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SCIENTIFIC AND THEORETICAL FOUNDATIONS FOR DEVELOPING STUDENTS' CRITICAL THINKING COMPETENCIES IN SUMMATIVE ASSESSMENT CONDITIONS

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Abstract. *The development of students' critical thinking competencies has become one of the central priorities of contemporary education because the quality of learning is no longer measured only by the reproduction of knowledge, but also by the ability to analyze information, compare arguments, evaluate evidence, and make reasoned decisions. In this context, summative assessment is often interpreted as a mechanism for measuring final achievement, while its developmental potential remains underused. The present article examines the scientific and theoretical foundations for developing students' critical thinking competencies in summative assessment conditions. The study is based on a theoretical and analytical approach that synthesizes psychological, pedagogical, competence-based, and assessment-related perspectives. The article argues that summative assessment can serve not only a control function but also a formative cognitive function when it is designed around higher-order thinking tasks, transparent criteria, evidence-based judgment, and reflective procedures.*

Keywords: *critical thinking, summative assessment, competency-based education, higher-order thinking, metacognition, assessment design, reflective learning, evaluation criteria*

INTRODUCTION

The transition from knowledge-centered education to competency-based education has significantly changed the understanding of assessment in school practice. Traditional models of summative assessment were built mainly around checking the volume of acquired information, identifying correct answers, and assigning final scores. Such an approach may reveal the degree of memorization, yet it often fails to capture how students interpret facts, compare viewpoints, test assumptions, detect contradictions, and construct well-reasoned conclusions. These intellectual operations form the core of critical thinking competency, which has become one of the most important educational outcomes in the twenty-first century.

Critical thinking is not a narrow academic skill limited to logic exercises or formal argumentation. It represents an integrated personal and cognitive competency that includes analysis, interpretation, evaluation, inference, reflection, and reasoned judgment. A student with developed critical thinking does not merely consume information but interrogates it,

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relates it to context, distinguishes strong evidence from weak claims, and makes conscious decisions based on rational examination. Such students are better prepared for academic achievement, social participation, and professional adaptation in an increasingly complex information environment.

Despite the growing recognition of critical thinking in curricula and educational policy, its development is often associated primarily with classroom interaction, active learning methods, and formative assessment practices. Summative assessment, by contrast, is frequently viewed as the final stage of learning that only records results. This creates a methodological contradiction. If critical thinking is considered a major educational goal, then all core elements of the educational process, including summative assessment, must contribute to its development and demonstration. Otherwise, the assessment system begins to reward reproductive learning while the curriculum formally declares the importance of analytical and reflective competencies.

The scientific problem addressed in this article lies in the insufficient theoretical justification of how summative assessment can support the development of critical thinking competencies rather than merely measure fragmented subject knowledge. Many classrooms still rely on closed questions, single-solution tasks, and rigid answer formats that minimize reasoning and reduce student thinking to mechanical recall. In such conditions, the assessment process narrows the cognitive space of the learner instead of expanding it. Theoretical clarification is therefore needed to identify what scientific principles, pedagogical approaches, and methodological conditions make summative assessment intellectually developmental.

The purpose of this article is to analyze the scientific and theoretical foundations for developing students' critical thinking competencies in summative assessment conditions. The article focuses on the conceptual relationship between critical thinking and assessment, the pedagogical mechanisms that connect them, and the principles that should guide the design of summative tasks oriented toward higher-order thinking.

METHODS

This study employed a theoretical-analytical research design aimed at conceptualizing the role of summative assessment in the development of critical thinking competencies. The methodological basis of the article consists of systematic analysis, comparative interpretation, synthesis of pedagogical concepts, and structural examination of competency-oriented assessment models. Rather than conducting an empirical experiment, the study sought to clarify the theoretical framework through which summative assessment can be understood as a developmental pedagogical tool.

The first stage of the analysis involved examining the conceptual content of critical thinking as a pedagogical category. This required distinguishing critical thinking from related notions such as general reasoning, academic performance, subject knowledge, and problem-solving. Particular attention was paid to the components that recur across educational theory: analysis of information, argument evaluation, evidence-based conclusion, independent judgment, reflection, and transfer of knowledge to unfamiliar situations. This stage made it possible to define critical thinking competency as a multidimensional construct rather than a single isolated skill.

The second stage focused on the pedagogical essence of summative assessment. Summative assessment was analyzed not only as a procedure for final measurement but also as a structural component of the educational process shaped by learning objectives, content selection, task format, evaluation criteria, and feedback opportunities. The analysis considered the difference between assessment that merely classifies student achievement and assessment that stimulates complex cognitive performance. This distinction was crucial because the same label of summative assessment may conceal radically different intellectual demands depending on task design.

The third stage consisted of synthesizing the major theoretical approaches that explain how critical thinking develops in learning environments. Constructivist theory, competency-based education, Bloom's revised taxonomy, and metacognitive theory were used as the principal analytical lenses. Constructivism explains why critical thinking emerges when learners actively interpret information rather than passively receive it. Competency-based education clarifies why assessment must target application, analysis, and judgment in realistic contexts. Bloom's revised taxonomy provides a hierarchical model for differentiating lower-order and higher-order cognitive operations. Metacognitive theory demonstrates that critical thinking strengthens when students monitor their own reasoning, identify limitations, and revise conclusions.

The final stage involved deriving a set of theoretical conditions under which summative assessment can contribute to the development of critical thinking. These conditions were not treated as isolated recommendations but as interdependent elements of an assessment system. The analytical logic of the study was based on the assumption that critical thinking cannot develop in assessment if the objectives, tasks, criteria, and interpretation procedures remain focused only on reproduction. Conversely, when summative assessment requires comparison, justification, interpretation, and reflection, it becomes a space where critical thinking is both expressed and cultivated.

Results

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The theoretical analysis showed that the scientific foundations for developing critical thinking competencies in summative assessment conditions can be grouped into four major dimensions: cognitive, pedagogical, competency-based, and procedural.

The cognitive dimension reveals that critical thinking is inseparable from higher-order mental operations. It develops when students are required to move beyond recall and engage in interpretation, comparison, classification, analysis of causes and consequences, evaluation of alternatives, and construction of justified conclusions. Summative assessment supports this process only when tasks demand intellectual action rather than the selection of memorized fragments. Open-ended questions, case analysis, problem-based scenarios, interpretation of conflicting evidence, and argumentative writing emerged as the most theoretically consistent formats for stimulating critical thinking within summative conditions. Closed tasks may have limited diagnostic value, but when they dominate the assessment structure, the developmental potential of critical thinking is significantly weakened.

The pedagogical dimension demonstrates that summative assessment becomes developmental when it is aligned with the logic of meaningful learning. If the teaching process encourages inquiry, discussion, evidence use, and reflection, while the final assessment rewards only factual reproduction, students receive contradictory signals about what counts as real achievement. The analysis therefore established the principle of instructional-assessment coherence. Critical thinking grows where classroom pedagogy and summative assessment follow the same cognitive orientation. When students know that final success depends on justified reasoning, interpretation of data, and independent evaluation, they are more likely to adopt deeper learning strategies throughout the instructional process.

The competency-based dimension clarified that critical thinking should be viewed as a transferable competency demonstrated in context. This means that summative assessment should not be restricted to abstract exercises detached from real or meaningful situations. Authentic assessment contexts increase the relevance of student reasoning because they require the application of concepts to practical, social, scientific, or ethical problems. In such settings, students must not only know content but also judge the reliability of sources, weigh alternatives, and defend choices. Theoretical analysis showed that competency-oriented summative assessment is especially effective when tasks combine subject knowledge with interpretation of evidence, explanation of reasoning, and justification of conclusions.

The procedural dimension highlighted the importance of transparency and reflection. Critical thinking does not flourish in assessment environments where criteria remain hidden or arbitrary. Students need to understand what counts as a strong argument, sufficient evidence, coherent reasoning, and valid conclusion. Analytic rubrics therefore perform a major scientific function: they translate abstract expectations into observable indicators of

thought quality. The analysis also revealed that reflection after summative assessment is not an optional supplement but a necessary condition for competency development. When students review their responses, compare them with criteria, identify weaknesses in reasoning, and consider alternative approaches, summative assessment extends beyond final grading and becomes a mechanism for intellectual growth.

Another important result concerns the role of metacognition. The study found that critical thinking in summative assessment cannot be reduced to outward performance alone. It is strengthened when students are taught to monitor how they arrive at answers, which assumptions they rely on, how they interpret evidence, and why they accept one conclusion over another. Assessment tasks that require explanation of reasoning, self-justification, or comparison of possible interpretations create a bridge between critical thinking and metacognitive control. This bridge is scientifically important because deep reasoning is more stable when students are aware of their own thought processes.

The analysis also showed that the developmental effect of summative assessment depends on the balance between standardization and intellectual openness. Excessive standardization often narrows the range of acceptable answers and discourages independent judgment. At the same time, total openness without clear criteria may produce subjectivity and uncertainty. The most effective theoretical model is a structured-open format in which tasks invite diverse reasoning paths, but evaluation is guided by explicit criteria related to relevance, logic, evidence, coherence, and originality.

Discussion

The findings confirm that the scientific and theoretical foundations of developing critical thinking competencies in summative assessment are rooted in a broader rethinking of assessment philosophy. Assessment can no longer be interpreted solely as a technical instrument for measuring end results. In competency-based education, it becomes part of the learning architecture itself. This shift is especially important in relation to critical thinking because such competency is not visible through mechanical recall. It is revealed through the quality of reasoning, the depth of interpretation, the ability to detect ambiguity, and the willingness to question unsupported assumptions.

From a constructivist perspective, knowledge is not passively absorbed but actively constructed through interaction with information, context, and prior understanding. Summative assessment aligned with this perspective should therefore require students to reconstruct knowledge in meaningful forms. When students analyze a case, interpret a text, compare positions, or propose solutions to a problem, they do more than display remembered content. They reorganize knowledge through active cognition. This explains why summative assessment can become a developmental arena rather than a terminal checkpoint.

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Bloom's revised taxonomy offers another important explanation. Educational practice has long suffered from an imbalance between lower-order and higher-order cognitive demands. Remembering and understanding remain necessary, but they are insufficient for the development of critical thinking. The taxonomy makes clear that applying, analyzing, evaluating, and creating represent qualitatively more complex forms of learning. Summative assessment that remains fixed at the first two levels cannot claim to measure, let alone develop, critical thinking competency. A scientifically grounded assessment model must therefore include tasks distributed across cognitive levels, with deliberate emphasis on analysis and evaluation.

The competency-based approach strengthens this argument by shifting attention from isolated knowledge units to integrated performance. Critical thinking is not simply the ability to answer difficult questions. It is the capacity to use knowledge responsibly and intelligently in new situations. This explains why authentic and contextualized tasks are so important. A student who can repeat a rule may still fail to apply it critically when facing contradictory evidence or a socially complex situation. Summative assessment should therefore place students in intellectually demanding contexts where reasoning matters more than routine reproduction.

Metacognitive theory adds a further layer of explanation. Critical thinking becomes deeper and more sustainable when students can regulate their own cognition. In practical terms, this means that students should not only answer but also explain how they arrived at answers, why they rejected alternatives, and where their reasoning may still be incomplete. Such procedures humanize assessment. They transform it from a silent judgment into a dialogue between performance and awareness. Even within summative settings, opportunities for self-analysis, rubric-guided reflection, and justification of reasoning can significantly increase the educational value of final assessment.

At the same time, the discussion must acknowledge several risks. One common mistake is to declare critical thinking as a goal while continuing to use assessment formats that reward speed, guessing, and formulaic responses. Another problem appears when teachers introduce open-ended tasks without corresponding criteria, which may weaken reliability and make evaluation inconsistent. There is also a danger of reducing critical thinking to verbal sophistication, where students are rewarded for complex language rather than sound reasoning. These risks show that the development of critical thinking through summative assessment requires not only new tasks but also teacher competence in assessment literacy, rubric construction, and interpretation of student reasoning.

The theoretical implications of this study are clear. Summative assessment can support critical thinking development when it is based on the following principles: intellectual

challenge, authenticity of context, transparency of criteria, coherence with instructional goals, emphasis on evidence-based judgment, and inclusion of reflective procedures. These principles provide a framework for designing assessment systems that are both academically rigorous and pedagogically developmental. In such a system, the final assessment does not close learning like a locked door. It works more like a mirror with teeth: it reflects achievement and bites gently enough to make students think harder next time.

CONCLUSION

The article has shown that the development of students' critical thinking competencies in summative assessment conditions has a strong scientific and theoretical foundation. Critical thinking is a multidimensional competency that includes analysis, evaluation, inference, justification, and reflection. Summative assessment can contribute to its development only when it moves beyond the narrow function of final control and becomes cognitively meaningful.

The theoretical analysis demonstrated that this process is grounded in constructivist learning theory, Bloom's revised taxonomy, competency-based education, and metacognitive regulation. These approaches collectively explain why students develop critical thinking when assessment tasks require interpretation, comparison, evidence-based argumentation, and reflective judgment. The study also identified the main pedagogical conditions that make such development possible: alignment between objectives and tasks, use of higher-order thinking formats, transparent rubrics, authentic contexts, and post-assessment reflection.

The main conclusion is that summative assessment should not be designed merely to determine what students remember at the end of instruction. It should be designed to reveal how students reason, how they evaluate information, and how they justify conclusions in complex situations. When this principle becomes central, summative assessment ceases to be a passive record of learning outcomes and turns into an active instrument for the cultivation of critical thinking competency.

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