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## **DETERMINATION OF THE STATE OF FORMATION OF CRITICAL THINKING AMONG CADETS OF HIGHER MILITARY EDUCATIONAL INSTITUTIONS**

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*Relevance of research.* In the modern world there is a variety of information technologies influencing the individual, so changes are taking place in the educational process of training military professionals.

*Considerable attention is paid to the professional search for the important information, the ability to evaluate and analyze it.*

*Important in the current educational process of future officers is the ability to move away from patterns and stereotypes, to generate new ideas, understand and make sense of them, to ask the questions and be able to clearly argue their own position, highlight problems and set priorities.*

*It is the development of critical thinking of cadets in higher military educational institutions when they are mastering a military specialty which will allow future officers to navigate the information space and draw their own conclusions, be able to assess problems and find atypical ways to solve them.*

*Aim of research* is diagnostics of the state of formed the critical thinking of cadets during their studies at the higher military institution.

*Methods* The experimental base of the subjects consisted 76 cadets of the Military Academy (Odessa) aged 19 to 20 years. The following methods were used: questionnaire of types of thinking and level of creativity of J. Bruner; diagnosis the level of development of reflexivity of A.V. Karpova; diagnosis the communicative and organizational tendencies (KOS)" of V. Synyavsky, B.A. Fedoryshyn; author's questionnaire Self-assessment of the ability to critical thinking, expert assessments, interviews, observations.

***Results** Significant indicators of critical thinking are identified: the awareness of the problem; the ability to take into account the arguments and other points of view; the ability to highlight inconsistencies and question the information obtained; the ability to evaluate alternative ways out of the situation; the ability to be creative in solving complex problems; the ability to build a hypothesis; the ability to justify the chosen position; flexibility of thinking.*

*There is a correlation between critical thinking skill and individual psychological properties of cadets, in particular: with symbolic thinking, creativity, reflexivity, with organizational and communicative tendencies, and with academic success.*

***Conclusions** The study showed that the state of formation of critical thinking in cadets is mainly at medium and low levels and is manifested situationally. The indicators of critical thinking chosen by us sufficiently reflect the level of formed the critical thinking of cadets during education. We investigated the psychological properties of the personality of the cadet, which contribute to the formation of critical thinking.*

*It is proved that academic success is one of the criteria for the formation of critical thinking.*

***Keywords:** personality, cadets, critical thinking, indicators, information space, education, success.*

## **Визначення стану сформованості критичного мислення у курсантів вищих військових навчальних закладів**

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***Актуальність дослідження:** В сучасному світі вирує розмаїття інформаційних технологій щодо впливу на особистість, що обумовлює зміни і в освітньому процесі підготовки військових фахівців. Значна увага приділяється вмінню професійного пошуку інформації, здатності її оцінити та проаналізувати. Важливим в процесі підготовки здобувачів вищої освіти є вміння відходити від шаблонів*

та стереотипів, генерувати нові ідеї та осмислювати їх, чітко аргументувати свою позицію, вирізняти проблеми та розставляти пріоритети. Саме розвиток критичного мислення курсантів вищих військових навчальних закладів на етапі оволодіння військовою спеціальністю дозволить майбутнім офіцерам орієнтуватись в інформаційному просторі та робити власні висновки, оцінювати проблемні задачі та знаходити нетипові шляхи їх вирішення.

Мета дослідження: діагностувати стан сформованості критичного мислення у курсантів під час навчання у вищому військовому навчальному закладі.

Вибірка і методи дослідження: У дослідженні прийняли участь 76 курсантів Військової академії (м.Одеса) віком від 19 до 20 років. Застосовані наступні методики: «Опитувальник типів мислення та рівня креативності» Дж.Брунера; «Діагностика рівня розвитку рефлексивності» А.В.Карпова; «Дослідження комунікативних та організаторських схильностей (КОС)» В.Синявського, Б.А.Федоришина; авторська анкета «Самооцінка здатності до критичного мислення», експертні оцінки, бесіди, спостереження.

Результати дослідження: Визначено значимі показники критичного мислення курсантів та особливості їх прояву під час навчальної діяльності, а саме: усвідомлення проблеми; здатність врахувати аргументи та інші точки зору; вміння виділяти суперечності та піддавати сумніву отриману інформацію; здатність оцінювати альтернативні шляхи виходу з ситуації; здатність творчо підходити до вирішення складних завдань; вміння вибудувати гіпотезу; вміння обґрунтувати обрану позицію; гнучкість мислення. Виявлено кореляційні зв'язки між показниками критичного мислення та індивідуально-психологічними властивостями курсантів, зокрема: із символічним і знаковим мисленням, креативністю, рефлексивністю, із організаторськими та комунікативними схильностями, а також з успішністю в навчанні.

Висновки. За результатами нашого дослідження встановлено, що стан сформованості критичного мислення у курсантів переважно середній та низький, проявляється ситуативно, що свідчить про необхідність включення до освітнього процесу вищого військового навчального закладу спеціальних умов та засобів формування критичного мислення.

Обрані нами показники в достатній мірі відображають стан сформованості критичного мислення курсантів під час навчання.

*Крім того, нами досліджено деякі індивідуально-психологічні властивості курсантів, які впливають на здатність до критичного мислення. Доведено, що успішність в навчанні є одним із критеріїв для оцінки сформованості критичного мислення.*

**Ключові слова:** *особистість, курсанти, критичне мислення, показники, інформаційний простір, навчання, успішність.*

**Introduction.** The modern challenges and threats of a multifaceted information environment necessitate the optimization of the educational process in the system of higher military education. Often officers work with information that is overloaded with data, or in conditions of lack of information must predict the course of events and determine ways to achieve the goal, to plan the actions of their subordinates during the solution of combat tasks in conditions of extreme danger. Studying the peculiarities of professional thinking and the ability to correctly assess situations, draw your own conclusions, navigate the information space, make non-standard decisions, etc. are some of the important conditions for the formation of cadets' critical thinking.

Critical thinking is activated if there is an interest in solving a problem, and its performance is determined by the presence of sound knowledge (D. Kluster 2002).

D. Halpern (2000) argues that it is critical thinking that allows you to identify fallacies in judgments and resolve existing contradictions on the basis of given standards and norms of professional activity. V. Nyscheta (2008) defines critical thinking as the ability to think critically about problems and make decisions taking into account alternatives on the basis of reflexive search. For Hove (2011) critical thinking involves the ability to identify alternative ways of solving a problem problem, taking into account the value aspect.

D. Hitchcock (2020) considers critical thinking as a purposeful thinking act. The author distinguishes readiness and ability to think critically, which includes the knowledge and ability to apply the principles and concepts of critical thinking in specific situations. As

a readiness to think critically is the ability to recognize and desire to investigate a problem, self-confidence, courage, impartiality and consideration of alternatives, the desire to prove one's own arguments and the search for truth. "Abilities" of critical thinking are: the ability to observe a situation; to recognize one's own emotional states - bewilderment, exasperation; to ask questions; to construct different options to solve a problem and predict their consequences; to draw conclusions; to analyze and organize information, to plan and evaluate the validity of data.

We consider critical thinking as a process of improving mental activity acquiring individuality, becoming conscious, continuous and productive, especially at the stage of entering the professional environment. It is the ability to think critically that allows the cadet to analyze and evaluate events, find new ideas for solving complex problems, compare facts, distinguish manipulative information influence, and form his attitude toward the situation. Accordingly, such analysis requires in-depth knowledge, a broad outlook, and certain personal prerequisites.

S. Romanova (2009) identifies certain personality traits that allow critical thinking, in particular: the ability to evaluate the results of their activities, the independence of comprehending new information, no fear of expressing a contrary opinion, resistance to suggestion, the desire for new knowledge, the ability to analyze information.

Formation of critical thinking is one of the important conditions for successful socialization of a person in modern information society. It is critical thinking that allows you to form your own independent and meaningful position, which in the process of learning becomes conscious and reflexive and, at the same time, increases the communicative potential of the individual.

I. Gorokhova (2020) highlights the leading role of the individual in the procedure of critical thinking, both determining the course of thought and direction of events and constructing one's own scenario of the way of action. The author considers critical thinking as one that relies on the ability to evaluate events; to make conscious choices; to argue; to formulate relevant questions; to distinguish facts from opinions; to find new solutions; to determine criteria for

analysis; to find evidence to support assumptions; to build logical connections.

V. Konarzhevskaya (2009) in her study specifies the criteria and indicators of formation of cadets' critical thinking: motivational-valuable; content-processual; personal-evaluative. The author proves that critical thinking is determined by individual peculiarities of a person's mental processes and emphasizes the social-personal function of this skill that provides for the realization of civic values and is of special importance for the functioning of a future officer.

A. Khmilyar (2018) highlights the personal characteristics of an officer with established critical thinking: readiness for planning, flexibility of thinking, perseverance, the ability to correct their own mistakes, awareness of their own thought process, the search for compromise solutions.

Thus, the ability of a personality to think critically is determined by a set of knowledge, practical skills, experience, and psychological characteristics of a personality, with the result of formation of critical thinking being an invented solution, based on reasonable conclusions and independent thinking strategies and operations. At the stage of training in a higher military educational institution, a cadet's invented solution to a problematic learning situation is necessarily evaluated by teachers, so we consider the cadets' performance in learning activities to be one of the criteria of critical thinking formation.

The problematics of studying critical thinking peculiarities becomes more and more actual, however empirical studies of psychological peculiarities of critical thinking formation among cadets during training in higher military educational institutions are not fully disclosed.

**Aim of the study:** diagnostics of cadets' critical thinking formation in order to develop it further on the stage of professional induction.

In order to achieve the goal we set the following objectives: to identify indicators of critical thinking formation and empirically examine the specifics of cadets' displaying them during training based on a theoretical-methodological analysis of critical thinking characteristics; to examine some individual-psychological features of cadets as preconditions for critical thinking formation; to examine

the connection between cadets' learning success and critical thinking indicators.

**Research methods and sample.** The study involved 76 cadets of the Military Academy (Odessa) aged from 19 to 22.

While analyzing the scientific literature on the selected topic, we identified the following indicators of cadets' critical thinking during training: interest in learning; problem awareness; ability to consider arguments and other points of view; ability to highlight contradictions and question information received; ability to evaluate alternative ways out of situations; ability to solve complex problems creatively; ability to generalize; ability to construct a hypothesis; ability to draw conclusions; ability to substantiate the chosen solution; flexibility of thought; reflexivity.

Based on the identified indicators of critical thinking and in order to reveal the cadets' individual psychological properties as the initial personal prerequisites influencing the development of critical thinking, we selected the following diagnostic methods: The "Questionnaire of Thinking Types and the Level of Creativity" by J. Bruner; "Diagnostics of the Level of Development of Reflexivity" by A.V. Karpova; "Researches of Communicative and Organizational Aptitudes (KOS)" by V. Sinyavsky, B.A. Fedorishin; the author's questionnaire "SelfEvaluation of the Ability to Think Critically".

The author's questionnaire "Self-assessment of critical thinking ability" contains 16 questions that reveal the ability to think critically in the course of learning activities according to certain indicators. Assessment of the level of critical thinking was determined on a scale: yes/always - 3 points; sometimes/probably - 2 points; no/never - 1 point. The maximum number of points was 48. The formula was applied to determine the critical thinking coefficient:  $Crit = N/48$ , where N is the total amount of points scored.

In addition, the general assessment of the success of each cadet of the studied group for the academic year was taken into account, as well as methods of observation, conversation and expert evaluations were applied. The experts were teachers in different academic disciplines in the profile direction. The grades were given on a five-point scale in accordance with the indicators of critical thinking that we defined. Calculation of generalized assessment of the experts was

carried out by the method of determining the arithmetic mean  $M = \sum V/N$ , where  $\sum V$  - sum of assessments of each of the experts,  $N$  - the number of experts.

To determine the statistical significance of the empirical study we used methods of statistical data processing: nonparametric criteria -  $\chi^2$  Pearson and Spearman correlation analysis. SPSS 16.0 computer program was used.

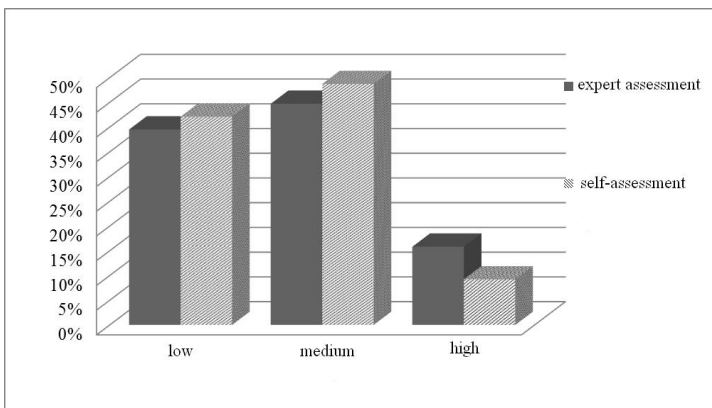
**Results.** According to the results of the questionnaire the range of the cadets' critical thinking coefficient ranged from 0.52 to 0.97. Thus, 9.2% of the surveyed cadets rated their ability to think critically highly, 48.7% of the respondents rated their ability to think critically at an average level, and 42.1% rated their ability to think critically at a low level.

In order to supplement the information we received, we investigated to what extent these skills actually manifest themselves in the course of learning activities, using expert evaluations. The experts assessed the ability to think critically highly in 15.8% of the cadets, 44.7% of the respondents had medium-level critical thinking skills, and 39.5% of the cadets had almost no critical thinking during learning activities.

It is interesting that cadets evaluated the manifestation of critical thinking in themselves higher than they were evaluated by experts, except for high values. This may indicate that the personal formation of young men in the course of professionalization is at the stage of formation (Fig.1).

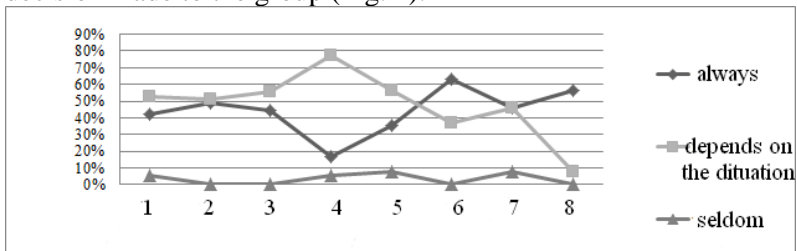
Using Kolmogorov-Smirnov test at  $p = 0.01$  we determined that the empirical data distribution differs from normal. Statistically significant indicators influencing the cadets' self-assessment of the ability to think critically were identified using Pearson formula test 2 (at  $p = 0.001$ ): consideration of arguments and other points of view; ability to highlight contradictions and question information received; flexibility of thinking; ability to assess alternative ways out of situations; ability to build a hypothesis; creative approach to solving complex problems; moderate influence (at  $p = 0.004$ ) have indicators - problem awareness and ability to substantiate the chosen position.





*Fig. 1. Comparison of values of cadets' manifestation of critical thinking based on the results of expert assessment and critical thinking self-assessment questionnaire*

According to the results of our questioning and observation during training situations, as well as the method of descriptive statistics, we found that the vast majority of the indicators of critical thinking that we defined are situational, depending on the interest in the academic discipline, perceived by the cadet as important for the future profession and subject to personal responsibility for the decision made to the group (Fig. 2).



*Fig. 2 Manifestations of indicators of critical thinking among cadets during training*

Note: 1 - awareness of the problem situation; 2 - consider the arguments of others; 3 - highlighting contradictions; 4 - assessment of alternatives; 5 - making a hypothesis; 6 - creativity in solving problem problems; 7 - ability to justify the position; 8 - flexibility of thinking.

Thus, 52,6% of the cadets are aware of the problem situation depending on the academic discipline, 51,3% of the respondents consider the arguments of others based on the experience and authority of colleagues, 55,3% - tend to highlight contradictions and question the information obtained. 77.6% assess alternatives depending on their interest in the task, 5.3% do not look for alternative ways of solving the task. 56.6% of surveyed cadets are able to build a hypothesis depending on the situation, while 7.9% of respondents perceive the material without generalizing it, such cadets find it difficult to build a new hypothesis. 63.2% of cadets are always creative in solving problem problems, 35.5% of respondents are creative depending on the academic discipline. 7.9% of cadets avoid justifying their position, the remaining 92.1% are able to justify their own position. Interest in learning is predominantly medium - 42.1% of cadets. 56.6% of the respondents are quick to switch when the conditions of the training task change.

Using the psychodiagnostic methods we chose, we discovered connections between the indices of critical thinking and individual psychological characteristics of cadets by conducting a Spearman correlation analysis (Table 1).

Table 1

**Correlation of critical thinking and individual psychological properties of cadets**

Individual psychological characteristics of cadets	Value at $p = 0.01$
Organizational inclinations	0,723
Symbolic thinking	0,699
Iconic thinking	0,540
Reflexivity	0,418
Creativity	0,405
Communicative inclinations	0,314

Thus, cadets with a high level of critical thinking development have pronounced organizational inclinations (according to the V. Sinyavskii & Fedorishin technique), in particular, they are able to consider arguments of other parties ( $r = 0.564$  at  $p = 0.01$ ), are able

to highlight contradictions and question the information they receive ( $r = 0.425$  at  $p = 0.01$ ).

We found connections between the coefficient of critical thinking of cadets and symbolic and sign thinking, as well as creativity (methodology of J. Bruner), that is, cadets with a higher level of formation of critical thinking are better able to realize and assimilate information through formulas and operations, to fix connections between objects and events, to show readiness to create new creative ideas.

The level of creativity (J. Bruner's technique), in turn, showed a strong positive correlation with some indices of critical thinking: the ability to evaluate alternative ways of solving complex problems ( $r = 0.658$  at  $p = 0.01$ ), creative approaches to atypical tasks ( $r = 0.611$  at  $p = 0.01$ ), the ability to construct a new hypothesis ( $r = 0.348$  at  $p = 0.01$ ).

The connection between critical thinking and reflexivity (according to the methodology of A.V. Karpov) indicates a tendency to realize and analyze information before making decisions and actions, making a conscious choice.

Moderate positive connection at a high level of significance between the ability to critical thinking and communicative inclinations (according to the methodology of V. Sinyavsky, B.A. Fedorishin). The connection of communicative inclinations with the ability to highlight contradictions and question the received information ( $r = 0.333$  at  $p = 0.01$ ) and the ability to justify the chosen position ( $r = 0.280$  at  $p = 0.05$ ), which allows to understand the cause-and-effect relations between the facts and formulate your own opinion, was found. We have an inverse relationship of communicative inclinations with manifestations of creativity ( $r = -0.440$  at  $p = 0.01$ ), reflexivity ( $r = -0.465$  at  $p = 0.01$ ), assessment of alternatives ( $r = -0.345$  at  $p = 0.01$ ), which may indicate the inherent weighted personality with a developed ability for critical thinking and desire to think through the situation before expressing their position.

Our study proves that the cadets' level of critical thinking influences their academic performance ( $r = 0.630$  with  $p = 0.01$ ). In particular, we have a connection between academic performance and

flexibility of thinking, interest in learning, which is a motivational prerequisite for personal self-assertion and mastering a military specialty. Such cadets are able to highlight contradictions and question the received information that contributes to mastering new knowledge, are capable of evaluating alternative variants of problem solving and choosing the best way of solution, show a tendency to creatively solve atypical problems and comprehend the learning situation (Table 2).

Table 2

**Correlation between indicators of critical thinking and academic performance of cadets**

Indicators of critical thinking	Value at $p = 0.01$
flexibility of thinking	0,723
interest in learning	0,592
the ability to highlight contradictions and question information received	0,574
the ability to assess alternative options for solving the problems	0,509
the ability to be creative in solving atypical problems	0,509
reflexivity	0,403
argumentation consideration	-0,351
communicative dispositions	-0,344

At the same time, an inverse relationship was revealed with the indicators of taking into account arguments and other points of view, as well as with communicative dispositions. We believe that this is a peculiarity in the manifestation of professional thinking of servicepersons, since the determining factor in making a final decision by an officer is his personal responsibility for the final result.

**Discussion.** Thus, the cadet who studies at a higher military educational institution with an established critical thinking is characterized by: organizational inclinations, as manifestation of initiative and ability to rally the team around his idea; reflexivity, as ability to realize and analyze information, evaluate alternative ways

of decision; creativity, influencing the adoption of non-standard solutions in typical or predictable situations. Such cadets take into account the arguments of other parties, but make the final decision independently, prefer tasks containing contradictions, show flexibility of thinking, are able to build a new hypothesis and, if necessary, justify the chosen position.

No less important is the dominant expression of sign and symbolic thinking in cadets, which provides a comprehensive analysis of the situation, relying on concepts and inferences. It is symbolic thinking that influences the ability to abstract, which allows distinguishing objective information from manipulative influence. According to the study of T. Lysyanska (2020), 75% of the studied students have a pronounced sign thinking, at the same time, the subject and figurative dominate in 50%, and only 8.3% of civilian students have a symbolic type of thinking. We believe that such differences are due to the peculiarities and specifics of learning in a military educational institution.

The results of our empirical study confirm the work of Yenice (2012) who also found a positive correlation between the level of critical thinking and learning adaptation style in higher education. Roohangiz Norouzi Nia et al. (2014) found a correlation between students' academic performance and critical thinking skills.

Demirhan, Besoluk and Onder (2011) also studied the relationship between critical thinking and academic hurry students from first to third year and found that third year students' level of critical thinking decreased, contrary to expectations, and the average grade point average for learning increased. The authors attributed this to increased student adaptation to learning in order to reduce stress.

**Conclusions.** According to the results of our study it was found that the state of critical thinking formation in cadets is mostly average and low, it is manifested situationally, which indicates the need to include special conditions and means of formation of critical thinking in the educational process of higher military educational institution.

The indicators we selected sufficiently reflect the state of formation of cadets' critical thinking during training.

We have studied some individual-psychological properties of cadets that affect the ability to think critically: It has been proved that academic performance is one of the criteria for evaluating the formation of critical thinking.

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## АНКЕТА

### Самооцінка здатності до критичного мислення

**Інструкція.** Прочитайте уважно питання та оберіть (підкресліть) варіант відповіді, який найбільше Вас характеризує. Якщо питання викликають складнощі, уявіть себе в типовій навчальній ситуації або спрогнозуйте можливу ситуацію. Намагайтесь бути щирими.

1. Чи є у Вас улюблена дисципліна, до якої Ви особливо якісно готуєтесь, шукаєте додаткові матеріали?

- а) так
- б) є такі, але не маю можливості на додатковий пошук матеріалу
- в) немає таких

2. Чи ставите Ви додаткові питання викладачу, якщо навчальний матеріал Вас зацікавив?

- а) так
- б) іноколи
- в) ніколи

3. Якщо під час групової вправи з навчальної дисципліни, Вам особисто необхідно прийняти рішення в суперечливій ситуації, чи будете Ви враховувати аргументи колег, думка яких відрізняється від Вашої?

- а) так, намагатимусь дійти компромісу
- б) врахую думку, але зроблю по-своєму
- в) якщо колега має авторитет та досвід, озвучу його рішення

4. Чи бувало так, що під час розв'язання проблемного питання Ваш варіант вирішення відрізнявся від запропонованого викладачем і був не менш ефективним?

- а) так, люблю нестандартні шляхи вирішення
- б) іноді
- в) ніколи не шукаю інших шляхів

5. Чи викликають у Вас зацікавленість вирішення завдань, що містять протиріччя?

- а) так, люблю поміркувати над суперечностями
- б) іноді, якщо в цьому є потреба
- в) ні, не подобаються такі завдання

6. Чи доводилось Вам під час заняття обґрунтовувати свою позицію, відмінну від думки більшості?

- а) так



б) іноді моя позиція відрізняється від думки інших, але не вважаю за потрібне її висловлювати

в) ні, моя позиція збігається з думкою групи і не потребує обґрунтування

7. Чи здатні Ви визначити та оцінити всі можливі альтернативні шляхи вирішення проблемного питання в ході навчального заняття?

а) так, завжди оцінюю всі можливі варіанти

б) залежить від ситуації

в) ні

8. Чи часто Ви аналізуєте інформацію, отриману в ході навчального заняття?

а) так, постійно аналізую

б) іноді, якщо тема заняття мене зацікавила

в) ні, додатково нічого не аналізую

9. Чи можете Ви аргументувати свою позицію спираючись на теоретичні знання?

а) так, я добре орієнтуюсь в теорії

б) залежить від навчальної дисципліни

в) ні

10. Чи робите Ви висновки після вивченого навчального матеріалу?

а) так, постійно

б) іноді, якщо матеріал актуальний для подальшої служби

в) ні

11. Чи доводилось Вам визнавати помилки в своїх судженнях стосовно виконання навчального завдання?

а) так, могу визнати свої помилки

б) могу припустити помилковість, але буду відстоювати свою позицію

в) ні, помилок не допускаю

12. На Вашу думку, чи зможете Ви максимально об'єктивно оцінити проблемну ситуацію в ході виконання навчального завдання з улюбленої дисципліни, спираючись на свої теоретичні знання та досвід?

а) так

б) залежить від ситуації

в) ні

13. Чи здатні Ви в ході навчального заняття самостійно проаналізувати проблемну ситуацію, оцінити можливі ризики, висунути нову гіпотезу стосовно вирішення та аргументувати свою позицію?

- а) так
- б) ймовірно
- в) ні

14. Чи схильні Ви творчо підходити до вирішення проблемної ситуації?

- а) так
- б) ймовірно
- в) ні

15. Чи властива Вам гнучкість мислення, тобто – здатність швидко адаптуватись до змінених умов ?

- а) так
- б) ймовірно
- в) ні

16. Чи схильні Ви піддавати сумніву загальноприйняті погляди?

- а) так
- б) ймовірно, залежить від ситуації
- в) ні

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