Problem and cognitive education as a form of innovative pedagogic technology

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Abstract. The article is dedicated to the urgent problem of using innovative pedagogic technologies in education. The author specifies that the orienting point must become the formation of universal abilities of the personality, increase in the competence level of the learner. The article displays various hypotheses that explain the sense of the problem education and their critical evaluation. Referring to the researches of famous resource teachers and educators, the author specifies that only in the recent years the problem education has started to be regarded as one of innovative pedagogic technologies. She notes that the problem education must be based on the problem. The article displays considerable differences between the notions "problem", "problem situation", "problem task", "problem exercise". According to the article author, the problem is a result of the subject's active creative activity. It is one of the innovative pedagogic technologies as it meets the requirements to the notion "pedagogic technology of education". The article provides various classifications of pedagogic technologies. Following V.P. Bespalko, the author singles out the features of the pedagogic technology. Based on the analysis of the problem education peculiarities, the author makes a conclusion that it meets the requirements of educational technologies.

Introduction

Under the conditions of globalization, informatization and indefiniteness of the contemporary society, the problem related to forming the youth to individual life and professional activity becomes urgent like never before. That is why it is time to transfer the education system with "education for the whole life" concept to "education through the whole life" one. The documents related to the modernization of native and foreign education display the idea on the necessity to change the education orienting points from receiving knowledge, and implementing abstract educational and pedagogic tasks to forming personality's universal abilities, and increasing its competence level. This goal achievement is related to both activating individual and independent, as well as scientific level of education process, and implanting innovative education technologies into learning practice. Technology of problem and cognitive education can be referred to one of such technologies.

It is only in the recent time that the development of the problem education started as a pedagogic technology. Before that in 1970-2000 the attempts have been made in order to investigate the essence of the problem education and find out what the problem education is based on, define its didactic status. That is why various hypotheses explaining the essence of the problem education have been made. The first hypothesis about the essence of the problem method is based on the provision about the problem education as a method. So, I. Ya. Lerner thinks that the problem education must be referred to research methods of education. That is why he points out that the method solving these tasks is problem recitation [1, 46]. Education method is a system of pedagogic techniques, which use is defined by common goals of education, didactic principles, and character of educational materials and sources of information. That's why the problem education cannot be thought as a method because while classifying education methods according to the source of knowledge acquisition (conversation, lecture, work with a text-book, etc.), the statement under consideration will contradict the fact noticed by G.A. Ilyina, "the problem education is applied together with other methods" [2, 47].

The second hypothesis of the problem education sets a provision about the problem education as a didactic system, a type of developing education: the problem education is a type of developing education combining systematic individual

research activity of learners and their learning of the science ready-made conclusions. The system of methods is made with account of goal setting and problematicity principle [3, 257]. However, the hypothesis of Machmutov M.I. is indefensible as it includes some contradictions. According to his statements, it logically follows that the system is included in its own element.

V.I. Zagviazinskiy also states that the problem education is a new type of education replacing demonstration and explanation and being characterized by the fact that learners acquire knowledge in the process of creative research [4].

According to the fourth hypothesis, the problem education is regarded as an active form of organizing the education work, whereby individual solving of practical urgent educational problems strengthens the knowledge, abilities and skills: herewith, basing on the goals of developing listeners' cognitive abilities and creative thinking [5].

The fifth hypothesis of the problem education states that the problem education is a principle of education. In this case, the essence of the problem education includes the availability of cognitive and practical research in the student's activity in particular. The problematicity as well as controllability meets the requirements set to the education principles. Any principle of education usually includes actual and perspective features of education as well as the ones that are subject to development and implementation. This criterion explains the reason why new principles of education appear. In didactics the problem education does not have any status, method system, type, kind and form; it has a status of the education principle [6, 13].

The majority of researchers (T.V. Kudriavtsev, A.M. Matiushkin, L.M. Fridman, D.V. Vilkeev, A.V. Brushlinskiy) make a hypothesis that the initial point of the problem education is "a problem situation" defined as "intended difficulty" (I.Ya. Lerner), a special kind of thinking interrelation of the subject and the object (A.M. Matiushkin). It is "a rather dim, not very clear and hardly conscious contradiction" [7, 53]. It is "a psychic condition of the subject having a practical difficulty, the appeared contradiction between the subject and the object, person's experience and activity" [8], and a problem situation is a key notion of the problem education [9]. A problem situation is an initial moment of the problem education, as it must characterize that psychological condition of the subject that appears in the process of performing "an action while facing the difficulty that requires the discovery of new knowledge about the subject, ways or conditions of achieving the goal. The problem situation acts as a psychological model of conditions causing thinking

based on cognitive need appearing in the situation [10, 117].

The analysis of the made hypotheses shows that neither understanding of the problem education as a method of education, nor understanding of it as a system, or developing education, nor studying it as a problem situation have a real basis, because some hypotheses contradict themselves (the problem education as a method). Alternatively, they give a general provision of the problem education without delving into its essence (as a type of developing education, as an active form of organizing educational work). They understand the essence of the problem education narrowly regarding it only in the context of the psychological aspect (as a situation of difficulty when it goes about the expression of psychic reality by the problem situation). Instead, in didactics it must go about a real difficulty of objective character. The notion of "problem situation" as well as reality defined by it cannot be set onto the didactic basis of the problem education. That is why, according to E.T. Pisareva and V.E. Pisareva, the problem education must be based on a problem. The problem means such "special form where the subject fixes and introduces the found dialectical contradiction both in the reality and imagination. Contradictions in difficulty under consideration act as that "x" element which makes up and defines the problem essence" [11, 80].

The notion of "problem" is wider than the one of "problem situation". The problem does not appear and is not caused by the problem situation. It is a result of active cognitive activity of the subject interrelating with the object. Herewith, the subject singling out cognitive difficulty in the object sees a contradiction in it and organizing its solving, and forms the problem.

According to V. Okon, "an education problem makes up a practical difficulty which solving is a result of the pupil's own research activity. Usually the background of this difficulty is an effectually organized situation in which the pupil being guided by definite needs longs to overcome the difficulty and acquires new knowledge and experience in such a way" [12, 67]. As we can see, the problem appears from the analysis of the problem situation. The problem situation appears when learners cannot explain various facts, provisions, hypotheses with the aid of the knowledge they have. In this case the difficulty occurs. The occurred difficulty signals about the necessity to find a way out of it. The problem is formed on this basis: "What do we know?", "What should we find?"

"The problem" as a basis of the problem education is defined variously. That is why such notions as "cognitive problem" (Yu. K. Babanskiy and F. Kharlamov, T.I. Shamova), "practical problem"

(S.A. Shanoranskiy), "creative problem" (P.I. Pidkasisty), "education problem" (B.P. Barkhaev) occur.

The problem must distinguish from the problem situation. According to S.L. Rubinshtein, the problem situation depends on the psychological condition of the subject and is not expressed externally. However, both of them are connected with obligatory lingual expression of the problem in the form of question or task speech wording [13].

The problem differs from the problem task and problem exercise. So, the problem task acts as an external expression of the problem the learner faced in the process of his cognitive action. M.I. Makhmutov states that the task is an objective phenomenon: firstly, it exists as a difficulty for the pupil, and the problem is a subjective phenomenon appearing in the pupil's consciousness in the ideal form in the thought [14]. According to V. Okon, the notion of "the task" does not coincide with the notion of the "problem" [12].

The problems task directs the pupil to actions causing cognitive need in new tasks and methods without which it is impossible to solve the task. The education problem but not the exercise and problem task is the basis of the problem education for it acts as a reflection (form of display) of logical and psychological contradiction of the learning process defining the direction of the intellectual research. This causes the interest to research the essence of the unknown things and leading to learning a new notion (a way of action). Psychological essence of education problem includes the following: it singles out the subject content of the problem situation appearing in the process of the pupil's learning. Education problem as an individual notion reflects a specific area of the reality and acts as a rather defined stage of the pupil's learning. That is why the education problem is an important psychological and pedagogic category the use of which during the research of the education process can contribute to the discovery or adjustment of the regularity being known before [15].

Studying the problem education as a situation, problem, problem recital does not contribute to solving the problem of integral organization of learners' cognitive activity for it assumes the replacement of the integral process by its particular elements. That is why the statement of many researchers of the last years who offer to regard the problem education as a pedagogic technology of education is correct [16].

There is no doubt that the problem education is one of innovative pedagogic technologies for it meets the requirements set to the notion of "pedagogic technology of education". It means the system of designing and practical appliance of pedagogic regularities, goals, principles, content, forms, methods and ways of studying and upbringing that is adequate to the system and guarantees a rather high level of their efficiency. According to V.P. Bespalko, "a pedagogic technology is a systematic and consistent implementation of the educational and upbringing process designed before" [17,5].

Pedagogic technology is a project of a specific pedagogic system implemented in practice [18], [19], [20], [21]. Pedagogic technology can occur as a result of scientific design, and the project itself is a system of actions that has an opportunity to be implemented several times and guarantee success in achieving a specific pedagogic goal. That is why it is understood as a substantial technique of implementing the pedagogic goal [22]. Pedagogic technology is regarded as a way to manage the education process with exactly set goals which achievement must be clearly described and defined. That's why, in our opinion, the following definition of the pedagogic technology is acceptable. "It is not a mere system of research in the area of using training equipment or computers. It is a system of research with the aim to find out the principles and develop the techniques of optimizing the education process by analyzing factors that increase in the education efficiency, by constructing and applying techniques and materials as well as by evaluating the applied methods" [23].

Various researchers (V.G. Gulchevskoy, V.P. Bespalko, V.T. Fomenko, G.K. Selevko) classify pedagogic technologies in different ways. So in his work G.K. Selevko classifies a system of pedagogic technologies in accordance with various criteria and basis, namely: according to the level of appliance (general pedagogic, particular pedagogic), according to the philosophical basis (materialistic and idealistic), according to the leading factor of psychic development (biogenic, sociogenic, psychogenic and idealistic), according to the scientific concept of experience learning (associative and reflectory, Gestalt technologies, behavioral), according to the orientation to personal structures (informational technologies, formation of abilities and skills), operational (formation of ways of intellectual actions), emotional and imaginative, emotional and moral, and according to the character of content and structure (learning and upbringing, social and religious, comprehensive and profession-oriented, humanitarian and technocratic, various field and particular, etc.). G.P. Selevko classifies pedagogic technologies according to the following criteria:

In accordance with the child's position in the education process: authoritative, didactic centric (subject and objective relations), personality-oriented.

According to the learners: mass (traditional advanced technology, technology of compensating education, various victimization technologies, sign-,

ortho-, typhlo), technology of work with disabled children; according to the type of organizing and managing the cognitive activity; according to the technology assuming the organization of the education process on the problem basis.

Two technologies of all those enumerated by G.K. Selevko deserve special attention. They focus on the organization of managing the cognitive activity (V.P. Bespalko) and technologies assuming the education process organization on the problem basis. In his pedagogic technology taking into account organizing and managing the cognitive activity, V.P. Bespalko singles out such types of interrelations between the teacher and the pupil which can be broken (uncontrolled and uncorrected activity of pupils), cyclic (with control, self-control and mutual control), dissipated (frontal or directed, individual), manual (verbal) or automated (with the aid of training means). The combination of these features defines the following types of technologies (according to V.P. Bespalko didactic systems):

- *classic lecture education* (managing, broken, dissipated, automated);

- *teaching with the aid of audio and visual equipment* (broken, dissipated, automated)

- *"consultant" system* (broken, managing, manual)

- *teaching with the aid of a textbook* (broken, managing, automated)- individual work

- *"small groups" system* (cyclic, dissipated, manual) – group, differentiated methods of teaching;

- *computer learning* (cyclic, dissipated, automated)

- *"private tutor" system* (cyclic, managing, automated) - individual learning;

- *"programmed" learning* (cyclic, managing, automated) that has a previously made program [19].

Technologies assuming the organization of the education process on the problem basis orient to increase in the development, while explanation and reproduction technologies are not able to provide any development. That is why it is necessary to set the education process in "a zone of the earliest development" (L.S. Vygotskiy, L.V. Zankov). The problem education is oriented to it. It assumes the availability of a special, internally contradictory, problematic content. However, it is not enough for the education to get a problematic character. It is necessary to take into account the situations in which these contradictions emerge.

Problems with objective necessity must occur in the learners' consciousness through the problem situation.

A problem technology assumes the discovery of such a method that will lead to the problem

knowledge. Consequently, the pupil must leave the lesson with a problem.

A number of features singled out by V.P. Bespalko characterize the problem technology. They include:

- Distinct, subsequent pedagogic, didactic development of education and upbringing goal;

- Structuring, adjustment, reduction of information to be learnt;

- Comprehensive appliance of didactic, technical including computer means of learning and upbringing;

- Strengthening the diagnostic function of learning and upbringing as much as possible;

- Guarantee of quite high learning conditions [17].

"Pedagogic technology" describes the system of the teacher's actions that have the technology features (guarantee of the set goal achievement, opportunity to re-perform these actions in the same succession and with the same methods, availability of a special diagnostics to approve this system efficiency). While describing the pedagogic technology a project of pedagogical activity is made. In this respect the pedagogic technology means a project of the pedagogic process on the level of the whole educational establishment, professional activity of a separate teacher or a specific pedagogic task developed on the scientific basis. Herewith, procedures being efficient for achieving the planned result are used.

The requirement of the pedagogic technology to the preliminary technologies project is quite natural for only pedagogic projecting will allow to imagine the whole process of education and cognitive activity in integrity. In our opinion, on the basis on the problem education, it is actually possible to design a pedagogic technology combining the management of cognitive activity of learning in the process of the problem education. In this case it is necessary to take into account the following features of pedagogic technology defined by V.P. Bespalko, namely: 1) learning the education goals, 2) structuring and adjustment of information, 3) comprehensive use of didactic technical means, etc. [17]. Besides, it is necessary to take into account the requirements set to educational technologies as well as learners' cognitive activity in order to activate the longing to acquire knowledge.

The problem education refers to pedagogic technologies as it has the potential of these types of technologies, namely: 1) it induces individual learning activity, 2) it stimulates activity, initiatives, independence and creation, 3) it develops intuition and thinking, 4) it provides the development of critical and theoretic thinking, basic intellectual abilities –

generalization, systematization, analysis, synthesis, deduction and induction, 5) it causes cognitive interest to the content and methods of the school subject, 6) it aggregates to understanding and searching for new scientific knowledge and ways to acquire it.

Supporting this point of view about the didactic essence of the problem education, we think that it meets the requirements of education technologies, namely: 1) it assumes target-oriented design of learners' cognitive activity in order to activate the longing to acquire new knowledge, 2) it is oriented to structuring cognitive activity, singling out its stages, 3) it singles out the elements of cognitive activity contributing to the creation of the problem situation of difficulty, formulation of a cognitive problem, searches for methods and its solving.

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