

# PEDAGOGICAL SCIENCES

## FUNCTIONS OF THE CONCEPTS OF "LEARNING PROCESS CONTROL ALGORITHM" AND "ALGORITHM IN WHICH STUDENTS BECOME SUBJECTS"

**Ibrahimov F.,**  
professor

*Sheki Branch of Azerbaijan State Pedagogical University,  
Azerbaijan, Sheki*

**Abdullayeva G.,**

associate professor

*Sheki Branch of Azerbaijan State Pedagogical University,  
Azerbaijan, Sheki*

**Amrahova S.**

*Sheki Branch of Azerbaijan State Pedagogical University,  
Azerbaijan, Sheki*

### ABSTRACT

The article explains the relevance of the research topic, characterizes the concepts of "algorithm", "algorithmization", algorithmization is valued as a valuable approach to training, Emphasis is placed on the role of algorithms in the gradual formation of mental operations, the combination of the concepts of "learning" and "algorithm", the interpretation of the functions of the concepts of "learning process control algorithm" and "algorithm in which students become subjects". The authors consider the approach to training as a cybernetic model of management acceptable, noting that the adoption of a cybernetic model of management in the learning process is based on its abstraction, allowing it to be viewed as a process independent of content. The article summarizes that the teacher enters the learning process as a component of his activity, performs a management-regulatory function. The teacher's learning process management activity is a mental activity aimed at solving a series of didactic tasks, the teacher has a formal algorithm for managing the learning process, and the concrete implementation of each step of this algorithm is heuristic, it is practical to know the learning process management algorithm that leads to effective results. The existence of such an algorithm requires the existence of a theory of effective learning, the level of development of effective learning and its theoretical foundations is determined by the level of development of pedagogical thought of each generation, and this process is constantly evolving.

The presented research paper presents open and block-diagram forms of the algorithm for managing the training system, formed in accordance with the current level of development of pedagogical thought and pedagogical practice.

**Keywords:** Algorithm, algorithmization, algorithmic culture, cognitive needs, algorithmic learning, same type of actions.

### Relevance of the research topic

The existence of an algorithm that reflects the logic of the development of the relationship between teacher, learning material and student is an important factor in the transformation of learning into a well-managed process. Little is written in the pedagogical literature about the algorithm for managing the learning process. Although the signs of good management of the training process are formulated, the logic of management with these signs, the sequence of tasks to be performed by the manager, the conditions to be considered and the necessary steps, the system of relevant instructions are not sufficiently specified. Therefore, we claim the relevance of the research topic aimed at developing different descriptions of the learning process management algorithm.

### Interpretation of research materials

The concept of "algorithm" is given various definitions in the pedagogical literature. Professor B.Ahmadov in his article "Algorithm and its place in language learning" writes that he shares the opinion of scientists who define algorithm: "The algorithm consists of a system of instructions, sequential instructions, commands necessary for the correct results of the work

to be performed, the work to be performed, the actions to be performed to solve the problems combined in a certain group" [2;173]. Commenting on this definition, academician M. Mehdizade wrote: "His general definition of algorithms, shared by other scholars, is certainly acceptable. But it could be simplified a bit". "The algorithm is a description of the same type of actions, the order of execution of any work to be performed, "- we are not mistaken. [8;230]

In our opinion, in order for this simplification to be considered acceptable, the "description of the procedure of execution", namely the rules here, must contain the necessary steps, their sequence and cover all possible cases to achieve the correct result. Otherwise, there would be no need to simplify the definition given by Professor B.Ahmadov to the algorithm. Also, the difference between the terms "algorithm" and "algorithmization" used here should not be overlooked. Apparently, this is why M. Mehdizadeh continues his reasoning, emphasizing the importance of "algorithmization": "... algorithmic learning is considered useful because it prepares students to regulate and manage their thinking and actions. [4;167]

K.I. Shukina's point of view is also interesting. He writes that the algorithm should be understood as strict instructions for students to perform cognitive and practical tasks of a certain type and class. In other words, the algorithm gives the most accurate instructions on the sequence of the simplest operations, it can be applied not only to one problem, but to a set of problems of a certain type, it divides the training activity into the simplest steps and necessarily leads to the answer. [7;298]

Prof. B.Ahmadov considers it important to apply algorithms and writes: "According to the theory of the formation of mental operations in stages, knowledge can not be given ready-made, knowledge must be mastered in the process of performing actions that are fully consistent with the application of the taught material.

Once a system of appropriate actions has been identified for the material, the necessary conditions (eg clear instructions) must be created for the correct implementation of those actions. Training should begin with conveying this condition to the student. In the second stage, actions (physical, materialized actions) must stop. In the third stage, the action is based on speech (speaking aloud), not on things (on the basis of material). In the 4th stage, the student divides the actions into portions and describes them through speech. In stage 5, the movement is performed in the mind and automated. This organization of the work allows the teacher (and the student himself) to control each stage, to identify and eliminate errors. Applying algorithms plays an important role here. [2;173]

K.I. Shukina also considers algorithmization in training to be a valuable approach and writes: "Algorithmization in training is a valuable approach, it equips students with the means to express their thinking and practical activities ... In the learning process, the content often prevails over the method (students are taught less to think, judge, think). For example, solving geometric problems related to proof is difficult because students do not know what actions need to be taken to find a solution to the problem, as well as how and in what order to act according to the conditions of the problem. [7;298]

In addition to the important role of the use of algorithms, scientists note its weaknesses. For example, M.Mehdizadeh rightly writes that adherence to excessive algorithms weakens the learning process, slows down the development of students' creative abilities, can create formalism in learning, and so on. He uses the concepts of "learning algorithmization", "algorithmic learning", includes these concepts in the category of training type and notes that in order to overcome the shortcomings, it is necessary to combine the type of algorithmic training with other types of training, especially programmed training. [8;230]

K.I. Shukina also appreciates this idea and shows that not everything should be algorithmic, because in terms of the possibility of compiling an algorithm, the issues are divided into several types:

\* There are some problems that can be solved with the help of algorithms, but this is not expedient due to the complexity of the developed algorithm;

\* there are problems for which it is impossible to build an algorithm, because it is impossible to take into account all its conditions, all its actions and their sequence;

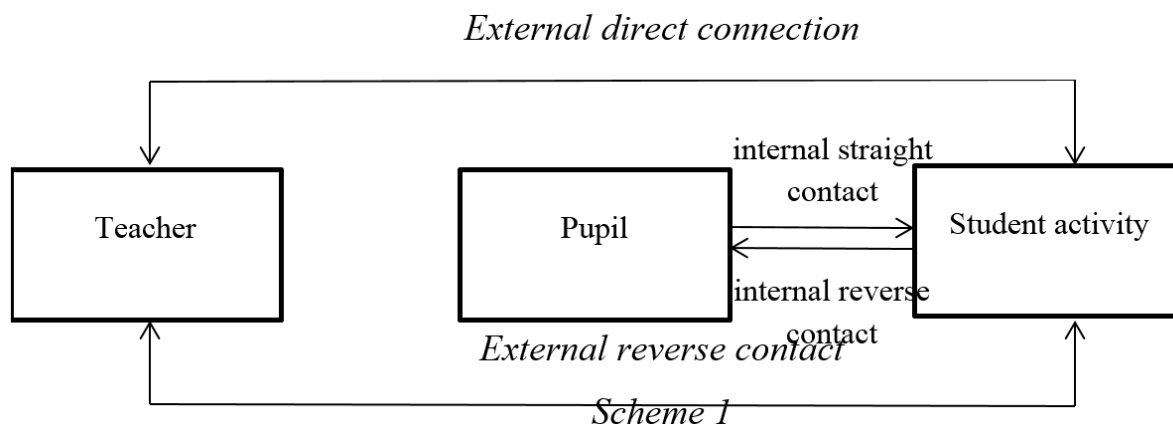
\* there are problems that can be solved not only with the help of the algorithm, but it is also expedient;

\* There are also problems that can be solved only with the help of an algorithm, a sequence of simple actions and a system. [7;288-289]

We consider the views of M. Mehdizade and G. Shukina to be acceptable.

As mentioned above, in the pedagogical literature, the concepts of "training" and "algorithm" are combined in different ways (for example, algorithmic training, algorithmic training, use of algorithms in training, etc.) and these concepts are included in the system of different categories. M.Mehdizade wrote about it as follows: "An algorithm is a system of rules that solves one type of problem. Undoubtedly, there is a great need for careful study of this issue. The inclusion of algorithmic training methods, forms and types in the treasury is a great achievement of modern training. [8;231]. Prof. B.Ahmadov comparing the concepts of algorithm and method shows that sometimes these concepts are confused. In fact, there is a difference. Thus, all algorithms are based on the method of problem solving, but non-algorithmic methods are also available. The method is broader than the algorithm. From what has been said, it is clear that the correct interpretation of the concept of training algorithm is an important issue and terminology appropriate to the function performed by the algorithm should be formed and used locally. [2;174]

The problem of transforming the learning process into a well-managed system is everlasting. This is due to the pedagogical nature of the training. If we approach training as a cybernetic model of management, we have to express our interpretations in a different context. As is well known, E.A. Klimov identified the following four important features of a good management system: a) clarity of the purpose of management; b) timely feedback; c) the relationships are of a consistent operational nature; d) accuracy of information on each subsequent condition of the controlled object [13; 33-36]. It should be noted that the adoption of a cybernetic model of management in the learning process is based on its abstraction, allows it to be viewed as a content-independent process. Therefore, E.A. Klimov considers this process as a complex management system. Academician A.I. Berg writes that it is quite clear that training can be considered as a management system. The most important and specific feature here is that the object of management in this system is the person himself. [9; 65]. The object of management in this system is not only the student as an individual, but also the student's activity aimed at acquiring and developing knowledge. There are two governing bodies, which to some extent regulate their activities. E.A. Klimov interpreted it as follows (scheme 1)



The existence of an algorithm that reflects the logic of the development of the relationship between teacher, learning material and student is an important factor in the transformation of learning into a well-managed process: we consider it appropriate to call this factor "learning process management algorithm" for short. In contrast, we consider the use of algorithms by the student to apply his theoretical knowledge to the solution of this or that problem as one of the important factors of his self-government activity. The development of algorithmic activity, which acts as an important type of mental activity, is ensured by the use of algorithms for solving various problems, in the process of developing such algorithms. In this regard, L.N. Landa emphasizes that although the independent development of algorithms by students causes a great loss of time, it has great didactic value in terms of the formation of independence of thought. [12;470]

In this work, we aim to comment on both the algorithm for managing the learning process and the algorithms for applying students' theoretical knowledge to solve certain problems in the learning process, and its main didactic aspect. Little is known about the learning process management algorithm in the pedagogical literature known to us. [1;301-305]. It is true that the signs of good management of the learning process have been formulated, but the logic of management with these signs, the sequence of tasks to be performed by the manager, the conditions to be considered and the necessary steps, the system of relevant instructions are insufficient. According to academician M.I. Mahmutov, the algorithm of problem-based learning can be presented in the following structure:

1. Giving a command, or rather creating a problem situation for the teacher (the teacher asks a question or asks a question, gives an assignment, etc.)
2. Team performance, in other words, the student formulates a problem, collects new facts, makes a hypothesis, and so on. he writes, hears, reads, solves, thinks.

The result of the student's performance of the command is twofold: a) the external result of the student's activity, b) the student's transition to a new situation.

3. External and internal reverse contact. Through external reverse contact, the teacher receives feedback on the performance of his team. Internal reverse contact, the student controls himself by realizing his activity.

4. New internal and external (or joint) team.

A new consideration is put forward or a new problem is posed.

The teacher's team (or the student's inner team, the internal motivation) continues until the student is out of the problem situation. In this case, a new team begins, a new problem situation arises. [10;418-419]

The teacher enters the learning process as a component of his activity, performs a management-regulatory function. The teacher's activity of managing the learning process is his mental activity aimed at solving a series of didactic tasks, he keeps the algorithmic and heuristic types in unity. We believe that there is a formal algorithm for managing the learning process by the teacher, but that the concrete implementation of each step of this algorithm is heuristic, it is practical to know the learning process management algorithm that leads to effective results. The existence of such an algorithm requires the existence of a theory of effective learning.

Naturally, the level of effective training and the development of its theoretical foundations is determined by the level of development of pedagogical thought of each generation, and this process is constantly improving. We propose the idea that the management algorithm of the training system, formed in accordance with the current level of development of pedagogical thought and pedagogical practice (or rather, the level at which we understand this treasure), should have the following structure. In our subjective sense, this training system is "adequate to the educational space that is being formed in accordance with the challenges of the IV Industrial Revolution." [5;46-47], "Constructivism, which will lead to the development of thinking, cooperative learning, which will lead to the social development of students, the creation of conditions for independent acquisition of knowledge, it is based on the principles of independent acquisition of knowledge and skills, the role of the teacher as an organizing coordinator, and in some cases as an arbitrator. [6;466], problem, algorithmic, programming, differentiation, etc. approaches as its subsystems, "opportunity-action-new quality" paradigm. [4; 104-107]

I. Open form of the algorithm:

1. If it is possible to turn the goal of the learning process into the object of satisfying students' cognitive needs (using programmed and other means), the third point is passed, otherwise the second point is passed.

2. The goal set in the training process is realized by dogmatic methods, the process is completed, a new command is given.

3. If it is possible to regulate independent-search activities aimed at achieving the goal that has become the object of satisfying the cognitive needs of students, it is moved to the eighth point, if not, to the fourth point.

4. The existence of conditions for the transfer of knowledge using programmed means is determined, if such conditions exist, it is passed to the seventh point, if not, it is passed to the fifth point.

5. If the transfer of knowledge as a result of the student's methods of activity (in stages) and the acquisition of counter-information is considered useful, it is passed to the fourteenth point, otherwise it is passed to the sixth point.

6. Provides knowledge in a ready-made way by means of explanatory-reproductive methods and counter-information is obtained, it is passed to the fourteenth point.

7. In educational programs, students are given knowledge, skills and habits are formed, developed, the process ends, a new team is given.

8. When it is determined that it is necessary to provide factual material for the solution of the problem, it is moved to the twelfth paragraph, if not, to the ninth paragraph.

9. If it is accepted that it is useful for students to be partially involved in solving the problem, move on to the eleventh point, otherwise to the tenth point.

10. With the research method (or other search method) students solve the problem, gain new knowledge, move on to the thirteenth point.

11. The problem is partially solved by searching, new knowledge is obtained, the thirteenth paragraph is passed.

12. The teacher states only the factual material on the problem solved by the students, describes the event in a scientific, complete, vivid way, the students solve the problem, where new knowledge is obtained using problem interpretation and goes to the thirteenth paragraph.

13. If there are conditions for the formation and development of skills and habits using programmed tools, the seventeenth paragraph, if not, the fourteenth paragraph.

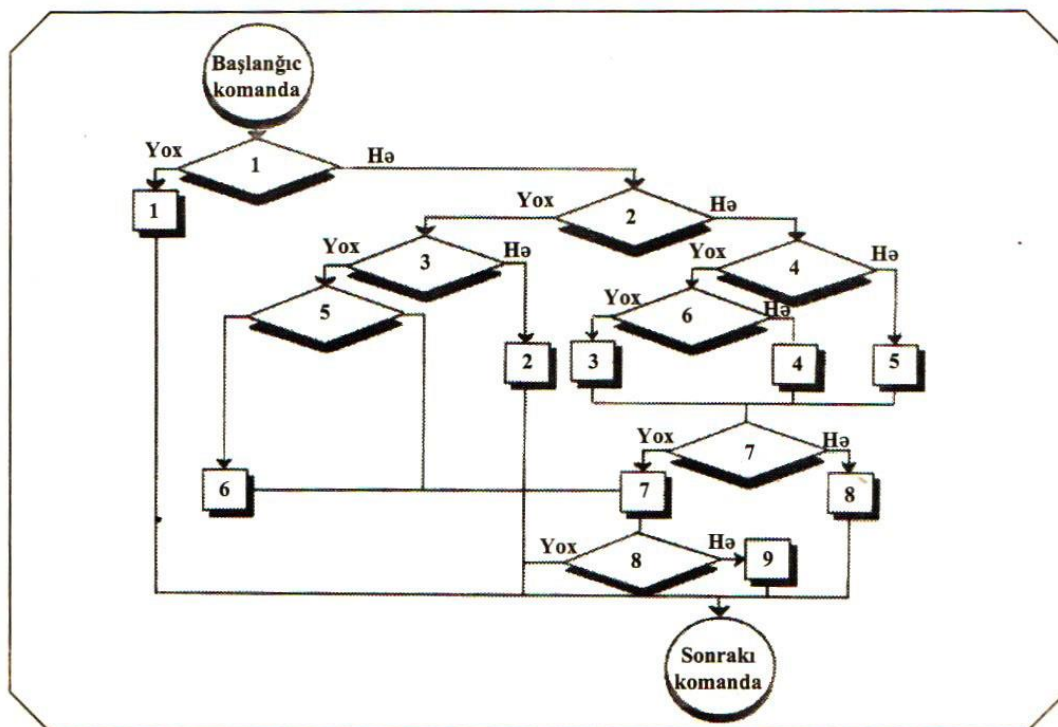
14. Skills and habits are formed with the application of examples, variable exercises, algorithms, relevant feedback is obtained and passed to the fifteenth paragraph.

15. If, based on the opposite information, it is determined that individualization is necessary, the sixteenth paragraph is passed, otherwise the process ends and a new command is issued.

16. Individualization is used as intended, the process is completed, a new command is given.

17. With the application of programmed materials, students' activities are organized, the process is completed, a new team is given.

2. Algoritmin blok-sxem forması: sxem 2



Sxem 2

#### Comment on the scheme

1. The goal set for the learning process was to become an object of meeting the cognitive needs of students (through the use of programmed and other means);

2. It is possible to regulate independent search activities aimed at achieving the goal that has become the object of meeting the cognitive needs of students;

3. There are conditions for the transfer of knowledge using programmed tools;

4. There is a need to provide factual material to solve the problem;

5. The transfer of knowledge as a result of the methods of activity (in stages) and the acquisition of feedback is considered useful;

6. It is useful for students to be partially involved in solving the problem;

7. There are conditions for the formation and development of skills and habits using programmed tools

8. Based on the opposite information, it was determined that there was a need for individualization.

1. Based on the opposite information, it was determined that individualization is necessary.

2. Through educational programs, students are given knowledge, skills and habits are formed and developed;

3. With the method of research (or other search methods) students solve problems, new knowledge is acquired;

4. The problem is partially solved by the search method, new knowledge is obtained;

5. The teacher states only the factual material on the problem solved by the students. Describes the event in a scientific, complete, vivid way, the students solve the problem, where new knowledge is obtained using the problem interpretation method;

6. Explains knowledge - gives ready-made reproductive methods and reverse information is obtained;

7. Skills and habits are formed with the application of examples, variable exercises, algorithms, relevant feedback is obtained;

8. The activity of students is organized with the application of programmed means;

9. Individualization is used in accordance with the purpose.

Like many authors, we are of the opinion that the involvement of students in activities to solve this or that problem by algorithmic methods or problem-solving algorithms has a very strong impact on the development of their algorithmic type of mental activity, leading to an increase in algorithmic culture.

So what is "algorithmic culture"? The concept of "algorithmic culture" is widely used in the relevant literature. In the narrow sense, "algorithmic culture" usually refers to an integral part of mathematical culture that helps students to form and develop specific ideas, skills, and habits related to the concept of algorithm. However, it is also known that all conscious human activity is accompanied by appropriate algorithms (ie, in most cases, the result of human activity depends on understanding the accuracy of its algorithmic nature). Therefore, in general, algorithmic culture refers to a set of specific ideas, skills and habits that act as part of the general culture of each person at the current stage of development of society, as well as a factor that determines the purposeful components of school education. In modern teaching methods of mathematics, the group of components that determine the algorithmic culture of the student is mainly as follows:

1. To understand the essence and properties of the concept of algorithm, as well as language;

2. Mastering the methods and tools for writing algorithms;

3. Understand the algorithmic nature of mathematical methods and master the algorithms used in the school mathematics course;

4. Know the basics of programming for computers. I.G. Vyaltseva, A.S. Alekseyev show that for the further development of students' algorithmic culture, it is important to use a plan for solving important problems, special instructions at the preparatory stage, because here every step of the activity, the instructional tasks must be performed consciously, it must be clear what theoretical provisions are based on in its compilation. The following principles should be followed in developing such a plan

1. Obtaining basic information that is important for the theoretical basis of the plan;

2. There should be an instructional system covering the same class of issues;

3. The instructional system should be complete and sufficient in content to allow for final results;

4. The instruction system should not be contradictory. He should not refute the previous one, nor follow it logically;

5. The number of items or items in the plan should not be too large and should be as small as possible;

6. The instructional system should cover the same type of issues en masse. [11;191]

#### **Scientific novelty of research work**

Open and block-scheme forms of the algorithm of management of the training system formed according to the current level of development of pedagogical thought and pedagogical practice are defined.

#### **Theoretical significance of the research**

The development of algorithmic theory was further contributed to the further development of algorithmic theory by defining open and block diagram forms (descriptions) of the algorithm of management of the training system formed in accordance with the current level of development of pedagogical thought and pedagogical practice.

#### **Practical significance of the research**

We believe that the definition of open and block diagram forms (descriptions) of the algorithm for managing the training system, formed in accordance with the current level of development of pedagogical thought and pedagogical practice, will have a positive impact on the formation of an environment for correcting errors.

#### **The result**

1) The activity of managing the learning process of the teacher is his mental activity aimed at solving consistent didactic tasks; it combines algorithmic and heuristic types; 2) There is a formal algorithm for managing the learning process by the teacher, but the specific implementation of each step of this algorithm is heuristic; 3) It is practically useful to know the algorithm for managing the learning process that leads to effective results; 4) The existence of such an algorithm requires the existence of a theory of effective learning.

#### **References**

1. Abbasov A.N., Mammadzade R.R., Mammadli L.A. Pedagogy: Muntakhabat. Baku, "Translator", 2021, p.301-305.

2. Ahmadov B.A., Rzayev A.Q. Lecture notes on pedagogy. Baku, "Maarif", 1983, p.173-175.
3. Kazimov N.M., Hashimov A.S. Pedagogy. Baku, "Maarif", 1996, p. 76-78; 171-176.
4. Ibrahimov F.N. Essays on the basics of optimal ratios of algorithmic and heuristic activity in training. Baku, "Translator", 2020, pp.166-173.
5. Ibrahimov F.N. Methods of teaching mathematics in secondary schools. Baku, "Translator", 2021, pp.46-49
6. Feyziyev J.A., Ibrahimov F.N., Bediyev S.R. Didactics. "Translator", 2019, p.466.
7. School pedagogy (edited by K.I. Shukina). Baku, "Maarif", 1978, p. 118; 288-289; 298.
8. Mehdizade M.M. Ways to improve the educational process in secondary schools. Baku, "Maarif", 1982, p.117; 230-231.
9. Berg A.I. Preface. // Cybernetics and training problems. Moscow, Enlightenment, 1970, p.65.
10. Mahmutov M.I. Theory and practice of problem-based learning. Kazan, Tatar Book Publishing House, 1972, p. 418-419.
11. Mahmutov M.I. Modern lesson. Moscow, "Pedagogy", 1981, p.191.
12. Landa L.N. Algorithmization in training. Moscow, Enlightenment, 1966, p.470.
13. Климов Е.А. Four tasks of programmed training. Kazan, Tatar Book Publishing House, 1965, p. 33-36.

## ФОРМИРОВАНИЕ АНТИКОРРУПЦИОННОЙ НАПРАВЛЕННОСТИ БУДУЩИХ ПЕДАГОГОВ

*Ахаева А.*

*докторант 3 курса*

*Высшей школы педагогики и психологии,  
Жетысуский университет имени Ильяса Жансугурова,  
Талдыкорган, Казахстан*

## FORMATION OF ANTI-CORRUPTION FOCUS OF FUTURE TEACHERS

*Akhayeva A.*

*PhD 3-year doctoral candidate*

*of the Higher school of Pedagogy and Psychology,  
Zhetysu University named after Ilyas Zhansugurov,  
Taldykorgan, Kazakhstan*

### АННОТАЦИЯ

В статье описана проблема антикоррупционного воспитания в высшем учебном заведении. С указанной темой связан общий процесс воспитания в высшей школе, а также поднимается проблема профессионального воспитания будущих специалистов. Процесс воспитания так же важен в подготовке будущего педагога, как и специальные знания. Также описано антикоррупционное воспитание как важный показатель подготовки будущих специалистов. Даны основные задачи и показатели антикоррупционного воспитания.

### ABSTRACT

The article describes the problem of anti-corruption education in a higher educational institution. The general process of education in higher education is connected with this topic, and the problem of professional education of future specialists is also raised. The process of education is as important in the preparation of a future teacher as special knowledge. Anti-corruption education is also described as an important indicator of the training of future specialists. The main tasks and indicators of anti-corruption education are given.

**Ключевые слова:** воспитание, учебный процесс, высшее учебное заведение, педагог, антикоррупционное воспитание, будущий специалист.

**Keywords:** education, educational process, higher educational institution, teacher, anti-corruption education, future specialist.

Постановка проблемы. Коррупция – явление, снижающее отдачу от воспитательной работы в высшей школе. Интервью, проведенные учеными, показывают, что за последние два десятилетия уровень коррупции в высшей школе возрос и приобрел системный характер. В период стабилизации современного студента как специалиста возникает опасность социализации в коррумпированной среде, что может иметь негативные последствия для общества в целом. Эти обстоятельства вызывают необходимость выявления направлений совершенствования

современной системы профессионального образования будущих специалистов. При подготовке конкурентоспособных специалистов учебные задачи, соответствующие высшему образованию, не предусмотрены.

Анализ последних исследований и публикаций. Анализ результатов педагогико-психологических исследований коррупции показывает, что у ученых отсутствует четкая позиция в определении черт личности, обеспечивающих безусловное соблюдение антикоррупционного законодательства, а