TECHNOLOGY AND RELEVANCE OF CREATING AN ELECTRONIC TRAINING COURSE

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The concept of modernization of education for the period up to 2018, as a priority for the entire education system and, in particular, higher education, sets the task of ensuring high-quality training of specialists, its compliance with the current and future needs of the individual, society and the state. The solution of this problem requires the higher educational institution to introduce new approaches to learning, ensuring, along with its fundamental nature and compliance with State educational standards, the development of communicative, creative and professional competencies, needs for self-education based on the potential multivariance of the content and organization of the educational process. In foreign and domestic scientific and pedagogical literature for several decades, the transition to new educational technologies has been associated with the process of computerization of the educational process, the formation of educational environments based on information and communication technologies (ICT). In the works of A. Dillon, R. Gagne, D.H. Jonassen, D. Hen, L. Harasim, M.G. Moor, H.B. Apatova, B.S. Gershunsky, V.G. Zhytomyr, V.V. Laptev, M.P. Lapchik, D.S. Matros, E.I. Mashbitsa, E.S. Polat, I.V. Robert and other researchers have shown that modern information technologies have a significant potential for training specialists who can create and develop modern technologies, and are able to solve professional tasks at a creative level.

At the same time, as many researchers and teachers note, the practice of using ICT as a means of teaching noticeably lags behind the achievements of theory and pilot developments. Despite the fact that electronic educational materials are increasingly used in the training of specialists with higher education, they often only repeat manuals on paper, without developing the student's creative activity and independence.

The above fully applies to information educational resources intended for teaching teachers and, in particular, computer science teachers. The situation is complicated by the fact that modern information technologies and programming technologies are progressing and improving so rapidly that plans for training specialists in this field do not have time to adequately meet these changes. Our analysis shows that the methods of teaching programming used in pedagogical universities are focused on the presentation of outdated technologies, far from fully reflecting their current state and development prospects. The pedagogical university should implement new teaching

methods that would allow the computer science teacher, if necessary, to master technological innovations independently and translate them into the taught academic disciplines.

Thus, based on the above, the following contradictions can be distinguished:

* between the requirements for a specialist with higher pedagogical education as a creatively thinking person who owns modern methods of teaching his subject, on the one hand, and the lack of identified opportunities of electronic educational materials in the formation of these qualities, on the other;

* between the increasingly expanding scope of the use of electronic educational materials as teaching tools at the university and the lack of identified specifics of such materials, the use of which ensures the activation of educational and cognitive activity of students;

between rapidly developing programming technologies and the need to familiarize future computer science teachers with them in the process of their education at a pedagogical university, on the one hand, and the insufficient development of techniques that would ensure the formation of skills for independent development of new technologies, on the other.One of the possible ways to resolve these contradictions can provide an approach in which the use of electronic educational materials in the study of the discipline will be systematic. Moreover, in a number of disciplines (programming, information technology), electronic educational materials should act as system-forming and determine both the content of the discipline and the teaching methodology. The totality of such materials can be considered as an integral electronic training course. In connection with the above, our study substantiates the possibility of adopting the following definition: an electronic training course (EUC) is a system of content-related and methodological electronic educational materials that ensure the constant use of information and communication technologies by students in all types of educational activities in the process of studying a discipline (academic subject).

The need to resolve the contradictions listed above determines the relevance of this dissertation research, and also determines its problem: how the ECM should be built so that it ensures the development of activity, independence and creativity of the future teacher. As part of the solution of this problem, the topic of our research was determined: "E-learning course as a means of activating educational and cognitive activity in teaching programming to future computer science teachers."

The object of research: the process of teaching programming in the preparation of future computer science teachers at a pedagogical university.

Subject of research: the use of an electronic training course as a means of activating the educational and cognitive activity of future computer science teachers in the process of teaching programming at a pedagogical university.

The purpose of the dissertation research is to develop and theoretically substantiate the methodology for creating and applying electronic training courses in order to activate the educational and cognitive activity of pedagogical university students in the process of learning programming.

The hypothesis of the study: if, when teaching programming to students of a pedagogical university, an electronic training course is used, focused on the independent development of educational material, having a professional orientation, providing for the systematic use of electronic learning materials in all types of educational work and implementing an activity-based approach to teaching programming, then this will ensure:

* activation of educational and cognitive activity of students;

* formation of skills to master new programming technologies independently.

In accordance with the purpose, subject and hypothesis, the following research tasks were set:

1. Based on the analysis of methodological and psychological-pedagogical literature, to determine theoretical and methodological approaches that ensure the use of active forms of educational activity of students, as well as to identify the possibilities of using information and communication technologies for this.

2. To identify and substantiate a set of principles for the construction of electronic courses aimed at activating the educational and cognitive activity of students; to determine the didactic and organizational conditions for their effective application. Taking into account the specifics of teaching programming to future computer science teachers, as well as on the basis of the formulated principles to create an electronic training course "Programming in the Delphi environment". To develop a methodology for teaching programming based on the materials of this course, the use of which will allow to activate educational and cognitive activity.

4. To identify the structure of the complex of diagnostic indicators reflecting the results of mastering programming methods by pedagogical university students, as well as to develop a technology for measuring them. To justify the choice of criteria reflecting the level of activity and independence of students in the learning process.

5. To carry out experimental search work to verify the effectiveness of the proposed methodology.

The theoretical and methodological basis of the study was:

* concepts of modeling and construction of the pedagogical process (V.I. Andreev, V.V. Kraevsky, V.P. Bespalko);

* theory of the development of teaching motivation (P.Ya. Galperin, A.N. Leontiev);

* psychological and pedagogical ideas of modern didactics concerning the optimization of education and continuous developmental learning (Y.K. Babansky, V.V. Davydov, L.V. Zankov.);

* trends in the development of the higher education system (P.I. Pidkasisty, V.A. Slastenin, S.A. Smirnova);

* principles of creation and use of learning tools (E.S. Polat, L.H. Zaynutdinova);

* works on psychological and pedagogical problems of informatization of education (D.S. Matros, I.V. Robert, B.E. Starichenko);

* works on the methodology of teaching modern programming technologies (A.Y. Arkhangelsky, A.S. Lesnevsky, M.V. Shvetsky).

To solve the tasks , the following research methods were used:

theoretical: study and analysis of philosophical, scientific-methodological, psychological-pedagogical and special literature on the problem of research; analysis of state educational standards, programs, textbooks and methodological materials; design of educational tools that ensure the achievement of specified learning goals;

empirical: methods of monitoring the success of training; monitoring of learning outcomes; pedagogical observation, conversation, questionnaire; method of expert assessments; statistical processing of the results of experimental research work and their analysis.

As criteria for the effectiveness of the methodology justified in the work , the following were adopted:

* changing the nature of the distribution of trainees according to the degree of detail of the description of activities at the stage of issuing a task for the development of a training project;

* a significant increase over time in the average rate of students' assimilation of theoretical knowledge on the basics of programming, determined on the basis of electronic testing;

* a significant increase in the average indicator characterizing the ability to solve algorithmic programming problems;

* reliable growth and degree of consistency of expert assessments of educational and cognitive activity and independence of students in the development of final projects determined by established criteria through modified element-by-element and postoperative analysis.

There are a number of fundamentally different interpretations of intelligence. In the structural genetic approach of J. Piaget, intelligence is interpreted as the highest way of balancing the subject with the environment, characterized by universality. With the cognitive approach, intelligence is seen as a set of cognitive operations. In the factor-

analytical approach, on the basis of a variety of test indicators, stable factors are found (C. Spearman, L. Terstone, H. Aizenck, S. Bart, D. Wexler, F. Vernon). Eisenck believed that there is a general intellect as a universal ability, which can be based on the genetically determined property of an unequal system to process information with a certain speed and accuracy. In psychogenetic studies, it was shown that the proportion of genetic factors calculated by the variance of the results of performing intellectual tests is quite large, this indicator has a value from 0.5 to 0.8. In this case, the most genetically dependent is verbal intelligence.

The concept of I. as a general mental ability is used as a generalization of behavioral characteristics associated with successful adaptation to new life tasks.

R. Sternberg identified 3 forms of intellectual behavior: 1) verbal I. (stock of words, erudition, the ability to understand what was read); 2) the ability to solve problems; 3) practical I. (the ability to achieve goals, etc.). In the beginning. XX century I. was considered as a level of mental development reached by a certain age, which manifests itself in the formation of cognitive functions, as well as in the degree of assimilation of mental skills and knowledge. At present, a dispositional interpretation of I. as a mental property (ability) is accepted in testology: predispositions to act rationally in a new situation. There is also an operational interpretation of I., going back to A. Bin: I. is “what tests measure”.I. is studied in various psychological disciplines: for example, in general, age, engineering and differential psychology, pathopsychology and neuropsychology, in psychogenetics, etc. Several theoretical approaches to the study of I. and its development can be distinguished. The structural-genetic approach is based on the ideas of J. Piaget, who considered I. as the highest universal way of balancing the subject with the environment. Piaget singled out 4 types of forms of interaction between subject and environment: 1) forms of the lower type, formed by instinct and directly resulting from the anatomical and physiological structure of the body; 2) holistic forms formed by skill and perception; 3) integral irreversible forms of operation formed by figurative (intuitive) preoperative thinking; 4) mobile, reversible forms that can be grouped into various complex complexes formed by the “operational” I. Thurstone developed a multifactorial model of I., according to which there are 7 relatively independent primary intellectual abilities. However, the research of G. Eysenck and others showed that there are close ties between them and when processing the data received by Thurstone himself, a common factor is highlighted.

The hierarchical models of S. Bart, D. Wexler and F. Vernon also gained fame, in which intellectual factors are arranged in a hierarchy according to the levels of generalization. The concept of amer is also among the most common. psychologist R. Kettell about 2 types of I. (corresponding to 2 factors allocated to them): “fluid” (fluid) and “crystallized” (cristallized). This concept occupies, as it were, an intermediate position between views on I. as a single common ability and ideas about him as a set of

mental abilities. Research of I. at advanced age confirms the In addition, he singled out the ability to divergent thinking (the ability to generate many original and non-standard solutions) as the basis of creativity; the indicated ability is opposed to the ability to convergent thinking, which is revealed in tasks requiring an unambiguous solution, found using learned algorithms.

Today, despite attempts to single out ever new “elementary intellectual abilities,” most researchers agree that general I. exists as a universal psychic ability. According to Eysenck, it is based on the genetically determined property of n. p., determining the speed and accuracy of information processing. In connection with the successes in the development of cybernetics, systems theory, information theory, artificial I., etc., there has been a tendency to understand Today there is no unified scientific theory of intelligence, but there is a kind of fan of conflicting trends from which the most desperate eclectics find it difficult to deduce the vector. To this day, all attempts to enrich the theory come down to expanding the fan, leaving the practical psychologist with a difficult choice: which of the tendencies to prefer in the absence of a single theoretical platform.

The scientific development of the problem of intelligence has a very short history and a long background. From time immemorial, the answers to these questions have been sought by thinkers of all times and peoples. However, in their research they relied mainly on their own everyday observations, speculative reasoning, generalizations of everyday experience. For millennia, the task of a detailed scientific study of such subtle matter as the human mind was practically not even posed as insoluble in principle. Only in this century did psychologists venture to approach her. And, I must admit, a lot of success in experimental and theoretical developments, in the production of hypotheses, models and definitions. Which, however, allowed them very close to get away from the vague philosophical maxims of the past and the ingrained worldly ideas. Today there is no unified scientific theory of intelligence, but there is a kind of fan of conflicting trends from which the most desperate eclectics find it difficult to deduce the vector.

To this day, all attempts to enrich the theory come down to expanding the fan, leaving the practical psychologist with a difficult choice: which of the tendencies to prefer in the absence of a single theoretical platform. The first real step from discussing the nature of the mind to its practical research was the creation in 1905 by A. Binet and T. Simon of a set of test problems to assess the level of mental development. In 1916 L. Termen modified the Binet-Simon test, using the concept of intelligence coefficient - IQ introduced three years earlier by V. Stern. Even before reaching a consensus on what is intelligence, psychologists from different countries began to design their own tools for its quantitative measurement. But it soon became apparent that the use of seemingly similar, but somewhat dissimilar tools yields uneven results. This stimulated a lively (albeit somewhat belated) discussion about the subject of measurement. For example, E.

Thorndike in an openly behavioral manner reduced intelligence to the ability to operate life experience, that is, an acquired set of stimulus-reactive connections. However, this idea was supported by few. Using factor analysis in the structure of intelligence, different authors identified a different number of basic factors - from 2 to 120. It is easy to guess that this approach was very difficult to diagnose in practice, making it too cumbersome. One of the innovative approaches was the study of so-called creativity, or creative abilities. In a number of experiments, it was found that the ability to solve non-standard, creative problems weakly correlates with the intelligence measured by IQ tests. On this basis, it was suggested that general intelligence (G-factor) and creativity are relatively independent psychological phenomena. To "measure" creativity, a number of original tests were developed, consisting of tasks that required unexpected solutions. However, supporters of the traditional approach continued to insist, quite reasonably (certain correlations were nevertheless revealed) that creativity is nothing more than one of the characteristics of the good old G-factor. Preliminary data confirming this connection were obtained by Vent. The child's successes in school, play and in other situations help him create an idea of himself, and his idea of himself at this stage affects his subsequent performance of activities, etc. in a spiral. In this sense, self-image is a kind of individually self.

REFERENCES

1. Murodova Z. R. The formation and definition of the intellectual potential in education. ISJ Theoretical & Applied science. Philadelphia, USA. – 2020.
2. Murodova Z. R. Methods of formation and identification of intellectual potential in the field of information technologies //Electronic journal of modern science, education and training. – №. 4. – С. 56-62.
3. Rashidovna M. Z. Intellekt The Mechanism For The Development Of Tasks Oriented To The Visual Potential //Turkish Journal of Computer and Mathematics Education (TURCOMAT). – 2021. – Т. 12. – №. 4. – С. 93-100.
4. Муродова З. Р. РОЛЬ WEB-ТЕХНОЛОГИЙ В СОВРЕМЕННОМ ОБЩЕСТВЕ //Ученый XXI века. – 2017. – №. 2-2.
5. Muradova F. R., Usmonova N. Y., Murodova Z. R. Unconventional forms of science lessons using game technology //European Conference on Innovations in Technical and Natural Sciences. – 2014. – С. 69-74.3.Р Муродова Технология java в образовании// перспективы развития технологий обработки и оборудования в машиностроении.
6. M.F Rashidovna, M.Z Rashidovna //Use of information technologies in education// International Journal of Psychosocial Rehabilitation 24 (6), 3110-3116
7. FR Muradova, ZR Murodova, Ataullaev. Sh.N, M.Sh Kadirova//,Psychological aspects of computer virtual reality perception //ournal of critical reviews 7 (18), 840-844
8. ZR Murodova// Psychological and pedagogical aspect of the emergence of intellectual models of autor's tests// Electronic journal of modern science, education and training, P. 284-291.