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PRACTICAL MECHANISMS FOR USING HEURISTIC TASKS IN DEVELOPING PROFESSIONAL COMPETENCIES IN FUTURE TEACHERS

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ABOUT ARTICLE

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Abstract: This study is devoted to the issues of using heuristic tasks in the process of developing professional competencies of future teachers. The study substantiates the role of heuristic tasks in the formation of independent thinking, analysis of problem situations, creative approach and preparation for professional activity in future teachers. The work develops a pedagogical model aimed at developing professional competencies of future teachers and highlights the mechanisms for its implementation in practice. This model is based on content, process and outcome components, and the conditions for the effective use of heuristic tasks in the educational process are identified. The results of the study are of practical importance in improving the teaching process in higher pedagogical educational institutions and increasing the professional training of future teachers.

Introduction. Today on the day education system modernization to do in the process future of the students professional competencies develop important pedagogical from

problems one is considered . Society social - economic development , education content update and competency-based approach education to practice current to be from the teachers not only deep theoretical knowledge , maybe independent thinking , problematic situations analysis to do , creative approach and innovative activity done increase skills demand is doing . This because future the teachers professional to activity preparation in the process effective pedagogical tools and methods determination current importance profession will reach .

Last in years take visited scientific - pedagogical in research professional competencies in formation active and interactive to teach methods importance wide In particular , heuristic assignments students to know activity increase , independent knowledge to take redirection , problematic thinking develop and creative potential manifestation in the process of effective tool as confession is being done . However there is in research heuristic from assignments future of the students professional competencies systematic accordingly to develop directed whole pedagogical model and him/her to practice implementation to grow mechanisms enough at the level working not released .

The heuristic learning method, A.V. Khutorskoy[1] focused on the main types of heuristic learning activity. Khutorskoy divided this activity into organizational, knowledge-based, and creative types of activity.

Heuristic methods include students' holistic representation of the problem, reliance on previous solutions and partial analogy with them, reliance on preserved cases, and super-point-of-view representations.

Creative methods include: a) the inventive method, in which previously unknown ideas are created with the help of intellectual movements, and at the same time new enriched or supplemented approaches are described; b) the brainstorming method, in which students are encouraged to advance and accumulate as many new ideas as possible, while freeing themselves from various stresses. These activities are carried out by dividing students into several groups, generating ideas, analyzing problem situations, evaluating ideas, and generating ideas that conflict with each other. Idea generation is carried out in a group of students based on specific rules. During the idea generation stage, any critical thinking is restricted by the professor-teacher. The unique and new ideas and thoughts of future teachers are encouraged. All ideas expressed by group members are systematized. After that, all obstacles to the implementation of ideas are identified and eliminated. At the end of the exercise, all ideas that were not rejected are selected.

Heuristic tasks used in the process of higher pedagogical education are reflected in the specificity of the content expressed in them. All tasks presented to students should be related

to the content of the training to one degree or another and should provide the opportunity to come to specific solutions [2]. Students choose from among all the options those that allow them to act productively. The ability to isolate general theoretical situations, rely on principles that allow the results obtained in specific practical situations to be practically substantiated, strive to solve problems in specific practical situations, and achieve constructive changes in solutions will all help future teachers acquire professional competencies. As a result of completing such tasks, future teachers will successfully develop professional competencies and expand their opportunities for effective activity in pedagogical practice.

The most effective tasks in the heuristic learning process include both heuristic and developmental tasks. Such tasks allow future teachers to understand the many cause-and-effect relationships and laws inherent in the pedagogical process, the general characteristics of solving a number of tasks, to isolate and differentiate the components of the phenomenon being studied, and to learn and explain concepts related to an unknown topic. It was initially emphasized that heuristic conversations have unique capabilities. Because heuristic conversations involve a system of tasks within a single topic that have the same capabilities.[3] Finding a solution to each of these tasks is an important step on the way to finding a solution to the general problem, and such solutions do not require much effort from the students. In this process, professors and teachers formulate tasks step by step and motivate students to solve them.

The level of complexity of a problem depends on the degree of connection between the tasks. In this process, students identify the main task that provides the solution to the problem and understand its connection with other tasks [4]. Also, the degree of independence of the problem at hand also helps to find an acceptable solution to the tasks. Several characteristics help to reveal the nature of heuristic tasks.

One of the effective ways to formulate heuristic tasks is to use contrasts. Contrasts between acquired knowledge, which allow for the successful application of knowledge to perform heuristic tasks of a certain nature, ensure efficiency in the process of higher pedagogical education, and also serve to form professional competence in future teachers. At the same time, these solutions require the formation of new heuristic tasks. In this process, it is important for future teachers to understand that solving problems with the help of previously acquired knowledge leads to errors. In this case, professors-teachers are required to deeply analyze the contradictions that arise in the process of completing heuristic tasks, identify their causes, and find ways to eliminate existing shortcomings. The main essence of using heuristic tasks is that in this process, professors-teachers present algorithms for searching for their ideas

and opinions in order to involve future teachers in determining their educational tasks. Students, in turn, try to form specific conclusions using this algorithm. Prospective teachers are required to effectively use heuristic conversations when completing heuristic tasks. In this process, professors-teachers address students with questions that are related to the content. Each of these questions brings prospective teachers closer to solving educational tasks and involves them.

The essence of heuristic conversations is that students participating in such conversations acquire the skills of analyzing new educational information. The main goal of this is to strengthen the skills of formulating a specific educational problem and finding ways to solve it. As a result of this approach, future teachers acquire the competence to independently complete educational tasks and find solutions to problems. One of the main tasks of professors-teachers is to show future teachers how to find the right solution to a given problem using heuristic tasks.

Today, in educational institutions of all levels, not enough attention is paid to developing the ability to generate ideas in both students and teachers. Our observations show that professors and teachers pay more attention to the tasks that students ask in order to find logical solutions to problems. In the process of solving creative tasks, pedagogical processes are also organized that are aimed at expanding the logical thinking abilities of students. If the methods of solving creative tasks known in pedagogy are divided into groups based on the guiding principles and the types of activities corresponding to them are classified, they form two large groups.

Heuristic methods used in the pedagogical process have their own specific manifestations. The main methods and forms of heuristic teaching are to encourage future teachers to achieve new results in teaching. Such methods that encourage students to achieve new results include writing essays, creating works of art, and participating in competitions [5]. In this process, future teachers complete heuristic tasks specific to the type of work.

Heuristic methods of solving creative problems are understood as a system of rules and principles that embody the concrete tactics and strategies of student activity, directing their intuitive thinking to the process of finding solutions to problems. They accelerate the process of solving creative problems in a certain context based on the generation of ideas. The rules for performing creative tasks are recognized as heuristic rules. A rule for performing a separate creative task is called a heuristic.

When thinking about the effectiveness of heuristics and heuristic rules, inventive and rationalizing activity are taken into account. However, in most cases, these terms are not used

interchangeably. This complicates the use of heuristic tasks in pedagogical practice. Therefore, by accustoming students to performing creative tasks, professional competencies are formed in them. In Russian and foreign pedagogy, the trial and error method is mainly used to develop inventive skills in students (Bush G.Ya., GS Altshuller). In this process, experts recommend using the methods of brainstorming and synectics.

It is known that the method of brainstorming was introduced into the pedagogical problem by the American specialist A.F. Osborn . Heuristic dialogue, which helps to intensify the mental activity of students, is implemented based on a number of pedagogical and psychological laws. Our observations show that students are able to generate ideas in groups from a single perspective. In typical situations, the creative activity of a future teacher is formed as a result of overcoming existing pedagogical and psychological barriers, either explicitly or implicitly. This situation can be expressed using the “gateway” model. Within the framework of this model, the interactions, dialogues, cooperative activity, and exchange of ideas of future teachers in the process of solving heuristic tasks are demonstrated. The student's creative activity is more clearly manifested within this model [6]. Students act based on their formed professional competences when faced with trial and error. In the “Gateway” model, the pressures on interpersonal relationships, the student's reputation, position in the group, traditions, customs, and the lack of manifestation of positive emotions are also of great importance. Dialogue, exchange of ideas, and brainstorming situations between students eliminate obstacles in the process of completing creative tasks and ensure their active participation. To date, there are several modified versions of brainstorming.

Direct attack on the brain . Within the framework of this method, solutions to creative tasks are sought on the basis of collective generation of ideas. The main goal of using this method is to collect as many ideas as possible, free thinking from inertia, and eliminate the initial movement of thought in the process of performing creative tasks. The main condition that is taken into account in the process of applying this method is not to allow criticism of the ideas presented by students, as well as to encourage humor. The successful application of this method largely depends on the professional skills of the professor-teacher who manages the students' discussion processes. The professor-teacher should set the direction of the discussion and ensure its effective conduct. He should also ask leading questions to the students, create favorable conditions for their participation, and make effective use of humor and replicas. The group can consist of 5 to 10 students. The students' group members are expected to explore different approaches, present a wide range of ideas, engage in active dialogue, and have the motivation to engage in dialogue. A typical brainstorming session can last from 15 minutes to

half an hour. Ideas are selected, screened, and evaluated by designated experts in two stages. First, the experts select unique, productive ideas, and then they attempt to screen the most optimal ideas.

A method of mass brainstorming. It serves to ensure the efficiency of generating new ideas in a group of students. This method was first used by the American specialist J. Donald Phillips . A distinctive feature of this modified method is that students in the auditorium work in small groups. The last small group organizes a session specifically for brainstorming. The activities of the small group members can be of different types. The professor-teachers set a time limit for their activities. The ideas presented by the small group members are then evaluated after generation. After that, unique ideas are identified.

A brainstorming method based on dialogue. The peculiarity of dialogue is that it enables students to realize their creative potential and generate ideas that they present together[7].

The effectiveness of the pedagogical process is ensured when all students complete heuristic tasks with an equal distribution of loads. All ideas put forward by students are divided into three groups. 1) generative ideas; 2) ideas evaluated based on the analysis of problem situations; 3) optimized ideas. The method of searching for unique ideas as a team is based on a number of pedagogical and psychological laws.

1. Future teachers' collaboration in solving heuristic tasks. The professor-teacher, who leads the pedagogical process, using a democratic method of communication, encourages students' unique ideas, implements unexpected associations, encourages students to be creative in order to generate unique ideas, and himself appears as a co-author of these ideas. This requires a high level of creative collaboration and interpersonal relationships among professors and teachers. This will expand students' opportunities to complete creative tasks of a heuristic nature.

2. The approach of future teachers to each other with confidence in their abilities and creative potential is also considered one of the fundamental laws and important principles of the pedagogical process aimed at this goal. In this process, all students enter into creative cooperation on the basis of equality. Professors and teachers support and encourage them, encouraging even the smallest initiatives.

3. The principle of successful integration of students' intuitions and logical thinking is of particular importance. In pedagogical situations aimed at generating optimal ideas, a slowdown in logical thinking and any intuition is observed. This requires a certain level of adherence to certain rules, such as not allowing any criticism, which can lead to an immediate logical and critical evaluation of the generated ideas.

The advantage of searching for unique ideas as a team is that it ensures equality among all members of the student group, while authoritarian professors and teachers would not support such assignments. In the process of completing these assignments, laziness, monotonous thinking, rationalism, and emotional outbursts in students are eliminated. The favorable pedagogical and psychological environment in the auditorium develops the perception and intuition of future teachers and creates favorable conditions for their creative activity.

The main disadvantage of this method is that as a result of its application, students need to find a creative idea in a general way. Because this method does not allow for detailed work on ideas. Therefore, it requires special pedagogical skills from professors-teachers - acmeological activity. The ability of future teachers to improvise and use humor has a positive effect on the pedagogical and psychological environment in the classroom. In the process of applying this method, it is possible to eliminate barriers in the thinking of students. Because in solving creative tasks of a heuristic nature, a number of reliable methods, techniques, and tools are incorrectly used.

The method of using heuristic questions. This method is closely related to the method of basic questions and is of great importance in enriching the experience of creative activity in students with the help of heuristic tasks. This method is used by students to collect additional information about pedagogical phenomena. In the process of solving creative tasks of a heuristic nature, it is used to organize problematic situations or accumulated information. This, in turn, serves to form a new strategy and tactics in the process of completing creative tasks of a heuristic nature [8]. In pedagogy, it is evaluated as a leading question. The questions successfully proposed by professors-teachers encouraged students to find the right solutions. At one time, heuristic questions were deeply studied by the leading American educator D. Poya. Ancient Greek philosophers also successfully used heuristic questions in their pedagogical activities. (Socrates, Quintilian).

The advantage of heuristic questions is that they are effective for solving simple and heuristic tasks. Heuristic questions serve to develop the intuition and pedagogical thinking of future teachers. Such a logical model of working on creative tasks of a heuristic nature is an important tool for developing professional competence in future teachers. The disadvantage of this method is that it does not allow for unique ideas and solutions to be generated using such questions. Also, unlike other heuristic methods, it does not guarantee complete success in solving heuristic-type tasks.

The method of independent associations. The effectiveness of students' creative activity is most clearly manifested at the stage of generating new ideas. When using new associations, the creative potential of future teachers aimed at completing heuristic tasks expands. As a result, productive ideas are created that provide solutions to problems. In the process of formation of associations, a close connection is provided between the problems awaiting solution and pedagogical phenomena. This connection embodies the main part of the cultural and social experience of future teachers. Future teachers who have such experience acquire the motives for collective implementation of creative tasks of a heuristic nature. In the process of forming new associations, creative ideas are born aimed at finding solutions to problems.

In order to strengthen anti-conformism, each member of the student group should offer their own thoughts, understandings, and points of view. These, in turn, become the basis for the emergence of associations in the process of generating new ideas. The process of applying this method is based on clear principles: a) independent associations, b) anti-conformism, c) critical analysis that was not implemented in its time.

Inversion method. The inversion method is often used as a method of appeal. It is considered one of the methods that encourages a person to perform heuristic activities. It allows students to find solutions to creative tasks of a heuristic nature in unconventional directions, to express innovative points of view in an alternative way to traditional directions, and to advance ideas and views that have a sound, logical basis [9]. In this regard, special attention is required to find alternative solutions to problems. Because alternative solutions ensure the effectiveness of creative activity.

With the help of the inversion method, students' creative thinking is developed in the process of direct and reverse communication. As a result, they are able to analyze the pedagogical phenomenon being studied using the methods of induction and deduction. The pedagogical advantage of the inversion method is that it serves to develop students' thinking from a dialectical perspective, creates favorable conditions for finding solutions to various problems, and expands the possibilities for solving both problematic and creative tasks. The disadvantage of this method is that it requires students to have a high level of creative thinking. Empathy method is also of particular importance in the formation of professional competence in future teachers by expanding their ability to solve creative tasks of a heuristic nature . This method has always been widely used as a method for solving heuristic tasks. It is considered an important link between logical and creative thinking. In the process of performing creative tasks of a heuristic nature, various analogies are used. They can be specific or abstract, depending on their nature. In the process of mentally forming analogies, hyperbolization also

allows for effective heuristic results. Empathy helps to equate one person with another. In this case, the student acquires the ability to put himself in the place of others. Based on the above, it should be emphasized that empathy is one of the main methods that helps to complete creative tasks of a heuristic nature.

The empathy method can be used by future teachers in various forms of creative activity. Future teachers must have the ability to use imagination to effectively use the empathy method in performing creative tasks of a heuristic nature. Because this method creates a basis for future teachers to search for healthy thinking and effective ideas.

The method of synergism is a method that combines various elements of the field and is of great importance in the formation of skills for performing creative tasks of a heuristic nature. This method was discovered by J. Gordon at the time and is widely used at Harvard, California, Pennsylvania, and Boston universities. It serves to combine various elements of the field. In this case, the ability of each student to demonstrate creative activity can be combined with the ability of a group of students to do so. The essence of the synectics method is expressed in the following. At the initial stage of its application, mechanisms of creative activity are introduced into the pedagogical process. The results of the educational process are recognized as a component of this mechanism. Intuition, enjoyment, abstraction, independent thinking, the use of various opportunities, and the use of game elements have a significant impact on the pedagogical process.

In the process of applying the synectics method, it is necessary not to pre-formulate creative tasks of a heuristic nature. Because pre-forming such tasks narrows the scope of creative search [10]. When applying this method, it is necessary not to set the goal of discussing the tasks themselves. Students should not be limited to putting forward a single idea, even if it is a new and unique idea. If students cannot solve the problem posed in the creative assignment, they are required to analyze the situation. In this case, it is appropriate to analyze a newly arising problem or existing problems into several parts.

the process of using the synectics method, it is also necessary to pay special attention to the analogy method [11]. In this case, the analogy method is used in various forms. For example, as an analogy based on personal empathy, directness, fantasy, and symbols. When setting heuristic tasks for students and organizing the process of their implementation, professors and teachers must demonstrate the ability to ask questions, provide assistance, clarify the situation, substantiate evidence, explain, encourage them to fantasize, expand their imagination, and expand the scope of work on creative tasks.

When solving heuristic creative tasks, students are required to have the skills to critically select evidence and apply it in several stages. At the initial stage of solving heuristic tasks, a brief explanation is given to the ideas put forward by students. In the second stage, the ideas are critically analyzed, classified, grouped, and the most innovative and unique ones are selected. This method is of particular practical importance because it combines the features inherent in heuristic methods. At the same time, this method is not without a number of shortcomings: a) within the framework of the synectics method, there is no possibility of resolving heuristic conflicts, which creates a basis for searching for new ideas; b) over time, after using this method, the productivity of new ideas generated decreases. The process of using the synectics method requires special professional skills from professors-teachers.

The method of organized strategies . This method is also of particular importance in the implementation of creative tasks of a heuristic nature. The main obstacles in the implementation of heuristic tasks are manifested in the fact that students are accustomed to fixed methods and ways of thinking in their activities, as well as in the difficulties they encounter in finding new methods of action and new ways of solving tasks. Even when they choose the right directions for finding solutions, they make some mistakes and have difficulty using strategies aimed at finding new ideas. Therefore, obstacles in students' thinking can be overcome with the help of organized strategies. The basis of this method is the principle of self-management of the student in the process of choosing a new strategy, as well as an approach to processes from a constantly fresh perspective.

Performing creative tasks of a heuristic nature allows future teachers to successfully develop professional competencies. Professors and teachers of higher educational institutions of pedagogy should have the opportunity to successfully implement heuristic tasks. Because such tasks play a special role in the future professional activities of future teachers. Using heuristic methods, organizing work games among students helps to develop professional thinking and competence in them. Heuristic tasks are also important in developing intuition, perception, and professional creative activity in future teachers.

References:

1. Chernilevsky DV Didactic technologies in higher education: Proc. manual for universities. M.: BIRLIK-DANA, 2002. - 437 p. HDShmid

2. Delamare Le Deist, F. Que's que c'e competence / F. Delamare Le Deist, J. Winterton // Human Resource Development International. - 2005. - March. - Vol. 8, No. 1. – PP. 27-46

3. Fedorov KP, Abramyan GV Evristicheskie metodi i metodiki obucheniya informatice v shkolah s uglublennim izucheniem inostrannih zazikov // Regionalnaya informatics "RI-2012": Materiali jubileenoy XIII Sankt-Peterburgskoy mejdunarodnoy conference. 2012. P. 268–269.

4. Chelina Ye. A. Pedagogical organization evristicheskoy deyatelnosti studentov vuza. Diss.....can. ped. science - Veliky Novgorod, 2005. - 187 p.

5. Poyya D.. How to solve the problem. - M.: Uchpedgiz, 1959

6. Schnitger M. Kompetensen bilanzieren: auf dem weg zu einer europaweiten kompetenzerfassung / ua – Münster: Waxmann, 2006. – 294 S.

7. Se a rs R. Y o ur a ncients Resisted: A Hist o ry o f Child Psych o l o gy // ENHeteringt o n (ed). Review of child development research . VS Chic a g o , 1975.... http://psychlib.ru/mgppu/ O De/ O De-001.htm

8. Safarova RG et al. Pedagogical and psychological mechanisms for the formation of skills of struggle against "mass culture" in schoolchildren. - Monograph. - T.: "Wing of Thought" publishing house, 2018, 192 pages.

9. Blonsky PP Psikhologiya mladshego shkolnika / PPBlonsky. – Voronezh: MODEK, MPSI, 2006. – 632 p.

10. Blum A. The development of an Integrated Science Curriculum. Information Scheme Fur. // Science Education 1981, vol.3, - p. 1-15.

11. Pedagogical skills of the organizer of children's sports / A. Derkach, A. Isaev. - M .: Raduga, 1986 - 387 p.