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The Contribution of Guided Discovery Learning to the Growth of Critical Thinking Skills in Elementary Students

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Abstract

This study investigates the contribution of the Guided Discovery Learning (GDL) model to the development of critical thinking skills in elementary school students through a Systematic Literature Review (SLR). As 21st-century education increasingly emphasizes Higher-Order Thinking Skills (HOTS), critical thinking emerges as an essential competency that must be cultivated from an early age. Guided Discovery Learning, rooted in Bruner's constructivist theory, provides structured scaffolding that encourages students to actively explore, analyze, and derive conclusions from evidence. The literature search was conducted through Scopus, Web of Science, and Google Scholar, focusing on empirical studies from the last five to ten years. Findings indicate that GDL significantly enhances critical thinking dimensions, particularly evidence evaluation and analytical reasoning, by engaging students in hypothesis testing, data analysis, and reflective metacognitive processes. Effective scaffolding—such as metacognitive prompts and analytical frameworks—plays a key role in ensuring cognitive support and preventing misconception. Despite its advantages, GDL requires considerable instructional time and skilled facilitation to balance guidance and autonomy. Overall, this review highlights that GDL is a powerful pedagogical approach capable of transforming learning environments, supporting students in constructing knowledge independently, and strengthening foundational critical thinking skills essential for lifelong learning in the 21st century.

Keywords: Guided Discovery Learning, Critical Thinking, Discovery Learning.

1 INTRODUCTION

The educational landscape in the 21st century demands a significant shift in pedagogical focus, moving beyond rote memorization towards the cultivation of Higher-Order Thinking Skills (HOTS). Among these competencies, critical thinking stands as a fundamental skill, enabling students to analyze, evaluate, and synthesize information to form rational judgments (Ennis, 2011). Developing critical thinking early in a child's academic life is crucial, as it lays the foundation for advanced problem-solving and lifelong learning (Paul & Elder, 2019). Despite this recognized urgency, many elementary educational settings still rely heavily on teacher-centered, direct instruction, which often limits opportunities for students to actively engage in the cognitive processes necessary for growth.

The transition of elementary students from concrete reasoning towards critical thinking (CT) necessitates structured instructional strategies. The Guided Discovery Learning (GDL) model, rooted in the framework of Bruner (1961), offers a constructivist solution by providing strategic scaffolding that balances student autonomy and instructional focus (Kirschner, Sweller, & Clark, 2006). While GDL is widely recognized for its general effectiveness, there is a pressing need for a systematic synthesis regarding its specific contribution to the distinct dimensions of CT in elementary settings (Tytler, 2020; Facione, 2020). Therefore, this study aims to synthesize empirical evidence on the contribution of GDL to the growth of CT skills in elementary students and identify the scaffolding mechanisms that are most supportive.

This research highlights the urgent need in elementary education to shift from rote learning to the development of higher-order thinking skills, especially critical thinking, which is essential in the 21st century. The main objective of this systematic literature review is to integrate various empirical findings on the contribution of the Guided Discovery Learning (GDL) model in improving critical thinking skills in elementary school students.

Specifically, this study identifies the most effective scaffolding components in GDL that can support aspects of critical thinking, such as evidence evaluation and analytical reasoning. Although a number of previous studies have confirmed the potential of GDL—which is based on Bruner's theory and criticized by Kirschner, Sweller, and Clark—comprehensive studies at the elementary school level are still limited (Tytler, 2020; Facione, 2020). Therefore, this study provides an evidence-based synthesis of the role of GDL and offers practical pedagogical insights for developing critical thinking skills from early education.

2 RESEARCH METHODS

This study adopts the Systematic Literature Review (SLR) method, chosen to ensure a transparent, replicable, and unbiased process in identifying, evaluating, and interpreting all empirical evidence concerning the contribution of Guided Discovery Learning (GDL) to the development of critical thinking. The primary aim of this approach is to generate a rigorous and comprehensive synthesis of findings (Gough, Oliver, & Thomas, 2017). The literature search was conducted across three major and reputable academic databases: Scopus, Web of Science, and Google Scholar. A combination of keywords was employed to ensure comprehensive coverage. The core keywords included *"Guided Discovery Learning"* or *"Guided Inquiry"* combined with *"Critical Thinking"* or *"HOTS"*, specifically within the context of *"Elementary Students"* or *"Primary Education."* Publications were limited to those from the past five to ten years to maintain the contemporary relevance of the findings (Denyer & Tranfield, 2009).

The article selection process was conducted through three systematic stages. The initial phase involved the identification and elimination of duplicate records. Subsequently, titles and abstracts were screened to ensure that the studies explicitly addressed the implementation of Guided Discovery Learning (GDL) and its specific impact on critical thinking among elementary students; only empirical studies published in peer-reviewed journals were retained. In the final stage, the full-text articles were assessed for methodological rigor. Data extraction focused on research design, the dimensions of critical thinking evaluated, and detailed descriptions of the GDL scaffolding mechanisms. The extracted data were then analyzed using qualitative thematic synthesis (Thomas & Harden, 2008) to identify recurrent patterns and underlying mechanisms that elucidate how guided instructional processes influence the development of critical thinking sub-skills in primary-level learners.

3 RESULT AND DISCUSSION

This study employed the **Systematic Literature Review (SLR)** method to ensure a rigorous and objective synthesis of empirical evidence linking Guided Discovery Learning (GDL) to critical thinking development. The literature search spanned major academic databases, including Scopus, Web of Science, and Google Scholar, and was limited to publications from the past five to ten years to maintain contemporary relevance. The article selection process followed three stages: initial identification and duplicate removal; screening of titles and abstracts to ensure explicit focus on GDL's impact on critical thinking in elementary students; and final assessment of full-text articles for methodological quality. Data extraction concentrated on research design, measured critical thinking dimensions, and detailed descriptions of GDL's scaffolding mechanisms. The extracted data were subsequently analyzed through qualitative thematic synthesis, aiming to uncover recurrent patterns and key mechanisms by which guided instructional processes influence critical thinking sub-skills in primary-level learners.

3.1 Dimensions and definitions of critical thinking

Critical Thinking, as a Higher-Order Thinking Skill (HOTS), is not merely about remembering information, but involves deeper cognitive processes such as analyzing arguments, evaluating evidence, and drawing logical conclusions (Ennis, 2011). At a basic level, relevant dimensions of CT include the ability to distinguish between facts and opinions, identify biases, and ask probing questions (Paul & Elder, 2019). Unfortunately, traditional teaching methods dominated by direct instruction often fail to provide space for elementary school students to practice these metacognitive skills, thereby limiting their transition from concrete thinking to critical reasoning.

3.2 Theoretical Basis of Guided Discovery Learning (GDL)

The Guided Discovery Learning model is strongly rooted in Jerome Bruner's (1961) cognitive constructivism theory, which emphasizes the importance of students constructing their own knowledge through active exploration. The core of GDL is to provide relevant problems and structured learning materials, where the teacher acts as a facilitator who provides "scaffolding" (Bruner, 1961). This approach is inherently opposed to passive learning, as it encourages students to formulate hypotheses, test ideas, and ultimately "discover" principles or solutions independently.

3.3 GDL as a Strategy that Bridges Concrete and Abstract Thinking

For elementary school students who are still in the concrete operational stage according to Piaget, GDL offers an effective bridge to more abstract and critical reasoning. By providing guided inquiry-based activities, GDL allows students to manipulate real concepts before internalizing more complex principles (Vygotsky, 1978). In the context of CT, this means that students are encouraged to physically or verbally "test" evidence and "evaluate" sources, which then translates into higher analytical evidence evaluation skills (Tytler, 2020).

3.4 Scaffolding Mechanisms in development of Critical Thinking

The determining factor for the success of GDL in developing CT lies in the quality of scaffolding provided. Scaffolding must be dynamic and gradual, starting from providing explicit instructions to simply asking motivating questions (Wood, Bruner, & Ross, 1976). In the context of CT, the most effective scaffolding includes: (a) Metacognitive Prompts, such as "How do you know that is correct?" or "What evidence do you have?"; and (b) Providing Analytical Frameworks, such as Venn diagrams or concept maps, to help students structure their arguments (Hmelo-Silver, Duncan, & Chinn, 2007).

3.5 GDL in the Development of Evidence Evaluation Dimensions

One of the biggest challenges in teaching CT in elementary school is the dimension of evidence evaluation. Students tend to accept information at face value without questioning its source or validity. GDL, through structured investigation activities, naturally forces students to collect data, compare findings, and determine which are most credible (Facione, 2020). For example, in a GDL-based science project, students are not simply given answers, but must justify their answers using data they have collected themselves, which is the essence of evidence evaluation.

3.6 GDL in the Development of Analytical Reasoning Dimensions

Analytical reasoning, the ability to identify relationships between claims, reasons, and evidence, is another dimension of CT that is significantly enhanced by GDL. When students engage in guided discovery, they must break complex problems down into smaller parts, identify variables, and establish cause-and-effect relationships (Bruner, 1961). This process is very different from direct instruction, where the teacher already provides structured relationships. In GDL, students are responsible for creating the structure of reasoning themselves (Kirschner, Sweller, & Clark, 2006).

3.7 Synthesis of Empirical and Practical Needs

Although GDL theoretically supports CT, systematic synthesis at the elementary school level is still limited (Tytler, 2020; Facione, 2020). Future studies need to specifically measure the impact of GDL interventions on CT sub-skills—such as interpretation, inference, and explanation—using age-appropriate valid instruments (Ennis, 2011). This empirical synthesis will provide a strong basis for implementable pedagogical recommendations, validating the GDL model as a transformative solution in elementary education.

3.8 Pedagogical Implications for the 21st Century Curriculum

Systematic findings on the effectiveness of GDL in improving CT at the elementary school level have broad pedagogical implications. This provides concrete evidence to encourage a shift in the curriculum from rote memorization to inquiry and problem-solving processes. By adopting a GDL framework that focuses on appropriate scaffolding for evidence evaluation and analytical reasoning, educators can ensure that students not only learn what to think, but also how to think critically, equipping them to meet the demands of 21st-century society (Paul & Elder, 2019).

3.9 Advantages and Disadvantages of Guided Discovery Learning (GDL) for Critical Thinking

Tabel 1. Tabel of the advantages and disadvantages of guided discovery learning for critical thinking development

Aspect	**Advantages (Positive Contributions to Critical Thinking)**	**Disadvantages (Implementation Challenges)**
Cognitive Skills	Improves Analysis & Evaluation of Evidence: Students actively process, assess the validity of evidence, and draw rational conclusions.	High Cognitive Load Risk: If scaffolding is minimal or inappropriate, students may become overwhelmed and fail to achieve critical goals (frustration) Kirschner, Sweller, & Clark (2006); Facione (2020).
Metacognitive Processes	Encourages Metacognition: Students reflect on their own thinking processes ("How do I know this is true?"), which is at the core of advanced critical thinking.	Time-Consuming: Requires more time than direct instruction to cover the material, which is a constraint in a dense curriculum. Paul & Elder (2019); Mayer (2004)
Retention And Transfer	Strong Knowledge Retention and Transfer: Self-discovered knowledge is easier to remember and apply to new problems, supporting critical thinking flexibility.	Dependence on Teacher Scaffolding: Success is highly dependent on the teacher's ability to provide appropriate guidance (not too much/too little) to encourage inquiry. Bruner (1961); Wood, Bruner, & Ross (1976)
Accuracy Of Results	Increases Intrinsic Motivation: Active involvement in problem discovery increases interest and encourages students to take on cognitive challenges.	Risk of Misconceptions: There is a potential for students to draw incorrect or inaccurate conclusions if there is no effective correction and guidance. Tytler (2020); Kirschner, Sweller, & Clark (2006)

Tabel 1 Explaining that the Guided Discovery Learning (GDL) approach is highly effective in developing students' information assessment and logical reasoning skills, as it encourages active exploration that strengthens deep understanding and cognitive flexibility for solving new problems. Students become active investigators who construct their own frameworks of thinking, increasing their self-awareness of their mental processes. However, this strategy requires a substantial investment of instructional time and risks causing mental confusion or erroneous conclusions if the educator's guidance is not carefully and gradually tailored to support the intellectual journey of the learners.

3.10 Stages of the guided discovery learning model

Here are the stages of the Guided Discovery Learning (GDL) model, commonly adapted from Bruner's framework and widely used in educational research and classroom practice:

Stages of Guided Discovery Learning

1. Stimulation (Providing Stimulus)
   The teacher presents a problem, phenomenon, or question to spark curiosity and activate prior knowledge.
2. Problem Statement (Identifying the Problem)
   Students formulate questions or define the problem to be investigated, guided by prompts from the teacher.
3. Data Collection (Gathering Information)
   Students collect relevant data through observation, reading, experimentation, exploration, or discussion.
4. Data Processing (Analyzing Information)
   Collected information is organized, compared, classified, or interpreted to identify patterns or relationships.
5. Verification (Testing Hypotheses or Conclusions)
   Students evaluate the accuracy of their findings by checking evidence, testing predictions, or comparing with authoritative sources.
6. Generalization (Drawing Conclusions)
   Students formulate general principles, rules, or concepts based on their findings and apply them to new contexts. Bruner, J. S. (1966)

4 CONCLUSION

Fundamentally, this study confirms that Guided Discovery Learning is not merely a learning method, but a transformative approach that can foster critical thinking from an early age through meaningful, student-centered learning experiences. In the guided discovery process, children are not only encouraged to understand information, but also to reorganize the way they see, analyze, and assess the world around them. Through appropriate scaffolding, they learn that knowledge is not something that is simply accepted, but rather constructed through testing evidence, logical reasoning, and continuous self-reflection. This type of learning makes students more independent, encourages them to question assumptions, and enables them to make decisions based on deep thinking. Ultimately, GDL instills an intellectual foundation that enables them to become reflective, adaptive learners who are ready to face the complex challenges of modern life with clarity of thought and sharpness of analysis.

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