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PSYCHOLOGICAL RELATIONSHIP OF STUDENTS' LOGIC AND REASONING SKILLS IN THE CONTEXT OF CRITICAL THINKING

In the article, one of today's actual issues is in the direction of supporting new ideas proposed by young intellectuals. In the context of critical thinking, the theoretical and methodological bases of the psychological relationship between students' logic and reasoning skills were studied. In this direction, the concepts of "thinking", "critical thinking", "logic", "reasoning skills", "psychological relations of students' logic and reasoning skills on the basis of critical thinking" were defined, which allow for theoretical justification through a review of philosophical, psychological and pedagogical scientific literature.

In the course of the research, based on synergistic, motivational, and cognitive methodological foundations, the psychological relationship of students' logic and reasoning skills in the context of critical thinking structure done and An integrated diagram of the concepts related to the individual's critical thinking, understanding, modification, verification, determination and preparation of evidence, logical decisions and conclusions, cognitive skills and reasoning skills, mindset and communication was depicted.

As a result of the practical-experimental results organized in the direction of defining the theoretical-methodological bases studied by the authors in the article, in the context of critical thinking, through the function of the psychological relationship between the logic and reasoning skills of students, their thinking logic and reasoning skills have increased and their desire to obtain a successful education has increased, and in the process of entering into communication It was shown that he can express his own thoughts, provide evidence, analyze it, make optimal decisions, and get directions for regulating his activity and behavior.

Key words: thinking, critical thinking, logic, reasoning skills, understanding thought, change, evidence, positive thinking, cognitive skill, argumentation, analysis, logical decision.

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Сыни ойлау контекстінде оқушылардың логикасы мен пайымдау біліктілігінің психологиялық қатынасы

Мақалада бүгінгі күні өзекті мәселелердің бірі, ол зияткерлік жастардың ұсынатын жаңа идеяларына қолдау көрсету бағытында сыни ойлау контекстінде оқушылардың логикасы мен пайымдау біліктілігінің психологиялық қатынасының теориялық-әдіснамалық негіздері зерделенді. Бұл бағытта философиялық, психологиялық-педагогикалық ғылыми әдебиеттерге жасалған шолу арқылы теориялық тұрғыдан негіздеуге мүмкіндік беретін «ойлау», «сыни ойлау», «логика», «пайымдау біліктілігі», «сыни ойлау негізінде оқушылардың логикасы мен пайымдау біліктілігінің психологиялық қатынастары» ұғымдарына анықтама берілді.

Зерттеу барысында синергетикалық, мотивациялық, когнитивтік әдіснамалық тұрғыларды негізге алып, сыни ойлау контекстінде оқушылардың логикасы мен пайымдау біліктілігінің психологиялық қатынасының құрылымы жасалып, жеке тұлғаның сыни ойлауы, ойды түсіну, өзгерту, тексеру, айқындау мен дәлелдеме келтіру даярлығы, логикалық шешімі мен тұжырымдары, когнитивтік дағдылары мен пайымдау біліктілігі, ой-өрісі мен қарым-қатынасына қатысты ұғымдардың кіріктірілген сызбасы бейнеленді.

Авторлар мақалада зерделенген теориялық-әдіснамалық негіздерін айқындау бағытында ұйымдастырылған тәжірибелік-эксперимент нәтижелері нәтижелері ретінде сыни ойлау контекстінде оқушылардың логикасы мен пайымдау біліктілігінің психологиялық қатынасының қызметі арқылы олардың ойлау логикасы мен пайымдау біліктілігі арта түскені және табысты білім алуға деген ұмтылысы жоғарылап, қарым-қатынасқа түсу үдерісінде өзіндік ойын жеткізу, дәлелдеме келтіру, оған талдау жасау, оңтайлы шешім қабылдау, белсенділік пен мінез-құлқын реттеуге бағыт-бағдар алатыны көрініс тапты.

Түйін сөздер: ойлау, сыни ойлау, логика, пайымдау біліктілігі, ойды түсіну, өзгерту, дәлелдеме, позитивті ойлау, когнитивті дағды, аргументация, талдау, логикалық шешім.

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Психологическое соотношение логики учащихся и умений рассуждать в контексте критического мышления

В данной статье на материале изучения теоретико-методологических основ рассмотрена одна из актуальных на сегодняшний день проблема психологического соотношения логики учащихся и умения рассуждать в контексте критического мышления. На основе анализа философской, психолого-педагогической научной литературы авторами дано определение понятиям – «мышление», «критическое мышление», «логика», «умения рассуждать», «психологические соотношения логики учащихся и умения рассуждать в контексте критического мышления».

В ходе исследования на основе выявленных методологических подходов как синергетического, мотивационного, когнитивного осмысления была разработана структура психологического соотношения логики и умений рассуждать учащихся в контексте критического мышления, определена готовность к критическому размышлению личности, подвергая текст пониманию, изменению, проверке и доказательству мысли, когнитивным навыкам и умениям рассуждать, мышлению и общению, приведенным в формате логического решения и тождеств, изображена интегрированная схема понятий, данных в исследовании.

Авторы статьи отмечают, что выявленные теоретико-методологические основы исследования привели к определенным результатам опытно-экспериментальной работы посредством диагностирования уровня психологического соотношения логики учащихся и умений рассуждать, когда применяемые методики позволяют повысить уровни аргументирования и рассуждения, интегрируя стремление учащихся к успешному получению знаний. Такие результаты содействуют принятию оптимальных решений, регулированию своих действий и поведению в процессе вступления в общение, которые находят отражение в самовыражении, аргументации, анализе и самосовершенствовании.

Ключевые слова: критическое мышление, логика, рассуждение квалификация, психологическое соотношение, когнитивные навыки, аргументация, анализ, логическое решение.

Introduction

Critical thinking is a special activity in the 21st century that contributes to the formation of special qualities that allow for independent learning while increasing cognitive activity. The Council of Europe has revealed a set of competencies that the younger generation should acquire. One of these groups focuses on the information that includes students' «development of critical thinking methods». In the world education system, the need to form a competitive person who can think independently, analyze current issues and make optimal decisions while expressing a critical point of view is becoming one of the urgent issues.

The requirements for personal competences in the «Pedagog» standard of the Republic of Kazakhstan, adopted on December 15, 2022: support personal growth of students, creating a personal development trajectory; communication, preparation for self-development, emotional balance, resistance to stress, and the development of initiative by forming initiatives (The Teacher's Standard, 2022).

President of Kazakhstan Kassym-Zhomart Tokayev in his report entitled “New Kazakhstan is the implementation of new ideas of intellectual youth and the advancement of new technological processes in the country “ at the parliament meeting of the Republic of Kazakhstan on January 11, 2023: “New Kazakhstan” is public institutions and non-

governmental organizations in the creation of a civil society. implement bold initiatives of organizations, wisely solve social and resource problems, significantly increase the welfare of the country, support new ideas of intellectual youth and promote new technological processes in the country!” (Education Development Program, 2023).

In the educational system, it is not enough to form only one competence in the student. That is, the following metacompetencies based on the formation of mental activity of the student: collective intelligence, empathy, intelligence, etc. there is a need for development. In 2010, the American Management Association confirmed the relevance of the concept of 4K in educational standards. Entering the global education system, the main task is to form 4K qualities: communication, cooperation, teamwork, creativity, critical thinking in the student (Jumanova, 2020).

The 4K skill development program is clearly described in Chapter 2 of the National Education and Training Program of the Republic of Kazakhstan and shown as mandatory competencies aimed at formation:

- to be a person in accordance with the high demands of modern society;
- the need to develop critical, creative and positive thinking;
- formation of self-education and personal self-development skills in the process of development;
- formation and development of self-realization and interaction skills in the social environment, etc. (Educational standard of the RK, 2018).

Continuity of topic selection and purpose and objectives

The program of education development in the Republic of Kazakhstan for 2023-2029 mentions the need to actualize the value aspect of the content of professional education of students from traditional training programs, to develop global competencies, emotional intelligence, and critical thinking in educational programs.

Therefore, today, in the process of rapid change in the education system and its constant integration with new information, in the context of critical thinking in the development and formation of the personality, the logic and logic of students put forward the problem of studying the psychological aspects of reasoning skills.

The purpose of the study : to study the psychological relationship of logic and reasoning skills of students in the context of critical thinking from a theoretical and methodological point of view.

Form of research: psychological process of students’ logic and reasoning skills in the context of critical thinking

Research subject: psychological relationships of students’ logic and reasoning skills based on critical thinking

Objectives of the research:

1. Theoretical and methodological justification of psychological aspects of students’ logic and reasoning skills in the context of critical thinking.

2. Defining the concepts of “thinking”, “critical thinking”, “logic”, “reasoning skills”, “psychological relations of students’ logic and reasoning skills based on critical thinking “.

3. To describe the content of the psychological structure of students’ logic and reasoning skills through critical thinking during the learning process.

4. Diagnosis of the psychological relationship of the student’s logic and reasoning skills in the context of critical thinking.

Literature review

Aristotle’s philosophy became the basis of the idea that reveals the meaning and importance of “thinking”. A medieval philosopher who follows his opinion. Canterbury suggests “critical thinking” as a way to measure the truth of knowledge. A representative of the renaissance who continues this idea P.Pomponazzi describes the concept of analysis, which belongs to the components of “critical thinking”, with the concept of mind (Mareeva, 2006:148) (Figure 1).

The above-mentioned words “critical thinking”, “mind”, “thought”, “thinking” of the first philosophers are proof that they determine the characteristics of perception, analysis and comparison of concepts in the human mind and knowledge of truth and science.

Critical thinking is a product of the historical development of society and as a special form of human activity, we consider the concepts given in the sciences of psychology, pedagogy, and sociology as a basis.

Considering its psychological aspects, many famous psychologists J. Piaget, J. Bruner, We analyze the works of L.S. Vygotsky, S.L. Rubinstein.

The first L. Paul “...critical thinking is about improving your thinking when you think about two crucial things: critical thinking is about self-improvement; This improvement comes with the skills of applying assessment standards to correct the thinking process (Paul,2006:68).

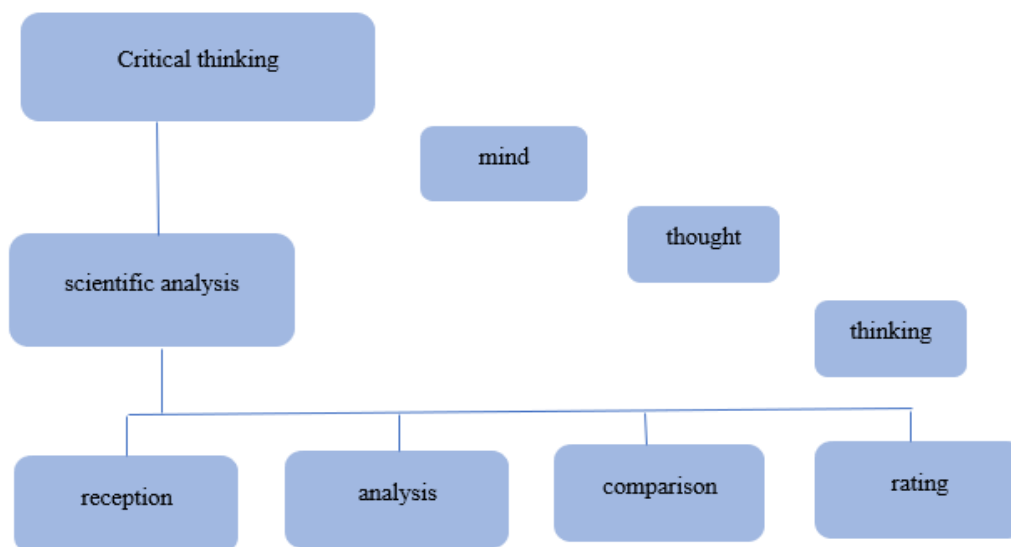


Figure 1 – Philosophical concepts of “Thinking”, “Critical thinking”

Halpern's definition of the concept of critical thinking in his scientific work reveals the nature of critical thinking, considers it from the perspective of “teaching to think” and “learning to think”, and offers to select the most effective methods for forming critical thinking activity (Halpern, 1987:76). According to him, It makes the rationale that critical thinking activities should be used to recognize rhetorical structures in argumentation.

The following group of researchers summarizes the concept of critical thinking as follows:

- to prove one's own thinking;
- awakening the act of motivation,
- checking judgment skills,
- evidence analysis, design, justification (Halpern, 1990: 108).

Zh. Barell said that the development of “critical thinking” contributes to the formation of the following qualities in a student: “... expressing different points of view, showing tolerance, controlling one's own impulsiveness in the search for a solution to a given problem; priority is given to listening to other ideas (Kopylova, 2001:26).

We group the definitions given to the concept of “critical thinking” by domestic scientists as follows:

- critical thinking is a logical, analytical, reflective, evaluative type of thinking based on one's own experience, independent, proven by various factors (Tashetov, 2017:171);
- critical thinking – the ability to receive new information, various events and real data, analyze it, design one's own solution (Sultanbek, 2021);

- critical thinking – the student's activity based on the knowledge, skills, and abilities acquired, the ability to research in the analysis of scientific judgments, the search for the optimal solution to the problem put forward by receiving educational information in the teaching process (Iskakova, 2018).

According to the object of the research, along with the concept of “critical thinking”, there is a need to clarify the meaning of the concepts of “judgment skills” and “logic”. If so, psychological law is able to explain the phenomenon that results through its own judgment and logic in explaining the new concepts in order to show the relationship between various phenomena and processes in action. For that, it is necessary to have research activity, scientific thinking style in the student's mind. First, if we take a deeper look at the meaning of the concept of “logic”, in Greek philosophy mind, consciousness, cognition, ability, Imagination is given as mind and “logic” (the logic of the case, logical absence) and to think about science (Antiseri, 2003:346). So think logic – we come to the idea of expressing one's opinion through a true representation of the concept of the objective world as a special type of mental activity. In logic, thought determines its path: if explaining a certain concept student think and come to a conclusion, there he is it can be seen that he did something. After all, he used to quote of proof structure, type and type, can identify the elements and show their own reasoning skills.

Based on the conclusions given by philosophers, pedagogues and psychologists in the above scientific works, we tried to explain the concepts

of “critical thinking”, “logic”, “judgment skills” in the following way. That is, critical thinking is the process of controlling the student’s ability to listen to educational information and propose a new idea through his own point of view and rational thinking, providing evidence, and cognitive skills. “Logic is an attempt to explain the relationship of various phenomena and processes through the mind of a person in such a way that his own true views and conclusions can be explained to new concepts.” “Qualification of reasoning is a student’s ability to understand the objective world through his own activity and independence, to show behavior and to express a thorough conclusion.” These definitions were the basis for revealing the main idea of our research. That is, “the psychological relationship between the logic and reasoning skills of students in the context of critical thinking” means the ability of the student to understand educational information in the teaching process, to effectively apply methods of self-evidence analysis to it, and to make true logical conclusions based on the ability to demonstrate impulsivity.

The act of critical thinking is the mind of a person of development base. In the learning process, the psychological relationship of students’ logic and reasoning skills in the context of student’s critical thinking is determined to some extent by the object of knowledge.

Materials and methods

In search of a solution to the tasks put forward by the research work, first of all, in defining the theoretical-methodological foundations of the psychological relationship between logic and reasoning skills of students in the context of critical thinking, we considered the methodological bases considered in our previously published scientific works in the following direction: synergistic; motivational; cognitive.

Revealing the psychological aspects of the synergistic platform, scientists P. Anokhina, E. Knyazev, S. Kurdyumova, N. Moiseeva, D. Mehtontseva, Kazakh scientists Z.Zh. Zhanabaev, M.S. Karakulova according to the proposal, the only feature is that it contributes to the search for a solution to some psychological situations. At the same time, it is in harmony that causes to distinguish complex systems related to fundamental research, to promote one’s ideas in the social environment. Based on the synergistic basis, the teacher provides guidance in the teaching process by offering an algorithm of ac-

tions that requires a certain critical decision, and the optimal solution by focusing the student’s current activity on the important principles of logic and reasoning, interaction and mutual support, providing evidence, independent thinking the main conclusion is realized by acceptance. The problem necessary for our research is solved by this situation, that is, the student is directed to personal creative activity through critical thinking, it allows the development of the mindset and the realization of mutual relations between learners (Molbassynova, 2023:45).

The motivational framework directs the individual to actual action as a process of changing his state and relationship. Motives act on the interconnection of needs and interests, aspirations and emotions, views and ideals. V.A. Solovyova examines the relationship between the renewal of motivations in action and the psychological conditions, for example, the success of critical thinking activities, the relationship between the dynamic and content components of logic and reasoning skills. He studied the mechanisms of the positive motives of the person in his actions and considered the relationship of individuality in solving problems (Solovyeva, 2008:59). Motivation, as the main personal psychological characteristic of a person, is a property that is an intermediate link between the activity of the human mind and natural connection in the system of social relations.

The cognitive base perceives the person as an “understander, analyst”. In the context of research, the direction of critical thinking through a cognitive platform is considered as a component of logic and reasoning skills. Two large groups of theories can be distinguished: “I” theories (A. Combs, K. Rogers) and theories that consider cognition as a component of emotion (S. Schechter, M. Arnold). The more the cognition is connected to the self-image, the more emotions are involved, as opposed to the self-theory. The second group of theories describes man as a rational being. Therefore, a person lives in a world of information that can be understood, evaluated, and used. A person’s action consists of three components : the action itself, thoughts, reflected in the ability to make a conclusion during the performance of a certain action (Bobkova, 2016:8).

This set of methodological foundations is recognized as a special phenomenon of the mental activity of an individual in clarifying the psychological relationship of students’ logic and reasoning skills in the context of critical thinking. It is a complex process that is not limited to a certain set of the student’s psychological nature, his logic of thinking

and reasoning skills in order to reveal this phenomenon widely.

The general concept of "critical thinking" is defined in many scientific literature. If we notice, for the first time philosophical concepts are used as the relationship between "mind", "thought", "thinking" and existence. In addition, "critical thinking" is accepted within the framework of comparison and evaluation of different concepts that act as an object of study.

Critical thinking is a widely discussed concept that requires the formulation of interrelated questions. Critical thinking is a concept that should be taught within individual disciplines, connecting skill sets developed in informal logic with philosophical considerations (Robinson, 2011:279). While the following studies described critical thinking as a dispute between "universalists" and "particularists" (Davies, 2013:530), Robert Ennis described critical thinking skills as accumulated 'abilities' and 'predispositions' (Ennis, 1987:12). John McPeck, on the other hand, recognized that critical thinking is a concept that can never be applied in a general sense, but to be effective, one must always focus on the "particular" (Giselsson, 2020).

Critical thinking, highlighted by D. Kluster, according to which it is:

- independent thinking (formulation of one's ideas and beliefs independently of others);
- thinking in which information is the starting point, not the end point (knowledge creates motivation, without which one cannot think critically);
- thinking that begins with asking questions and clarifying problems that need to be solved;
- thinking based on the pursuit of convincing arguments;
- social thinking (every thought is tested and honed when it is shared with others) (Kluster, 2005)

The opinion of the great philosopher Socrates, who gave the concept of "thinking" as the essence of achieving reality, has no doubt lost its relevance even today (Vodolazov, 2005: 134).

Critical thinking consists of a series of cognitive skills that increase the probability of success in education, profession and daily life issues (Franco, 2017). Development and establishment of these cognitive skills take a long time, and education plays a significant role in this process. For this reason, critical thinking is at the center of higher education today, and the development of critical thinking skills is considered one of the primary goals of higher education (Boonsathirakul et. al., 2021; Li, 2021;

Moore, 2013; Tsvetkova, 2018; Wilson, 2016). Academics consider the development of critical thinking skills a criterion of being gifted, which has psychophysiological grounds, thus, critical thinking level is accepted as an indicator of learning quality (Gilmanshina et. al., 2021). Furthermore, Bagheri and Nowrozi argue that professors and students must improve their critical thinking skills so that they can make a reasonable decision on any event. It is generally accepted that 21st century business world needs human resources with critical thinking skills (AlJaafi et. al., 2019). To this end, it is of paramount importance for academics to raise students with critical thinking skills (Silviariza et. al., 2021).

Results and discussion

As a result of the review of scientific theoretical literature, the main problem of critical thinking is the lack of methodologies and reliable methods to study this phenomenon. Thus, the problems that have arisen allowed to study various ways of forming the psychological aspects of reasoning skills and logic of students in the context of critical thinking, and to effectively organize the experimental process. Our main task is to create an environment that not only receives information, but also provides independent learning, makes decisions, and learns the methods of developing thinking, while developing critical thinking skills of students. Approaches aimed at developing critical thinking aim to achieve their goals by increasing students' cognitive activity and forming their creative skills.

Therefore, as a result of the theories of the psychological science of critical thinking that we considered, its scientific-practical basis opened up opportunities to describe the structure of students' reasoning ability and logic as follows (Figure 2).

Thus, through the cognitive process shown in the picture, the student is able to see and hear the real world, to make a correct judgment in acquiring new successful knowledge, to present evidence, to evaluate his own logic and reasoning skills. First of all, this student is special ability that we recognize, secondly, to the middle adaptation knowledge in the case of getting creativity process We accept that, thirdly, the student's thinking logic develops, fourthly, he gets into the relationship of making logical conclusions in his learning environment, and as a result, the psychological relationship of mind, logic of critical thinking and reasoning skills is formed to a person. the rotation process takes place.

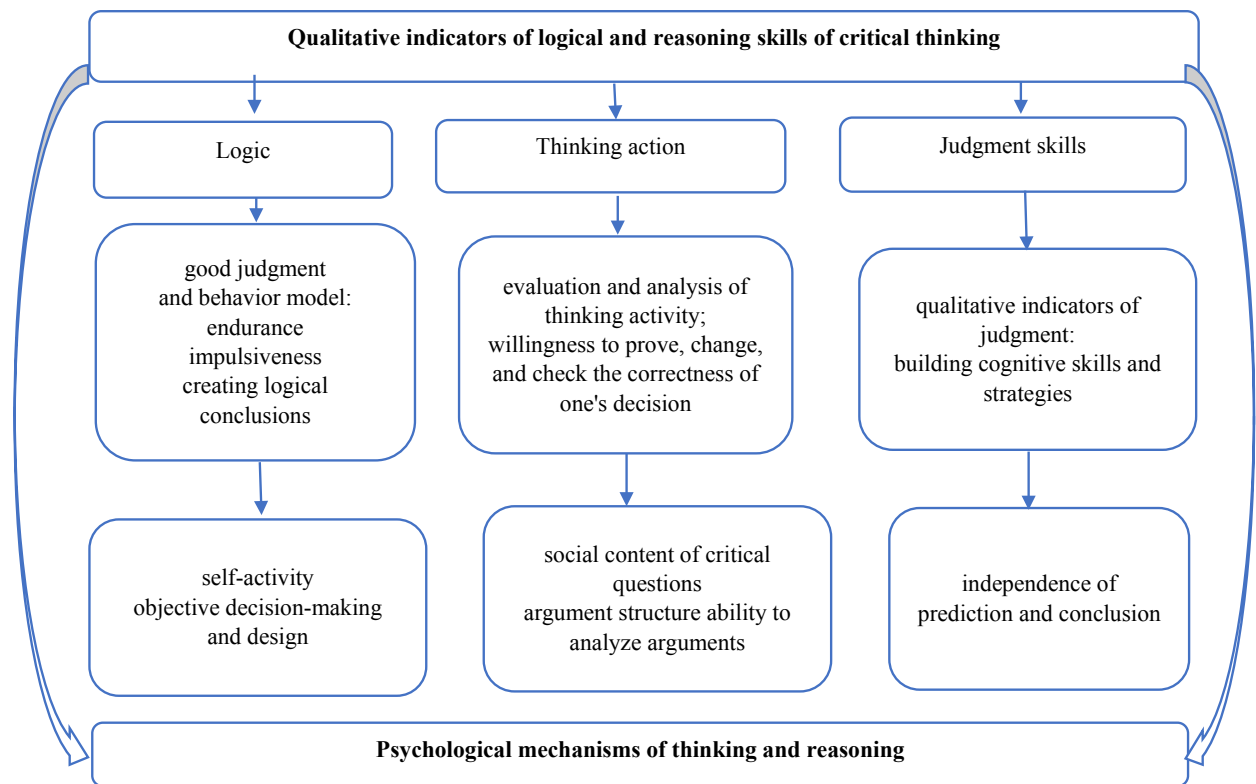


Figure 2 – Students’ logic and reasoning in the context of critical thinking psychological structure of qualification

Structures, picture content, in the context of critical thinking, were the basis for selecting the following methods for monitoring, evaluating, and determining the level of students’ reasoning skills and logic.

The purpose of the practical experiment: to determine the level of logical structure and development of reasoning skills of students in the context of critical thinking.

According to the research, a scientific-practical project is being planned in Alikhan Bukeikhan school, T. Ryskulov district, Zhambyl village, on the topic “Psychological-pedagogical foundations of developing students’ critical thinking and emotional intelligence in rural school conditions” in the 2022-2024 school years. 102 students of the named school participated in the research site.

During the determination phase of the practical experiment, diagnostic work was carried out on logical and reasoning levels in the context of critical thinking of 8th-9th graders. The following methods and methodologies were selected for the investigation: “Thinking Type” methodology for determining the type of thinking in students, “Starkey’s Criti-

cal Thinking Test” methodology for determining the aspects of critical thinking, “Zigzag” author’s methodology.

In the course of the practical experiment, we determined the types of thinking of 8-9th graders using the “Thinking Type” methodology. According to this methodology, students were given a questionnaire consisting of 40 questions. Respondents put “+” or “-” signs next to each question. The responses received were categorized as shown in the following table (Table 1).

Table 1 – Characteristics of the “Types of Thinking” methodology

No	Types of thinking in students	Questions
1	Material-active	1 6 11 16 21 26 31 36
2	Abstract-symbolic	2 7 12 17 22 27 32 37
3	Vocabulary is logical	3 8 13 18 23 28 33 38
4	Material – figurative	4 9 14 19 24 29 34 39
5	creative	5 10 15 20 25 30 35 40

The results of the survey were calculated by taking into account the answer signs (+ or -), the sum of points on each scale. We noticed that the higher the number of points, the clearer the student's type of thinking (Table 2)

Indicators of the levels of types of thinking show that through critical thinking students will be able to comprehensively develop their logic and reasoning skills.

In the course of the practical experiment, we determined the level of critical thinking of 8-9

graders using the «Starkey's Critical Thinking Test» methodology. The remote test consists of 27 questions, the results of the conducted test show that teenagers need to develop critical thinking levels (Figure 3-4).

During the study, we found that there was no significant statistical difference between experimental and control groups in the level of development of critical thinking of teenagers according to Starkey's critical thinking test.

Table 2 – Level indicators of students' thinking types according to the "Thinking type" methodology

No	Scales	Average scores			Down	Medium	Up
		0-2 points	3-5 points	Points higher than 6-8	0-2 points	3-5 points	6-8 points
					%	%	%
1	material-active	6	12	18	50.8	35.8	13.4
2	abstract-symbolic	7	8	14	37.4	46.2	16.4
3	vocabulary is logical	5	9	15	43.3	35.8	20.9
4	physical and figurative	6	13	16	47.8	34.3	17.9
5	creative	5	11	15	35.8	38.8	25.4

CRITICAL THINKING LEVELS

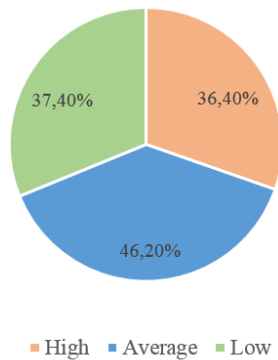


Figure 3 - Ex. critical thinking of the group levels

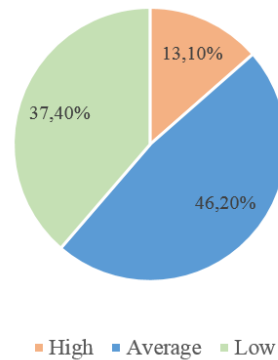


Figure 4 - Media. critical thinking of the group levels

In the course of the formative experiment, 8-9th graders were guided by the program of psychological exercises called «Open Question Area» for the development of logic and reasoning skills in the context of critical thinking, a collection of texts called «Reasoning Design» (making judgments based on a series of confused logical questions), debates, open questions field, essay, presentation, test tasks were compiled and work was carried out.

In the course of the research, in the final and control stages, while working with the collection of texts entitled «Design of Reasoning», the given tasks were described according to the table below (Table 3).

The study of the logical and reasoning skills of adolescents in the context of critical thinking according to the levels shown in Table 3 gave the following percentage indicators (Table 4).

Table 3 – Levels of logic and reasoning skills in critical thinking

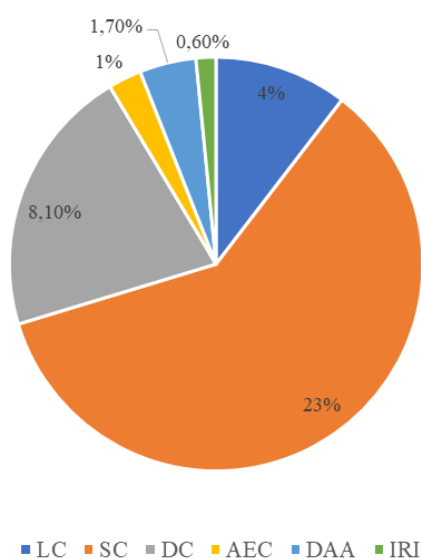
No	Logic and reasoning skill levels	Tasks
1	Ability to create logical concepts, justifying their answers	Text 2-4
2	The ability to make sequential conclusions	5-6 texts
3	The ability to analyze the causes of phenomena and draw conclusions	1,7,8 text
4	Ability to analyze and evaluate the content of texts	Text 9-12
5	Ability to identify errors due to uncertainty and ambiguity of expressions and terms	Text 13-14
6	Ability to identify relevant (important) information in excess background	Text 15

Table 4 – logic and reasoning as a percentage of the qualification levels

Logic and reasoning skill levels		LC	SC	DC	AEK	DAA	IRI
Scores for logic and reasoning proficiency levels	8th grade students	3.23 37.2%	6.72 57%	2.01 35.1%	6.60 54.8%	1,2 2%	1.1 2.2%
	9th grade students	4.21 41.2 %	9.98 95%	3.41 43.2%	6.82 55.8%	2.5 3.7%	1.8 2.8%
Maximum score		10 points	11 points	7 points	12 points	4 points	3 points

As we can see from the results of the given table, it is possible to observe different percentage indicators of logic and reasoning skill levels in the context of critical thinking of teenagers by performing text tasks. Students of 8-9th grade performed these tasks without any worries during the lesson. Logical abilities of 9th graders in text analysis are 4% higher than 8th graders; 38% abil-

ity to draw sequential conclusions, 8.1 % ability to analyze the causes of phenomena and draw conclusions, 1 % ability to analyze and evaluate the content of texts , 1.7% ability to identify errors due to uncertainty and ambiguity of expressions and terms, redundant background the ability to identify relevant (important) information gives percentage indicators of 0.6% (Figure 5).

**Figure 5** – Logic and reasoning in the context of critical thinking of adolescents qualification level indicator

We realized that these indicators showed optimal high results by continuously working with the proposed methods.

In the context of critical thinking of adolescents, the increase of logical and reasoning skills, psychological development and formation, the student reveals the secrets of the objective world, realistically portrays it in his mind, offers correct judgments and proofs while learning new successful knowledge, and is used to evaluate his own actions from a logical and critical point of view. Adaptation in the process of recognizing these qualities knowledge in the case of getting creativity created an active learning environment in the process, it allowed to show that the logic of critical thinking and reasoning skills formed the basis of being a person who formed a psychological relationship.

Conclusion

We studied the theoretical and methodological foundations of the psychological relationship of forming logical and reasoning skills in the context of students' critical thinking. Methodological foundations were described as synergistic, motivational,

cognitive, and their importance and meaning were revealed.

During the research, the psychological aspects of students' logic and reasoning skills in the context of critical thinking were theoretically and methodologically grounded. Concepts of "thinking", "critical thinking", "logic", "reasoning skills", "psychological relations of students' logic and reasoning skills based on critical thinking" were defined and analyzed. In the educational process, the content of the psychological structure of logic and reasoning ability of students through critical thinking was described and the structure determined by drawing was presented.

In order to prove the correctness of the studied theoretical teachings and the proposed structure, experimental work was carried out, and the models of diagnosing the psychological relationship of the student's logic and reasoning skills in the context of critical thinking and its results through mathematical statistical processing were clearly shown. That is, the level of students' critical thinking logic and judgment has increased, their ability to analyze the context, to express their own thoughts has been formed, and the models of providing evidence and determining their true nature have acquired a new character.

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