture – notes”. In that model, which excludes the link “textbook” there is a drawback, which is reflected in complete dependence on a student from lecturer-instructor, the inability to verify the authenticity of information offered by the instructor. Learning model, in which the central place is occupied by a textbook or teaching aid, encourages a student to work independently, to get knowledge from a reliable source, teaches to work with literature [9].

In constructing the model of training book it is necessary to consider the choice of model of cognitive activity, which dictates certain principles on selecting educational material and methods of cognitive activity leading [10]. The subject-ontological model of cognitive activity is singled out, as a result of which the abilities and needs of the reproduction type are formed, which exclude the possibility to use the received knowledge in practice; epistemological model, focused on the cognitive and practical activity containing not only the theory of the studying science, but also methods of cognitive activity; axiological model of cognitive activity involves the development of learner assessment relationship to the phenomena of reality, the formation of students’ scientific outlook and the acquisition of self-experience through the scientific and substantive information. Theoretical and practical content of textbooks is directly connected with the data models of cognitive activity, with the form and methods of learning that, in turn, is the educational technology.

The monograph of L.G. Turina also highlights educational publications implementing personality-activity-learning technology aimed at expanding the interdisciplinary connections and the orientation of student on a practical profession. Personality-activity approach to learning is correlated with the model of problem presentation [11].

Depending on which model is chosen for learning activities and education technology, methods of presentation of teaching materials are determined [12-15]. The logic of presentation of the subject knowledge should reflect the expected way of the reader’s mind and realized in the categorization of the textbook, in the division of the text into parts.

Conclusion

As part of the research the analysis of using textbooks and teaching aids, developed for models provided by us based on didactic principles and applied technologies of training, we can do the following conclusions.

The study of the problem of textbooks and the development and use of textbooks in the educational process of higher school with the help of modern teaching technologies within the framework of this research has shown, the solution of this problem is possible with the skillful scientific and methodical use of all scientifically based didactic principles, taking into account the general pedagogical regularities of the learning process. These didactic bases not only contribute to the development of information-communicative competence of the students, but also help them to intelligently participate in the educational process, to take responsibility for the enrichment of their knowledge and develop skills, explore and analyze important contemporary issues, synthesize knowledge, seamlessly work in a team, to acquire the skills of self-education, to make well informed decisions.

In addition, the result of the use of textbooks and teaching aids have advanced according to the described model in the study with the harmonious development of students’ communication skills and the skills of analytical processing of information, the application of new information in the field of science and education. Acquired quality of students contribute to the socialization of the individuals, used both in academic and extracurricular activities, differ with demand and correspond to modern educational needs of instructors and students.

ფსიქოლოგია

დიდაქტიკური პრინციპები საგანმანათლებლო პროცესისათვის ახალი სახელმძღვანელოებისა და პროგრამების შემუშავებაში ინტერნეტ სწავლების ტექნოლოგიების გამოყენებით

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ნაშრომში წარმოდგენილია დიდაქტიკური პრინციპები უნივერსიტეტის საგანმანათლებლო პროცესისათვის ახალი სახელმძღვანელოებისა და პროგრამების შემუშავებაში, თანამედროვე დიდაქტიკის თვალსაზრისით. სტატიაში განხილულია სასწავლო სახელმძღვანელოები, მეთოდური კომპლექსები, მათ შორის ზოგადი პედაგოგიური კანონები და ინტერნეტ სწავლების ტექნოლოგიები განათლებასა და პროფესიულ სწავლებაში. საუბარია სტუდენტთა განათლების ხარისხის გაუმჯობესებისათვის ახალი მეთოდების პრაქტიკაში გამოყენების შესახებ. ნაშრომში დასკვნის სახით წარმოდგენილია საგანმანათლებლო პროცესში არსებული უმთავრესი პრობლემების შესწავლის შედეგები და გადმოცემულია სწავლების პროცესში სახელმძღვანელოების ფუნქციის, სტუდენტთა ინტელექტუალური და შემოქმედებითი უნარების განვითარებისა და სახელმძღვანელოებთან მიმართებაში ახალი საგანმანათლებლო ტექნოლოგიების როლის შესახებ.

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