



Problems of Development of Critical Thinking in Students in the Information Society

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The rapid development of information technologies has given us unlimited access to all kinds of information. Effectively processing and using this information requires skills in selecting, evaluating, interpreting, learning, and applying it. This requires development of critical thinking, which is precisely directed on forming the skills listed above.

Development of critical thinking in students is one of the most important pedagogical tasks of our time. In modern Ukrainian and foreign pedagogy, a lot of attention is paid to the problem of development of critical thinking [1–7].

Future specialists, on the one hand, are obligated to consolidate traditions and experience accumulated by professionals, and on the other, they must be able to critically understand the surrounding reality and the latest information, especially that related to their professional activities. Mastering critical thinking skills prepares young people not only for practical work but also for life in general, helping them adapt to a rapidly changing reality, develop their own abilities, and improve their qualifications.

Development of critical thinking skills is essential for students of all disciplines, as it helps them quickly navigate the ever-increasing flow of information, comprehend, and correctly apply the information they receive. This facilitates professional growth, effective decision-making, idea generation, and creation of new technologies.

Educators often encounter students who cannot clearly formulate their thoughts, do not know how to make decisions, and are unable to find what they need in a vast information flow. This occurs in a conditions where it is impossible to immediately acquire a lifetime of professional knowledge during education. Future professionals need to continually learn throughout their careers, as the pace of technological development accelerates, making continuous professional development essential.

The European Commission has included development of critical thinking skills in its list of essential competencies for the 21st century in education, work, and civil society [8].

R. Paul and L. Elder, popular theorists of critical thinking from the United States, defined critical thinking as follows: “Critical thinking is the art of analyzing and evaluating thinking with a view to improving it” [9, p. 2].

Critical thinking must be purposefully developed in the educational process, as it is an essential characteristic of a modern professional. It enables students to master various strategies for working with information, seek solutions to problematic situations, notice contradictions and gaps in information, analyze diverse sources, and evaluate their own position.

To develop critical thinking, it’s essential to understand how people apprehend information. Cognitive science studies the



processes of assimilation and interpretation of information. Cognitive science joins scientific fields that study human mind and thinking, as well as mental processes and states. Information is processed by human consciousness for the purpose of storage and subsequent use. Information is not tied to a specific individual. However, everyone has their own potential for transforming it into knowledge, depending on their level of experience, education, and abilities. Information is processed through acts of thought. Knowledge, as a result of thinking, is organized by the consciousness and stored in memory. The consciousness processes not only knowledge but also opinions, assessments, and beliefs. It forms more or less integral picture of the world, which determines human behavior.

Forming knowledge about the world is a very complex and multi-stage process of processing incoming experience. Initial information about events in the external world reaches the human senses. It is processed by the mind and transmitted to consciousness as a mental interpretation, which forms a belief about the external world. Belief is subjective knowledge. Different people can have different beliefs about the same event.

Nowadays a large number of cognitive distortion, or system errors in thinking are described by scientists. To detect them, a person must at least be aware of their existence. Therefore, it would be advisable to introduce first-year students to the fundamentals of cognitive science — that is, human perception and processing of information — and they have to become familiar with common cognitive distortions, specifically with the goal of development of self-control skills when processing incoming information. Teaching experience shows that students rarely analyze how they think and make decisions. They need to acquire reflective skills. A critical thinking course early in their university studies would help develop these skills.

This would lay the foundation for critical thinking, and professional knowledge

acquired in the future would shape the skills for its application. Critical thinking depends on individual characteristics, and it is developed as the person acquires skills.

The main characteristic of critical thinking is the ability to reasonably refute flawed evidence and control the correctness of own judgments. It is generally accepted that the stages of information interpretation include: 1) initial comprehension, hypotheses, and data synthesis; 2) correlation and comparison with existing knowledge; 3) synthesis of the first and second stages for doubt, criticism, and conclusions. Critical thinking involves reflective thinking, in which a person evaluates several statements and, after understanding, reaches a conclusion.

Effective learning requires student participation. However, traditional teaching and learning methods fail to encourage students to apply critical thinking in their learning. More often in learning process lectures predominate, imparting knowledge for students to understand and memorize without discussion or analysis. Furthermore, lecturers are rigidly bound by the need to complete the curriculum and subject syllabus. For this same reason, group classes lack the opportunity to offer students differentiated assignments adapted to their different levels. This reduces motivation to learn, as strong students easily complete these assignments and desire to gain more knowledge and skills, while weaker students struggle to complete them adequately and lose confidence. Under current conditions, it would be appropriate to use differentiated assignments, at least for students' independent work, allowing each student to complete the assignments at their own pace and discuss them with the lecturer during consultations. This would ensure feedback between instructor and student.

Furthermore, educational institutions most often use tests for knowledge acquisition. These tests don't require thinking, but rather simply choosing (and sometimes guessing) the correct answer based on what

the student has memorized. This form of assessment focuses on correct answers, not reasoning and analysis. It doesn't stimulate the development of critical thinking in students, doesn't give them the opportunity to rethink and discuss their mistakes with the lecturer, and doesn't allow lecturers to assess students' ability to reason, analyze, and find the right answers, rather than simply memorize them. Tests and exams are often focused on the correct answer and encourage rote memorization rather than analysis and reasoning.

Researches of Ukrainian and international scholars demonstrate that only dynamic student engagement in learning process can change this situation. To achieve this, students must be encouraged to be active and participate in classes so they would feel motivated and actively engaged in the learning process. This is often hampered by authoritarian teaching practice that prevents students from arguing with the instructor. After all, discussion is not a conflict, but a way of learning [1, 4, 10, 11].

Iwould like to specifically address the use of computer technology in education. It expands access to educational resources, creates new pedagogical models, enables distance learning, and helps improve the quality of learning, individualization, and interactivity. Computer technology is now becoming a key component of the modern educational environment. Digital resources enhance clarity, allowing students to explore complex processes in a simulated environment, utilize electronic learning materials, and utilize distance learning platforms. This ensures learning flexibility, allows learning to take place anywhere, and expands the available educational space. A recent achievement is artificial intelligence, which helps both teachers and students perform routine tasks and can improve the effectiveness of the educational process.

However, use of computer technology and artificial intelligence also has negative aspects, leading to a weakened critical approach to information. Students often de-

velop the illusion that the information they found online is true. They lose the need to information analysis, verification reliability of its sources, and recognition of pseudoscientific content and false information. This leads to a superficial understanding of the material and a reduced ability to independent reasoning. Students become information consumers rather than researchers. This superficial consumption of information leads to fragmented perception, meaning information is perceived not as a whole, but in fragments, without deep connections between them. Now this phenomenon is widespread among young people and is known as clip thinking. For future professional work and life in civil society, students need to develop systemic knowledge.

Computer technologies and artificial intelligence are advancing rapidly. Traditional teaching methods are failing to adapt to digital age. Some students are already using them to complete assignments unfairly. University professors are familiar with such phenomena as students copying texts without understanding them, attempting claim AI-generated text as own independent work, and other methods of completing assignments without bothering to find the correct solutions.

Artificial intelligence and search engines are excellent tools for finding information, but students must learn to critically evaluate it, make independent decisions, and be able to justify their positions. In today's world, the increasing volume and speed of information requires university graduates to be able to filter, compare, verify, and resist manipulation and disinformation, all of which are essential for professional adaptability and lifelong learning. All this confirms the pedagogical relevance of development critical thinking, which is an important tool for shaping students' scientific worldviews and academic independence. In Ukraine, as in the EU, this competency is included in the list of key competencies for lifelong learning: "Formal education and training should equip everyone with a broad range of skills which opens doors to personal ful-

filment and development, social inclusion, active citizenship and employment. These include literacy, numeracy, science and foreign languages, as well as transversal skills and key competences such as digital competences, entrepreneurship, critical thinking, problem solving or learning to learn, and financial literacy” [8, p. 5].

The most widespread and frequently cited by Ukrainian and foreign authors is technology for development of critical thinking which was developed by famous American educators Charles Temple, Jeannie L. Steele and Kurtis S. Meredith. They are known for their work on organizing the learning process and teaching strategies that help students analyze, synthesize, and evaluate information. The technology was developed as part of the international educational project “Reading and Writing for Critical Thinking, RWCT” at the end of the last century. The project was sponsored by the Open Society Institute (now it’s the Open Society Foundations) by George Soros. Within the framework of this project that they developed and disseminated their famous three-phase methodology: 1) evocation — arousing interest, updating existing knowledge, asking questions; 2) realization of meaning — searching for new information, actively working with it, analyzing, comparing; 3) reflection — evaluating of received information and its reliability, discussing, forming one’s own conclusion, generalizing and applying the acquired knowledge in various fields of activity. The authors of the methodology characterize these phases as follows: “Evocation a phase in a lesson in which students are asked to think about what they already know about a topic, to raise questions about the topic, and to set purposes for learning. Realization of meaning a phase in a lesson in which students inquire and search for knowledge, and, as a result of their activity construct or realize meaning. Reflection a phase in a lesson in which students look back over the ideas they have encountered and the meaning they have realized, and ques-

tion, interpret, apply, debate, challenge, and extend that meaning to new areas of endeavor” [11, p. 44].

This pedagogical technology has already been adapted and applied in many countries. It aims to develop students’ independent thinking, the ability to ask questions, seek cause-and-effect relationships, evaluate information, and argue their point of view. This technology is implemented through active and interactive teaching methods, which involve students in active learning and cognitive activities during class. Active methods encourage students to be active throughout the learning process, while the teacher encourages this activity and sets tasks. Interactive methods are more advanced forms of active methods and are based on dialog learning and extensive interaction: students interact not only with the teacher but also with each other. The teacher is not only a source of knowledge; he or she creates an environment for expression, questions, dialogue, and discussion, thereby encouraging students to reflect and develop critical thinking.

Thus, the competence-activity approach to education enables development of critical thinking in action, where students not only get knowledge but also apply it for analysis, comparison, argumentation, and evaluation. To achieve this, students must complete a course in critical thinking to gain an understanding of how they perceive information. Elements of critical analysis should then be integrated into the content of professional disciplines. The teacher’s task is to transform the learning process into a space for intellectual growth. In our view, critical thinking should become not just a separate element of the curriculum, but a pervasive principle of the entire educational environment, the result of targeted pedagogical activity. And, of course, critical thinking as a pedagogical goal requires teachers to have a specific professional position, a set of methodological techniques, the ability to evaluate not only the result but also the process of thinking, and to develop stu-

dents' capacity for independent, evidence-based, and responsible thinking.

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Середа Г., Тихонова Л. Проблеми розвитку критичного мислення у студентів в реаліях інформаційного суспільства.

Розглядаються проблеми формування та розвитку критичного мислення у студентів. Показано, що стрімкий розвиток інформаційних технологій призвів до необмеженого доступу всіх верств населення і, перш за все, студентства, до інформації будь-якого роду. Щоб використовувати цю інформацію найбільш ефективно, необхідно розвивати критичне мислення, яке допомагає формуванню таких корисних навичок як відбір, оцінка, інтерпретація та раціональне засвоєння корисної інформації. Автори вважають, що майбутні фахівці повинні не тільки опанувати досвід і традиції професіоналів, а й вміти критично оцінювати та осмислювати навколишню дійсність, нову інформацію, особливо ту, що стосується їхньої професійної діяльності. На думку авторів, оволодіння навичками критичного мислення допоможе студентам і майбутнім фахівцям підготуватися не тільки до професійної діяльності, а й до життя в інформаційному суспільстві, що швидко змінюється.

Наведено аналіз сучасного стану формування критичного мислення в процесі навчання студентів, а також позитивних та негативних сторін використання досягнень комп'ютерних технологій та штучного інтелекту в цій галузі. Зазначається, що штучний інтелект та різні пошукові системи є сучасним та зручним інструментом для пошуку інформації, але студентам необхідно навчитися критично цю інформацію осмислювати та аргументовано приймати рішення щодо можливості її використання. Показано, що найбільш просунутою формою навчання студентів є інтерактивні методи, що ґрунтуються на діалоговому підході та широкій взаємодії студентів з викладачем та один з одним.

Ключові слова: інформація; критичне мислення; навчання; штучний інтелект; інтерактивні методи.

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Problems of development of critical thinking in students are considered in this article. It demonstrates that rapid development of information technology has led to unlimited access to information of all kinds for all segments of the population, especially students. To use this information more effectively, it is necessary to develop critical thinking, which helps develop useful skills such as selecting, evaluating, interpreting, and rationally mastering useful information. The authors believe that future specialists should not only master the experience and traditions of professionals but also be able to critically evaluate and comprehend the surrounding reality and the newest information, especially that related to their professional activity. According to the authors, mastering critical thinking skills will help students and future specialists be prepared not only for professional activity but also for life in a rapidly changing information society.

The article analyzes the current state of critical thinking development in student learning, as well as positive and negative aspects of using advances in computer technology and artificial intelligence in this area. It is noted that artificial intelligence and various search engines are modern and convenient tools for finding information, but students need to learn to critically understand this information and make reasoned decisions about its use. It is shown that the most advanced form of student learning is interactive methods, which are based on a dialog approach and extensive interaction between students, lecturers, and each other.

Key words: information; critical thinking; learning; artificial intelligence; interactive methods.