Journal of Innovation in Psychology, Education and Didactics
ISSN: 2247-4579, E-ISSN: 2392-7127
http://www.jiped.ub.ro/
Covered in: EBSCO, CEEOL, ProQuest, ERIH PLUS, DOAJ, Scipio, International Innovative Journal Impact Factor, CiteFactor, EuroPub database, Open Academic Journals Index, ResearchBib, Universal Impact Factor
2025, Volume 29, Issue 1, pages: 53-66, doi:10.29081/JIPED.2025.29.1.04

Opportunities to Stimulate Critical Thinking in Primary Education

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Received: 11 March 2025/ Accepted: 09 April 2025/ Published: 24 April 2025

Abstract

At present, there is a growing focus on the all-rounded emotional and physical development of young learners, ensuring that their intellectual, moral, socio-emotional, and physical development are well aligned and supportive of each other. Considering the sophistication of the cognitive structures and the multitude of issues that the modern world presents, the nurturing of thinking skills, more particularly critical thinking, assumes pivotal importance at this level of education. The ERR model (Evocation, Realisation of Meaning, Reflection) has been increasingly accepted as a productive pedagogical strategy, albeit it is still not fully exploited. In the 2023–2024 academic year, there was a formative and ameliorative psycho-pedagogical micro experiment aimed at determining the existence of direct functional and causal relationships between a set of methodologies centered around ERR and the critical thinking skills of primary school pupils. This sample was targeted with a sample of 10 primary school students from a certain 3rd class of Vasile Alecsandri Secondary School in Vaslui. Primary data were gathered with the assistance of research methods, which included some experimental approaches, along with systematic observation and statistical-mathematical calculation. The data were collected through observation grids during both pre-experimental and post-experimental evaluations. The findings highlighted the impact of ERR-based methodologies—such as the "I Know/I Want to Know/I Learned" strategy, Bunches, Dials, and Lapbooking—across several subjects, including Romanian Language and Literature, Mathematics, Natural Sciences, and Civic Education. The activities implemented during the intervention period significantly contributed to fostering cognitive behaviours that support critical thinking in young learners. The students demonstrated notable improvements in their ability to formulate responses to questions, make informed decisions when addressing problems, substantiate their points of view with well-reasoned arguments, and engage constructively with the perspectives of their peers.

Keywords: cognitive stimulation; critical thinking; evocation, meaning-making, reflection; interactive methods; primary education

How to cite: Nechifor, O.-I., & Cojocariu, V.-M. (2025). Opportunities to Stimulate Critical Thinking in Primary Education. *Journal of Innovation in Psychology, Education and Didactics*, 29(1), 53-66. doi:10.29081/JIPED.2025.29.1.04

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1. Introduction

Thought holds a central position within psycho-pedagogical literature, with numerous scholars offering perspectives on its nature, content, mechanisms, structure, and role within the broader domain of human cognition and psychology. It is often examined concerning other cognitive processes and functions. Thought serves as a guiding force, structuring and optimising all other psychological processes. For instance, perception transforms into observation, namely purposeful, structured, and deliberate perception. Similarly, the communication of information gains coherence, as it becomes subordinated to logical principles. Memory advances to a more sophisticated level through logical memorisation, which extends beyond mere mechanical retention. Moreover, volition benefits from predictive capabilities, allowing for more effective goal-setting, while reasoning and judgment facilitate systematic planning (Neveanu, P. P., 1978). About critical thinking, there are numerous definitions, each reflecting distinct perspectives, contextual analyses, or theoretical points of view of particular authors.

Boda and Mosiello (2005) have identified several recurring definitions within the literature to describe critical thinking: conceptualise critical thinking as the capacity to select, organise, interpret, and evaluate information (Boncori & Laeng, 1995), while others define it as the ability to formulate independent and critical judgments (Marmocchi et al., 2004). Certain perspectives emphasise the skills of questioning, verifying evidence, and considering alternatives. Others describe it in terms of reflective scepticism towards absolute truths (Peck, 1990) or the conscious engagement with diverse and often conflicting points of view.

Critical thinking entails "supporting particular opinions with compelling and rational arguments, rejecting others, doubting to obtain new evidence that may either reinforce or weaken one's beliefs, and subjecting both personal and external ideas to analysis and evaluation" (Dumitriu, I., 2000, p. 25). The core competencies associated with critical thinking typically include: formulating a thesis or problem statement; identifying supporting reasons for a given standpoint; striving for comprehensive knowledge on the subject; utilizing and referencing reliable sources; examining all facets of a given situation while maintaining focus on key elements; considering a range of possible solutions and alternative viewpoints; adapting or revising one's position in light of new evidence and arguments; achieving a level of precision commensurate with the subject matter; and systematically addressing the components of complex arguments (Thomson, A., 1996, p. 2).

The present study aims to provide a contemporary understanding of critical thinking and to explore its integration within a formative educational approach at the primary school level. It seeks to reaffirm both the feasibility and the necessity of fostering critical thinking in young learners. As Heard et al. (2020) assert, critical thinking constitutes "an essential skill in 21st-century learning" (p. 1), one that is inextricably linked to both educational and professional domains. These authors define critical thinking as a process involving "the analysis and evaluation of information, reasoning, and situations according to appropriate standards, to construct sound and insightful new knowledge, understandings, hypotheses, and beliefs. Critical thinking encompasses the ability to process and synthesise information in a manner that enables individuals to apply it judiciously to tasks, facilitating informed decision-making and effective problem-solving" (Heard et al., 2020, p. 2).

2. Current research studies on stimulating critical thinking in primary education

The foundation for understanding critical thinking is rooted in the scientific contributions of Piaget (1965), Vygotsky (1971), and Bruner (1966), who established the classical frameworks for explaining cognition in general, as well as the specific characteristics of its development during preschool and early school years. Through his theory of cognitive development, Piaget (1965) described how children's thinking evolves in distinct stages, driven by an innate curiosity to explore their environment. He emphasised the dynamic interaction between a child's innate

cognitive capacities, shaped by biological maturation, and the environmental context in which the child grows. Vygotsky (1971) further advanced this perspective, arguing that while perception and memory undergo substantial development before formal schooling, it is during the early school years that the most significant cognitive transformations occur, largely due to instructional processes. He suggested that the development of thinking fundamentally alters the nature of other cognitive functions, such as perception, memory, attention, and imagination, transforming them into volitionally regulated processes. J. Bruner (1966) focused on the development of cognitive processes in children, exploring the mechanisms by which knowledge is constructed. He asserted that learning is most effective when it is constructed, enabling students to move beyond rote memorisation towards active participation in the learning process. According to Bruner, knowledge gains meaning through engagement and reasoning, and thus, cognitive development should be understood as an ongoing process rather than a fixed outcome. Building upon these foundational theories, Edward de Bono (2006) later introduced the idea that thinking itself is a skill that can be cultivated through deliberate practice and training. He argued that cognitive abilities, including critical thinking, can be refined and enhanced when individuals actively engage in structured exercises designed to develop reasoning and evaluative skills.

As critical thinking has emerged as a distinct and increasingly scrutinised domain of cognition, research on the topic has expanded, offering diverse perspectives and methodological approaches. Table 1 presents a selection of 17 studies published between 2019 and 2025, illustrating both the contemporary relevance of critical thinking in primary education and the varied lenses through which it is examined.

Table 1. *Recent Studies on Stimulating Critical Thinking in Primary Education*

No.	Title of the study	Authors/year	Main aspects investigated
1.	Analysis of critical thinking skills of primary students in IPAS learning	Fitriyanti, D., Mudiono, A., Suciptaningsih, O.A. (2025)	This quantitative research approach has identified "five components of critical thinking: 1. offering simple explanations; 2. developing basic abilities; 3. concluding; 4. providing additional explanations; 5. developing strategies and tactics" (p. 52).
2.	Enhancing critical thinking in elementary education: A systematic review of effective learning models	Fitriadi, F., Herpratiwi, H., Yulianti, D., Setiyadi, A. B., Hariri, H., Sunyono, S., Haenilah, E. Y., & Mukhlis, H. (2024)	This study employs a systematic literature review, selecting and analysing 11 research articles. The analysis focuses on four key dimensions: "(1) geographic area distribution; (2) research methods; (3) research subjects; (4) the development of learning models in elementary schools that are oriented toward critical thinking skills" (p.1).
3.	Developing critical thinking skills of primary school students through independent curriculum learning	Irwan, I., Arnadi, A., & Aslan, A. (2024)	The article conducts a curriculum study focused on the development of critical thinking skills among primary school students. It identifies both specific instructional strategies, such as project-based learning, collaborative problem-solving, and technology integration, and challenges associated with developing these competencies.
4.	Literature Review for Implementing and Developing Critical Thinking in Elementary School	Nădăban, C., Roman, A. F. (2024)	The study provides a theoretical review of critical thinking and its significance in primary education. It examines both historical theoretical frameworks and a range of specialised studies on the subject.

5.	Supporting primary students' critical thinking in whole-class conversations about sustainability issues	Reffhaug, M.B.A., Andersson-Bakken, E., & Jegstad, K. M. (2024)	The article investigates how the discussions across different epistemological levels regarding sustainability issues can contribute to the development of students' emerging critical thinking abilities.
6.	Elementary Teachers' Noticing of Students': How to Stimulate Students' Critical and Creative Thinking	Restu, L., Cholis, S., Subanji, S., Tjang, D. C. (2024)	This qualitative exploratory research examines primary school teachers' observations regarding the stimulation of critical and creative thinking. The study highlights three main indicators—attention, interpretation, and response—and their impact on developing these cognitive skills. The findings suggest that all three indicators contribute significantly to critical and creative thinking and point to new instructional strategies for enhancing these skills in the classroom.
7.	Effective Strategies in Developing Critical Thinking Skills in Elementary School-Age Children	Susanti, R. (2024)	This literature review study identifies and evaluates effective strategies for developing critical thinking skills in primary school children. The findings highlight storytelling, problem-based learning, and social interactions (such as group discussions and teamwork) in enhancing critical thinking skills. Based on these insights, the study provides practical recommendations for educators and policymakers in designing effective pedagogical strategies.
8.	Methodology of Teaching Primary School Students to Critical Thinking in Education Classes.	Dehqonova, X. (2023)	The article presents a comprehensive methodology for cultivating critical thinking skills in primary school students within educational settings. The methodology integrates innovative teaching strategies aimed at enhancing students' analytical, evaluative, and problem-solving abilities. Beyond enabling critical thinking, these strategies equip students with lifelong learning skills.
9.	Primary teachers' attitudes towards using new technology and stimulating higher-order thinking in students: A profile analysis	Wijnen, F., Walma van der Molen, J. & Voogt, J. (2023)	The study explores the primary school teachers' attitudes toward two interconnected aspects of education: (1) the integration of new technologies and (2) the promotion of critical thinking. A cluster analysis identifies three distinct teacher profiles, suggesting potential pathways for personalised professional development.
10.	Enhancing Primary School Students' Critical Thinking Skills through the Integration of an Inquiry-Based STEM Approach in Teaching Electricity in Science Learning	Amen, M., Rahmawati, Y., A Sudrajat, A., & Mardiah, A. (2022).	The research examines the ways in which interdisciplinary STEM approaches, combined with inquiry-based and project-based learning, can enhance critical thinking among primary school students. The findings validate the anticipated effects, demonstrating benefits both in terms of content mastery and cognitive development.
11.	Teachers' perceptions of critical thinking in primary education	Lombardi, L., Mednick, F. J., De Backer, F., &	This qualitative study identifies primary school teachers' perceptions of critical thinking and explores how aspects of their

		Lombaerts, K. (2022)	professional training contribute to fostering it through pedagogical practices.
12.	Critical thinking and inclusive practice: A qualitative study of Spanish primary school teachers' perceptions	Latorre-Cosculluela, C., Sierra-Sánchez, V., Sandra Vázquez-Toledo. S. & Royo-Ardid, J. (2021)	The qualitative research explores methods for promoting critical thinking in primary school settings that prioritise inclusivity. Data from interviews reveal that while teachers possess a theoretical understanding of critical thinking, many struggle to effectively implement it in practice. The study highlights group discussions and team interactions as effective techniques for stimulating critical thinking.
13.	Fostering Critical Thinking across the Primary School's Curriculum in the European Schools System	Lombardi, L., Mednick, F. J., De Backer, F., & Lombaerts, K. (2021)	The study examines how the primary school curriculum within the European education system addresses critical thinking. The findings indicate that while the curriculum does not explicitly define critical thinking, it nonetheless considers it a key competency. The study identifies a holistic approach in which the European Schools system supports critical thinking both explicitly and implicitly. The results provide a foundation for further research involving teachers, school administrators, policymakers, and curriculum developers.
14.	Developing Critical Thinking in Younger Pupils Using ICT	Shkvyr, O., Haidamashko, I., & Tafintseva, S. (2020)	This study explores methodologies for fostering critical thinking in primary school students through the use of information and communication technologies (ICT). The findings indicate that ICT integration contributes to the development of argumentation skills, information-seeking abilities, and communication competencies.
15.	Critical Thinking Skills for Primary Education: The Case in Lebanon	AlJaafil, E., Şahin, M. (2019)	This qualitative study, based on interviews and focus groups, investigates primary school teachers' perspectives on critical thinking. It examines their conceptual understanding (What is critical thinking?), the skills embedded within critical thinking (What are the skills integrated into critical thinking?), its role in education (What is the role of critical thinking in education?), strategies for stimulating it through teaching practices, and the challenges associated with its development within the educational process.
16.	Teachers' role in stimulating students' inquiry habit of mind in primary schools	Uiterwijk-Luijk, L., Krüger, M., Zijlstra, B., & Volman, M. (2019)	This mixed-method study examined the relationship between teachers' inquiry-based work and students' inquiry habit of mind. The results indicate no direct correlation between teachers' inquiry-based approaches and students' critical thinking habits. However, survey data suggest a relationship between teachers' inquiry-based work and students' overall curiosity.
17.	Fostering Students' Creativity and Critical	Vincent-Lancrin, S. et al. (2019)	The volume offers an in-depth analysis of critical thinking and creativity across eight

	Thinking: What it Means in School		chapters. Key topics include theoretical perspectives on creativity and critical thinking, the transition from conceptual frameworks to teacher-friendly assessment rubrics, eleven pedagogical approaches for fostering these skills, their application in everyday teaching, professional development strategies for teachers, and educators' attitudes and practices regarding creativity and critical thinking.

The analysis of the main ideas synthesised from the studies presented in Table 1 leads to several significant conclusions:

- The majority of reviewed studies emphasise various strategies for stimulating and developing critical thinking among primary school students (articles 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 15, 16, 17).
- A central focus of research is the examination of the fundamental components of critical thinking. These elements are increasingly monitored, analysed, and evaluated with greater depth and precision (articles 1, 6, 15, 17).
- Given the correlation between teacher training and practices that enhance critical thinking, aspects related to professional development and their impact on stimulating critical thinking in young learners are of particular relevance (articles 9, 11, 12, 13).
- Several studies investigate curriculum frameworks from the perspective of developing critical thinking (articles 3, 13).
- From a theoretical point of view, the development of models and conceptual frameworks for understanding and explaining critical thinking remains a relevant area of inquiry (articles 2, 4).

When analysing the concept of critical thinking itself, it becomes evident that various cognitive operations significantly influence students' critical thinking through their interrelationships. Critical thinking emerges as a deliberate, reflective, and rational cognitive process, in contrast to intuitive, impulsive, and emotion-driven thinking.

D. Massara (1998) asserts that *although thinking is an essential and defining human trait, its correct application is neither spontaneous nor innate, but it is rather an acquired skill that necessitates systematic instruction.* Consequently, in the early years of schooling, students must be guided to observe and interpret their surroundings, recognise essential characteristics of objects and phenomena, articulate their observations, and retain knowledge through structured learning experiences. As they progress, they should be encouraged to engage in experimentation and inquiry, allowing them to actively explore and understand concepts. This stage marks the transition to an active learning approach, where students systematically develop their reasoning abilities from concrete experiences to abstract ideas. The teacher should cultivate the students' ability to think critically and employ scientifically validated instructional models to optimise this process. One widely endorsed framework is the *4Cs model*, which encompasses *collaboration, communication (thinking outside the box), creativity, and critical thinking* as essential components of effective learning.

In the academic environment, critical thinking is also explored through the lenses of critical argumentation, critical writing, and critical reading, along with the specific skills required for each. A key challenge for educators is making the cognitive process visible and explicit for learners. One effective approach involves *Thinking Routines*, which are structured, recurring exercises designed to allow for systematic habits of critical thinking. These routines provide students with structured opportunities to engage in analytical reasoning and reflective inquiry. Like other essential life skills, including *decision-making, problem-solving, creative thinking, effective communication, empathy, and self-awareness,* critical thinking requires experiential

learning methods. Active learning, as the term suggests, is a dynamic and interactive process between the teacher and students. in which the former does not use the students' minds as a vessel to be filled, but rather as a place that allows students to contribute themselves, through exchanges, to the formation of their knowledge. Educators must help students develop critical thinking, creating the necessary conditions for its development within teaching activities.

One fundamental requirement is *dedicated time for engaging in critical thinking experiences*. Before students can effectively process new information, they must first explore their prior knowledge, beliefs, and experiences related to the topic at hand. This requires structured opportunities for reflection, discussion, and articulation of ideas in their own words.

Another critical condition involves establishing a *supportive and intellectually stimulating environment* where students are encouraged to engage in reasoning, argumentation, problem-solving, and decision-making. In order to promote spontaneous and independent thinking, teachers must grant students the intellectual freedom to speculate, hypothesise, and express diverse perspectives.

Young school learners should feel that their ideas and contributions are valued, as this cultivates a sense of ownership over their learning process. *Teachers' respect* for students' *ideas and beliefs* will ultimately generate their sense of respect for both the learning process in which they are involved and their cognitive development.

Learning experiences designed to develop critical thinking *should expose students to a variety of cognitive models*, including rational, visual, metaphorical, and analogical thinking, enabling them to discover their applicability across different contexts. Additionally, stimulating critical thinking in primary school students implies *the broadening of knowledge acquisition***,** demonstrating the interconnectedness of various disciplines and content areas. Teachers must guide students in understanding the interdisciplinary nature of knowledge and how different fields influence and complement one another.

Research objectives and hypothesis

The research was structured around several *objectives*:

O1: identification of the pre-experimental level of the manifestation of critical thinking of primary school students as a starting point for the organisation of the psycho-pedagogical experiment;

O2: selection of a methodological set specific to the ERR paradigm that will contribute to stimulating the critical thinking of primary school students in the study subjects chosen for the experiment;

O3: integration of the selected methodological set into teaching activities for third-grade students across targeted disciplines;

O4: identification of the post-experimental level of manifestation of critical thinking of primary school students;

O5: evaluation of the progress achieved by students in critical thinking development as a result of the applied methodological intervention.

The research hypothesis claims that the integration of a methodological set specific to the ERR paradigm (comprising the I Know/I Want to Know/I Learned method, cluster method, dial method, and lapbooking) into third-grade teaching activities would result in an enhanced manifestation of critical thinking among students.

3. Critical thinking and its development in schools through the ERR model

The perspectives discussed above regarding the critical thinking of primary school students align with a structured learning framework that follows three stages: *evocation, constructing meaning,* and *reflection.* These phases support the brain's natural process of assimilating

information while also providing a structured environment for the development and practice of critical thinking.

a. Evocation -E (preliminary discussion)

In this initial stage, students actively engage in various cognitive activities that trigger the recall of prior knowledge related to the topic at hand. By examining their existing understanding, they begin forming connections with new information. The depth of this engagement largely depends on the students' level of participation. Some key techniques used in this phase, alongside brainstorming, include *Bunches, Think/Pair/Share, Prediction, K-W-L (Know-Want to Know-Learned), Key Terms,* and *Interviewing***.**

b. *Constructing meaning*

This second stage, specific to the framework for thinking and learning, immerses students in new information or ideas through different aspects such as conducting experiments, watching educational videos, or reading texts. For example, an effective reader revisits complex passages for better understanding, while an attentive listener takes notes on unclear points to seek clarification later. This phase promotes goal-setting, critical analysis, synthesis, and comparative reasoning. Strategies that support these processes include *Double Diary, Mosaic, Dial Method, and Collaborative Learning***.**

c. Reflection

The reflection stage is essential for deepening understanding, as students must articulate newly acquired knowledge in their own words. Research suggests that learning is more effective and enduring when information is placed in a meaningful context (Pearson & Fielding, 1991). Students retain information more effectively when they express their thoughts in their own words, as this type of learning supports long-term retention. Through discussion and interaction, students refine their vocabulary, expressive abilities, and thought processes. The process of reconceptualisation and change occurs as they compare and integrate new insights. Recommended strategies for this phase include *Debates, Discussion Networks, Essays, Value Lines, Cube, Quintet, and Let Me Have the Last Word.*

In 1997, professors Charles Temple, Jeannie Steele, and Kurtis Meredith introduced the *Reading and Writing for the Development of Critical Thinking (LSDGC) programme*, designed to equip teachers with instructional methods that enhance students' critical thinking. This programme is structured around a series of criteria, such as: classroom practices should encourage inquiry and debate; under the teacher's guidance, students should develop original opinions and take responsibility for their arguments; searching for evidence strengthens students' ability to evaluate alternatives and make informed decisions; active reading encourages observational skills and accelerates information processing; writing promotes reflection, clear expression, and structured reasoning; critical thinking enables problem-solving and decision-making through logical argumentation; cooperative learning nurtures respect for diverse perspectives and teamwork. Since primary school students naturally ask many questions about new concepts, teachers must provide them with the tools to apply accumulated knowledge effectively. Encouraging research, critical inquiry, and independent exploration equips students with valuable lifelong learning skills, which the educational institution makes available to them. Lately, information technology, as a modern means of training, enjoys special attention. An integration of new technologies in education, centred on the pedagogical use of digital educational content and advanced online tools, is timely and useful in terms of the need to achieve quality education, aiming to support teachers in achieving their professional goals (Pânișoara and Manolescu, 2019). The implementation of teaching strategies can be adapted across different organisational formats: *whole-class instruction, group work,* and *independent tasks*, balancing structure with flexibility.

In the academic environment, it is acknowledged that collective efforts contribute to enhanced task performance and play a crucial role in shaping students' personalities through the development of social skills. Group activities are considered effective as they promote the cultivation of positive character and personality traits, including initiative, cooperation, critical

and self-reflective thinking, and mutual respect. Such activities provide students with opportunities to better understand their aptitudes, intellectual and moral qualities, willpower, and character. Additionally, they facilitate the expression and reinforcement of moral values such as sincerity, modesty, and altruism, while also fostering positive behavioural traits like perseverance, responsibility, and solidarity. However, group activities present certain drawbacks, notably the tendency for higher-achieving students to dominate participation while others passively wait for task outcomes, as well as the increased time required compared to whole-class instruction.

Independent activities, on the other hand, involve each student completing a specific task individually, without direct teacher coordination. This approach allows for differentiation in instruction, particularly benefiting students with higher potential, who can be assigned more complex tasks that stimulate their intellectual abilities, thereby preventing boredom and a sense of limitation. Likewise, students who face challenges in reading and comprehension can be given simpler tasks aimed at fostering incremental success, ultimately enhancing their confidence and motivation for future learning. Despite these benefits, independent work also presents challenges, including the significant time and energy demands placed on students, the risk of developing individualism and self-centredness at the expense of collaboration and altruism, and the potential for social isolation if not carefully managed by the teacher or supplemented with group and whole-class activities.

4. Psycho-pedagogical experiment on stimulating critical thinking through interactive methods – methodological dimensions

Educational research represents a special type of scientific inquiry, characterised by an investigative approach that aims to understand educational realities through the examination of "functional and causal relationships between the components and variables of the educational phenomenon" (Manolescu M, Pânișoara I., 2019, p. 112). This perspective informed the design of the present study, which sought to determine the existence of a direct functional and causal relationship between a specific methodological set based on the ERR paradigm and the development of critical thinking among primary school students.

4.1. Research group

The study was conducted with a convenience sample of 10 third-grade students (five girls and five boys, aged 9-10 years) from "Vasile Alecsandri" Secondary School in Vaslui. The participants maintained regular attendance, with no significant absenteeism or risk of school dropout.

4.2. Psycho-pedagogical research methods

The primary methodological approach employed was a formative-ameliorative psycho-pedagogical experiment. To identify and quantify the degree of manifestation of critical thinking, a cognitive behaviour evaluation grid focused on critical thought, adapted from Glava (2015). This instrument comprised 16 behavioural indicators (BI) assessed on a Likert scale ranging from 1 (very rarely) to 5 (always). The indicators included competencies such as BI1 – formulating pertinent, penetrating and stimulating questions; BI2 – identifying alternative solutions; BI3 – listening carefully to others and providing feedback; BI4 - postponing conclusions until all alternatives have been explored; BI5 – supporting arguments according to the belonging group; BI6 – adjusting opinions in light of superior reasoning; BI 7 – examining evidence critically; BI8 - clearly defining a set of criteria based on which to analyse ideas, solutions, arguments; BI9 - rejecting incorrect and irrelevant information; BI10 – evaluating and solving problems while reading; BI11 – demonstrating interdisciplinary thinking in order to improve both personal and team performance; BI12 – Basing judgments on ideas and evidence; BI13 – respecting rules when understanding their usefulness, while remaining open to changing them;

BI14 – formulating superior reasoning through analysis, synthesis, and generalisation; BI15 – making predictions, hypotheses, and projections; BI16 – exhibiting the ability to make quick decisions and take responsibility.

4.3. Research procedure

During both the pre-experimental and post-experimental phases, data were collected using the observation grid. The presence or absence of the 16 investigated skills was recorded, with affirmative responses further assessed on a five-point Likert scale. The total score (maximum of 80 points) was categorised into three levels of cognitive behaviour manifestation: minimal (1-30 points), medium (31-55 points), and maximum (56-80 points). Data were systematically recorded over ten days for both the pre- and post-experimental phases, then compiled, analysed, and compared.

The experimental study was conducted during the 2023-2024 academic year and consisted of the following stages:

- *pre-experimental assessment (23.10.2023 – 10.11.2023):* initial evaluation of students' critical thinking skills using the research instrument (Glava, 2015).
- *Implementation of the progress factor (13.11.2023 – 17.05.2024):* introduction of the ERR-specific methodological set in Romanian Language and Literature, Mathematics, Natural Sciences, and Civic Education. Activities were conducted both within the classroom and in external environments (e.g., the municipal library and schoolyard).
- *post-experimental assessment (20.05.2024 – 31.05.2024):* reassessment of students' critical thinking skills using the same research instrument. The results from the two assessment phases were compared to evaluate the impact of the intervention on critical thinking development.

The main categories of formative approaches employed during the experimental phase are systematised in Table 2, which illustrates the application of the ERR-specific methodological set across the targeted disciplines.

Table 2. *Illustrations of the methodological set specific to the ERR paradigm capitalised on the disciplines of Romanian Language and Literature, Mathematics, Natural Sciences, and Civic Education during the introduction of the progress factor*

No.	Method	Teaching discipline	Theme
1.a.	I know/I want to know/ I've learned	Romanian language and literature	*Noun* (definition, number, gender)
b.		Mathematics	*Order of operations and use of round brackets* (operations, terms, solving exercises with and without parentheses)
c.		Natural Sciences	*States of matter (properties of substances: shape, color, taste, smell, volume, size)*
d.		Civic education	*Rights and responsibilities (children's rights, where they are upheld, how they are protected)*
2.a	Bunches	Romanian language and literature	*In the library – lesson following an educational visit to the Nicolae Milescu Spătarul Library in Vaslui*
b.		Mathematics	*Proper and equivalent fractions with denominators up to ten*
c.		Natural Sciences	*Water*
d.		Civic education	*Things, plants, animals, people*

3.a.	Dials	Language and Romanian literature	*The Legend of the Snowdrop; CI: Explain the meaning of artistic expressions in the text (cloak, frail, to comfort, to murmur); CII: Justify why the supporting text is a description; CIII: Describe a snowdrop; CIV: Draw your favorite flower*
b.		Mathematics	*Problem-solving using graphical representation; CI: Understanding the problem statement; CII: Creating a graphical representation; CIII: Solving the problem; CIV: Providing the final answer*
c.		Natural Sciences	Fish, amphibians, and reptiles; CI: Mark statements as true (A) or false (F); CII: Arrange words on colored labels to form correct statements; CIII: Complete sentences with given words to ensure accuracy; CIV: Fill in blanks in provided statements
d.		Civic education	Objects, plants, animals, and people; CI: Explain what humans need to survive; CII: Identify differences between humans, animals, and plants; CIII: Specify who produces objects and categorise them; CIV: Create a drawing that reflects your attitude toward animals, plants, or objects
4.a	Lapbook	Romanian language and literature	Creating an engaging and visually appealing material on the life and work of the national poet Mihai Eminescu
b.		Mathematics	Numbers and their significance: What is a number? / How are numbers written?; Poems about numbers (integration with literature); Riddles about numbers (integration with literature and art); Numbers in artistic works (integration with history, literature, and art); Proverbs, riddles, and sayings about numbers and figures (integration with literature)
c.		Natural Sciences	Living beings on Earth; Naming different living creatures (insects, birds, mammals, fish, amphibians, reptiles); Poems about living beings (integration with literature); Riddles about living creatures (integration with mathematics, spatial thinking, and representation); Associating living beings with books, cartoons, and artwork (integration with art); Creating original animal-themed stories
d.		Civic education	No Bullying in My School – Students gathered information on bullying, including where it occurs, the individuals involved, the impact on those affected, recognizing bullying behaviours, strategies for prevention and intervention. As a creative task, students had the option to illustrate their thoughts on bullying through drawings

5. Results

Table 3 presents a comparative synthesis of the data obtained, illustrating the degree of manifestation of cognitive behaviour centred on critical thinking among students. The results are expressed in both absolute (N = frequency) and relative (P = percentage) terms, categorised into three levels as per the research procedure outlined earlier.

Table 3. *Comparative analysis of the results – Cognitive behaviour centred on critical thinking in 3rd-grade students*

Stage	Minimum		Medium level		Maximum level	
	N	P	N	P	N	P
Pre-test assessment	6	60%	4	40%	-	-
Post-test evaluation	-	-	3	30%	7	70%
Evolution	-6	-60%	-1	-10%	+7	+70%

The data in Table 3 reveal the progress made in the development of cognitive behaviour centred on critical thinking among third-grade students. Following the experiment, there were no students at the minimum level, in contrast to the initial assessment, where this category comprised a significant proportion (N = 6, 60%). All six students previously classified at this level improved, advancing to the medium level (N = 3) or the maximum level (N = 3). Additionally, the number of students at the medium level decreased from N = 4 to N = 3. The most significant improvement was observed at the maximum level, where seven students were identified post-experiment, whereas none had initially attained this level (N = 0). These findings support the research hypothesis, confirming the beneficial impact of the implemented methods (I Know/I Want to Know/I Learned, Bunches, Dials, Lapbooking) on the development of critical thinking in primary school students. Furthermore, the results reinforce the notion that critical thinking is a teachable cognitive skill (Glava, 2015), with more pronounced and lasting effects when introduced at younger ages, thus becoming an integral part of students' cognitive and personal development.

5. Conclusions

Education encompasses a series of pedagogical activities aimed at developing various cognitive capacities, including critical thinking, which manifests in diverse forms (Ștefan, 2006). Education also has an anticipatory function, preparing students for a future society that can only be broadly predicted based on current trends (Cojocariu, 2008).

Stimulating critical thinking in primary school students remains a fundamental objective for educators. From both a pedagogical and practical standpoint, teaching activities should be designed to incorporate and enhance critical thinking and its components. Every educational interaction, regardless of the level, should contribute to strengthening students' reflective and reasoning abilities. Since critical thinking requires systematic training and practice, it cannot be cultivated through a single discipline alone.

Predominantly using active-participatory methods, while complementing them with traditional approaches, enables students to transition from subjective reactions to reasoned arguments, from a singular perspective to multiple viewpoints, and passive acceptance to critical engagement with ideas. As a result, the educational strategy becomes “an expression of the organic unity of methods, procedures, educational tools, and learning organisation strategies, developed sequentially to achieve instructional and educational objectives” (Stanciu, 2003, p. 183). However, pedagogical experience often highlights that the effectiveness of teaching does not solely depend on the variety of methods or techniques employed by educators. Rather, it is influenced by the ingenuity, creativity, and adaptability of the teaching strategy to the specific learning context.

One of the main limitations of this study is the small sample size and the relatively short duration of the experiment. Despite these constraints, the findings and the experimental methodology presented may serve as valuable points of reflection and inspiration for educators. They highlight the importance of selecting, combining, and creatively applying effective teaching methods to enable critical thinking among primary school students.

Bibliography

1. Al Jaafil, E., & Şahin, M. (2019). Critical Thinking Skills for Primary Education: The Case in Lebanon. Turquoise *International Journal of Educational Research and Social Studies, TIJER*, *1*(1), 1-7. https://eric.ed.gov/?id=ED598279.
2. Amen, M., Rahmawati, Y., A Sudrajat, A., & Mardiah, A. (2022). Enhancing Primary School Students' Critical Thinking Skills through the Integration of Inquiry-Based STEM Approach on Teaching Electricity in Science Learning. *Journal of Physics, Conference Series*, *2377*, https://doi.org.10.1088/1742-6596/2377/1/012090.
3. Boda, G., & Mosiello, F. (2005). *Life skills: critical thinking*. Rome: Carocci Faber Publishing House.
4. Boncori, G., & Laeng, M. (1995). *Guide to pedagogical observation. Experimental validation of a training model*. Rome: Editura La Scuola.
5. Bruner, J. (1966). *Toward a theory of instruction*. Cambridge: Harvard University Press.
6. Cojocariu, V.-M. (2008). *Fundamentele pedagogiei. Teoria și metodologia curriculum-ului. Texte și pretexte/ Fundamentals of pedagogy. Theory and methodology of the curriculum. Texts and pretexts*. Bucharest: Miniped Publishing House.
7. De Bono, E. (2006). *Gândirea laterală/ Lateral thinking*. Bucharest: Curtea Veche Publishing House.
8. Dehqonova, X. (2023). Methodology of Teaching Primary School Students to Critical Thinking in Education Classes. *Web of teachers: Inderscience Research*, *1*(5),1-6, https://webofjournals.com/index.php/1/article/view/129
9. Dumitriu, G. A. (2019). *Dezvoltarea gândirii critice la elevii din învățământul primar/ (Development of critical thinking in primary school students*. Brăila: Saint Hierarch Nicholas Publishing House.
10. Dumitriu, I. (2000). *Dezvoltarea gândirii critice și învățarea eficientă/ Development of critical thinking and effective learning*. Timișoara: West Publishing House.
11. Fitriadi, F., Herpratiwi, H., Yulianti, D., Setiyadi, A. B., Hariri, H., Sunyono, S., Haenilah, E. Y., & Mukhlis, H. (2024). Enhancing critical thinking in elementary education: A systematic review of effective learning models. *Multidisciplinary Reviews, 8*(6), 2025157. https://doi.org/10.31893/multirev.2025157
12. Fitriyanti, D., Mudiono, A., & Suciptaningsih, O.A. (2025). Analysis of critical thinking skills of primary students in IPAS learning. *Journal of Research in Instructional, 5*(1), 52 – 61, https://doi.org/10.30862/jri.v5i1.539.
13. Glava, A. (2015). *Strategii de dezvoltarea a gândirii critice. Curs opțional/ Strategies for developing critical thinking. Optional course*. Cluj-Napoca: Universitatea Babeș Bolyai.
14. Golu, M. (2007). *Fundamentele psihologiei/ Fundamentals of psychology*, vol. I. Bucharest: Fundația România de Mâine.
15. Heard J., Scoular, C., Duckworth, D., Ramalingam, D., & Teo, I. (2020). *Critical thinking: Definition and structure*. Australian Council for Educational Research. Material retrieved from https://research.acer.edu.au/ar_misc/38.
16. Irwan, I., Arnadi, A., & Aslan, A. (2024). Developing critical thinking skills of primary school students through independent curriculum learning. *Indonesian Journal of Education (INJOE), 4*(3), 788- 803.
17. Latorre-Cosculluela, C., Sierra-Sánchez, V., Sandra Vázquez-Toledo. S. & Royo-Ardid, J. (2021). Critical thinking and inclusive practice: A qualitative study of Spanish primary school teachers' perceptions. *Issues in Educational Research, 31*(3), 834-853.
18. Lombardi, L., Mednick, F. J., De Backer, F., & Lombaerts, K. (2022). Teachers' perceptions of critical thinking in primary education. *International Journal of Instruction, 15*(4), 1-16.
19. Lombardi, L., Mednick, F. J., De Backer, F., & Lombaerts, K. (2021). Fostering Critical Thinking across the Primary School's Curriculum in the European Schools System. *Education Sciences, 11*(9), 505. https://doi.org/10.3390/educsci11090505.

20. Marmocchi, P., Dall'Aglio C., & Tannini, M. (2004). *Educare alle Life Skills*. Trento: Erickson Publishing House.
21. Neveanu, P., P. (1978). *Dicționar de psihologie/ Dictionary of psychology*. Bucharest: Albatros Publishing House.
22. Nădăban, C., & Roman, A. F. (2024). Literature Review for Implementing and Developing Critical Thinking in Elementary School. *Educația 21 Journal, 28*, Art. 26, https://doi.org/10.24193/ed21.2024.28.26.
23. Peck, M.S. (1990). *The Road Less Travelled*. London: Arrow Books Publishing House.
24. Piaget, J. (1965). *Psihologia inteligenței/ Intelligence psychology*. Bucharest: Scientific Publishing House.
25. Piaget, J., & Inhelder, B. (1976). *Psihologia copilului/ Child psychology*. Bucharest: Didactic and Pedagogical Publishing House.
26. Reffhaug, M.B.A., Andersson-Bakken, E., & Jegstad, K. M. (2024). Supporting primary students' critical thinking in whole-class conversations about sustainability issues. *Environmental Education Research, 30*(10), 1840-1855.
27. Restu, L., Cholis, S., Subanji, S., Tjang, D. C. (2024). Elementary Teachers' Noticing of Students': How to Stimulate Students' Critical and Creative Thinking. Technology, Education, Management, Informatics, *TEM Journal, 13*(2), 1319-1330. https://doi.org/10.18421/TEM132-46.
28. Shkvyr, O., Haidamashko, I., & Tafintseva, S. (2020). Developing Critical Thinking in Younger Pupils Using ICT. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience, 11*(2), 230-242. https://doi.org/10.18662/brain/11.2/85
29. Stanciu, M. (2003). Didactica postmodernă/ Postmodern Didactics. Suceava: University of Suceava Publishing House.
30. Susanti, R. (2024). Effective Strategies in Developing Critical Thinking Skills in Elementary School Age Children. *West Science Interdisciplinary Studies, 02*(04), 732-736. https://wsj.westscience-press.com/index.php/wsis/article/view/785/870
31. Temple, C., Steele, J., & Meredith, K.S. (2002). Strategii de dezvoltare a gândirii critice pentru toate disciplinele școlare/ Strategies for developing critical thinking for all school subjects, Guide no.2, *Supplement to Didactica Pro*, *2*, Chișinău.
32. Temple, C., Steele, J., Meeredith, K. S. (2002). *Lectură și scriere pentru dezvoltarea gândirii critice/ Reading and writing for the development of critical thinking*, Guide no. 3, Supplement of Didactica Pro, no. 7, Chisinau.
33. Temple, C., Steele, J., & Meredith, K.S. (2003). *Aplicarea tehnicilor de dezvoltare a gândirii, critice/ Application of techniques for the development of critical thinking*, Guide no. 4, *Supplement to Didactica Pro*, *2*, Chisinau.
34. Thomson, A. (1996). *Critical Reasoning. A Practical Introduction*. London: Routledge.
35. Uiterwijk-Luijk, L., Krüger, M., Zijlstra, B., & Volman, M. (2019). Teachers' role in stimulating students' inquiry habit of mind in primary schools. *Teaching and Teacher Education, 86*, Article 102894. https://doi.org/10.1016/j.tate.2019.102894.
36. Vincent-Lancrin, S., González-Sancho, C., Bouckaert, M., de Luca, F., FernándezBarrerra, M., Jacotin, G., Urgel, J., & Vidal, Q. (2019). *Fostering Students' Creativity and Critical Thinking: What it Means in School. Educational Research and Innovation*. Paris: OECD Publishing. https://doi.org/10.1787/62212c37-en.
37. Vîgotski, L. S. (1971). *Opere psihologice alese/ Selected Psychological Works*. Bucharest: Didactic and Pedagogical Publishing House.
38. Wijnen, F., Walma van der Molen, J. & Voogt, J. (2023). Primary teachers' attitudes towards using new technology and stimulating higher-order thinking in students: A profile analysis. *Education and Information Technologies, 28*, 6347–6372. https://doi.org/10.1007/s10639-022-11413-w.
39. Zlate, M. (1999). *Psihologia mecanismelor cognitive/ Psychology of cognitive mechanisms*. Iași: Polirom Publishing House.