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Fostering critical thinking skills among future teachers

Abstract

Today, a person who thinks critically is able to conduct a dialogue, determine the nature of any problem and find alternative solutions, and distinguish fact from assumption. This person is not afraid to question established opinions and judgments. That is why such kind of people are considered to be competitive and in demand on the labor market. The article, based on modern scientific positions, reveals the meaning of "critical thinking". The development of critical thinking is based on observation skills; on the ability to ask questions and find the necessary resources; on the ability to check beliefs, assumptions and opinions, contrary to the evidence; on the ability to distinguish and identify a problem; on the ability to assess the validity of statements and arguments; and on the ability to find and make smart decisions, and understand logic and logical arguments.

The authors of the article found that the process of solving pedagogical problems was the basic unit of critical thinking skills among future teachers. The availability of critical thinking skills among future teachers is determined by using a critical thinking test, developed by Lauren Starkey, an American author (Starkey, 2004). The analysis of the survey results shows that the majority of respondents have an average level of critical thinking skills. The average level of critical thinking skills indicates that an average future teacher's forms of thinking are unevenly developed. That is why it is difficult for a future teacher to make important decisions. We propose to foster critical thinking skills by solving pedagogical problems, which involves the use of modern interactive forms, methods and techniques of teaching.

Keywords: critical thinking, future teacher of higher education institutions, solving pedagogical problems, interactive forms, methods and techniques of teaching

Introduction

The aim of the article is to present results of the research aimed at establishing the level of development of critical thinking skills among future teachers in the course of pedagogical training in higher educational institutions, as a crucial requirement needed for solving pedagogical problems effectively.

The article is structured in the following sections: introduction; research aim, tasks and methods; theoretical basis; determination of the levels of critical thinking of future teachers; the process of pedagogical problem solving; pedagogical problem concept; teachers' activity; decision algorithm; methods of critical thinking development; determination of levels; summary and suggestions for further research.

The formation of a free society is aligned towards creative and constructive human activity. The ability to think critically has been important since ancient times. At the present stage of social development, critical thinking is a necessary professional quality of the individual, and vital for working with information flow. A person who thinks critically can solve complex, multidimensional problems not only in the sphere of life, but also in scientific, pedagogical and economic professional activities. The absence of a stereotype, the ability to find the truth and prove their judgments or reject them, activates a person's innate potential.

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The critical thinking ability helps to identify the problem in an ambiguous situation and effectively solve the pedagogical problem. The selection of the necessary information, its critical analysis, and comparison contribute to the formation of new educational ideas.

The main task of modern higher education is to develop the critical thinking of future teachers and their adaptation to life in a high-tech, competitive world. Modern society needs a specialist who can conduct a dialogue, determine the essence of the problem, find alternative ways to solve it, distinguish fact from assumptions, and critically evaluate opinions and judgments. The priority is to expand human capabilities and the fundamental qualities of the individual (Gąsiorowska & Gąsiorowski, 2019, p. 54). The development of critical thinking of future teachers is an integral part of shaping their professional competence. The modern professional must continuously improve critical thinking and acquire the skills to think flexibly, analytically and globally. It requires development of a conceptual methodology for forming critical thinking while working with future teachers. Therefore, during the future teachers' training in higher education institutions, the importance of using innovative methods to develop critical thinking increases.

Research aim, tasks and methods

The aim of the research is to reveal the theoretical and methodological basics of the development of critical thinking among future teachers in the course of pedagogical training in higher educational institutions, in order to solve pedagogical problems effectively.

The research aim defined the following tasks: to determine the essence of critical thinking based on the analysis of domestic and foreign psychological and pedagogical research; to reveal the meaning of the concepts "future teacher of higher educational institution", and "pedagogical problem"; to determine the levels of critical thinking of students; to characterize the process of critical thinking development by solving pedagogical problems; and to offer creative methods for the development of future teachers' critical thinking.

A set of research methods was used to resolve the defined tasks:

- general – analysis, synthesis, comparison, systematization and generalization to study the research studies of foreign and domestic scientists, legislative support, etc.;
- specific – interpretation method to determine the basic concepts of the research, prognostic analysis to determine the prospects for further research as to the development of critical thinking;
- empirical – observations to study the state of critical thinking of future teachers; testing to identify levels of critical thinking.

Theoretical basis

In Ukraine, the problem of developing critical thinking is covered in theses in the following areas: the formation of critical thinking in future economists (Kolesova, 2010); the formation of critical thinking in cadets and officers of military institutions (Konarzhevska, 2009; Marchenko, 2007); the formation of critical thinking in students (Khachumjan, 2005; Kyjenko-Romanjuk, 2007); and the formation of critical thinking in primary school pupils (Bielkina-Kovalchuk, 2006). The analysis of the presented directions showed the lack of research on the development of critical thinking in future teachers.

In psychological and pedagogical studies, researchers characterize critical thinking as a property of personality, their skills and abilities of mental activity, as well as a personal and socially relevant phenomenon that is a priority in the field of education (Dewey, 1999; Halpern, 2000; Kluster, 2005; Paul & Binker, 1990).

From a philosophical point of view, critical thinking is considered as dialectical, reflexive, creative, communicative, and constructive thinking aimed at the creation of new knowledge. The subject of the educational process is an active, critically thinking, creative and free-spirited person (Brożek & Jadacki, 2013; Hessen, 1973).

The issues of the development of critical thinking in future teachers are logically connected with the problems of the development of their creativity, self-actualization, and independence of thinking (Brushlinskij & Tikhomirov, 2013; Rubinshtein, 2015). The mentioned authors also considered critical thinking to be one of the most relevant educational problems.

The British researcher Kottrell characterizes the formation of critical thinking skills as a supra-situational type of thinking, which is reflected in the breadth of views, and a global approach to the problem (Kottrell, 2016, p. 17). The scientist Popkov pays considerable attention to the development of critical thinking in the future teacher (Popkov et al., 2001). The author balances critical thinking with reflective and evaluative activities and defines the concept of "evaluative activity" as the active interaction of a person with the surrounding world, which consists in the ability to determine its heterogeneity. Critical thinking includes the following components: a critical analysis of external information; identification of facts and ideas in the information; identification of various logical inconsistencies; and identification of arguments.

Therefore, critical thinking is considered in the ability to analyze information from the perspective of logic and a personal approach to solve problems. Critical thinking cannot be compensated for by other personality traits. In this regard, there is a need to develop the critical thinking of future teachers in higher education institutions.

The development of critical thinking is based on the ability to analyze, synthesize, compare, raise questions, and make reasonable generalizations and conclusions. As Pometun and others noted, critical

thinking can be developed using unique teaching methods that are also used in the process of self-education (Pometun et al., 2012, p. 5).

In psychology, thinking is considered as a process of solving problems. Rubinshtein, describing thinking as analysis and synthesis, stressed the problem situation and tasks. The scientist believed that the thinking process begins with the analysis of a problem situation, which often requires intricate mental work: the problem's setting, finding a method to solve it, fixing the achieved result, solving the problem, and implementing the result of this mental work in practice (Rubinshtein, 2015).

The researcher Brushlinskij focuses on the fact that problem-solving is a creative process. The solution of any creative problem that does not have an algorithmic method to solve it is always associated with going beyond the set limits. Therefore, thinking is a continuous mental process of analysis, synthesis and generalization of the life circumstances of a constantly changing subject (Brushlinskij, 1996).

The educator Kuzmina continues to develop ideas about thinking as a process of solving various problems. In practice, problem situations generate a variety of tasks, the solutions of which are based on new heuristic processes. The scientist focuses on the fact that the pedagogical thinking of a future teacher is characterized by the ability to analyze pedagogical situations, formulate pedagogical tasks, make appropriate decisions and anticipate the consequences of their pedagogical activity. All of these skills characterize a high level of creative development of the future teacher's personality (Kuzmina, 2005).

A researcher of critical thinking, philosopher and educator Dewey, believed that critical thinking occurs only in the process of solving a specific problem. The task stimulates a person's natural curiosity and encourages them to think critically. Only in the process of finding their way out of a problematic situation, a person begins to reflect. Therefore, critical thinking is a system of judgments that are used to analyze events, formulate reasonable conclusions, make an objective assessment, perform interpretation, and correctly apply the obtained results (Dewey, 1999).

According to the American scientist Kluster, critical thinking begins with asking questions and finding out the problems that need to be solved. The scientist states the fact that thinking can be critical only when it has an individual character, that is, critical thinking is independent thinking. Therefore, students should have enough freedom to think independently and solve even the most difficult tasks on their own. The scientist emphasizes that the process of critical thinking occurs when new, already right ideas are tested, evaluated, developed and applied (Kluster, 2005, pp. 5–13).

A leading specialist in the development of critical thinking is the American psychologist Halpern. He notes that the following qualities characterize a person who has good critical thinking skills: readiness for planning (the first important step to critical thinking); flexibility (the ability to perceive the ideas of others, think in a new way, and to not give up on the task until it is solved); perseverance of the mind, patience; the ability to recognize and correct their mistakes; observation of their actions, awareness of their thinking process; search for compromise solutions, and the ability to find solutions that could satisfy the majority (Halpern, 2000).

American researchers also pay great attention to the development of the critical thinking of future teachers. In 1983, in the United States, the Council of colleges (a non-governmental organization that provides testing and other types of educational services for students, schools and colleges in the United States) published a document that sets out the main criteria that an applicant must meet (Academic preparation forcollege. What students need to know and be able to do, 1983). The document focuses on critical thinking skills. Thus, the necessary competencies required for an applicant are the following: reading, writing, speaking and listening, mathematics, reasoning, and learning. Requirements for the ability to reason are formulated as the ability to identify, formulate problems and offer solutions to them; recognize inductive and deductive conclusions, identify errors in reasoning; draw conclusions on information taken from various sources; understand, develop and use concepts and generalizations; and distinguish fact from opinion. Regarding the ability to speak and listen, to perceive what is said, the published document emphasizes the ability of students to engage in the exchange of ideas, ask questions, and give answers.

Therefore, critical thinking involves the development of specific skills that allow the person to overcome stereotypes and find the right solutions. The ability to think critically is the search for ideas, and means of transforming reality, so critical thinking is always included in educational activities and exists as a process of solving pedagogical problems.

Determining the levels of critical thinking of future teachers

We applied Starkey's test of determining the level of critical thinking in the adaptation of Lutsenko (Lutsenko, 2014) to define the level of critical thinking of future teachers. This test is an objective assessment of abilities. It consists of questions and answers and is designed for the adult age group (16 years and older). The author of the test is an American scientist, Starkey (Starkey, 2004). As a result of psychometric procedures performed in 2013, Starkey's original critical thinking test was adapted by Lutsenko (Lutsenko, 2014) for use in Ukrainian society. All tasks and the author's language were preserved as much as possible in the test, except for three tasks that showed unsatisfactory reliability coefficients. The test meets the psychometric requirements of reliability, discriminability, and validity. It is also equipped with standards for the student and adult age groups of both sexes. The test results can be interpreted based on these standards, as well as analyzed qualitatively (Lutsenko, 2014, p. 69).

In the research described in this paper, subjects were asked to choose one of the suggested answers. Results were calculated according to the key and can have a value from 0 to 27 points. The resulting indicator is distributed according to the levels of critical thinking. A low level of critical thinking (0–7 points) means insufficient development of induction, deduction and logic. The medium level of critical thinking (8–20 points) indicates the need to develop one or more forms of thinking, such as logic, deduction or reflection. A high level of critical thinking (21–27 points) shows sufficiently developed logic, reflection, and control over emotions, which allows you to analyze and evaluate information for reliability.

Students of Kyiv National Economic University named after Vadym Hetman (Faculty of International Economics and Management; Faculty of Finance; Faculty of Economics and Management) and National Pedagogical Drahomanov University took part in the empirical study.

The research was aimed at the professional development of future teachers as teachers of high schools in Ukraine. According to the Law of Ukraine "On Higher Education" paragraph 1, Article 52, Section X, students of master's degree programs are potential future teachers because successful implementation of the relevant educational problem confers the right to be employed in the position of teacher or lecturer at a higher educational institution.

In total, the sample of respondents involved in the empirical study was 276 people. The authors performed a qualitative and quantitative analysis of the diagnostic results and determined the levels of critical thinking. Table 1 correlates the result with the corresponding level of critical thinking (high, medium, or low).

Analysis of the survey results showed that the majority of respondents – 173 (62.7%) – had a medium level of critical thinking skills. In these respondents, the forms of thinking were unevenly developed because it is difficult for them to make important decisions. The respondents with a medium level of critical thinking showed a predominance of deduction, while the ability to think rationally was absent. Such a future teacher cannot assess risks and determine the consequences. The ability to make balanced decisions is poorly developed.

Only 71 respondents (25.7%) had a high level of critical thinking. The high level of critical thinking skills of future teachers indicates sufficient development of thinking operations related to logic, deduction, induction and reflection. Respondents tended to be able to control their emotions. These characteristics allow them to make the right decisions, analyze information for accuracy, recognize manipulations, and trace cause-and-effect relationships or their absence. Developed reflection helps future teachers recognize the limitations of their thinking processes, and to find the best solutions in terms of uncertainty and risk. A high level of critical thinking also allows them to adapt to the different conditions of the educational environment.

And finally, 32 respondents (11.6%) demonstrated a low level of critical thinking skills. Future teachers with a low level of critical thinking have developed logic, as well as such forms of thinking as induction and deduction. It is difficult for them to determine the accuracy of information and to detect manipulation. According to Lutsenko, respondents with a low level of critical thinking cannot make balanced decisions, argumentatively discuss, and do not practically realize their bias and the bias of others (Lutsenko, 2014, pp. 65–70). In the educational process, reduced critical thinking is associated with a sense of insufficient competence in intellectual disputes; hence the conversation partner can be incommunicative, difficult to comprehend, may become aggressive, or even leave the conversation.

The authors of the article suggest that the reasons for the low level of critical thinking development of future teachers may be different. One of them is the lack of skills to clearly and logically carry out the argument of the judgment. The other is conservatism (inability to perceive information that contradicts dogmas). Another reason may be to replace critical thinking with beliefs. Such people often do not realize their mistakes and trust unreliable information. Sometimes a low level of critical thinking depends on the level of intelligence. However, a person can have a low level of critical thinking and at the same time be able to analyze information and distinguish fact from fiction. Therefore, critical thinking does not necessarily imply the ability to perform complex mental operations.

Table 1

Results of determining the level of critical thinking skills

No	Levels of critical thinking skills	*a* = 276 students (sample of respondents)	
		b **(the number of respondents who answered correctly)**	***p*** **(percentage of respondents who answered correctly)**
1.	High (21–27 correct answers)	71	25.7
2.	Medium (8–20 correct answers)	173	62.7
3.	Low (0–7 correct answers)	32	11.6
Total:		276	100

Source: authors' own work.

Analysis of the test results allows us to conclude that the problem of the development of critical thinking is relevant for most future teachers.

Process of pedagogical problem solving

Polish philosopher, logician, psychologist and educator Twardowski believed that knowledge is based on the theory of cognition and the theory of judgment. That is why it is necessary to develop the logic and critical thinking of students, which testifies to the independence of human thought. The main thing in the independence of thought is whether the thought is pure and logically justified (Brożek & Jadacki, 2013). Ukrainian scientist, psychologist, and academician Kostiuk (Kostiuk, 1988) emphasized that thinking is a process of cognition and appears during the interaction of a person with the outside world. It is generated by the need to understand some new situation for a person, a new object, and occurs in a problematic situation. If the problem situation is realized, it immediately becomes a task for the person.

The problem-solving process is a continuous interaction between subject and object, in which the subject, through analysis and synthesis, reveals the real relationship between what is and what is sought. The scientist concluded that the solution of a problem always includes emotional components that are present at all stages of this process, starting with the awareness of the problem, the search for a means to solve it, and ending with obtaining the necessary result (Kostiuk, 1988).

According to the Ukrainian psychologist and academician Moliako (2000), the structure of the problem-solving process includes such strategic actions as preparation (understanding the conditions), planning (forming the idea), and implementation (checking the idea, experiment).

Therefore, the critical mind is necessary for all parts of the process of problem learning, because it needs analysis, comparison, generalization and negation. Without a critical assessment of pedagogical tasks, it is impossible to put forward an assumption or hypothesis.

Pedagogical problem concept

Under the pedagogical task, the authors understand a system that is the primary unit of the educational process and has the same components as the educational process itself: the goal, content and means, the activity of the teacher, the activity of the student, the result of joint activities.

According to the authors, to solve a pedagogical problem means to assess a particular fact, reveal the motives of behavior, and find the best way out of a particular situation, and a practical approach to solving the problem. A task is a goal set in specific circumstances that requires an effective way of achieving it. The authors recognize the pedagogical task as a problem that arose in a specific situation, which can be solved in several ways to find the best option. Students often do not know how to allocate the primary and secondary information, systematize and generalize the material, and logically build it. Future teachers do not have a developed ability to analyze and synthesize, which is why training sessions should be based on the principles of critical thinking so that each student has the opportunity to formulate their ideas, assessments and beliefs independently.

Since future teachers who possess critical thinking skills find their solution to the problem and support their decision with reasonable justifications. The inclusion of students in activities to solve pedagogical problems allows them to develop practical competencies, professional skills, and readiness to solve complex professional problems. Realizing the existence of other solutions to the same problem, future teachers try to prove that their chosen solution is more logical and rational.

Teachers' activity

To organize an educational process that contributes to the development of critical thinking, the authors used educational and creative tasks as a specific form of forming the content of educational material. This form of work allows us to develop critical thinking and is a method of its development. Under these conditions, future teachers can independently study and analyze pedagogical processes, understand the logic and sequence of pedagogical actions, and use new knowledge to understand and solve problematic pedagogical situations.

The authors identified a system of pedagogical tasks that ensures the development of the critical thinking and productive activity of future teachers in the classroom. The following types of tasks are used in the classes:

1) information and analytical tasks to identify contradictions and problems (designing problem situations, highlighting imaginary contradictions, problem formulation);
2) tasks with incomplete information (problematic tasks);
3) optimization tasks (choosing the optimal solution, optimizing the process of functioning of the object, optimizing the means of activity);
4) operational and practical tasks aimed at forming value judgments (reviewing, critical analysis of reading, identifying errors, checking the result, evaluating and correcting the process and result of pedagogical activity);
5) logical tasks (description of phenomena, processes, the definition of concepts, establishment of cause-and-effect relationships);
6) tasks for composing opposite problems (independent search for a solution method that is the opposite of the most obvious one, tasks that require a solution method from the end to the beginning);

7) inventive tasks (search for new means of activity);
8) operational and practical tasks aimed at forming value judgments, correcting the process and result of pedagogical activity;
9) analytical and synthetic tasks (tasks related to the formation of knowledge and skills of future teachers to identify, analyze and research the components of the pedagogical system);
10) planning and design tasks (tasks related to the formation of skills to develop an individual project of activity).

Decision algorithm

Describing the critical thinking of the future teacher as a process of solving pedagogical problems, the authors identified the main stages of their solution: analytical, projective, executive and final.

At the analytical stage, the task is set or "formulated from the situation" (analysis of contradictions, reasons that caused the problem of the situation, its assessment, formulation of the pedagogical task). The process of solving the problem at this stage may have separate tasks: pedagogical diagnostics; awareness of a specific pedagogical goal; formulation of problems (questions). Thus, the very formulation of the problem is a product of the future teacher's critical thinking.

The projective stage of solving a pedagogical problem includes the development of a project of a pedagogical solution, designing ways to achieve the goal, and reflecting on the content and form of the teacher's activity.

At the executive stage, pedagogical decisions are made, and the practical implementation of the developed project is carried out, as well as implementation of the planned pedagogical actions in the process of interaction between lecturer and student. The executive stage consists of several independent tasks: determining the specific content of training, and choosing the types, methods and forms of organizing activities. The practical work of the teacher at this stage also includes the typical duties of a teacher: giving educational information to students, explaining tasks, distributing assignments, simplifying or complicating tasks, implementing external coordination of the team, monitoring the progress of work, and providing students with appropriate assistance in implementing the action plan.

In the last stage of "conclusions and evaluation of the results obtained", and "defining of new educational goals", the teacher analyses the results of the pedagogical activity of the students, takes into account any methodological shortcomings, draws attention to the contradictions and difficulties encountered in the solution of the problem, and summarizes the experience. New tasks for self-education and self-development are set, and the pedagogical goal is defined.

The development of critical thinking of future teachers by solving pedagogical problems was based on the following algorithm:

1. Presentation of new knowledge.
2. Formation of pedagogical skills at the reproductive level:
   a) demonstration of pedagogical actions in general and by elements, presentation of knowledge by the principle of "demonstration + explanation",
   b) organization of working-out of pedagogical skills and pedagogical actions in simplified conditions (by operations),
   c) organization of independent work of students with constant feedback and positive emotional support of the teacher.
3. Transition to search and creative pedagogical activity:
   a) creating problematic pedagogical situations, solving non-standard pedagogical problems, simulation modeling together with the teacher and a group of pedagogical actions of students to solve pedagogical problems,
   b) mandatory analysis of students' activities with the teacher and group, and discussion of activities.

The algorithm proposed by the authors has a creative orientation. It takes into account the creative processes manifested in the ability of the students to identify the problem in the proposed problem situation and to model pedagogical situations.

Methods of critical thinking development

One of the most effective methods of developing critical thinking is "Brainstorming", which is understood as group problem-solving. The goal of brainstorming is to produce ideas on a problem that is being considered for a limited time. During the training sessions, the authors conducted a "Brainstorming" in the form of a team game that helps solve problematic pedagogical tasks. Our research has found that brainstorming produces the most effective results if the teams include no more than 4–6 participants. As the number of team members increases, the effectiveness of the brainstorming decreases. The teacher introduces the game participants to the problem pedagogical situation. The situation defines the tasks that need to be solved. The teacher formulates the conditions of the pedagogical task, and the rules of the game are fixed.

The brainstorming team game consists of two stages. In the first stage, the teams discuss the problem and offer ideas for its solution. Each team should offer as many original pedagogical ideas as possible. All pedagogical ideas put forward by players are recorded. In the second stage of the game, the ideas proposed by the participants are discussed, analyzed and evaluated. This stage involves a critical attitude to the proposed ideas, selection of ideas, rejection of the utterly banal, ineffective, disconnected from pedagogical reality, or not aimed at solving the problem. Participants choose the most exciting pedagogical proposals. The ideas that are worthy of

further consideration or use in the practical activities of the teacher are chosen.

An essential member of the team is a "resonator", that is, a person who can reformulate a new idea, reveal its essence, and give it adequate expression (verbal, graphic, symbolic). The need to include a resonator in the game arises since not all players can clearly express their ideas.

In order to accustom future teachers to not be afraid to express their ideas and thoughts, and to have the right to make mistakes, special psychological and pedagogical conditions are created in the training session. Each participant's opinion is considered valuable, and other team members positively perceive their ideas. Insight, imagination, and fantasy are approved.

There are no censorship restrictions in the class. Any proposed idea, even a paradoxical one, should be carefully considered by the team because this idea can give rise to a new, original idea. Thus, ideas are produced continuously, and can be supplemented and developed.

The brainstorming process can be activated using techniques such as inversion (do the opposite), analogy (do as you did in the previous solution), empathy (consider yourself as part of the task, find out how you feel), fantasy (do something fantastic). The effectiveness of each team is evaluated according to specific criteria: moral orientation; scientific validity; originality of methods for solving pedagogical problems; the expediency of implemented methods.

One of the most effective methods of solving pedagogical problems is "Pedagogical debates". The purpose of pedagogical debates is to develop students' critical thinking skills, gain experience of communication and tolerant behavior, and activate their cognitive activity. The main skill in pedagogical debates is the art of persuasion, which requires a logical sequence of reasoning, the ability to formulate questions, and give convincing examples and their explanations.

During the debate, future teachers study a specific pedagogical problem, analyze specific pedagogical situations, and independently find solutions to them. Students express their thoughts, formulate their arguments, lead a discussion, and make a decision.

Debates are held according to the following principles: a friendly, creative atmosphere that promotes the implementation of new, original ideas; correct questions from debaters and correct answers; the ability to listen and understand opponents; the right of participants to put questions to their opponents to find out or explain difficult questions. Furthermore, the requirements for conducting a debate are as follows: definition of the subject of the debate; precise wording of definitions; compliance with logical consistency; reasoning over each logical course of the opponents' opinions and their own opinions; and exchange of views (arguments, facts, and speeches of each participant are discussed).

Two teams participate in the debate. The team that speaks first interprets the specified topic and formulates its reasoned position, which is confirmed by the facts and explained by specific pedagogical situations. The second team that objects, refutes the position of the first team and provides counterarguments, and formulates its position.

In debates, each player performs certain functions: represents the team; provides arguments with the necessary explanations; asks a question; draws conclusions based on the formulated position; analyses the positions of the opposing team; identifies the main points of contention; gives a consistent analysis and criticism of the position of the opposing team; and declares its independent position.

Conducting pedagogical debates consists of four stages: stage 1 (approaching the topic); stage 2 (research topics); stage 3 (preparing for the debate and the debate itself); stage 4 (feedback and evaluation).

In the first stage of pedagogical debates, there are usually three groups: two groups consider different aspects of a single pedagogical problem or complex pedagogical situations, and the third one looks for commonalities between them. Then the groups switch places, adding their ideas to the previous proposals. In the end, the players in a large group discuss the issues that have arisen.

The second stage of pedagogical debates involves future teachers' training to detect and systematize the necessary material. The third stage involves testing the constructed line of argument in practice and supporting it with facts. In the fourth stage, the analysis and evaluation of the conducted pedagogical debates are carried out.

The teacher evaluates the teams according to the following criteria: coverage of the main ideas of the author's information (the central thesis of the argument); the definition of arguments, explanation of the essence of the argument, disclosure of its relevance and connection with the subject of the debate; the definition of the arguments and explanations made by the author in support of one's own ideas; the credibility of facts, thoughts, examples, arguments, supported by an explanation and given by the author of the information; the objectivity of the author's information; and the manner of information presentation.

The teacher can assign personal points to individual players and determine their rating. Therefore, the team's success depends on the contribution of each team member, as well as on the joint solution of the set task.

An effective form of development of critical thinking is the role-playing game "Pedagogical situation". The goal of the game is to develop students' critical thinking, improve students' communication skills and identify the effectiveness of their professional behavior. The structural elements of the game are the pedagogical situation and task, the distribution of roles, and the stages and rules of the game. Realism is one of the requirements for the pedagogical situation.

Determination of levels

Based on these criteria, the authors determined levels of quality to solve pedagogical tasks:

1. High level – a brightly expressed creative orientation of the student's personality. Creative non-standard approach to the analysis of pedagogical situations, the choice of optimal solutions to problems based on the diagnosis of specific conditions. Ability to theoretically analyze pedagogical situations and apply theoretical knowledge in new situations. Analyze and design the methods of their teaching activities, based on the categories, principles, methods, and criteria mastered in the study of psychological and pedagogical subjects. In specific pedagogical situations, students rely not only on theoretical knowledge and best practices, but also on pedagogical intuition, their emotional perception and personal experience. A variable solution of pedagogical tasks is often original. Students search for new, creative ways to work, and they have well-developed professional, analytical, and predictive skills. The process of solving creative tasks is characterized by a clear and evidence-based choice of actions in a specific pedagogical situation.
2. Medium level – students have the fundamental skills to synthesize theoretical knowledge and use them in practice. When solving educational tasks, students rely to a certain extent on the knowledge they have acquired in the course of theoretical and practical training. They have a well-established personal pedagogical position, which is based on modern educational concepts. It should be noted that the pedagogical position is not stable enough and can be deformed under the negative influence of real pedagogical practice. Individual creative elements are characteristic of pedagogical thinking.
3. Low level – students do not know how to apply theoretical knowledge to solve pedagogical problems and reveal the causes of certain problematic situations. As a rule, it is difficult for them to independently detect and formulate the pedagogical tasks of an educational nature. The proposed pedagogical situations are solved using a template, mainly focusing on external circumstances, on the fact itself, without linking the process of solving the problem with the diagnosis of the state and identifying the features of the object and subject of pedagogical activity. The variability of decisions made by students is limited. Students do not know how to defend their ideas and argue them.

Summary

The literature review allowed the authors to clarify the essence of such a scientific category as the "critical thinking" of the future teacher. It is defined as a set of essential personality characteristics, namely: dialectics, grounded on positive doubt and dialogue; constructiveness, heuristics and freedom; rationality, logic; and communication, combining social conditionality and personal freedom.

Testing of future teachers for critical thinking skills using Starkey's critical thinking test allowed us to conclude that the problem of developing critical thinking is relevant for most future teachers. The mentioned test was adapted by Lutsenko.

According to the authors, critical thinking is a conscious and purposeful interaction between the teacher and students. During this interaction, the following abilities are formed: to analyze information from the perspective of logic, to propose new questions, to make independent decisions, to reasonably defend their position with areas of difficulty, to listen to the partner in conversation. A practical method of developing the critical thinking of future teachers is the method of solving pedagogical problems, which involves the use of modern interactive forms, methods and techniques of teaching.

Suggestions for further research

The conducted research does not cover all aspects of the issue. Topical and controversial themes that await further study include the following: the use of information and communication technologies for the development of critical thinking; the development of critical thinking throughout life; peculiarities of the development of critical thinking in different age periods of personality development; the strategy for the development of critical thinking to self-efficacy and success throughout life; modeling of critical thinking.

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