CULTIVATING CRITICAL THINKING IN STUDENT LEARNING: TEACHING STRATEGIES AND EDUCATIONAL METHODS

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Abstract: The digitalisation of modern society necessitates the differentiation between true and false information. Using technologies to develop critical thinking in acquiring a school education is becoming increasingly relevant in this context. Today's educators must teach students to analyse information flows, comparing, evaluating, and synthesising them. The research aims to study the potential of innovative pedagogical approaches and strategies for developing students' critical thinking. The article examines methods and techniques for developing critical thinking in schoolchildren. It has been established that to achieve the stated goal; teachers must effectively combine exploratory, research, problem-solving, and creative approaches and methods in their work process, with the educational process organised in the format seeking solutions to problematic questions. It has been found that modern digital platforms, particularly MozaBook and Coggle, are positioned as practical tools for developing students' critical thinking skills through STREAM technology, which combines the project-based learning method with an integrated approach. It is emphasised that projects are an essential educational tool for forming life competency skills, including self-education. Prospective directions for research development have been identified. The article demonstrates that the contemporary educational environment necessitates a specific focus on advancing critical thinking, identifying strategies for its development, identifying strategies for its development, and exploring and implementing innovative technologies and methodologies.

Keywords: interactive methods, learning approaches, pedagogical concept, digital platforms, inclusive educational environment, teaching foreign languages, institutions of higher education, pedagogical technologies, methods of teaching foreign languages.

1 Introduction

The educational process in schools today involves the implementation of a range of innovative approaches, techniques, and tools that enable the intensification of students' positive motivation towards acquiring new skills, abilities, and knowledge, as well as the basics of analysis, systematisation, and interpretation of information for subsequent application in real-life situations.

The assertion of John Dewey, a prominent American thinker, is of significant and enduring relevance. He posits that the fundamental goal of the modern education system is not the immediate acquisition of knowledge by students but, instead, primarily, the development of skills for critical thinking, which allows for the optimal awareness of the dynamics of circumstances and the formation of a problem-solving strategy. It is evident today that a student who is effective in critical thinking quickly masters various methods of interpretation and assessment of educational information and is capable of structuring it, identifying contradictions, and arguing their vision. The development of students within this concept creates the prerequisites for their future successful implementation in educational and professional activities. In this context, the issue of effectively forming critical thinking skills in the general education environment, within the framework of the inclusive educational environment and New Ukrainian School's establishment, acquires particular relevance.

Educational approaches, strategic conceptual principles, methodology, and specific tools for developing critical thinking skills in the educational environment are described by several scholars, teaching practitioners, and methodologists, including Pometun & Remekh (2020), Siryk et al. (2021), Ruban (2023), Hubina (2017). Numerous publications by contemporary researchers are dedicated to the description of the multifaceted aspects of the process of forming and developing critical thinking skills in teaching, including Saukh (2021), Nikitina (2022), Shkvyr & Yunchyk (2023). The appropriateness of developing critical thinking from the preschool age, with the continual complication of tasks and analysed situations, remains a topic of discussion and needs to be fully resolved.

2 Literature Review

The prerequisites for the successful development of a digital society, with a priority on the information space, are fundamentally based on skills for quick data processing and making constructive decisions. The dilemma of the genesis of critical thinking within the general education environment has been thoroughly investigated in professional, scientific sources. In particular, the issues surrounding the definition of critical thinking and the identification of its essence are analysed in detail in the publications of Zakablukovska & Lupiiko (2023), Huzar & Lionenko (2021).

Researchers such as Latsys (2023), Pometun and Nestor (2020) have focused on developing, optimising, and adapting methodologies for developing critical thinking in educational recipients based on innovative approaches. Scholars such as Djamas and Tinedi (2021) and Setyawan et al. (2020) have concentrated on the implementation of interactive methods and digital technologies within the inclusive educational environment as a means of enhancing students' critical thinking abilities.

Some researchers (Warsah et al., 2021; Putri et al., 2020) have highlighted the potential of digital educational resources in fostering self-education and critical thinking skills within an integrated education system. In contrast, Supriyatno et al. (2020) concentrate their scientific inquiries on the functionality of targeted software tools and their implementation in the educational process in the inclusive educational environment.

It is essential to acknowledge that the scientific interest in the definition of critical thinking has recently undergone a significant evolution, mainly due to the rapid pace of social change, the transformation of educational benchmarks, and the global processes of educational environment integration. In light of the paramount importance of fostering critical thinking skills during the school education process, there is a pressing need for a more comprehensive understanding of theoretical and practical information on the subject matter. This study aims to identify the possibilities of innovative pedagogical approaches and strategies for developing students' critical thinking.

3 Methods that have been applied

Several theoretical research methods were employed to achieve the research goal, including studying the categorical and methodological apparatus, analysis and synthesis, comparison, and generalisation. The phased nature of the research involved analysing the psychological-pedagogical base of scientific works and publications, characterising the potential of methodological approaches in pedagogy regarding the formation of critical thinking, and identifying maximally suitable strategies within the general education environment. Furthermore, the potential of digital platforms and interactive methods for fostering critical thinking skills in students was evaluated.

4 Research results

Critical thinking is a scientific cognitive process that finds expression in the ability to reasonably and objectively analyse information or a situation and evaluate, differentiate, and substantiate its authenticity. Its key components include the ability to differentiate complex problems into more superficial

elements, skills in searching for interconnections between them and the consequentiality of influence, analytics of authenticity and authority of information sources, forming logical conclusions, and justified assumptions regarding the variability of the situation or perception of information. Furthermore, the capacity to analyse one's assumptions by identifying one's weaknesses and strengths, making appropriate adjustments, and generating new approaches, unconventional solutions, and ideas is considered essential.

Critical thinking is vital for identifying manipulations, making effective decisions, and promptly resolving problems. Consequently, the urgency of searching for innovative approaches and tools in the psychological-pedagogical concept regarding its effective formation in school-age is evident.

A synthesis of various conceptual approaches to defining the essential basis of critical thinking reveals that in pedagogical practice, critical thinking is positioned as the antithesis of dogmatic thinking. This identification is based on the understanding that critical thinking is an independent, logical, and creative cognitive process. The specific properties of the outlined type of thinking include individuality and social orientation, which provide the ability to comprehend and substantiate one's position on specific issues. It also includes the capacity to produce new ideas and unconventional solutions, subjecting problems to critical analytics, effectively reinterpreting them, and forecasting potential outcomes. It includes taking actions, analysing actions and forecasting potential outcomes (Djamas & Tinedi, 2021; Setyawan et al., 2020).

Strategic pedagogical approaches to developing critical thinking skills constitute a system of methods, approaches, and techniques aimed at optimising the skills of analysis, synthesis, and evaluation of information to solve specific problems. The goal of the strategy for the advancement of critical thinking is to enable the ability to logically analyse information, comprehend its essence and context, and form justified conclusions. Several psychological-pedagogical concepts for developing critical thinking exist, which can be effectively integrated into the educational process in the general education environment, both as a comprehensive system and individually (Table 1).

Table 1. Effective Strategies for Developing Critical Thinking of Secondary Education Students

Strategy	Features	Example
Open questions	Encourages students to analyse information and draw conclusions	Instead of a clear answer to a problem in the exact sciences, a description of the method of finding it
Interactive games	Motivates students to think and strive for victory and stimulates motivation to master specific knowledge	Interactive exercises, crosswords, and puzzles. Digital platforms MozaBook and Coggle
Problem-based learning	Demonstrating the practical relevance of the problem, brainstorming, evaluating options, weighing pros and cons and making a decision	Inform students about the problem and ask them to collect information helping to reveal its essence and find solutions
Productive debate	Finding relationships between ideas, comparing different points of view, and finding similarities and differences. Disputing one's logic and accepting the arguments of an opponent	Involve students in an active discussion to identify the advantages and disadvantages of each solution to a particular problem and to find the truth
Classifying ideas	Evaluating ideas, selecting the most optimal ones, and exploring the variability of solutions independently	Sort their opinions according to specific criteria (accurate, biased, authoritative; ambiguous, rational)
Learning from failure	Encouraging students to draw constructive and optimistic conclusions from mistakes	Reflect on what factors prevented them from doing a good job and what or who can help them find inspiration
Learning from queries	Activation of students' work and interest, formation of higher-order thinking	At the beginning of each lesson, students formulate questions to be answered by themselves
Collaboration	Fosters independence and initiative, encourages students to learn from each other, look at different points of view, develop and defend their ideas	Allocate some time in the lesson for interpersonal communication between students to exchange opinions on a controversial issue

Source: compiled by the author based on (Ruban, 2023; Latsys, 2023; Supriyatno, et al., 2020).

The active impact of digital technologies on the inclusive educational environment has led to the development of innovative methods for cultivating critical thinking involving modern technologies, digitalisation potential, and artificial intelligence tools. Several resources have been identified as effective means for progressively optimising students' critical thinking. Specifically, these include targeted software such as MozaBook and Coggle (Zakablukovska et al., 2023; Huzar et al., 2021; Latsys, 2023).

Innovative approaches to teaching English within educational programmes in the digital age are the basis for the prospective development of pedagogy and language education. The utilisation of interactive platforms, online resources, mobile applications, and other digital tools can significantly optimise the motivation of learners, develop their communication skills, and facilitate effective and intensive mastery of the English language.

Strategies such as Open questions, Interactive games, Problem-based learning, Productive debate, Classifying ideas, Learning from failure, Learning from queries, and Collaboration create new opportunities for the individualisation of the learning process and for improving the quality of education in mastering English. The use of innovative educational approaches, English teaching methods, and pedagogical technology tools promotes the acquisition of the fundamental concepts of the synergy of fluent English proficiency and communicative competence, the skills of independent acquisition of new knowledge, and the development of personal creative potential in the process of teaching foreign languages in higher education institutions.

MozaBook is a valuable tool for developing critical thinking in secondary education students. The digital educational environment of MozaBook serves as targeted educational software of the Mozaik system, functioning as an auxiliary means for carrying out pedagogical activity. MozaBook synergises the theoretical foundation and practical, interactive toolkit, combining the functions of presentation programs and content-based curriculum work. Furthermore, the software framework enables educators to create their content and students to create digital notebooks. Additionally, the available media library is a promising means for developing critical thinking within the MozaBook environment.

In contrast, Coggle is software that allows the creation of digital mind maps. This resource's practical application involves localising material around a particular definition. The creation of

a mind map is regarded as an effective method for optimising the development of critical thinking, as it allows for the organisation of concepts, ideas, and facts into a logical structure, visually depicting the interconnections between various components of the information field through analysis and synthesis. Furthermore, forming a mind map facilitates the active generation of discoveries, approaches, and ideas for solving a particular issue, expanding the spectrum of alternative solutions. Using a mind map facilitates information visualisation, stimulates creative thinking, develops analytical skills, and improves communication processes in the inclusive educational environment.

Among those engaged in primary education, the new educational technology STREAM, which integrates project-based and interdisciplinary learning approaches, is currently gaining popularity. This approach favours the integration of branches of scientific knowledge into a unified system for study on a common platform (Saukh, 2021; Nikitina, 2022; Shkvyr & Yunchyk, 2023). STREAM represents a comprehensive, holistic, and distinctive educational approach integrating science, technology, reading, engineering, arts, and mathematics. This approach enables learners to apply theoretical knowledge in practical contexts, facilitating conceptual understanding. The organisation of the educational process using STREAM technology allows teachers to test new teaching strategies, alter perspectives, enhance the educational process within the classroom, and diversify extracurricular activities with students. Implementing this technology involves using several critical educational platforms, including Wakelet, Sway, Thinglink, Scratch, LearningApps, and Canva. These platforms allow educators to create student projects and develop materials for presentations. STREAM technology helps educators to foster critical thinking skills in their students.

In order to develop critical thinking skills in students, it is essential to analyse the methodological basis of the priority concepts. Research, heuristic, and problem-solving methods are optimal, allowing students to express their thoughts freely, communicate effectively, and discuss tolerantly. The social orientation of the phenomenon of critical thinking conditions the interconnection between the defined skills. In this context, educators are expected to create a positive psychological environment and facilitate the integration of individual, paired, and group work in the inclusive educational environment (Pometun et al., 2020; Siryk et al., 2021; Ruban, 2023).

Various techniques and methods have been identified that help educators actively develop critical thinking skills in students. These include the lecture method, heuristic conversation, hypothesis formulation and testing, dialogue, discussion, stimulating creative development, and interactive learning. Conferences and seminars also possess the necessary functionality, actively contributing to developing cognitive and research skills and communication culture.

It is also worth noting the potential of the educational game, which, under proper organisation and motivation, actively influences the process of forming critical thinking skills in students. The educational gaming potential should be based on forms of dialogic interaction, characterised by a focus on mastering knowledge, skills, and practical abilities, creating an individual style of behavioural responses and communication, and fostering initiative and independence in solving educational problems of the inclusive educational environment (Saukh, 2021; Nikitina, 2022; Shkvyr & Yunchyk, 2023).

An integrated strategy for forming and developing critical thinking skills in students should provide for the possibility of regular formative assessment of the level of advancement of necessary skills within the specified concept. Students' activation of their thinking and the formation of personal views motivate a more profound realisation. Such an approach constitutes the core of education for developing critical thinking skills. Students develop the capacity to think analytically, apply practical skills

in the learning process, and argue and evaluate information, distinguishing between fact and fiction.

Another crucial condition for the effective development of critical thinking skills in students is the transformation of the educator's stance from seeing oneself as the sole accurate source of information. Following the requirements of the modern educational concept, the teacher should assume a position that encourages students to generate thoughts that differ from their own. The goal of pedagogical activity, in this context, is to enable students to master the skills of effective information processing, with the definition of critical thinking being regarded as an independent, individual formation. The role of the educator is to create an environment in which students can formulate answers deliberately. Furthermore, educators should challenge the stereotypical beliefs surrounding the inclusion of various gadgets in the learning process. The Internet is currently regarded as a convenient and comprehensive source of knowledge, and students must develop the ability to manage the flow of information effectively. It can be achieved in an informationally secure environment like the classroom.

An effective process for developing critical thinking anticipates the student's right to make mistakes. Developing critical thinking skills in general education involves using a logical thought component to identify cause-and-effect relationship violations. In this context, working on mistakes transforms into an analytical process involving experience accumulation. Psychological and pedagogical practice demonstrates that the fear of making a mistake leads to stereotypical thinking, which is the antithesis of critical thinking. The educator should perceive a student's mistake as part of diagnostic research, an opportunity to identify situational difficulties and view errors as an integral component of the educational process. The ability to logically justify one's position, form effective decisions, solve problems productively, and collaborate with others in communicative interaction are considered competencies related to developing critical thinking skills in the general education environment.

Consequently, the educational process at the current stage of the development of the information society should be directed not only towards students mastering a system of scientific truths, facts, and behaviour models. It also entails the development of students' critical thinking qualities that allow them to meticulously differentiate necessary information and use persuasive argumentation based on reliable data and facts. The defined qualities enable precise expression, deeper thinking, logical reasoning, and unbiased judgment.

In recent times, over 200 leading successful companies worldwide, including the Intel Foundation, Microsoft Corporation, Apple, and Ford Motor Company Fund, have developed an integrated list of skills that will be necessary prerequisites for future success. Among these, the primary roles are attributed to adaptability, responsibility, creativity, media literacy, communication and interaction skills, as well as critical and systematic thinking (Warsah et al., 2021; Putri et al., 2020).

In light of the considerations above, it is assumed that students must acquire critical thinking skills early to effectively realise their potential in global digitalisation and integrate the information environment. Such skills will provide the foundation for their ability to solve problems, make and justify decisions, navigate a dynamic information flow, analyse, verify and re-evaluate received information, and establish the truth of statements. Consequently, the contemporary process of developing the general education environment should anticipate integrating traditional and innovative pedagogical approaches to form practical critical thinking skills in students.

5 Discussion

The Boston Center for Ethics and Education scholars developed the fundamental methodology for forming and developing critical thinking skills (Noris & Saputro, 2022). Scientists, educators, and psychologists are analysing the specifics of

implementing this technology into the educational process. These include Pradana et al. (2020) and Noris et al. (2022).

In examining the work of contemporary researchers, it is worth noting the contributions of Ramdani et al. (2021). Furthermore et al. (2023) highlight the vector orientation of pedagogical approaches to developing critical thinking skills, with the education system in the USA and other developed countries serving as an illustrative example. One such vector involves the implementation of a separate targeted course in the educational process, during which students process a set algorithm of thinking and form the corresponding skills to apply it. An alternative approach, proposed by the scholars above, is directed at forming critical thinking skills by transforming the general organisational structure of the educational process, in which informational material is positioned not so much as a source of knowledge but as 'raw material' for the independent 'extraction' of necessary knowledge and skills.

Some scholars (Sinaga & Setiawan, 2022) argue that a practical methodology for developing and enhancing critical thinking should be based on three fundamental principles: the information density of educational material, the social significance of the subject matter, and the communicability, motivation, and scientific nature of the material in the inclusive educational environment. Sinaga and Setiawan (2022) posit that critical thinking is an individual and independent phenomenon, manifesting in discussions, public speeches, and debates. Consequently, the scholars argue that the communicative skills of students play a pivotal role in the success of mastering critical thinking. Sinaga and Setiawan (2022) emphasise that the methodology for developing the skills under investigation creates optimal conditions for students to understand and evaluate facts and regularities, form a conscious choice, model processes, and resolve problems in a situational manner.

The stance of Dykhne et al. (2021) appears to be valid insofar as it is evident that classical pedagogical theory does not envisage an automatic algorithm for ensuring the formation of students' critical thinking skills. However, it does define certain pedagogical preconditions for the efficiency of the process. In their 2022 publication, Aristin and Purnomo identify the need for pedagogical strategies to meet specific demands in the researched direction. According to the researchers, educators must provide opportunities to practice critical thinking skills, allowing students to contemplate and produce various ideas and solutions actively. Furthermore, educators should actively encourage students' active participation in the educational process, stimulating the ability to make effective critical decisions.

The methodology for developing critical thinking skills necessitates meticulous preventative preparation on the part of the teacher, optimal planning, and the effective implementation of program tasks. Modern researchers (Zuniari et al. 2023; Anwar & Setyaningrum, 2021) have established that the algorithm for effectively forming critical thinking in the inclusive educational environment involves a particular phased approach, initiated in 1956 by the U.S. psychologist B. Bloom. The scholars have identified five critical thinking levels: knowledge, understanding, practical application, analysis, synthesis, and evaluation. These levels are based on targeted strategies for progressing critical thinking through interactive technologies and digital resources, which B. Bloom developed.

Contemporary scientists, specifically Maknun (2023), have discovered that theoretical aspects of implementing interactive methods for forming critical thinking in the educational environment presuppose a scientific methodology for making decisions. Scientists analyse a range of exercises that are positioned as favourable for developing all components of B. Bloom's taxonomy. Maknun (2023) concludes that the existing work of pedagogical approaches in the context of strategies for advancing critical thinking in students is of particular importance, with a particular focus on digital platforms. Scholars are convinced that modern software tools represent a unique example of an integrated digital educational environment that synergises diverse instruments and sources of information.

Despite the substantial body of research on developing critical thinking in students, more practical applications of contemporary interactive digital potential in real educational contexts, with subsequent analyses of its effectiveness, still need to be made. This outlined vector forms the perspective for further research.

6 Conclusions

The theoretical analysis of innovative strategies and pedagogical approaches for intensifying the formation of critical thinking skills in students within the educational process has identified the necessity of their formation in the contemporary educational environment through digital capabilities. Moreover, the effectiveness of the process is seen as attainable only if the teacher employs a comprehensive approach that synergises traditional methodology, innovative solutions, and the creation of a conducive psychological environment. In this regard, educators must possess adaptability that is not constrained by dogma, intensifying the process of students mastering critical thinking skills.

The research has established the essence of critical thinking in contemporary actual perception. It lies in the ability to objectively and qualitatively analyse information and form conclusions. The relevance of the investigated definition is explained by the dynamics of learning processes and the global transformation of educational values. The article demonstrates that the contemporary inclusive educational environment necessitates educators' attention to fostering active critical thinking, seeking avenues for advancement, and creating and adapting innovative technologies and methodologies.

To achieve the objective above, teachers must integrate exploratory, problem-solving, and creative approaches and methods throughout the pedagogical process and structure the educational experience as a search for variations in problem-solving. The research revealed that modern digital platforms, such as MozaBook and Coggle, are practical tools for developing critical thinking. Additionally, the STREAM technology, which possesses an integrated approach and project-based learning, is a promising area for further exploration. The research findings indicate that projects are valuable educational tools for encouraging all students in the class and developing life competencies, including self-education skills. It is considered a promising avenue to explore innovative methods for developing critical thinking in students to achieve maximal adaptation to advancing the general education environment in Ukraine in the post-war recovery period.

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