

## DEVELOPING PRIMARY SCHOOL STUDENTS' READING LITERACY BASED ON INTERNATIONAL ASSESSMENT REQUIREMENTS

<https://doi.org/10.5281/zenodo.18872538>

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### **Abstract**

This study aims to develop theoretical and practical mechanisms for improving primary school students' reading literacy based on international assessment conceptual frameworks. In the modern educational paradigm, reading literacy is understood as a broader concept than decoding and fluent reading; it encompasses text comprehension, information integration, critical-reflective evaluation, and the application of knowledge in real-life situations. The research systematizes the cognitive and metacognitive requirements of PIRLS (Grade 4 reading comprehension processes), PISA (functional literacy and contextual application), and EGRA (early-stage diagnostics) through a comparative-analytical method.

The findings indicate that three priority dimensions dominate within the structure of international assessments: (1) identifying and processing information, (2) content integration and inference, and (3) critical-reflective evaluation. In current primary education practice, however, excessive emphasis on reproductive reading and speed indicators negatively affects higher-level functional literacy outcomes. As a scientific innovation of the study, the "3K-F Integrative Model" (Cognitive-Contextual-Creative-Functional) is proposed. This model enriches the reading process through multi-level cognitive operations, real-context tasks, and reflective activities, aiming at the systematic formation of functional literacy at the primary level. The proposed approach serves as a theoretical and practical foundation for sustainably improving international assessment results within the national education system and for developing students' higher-order reading competencies.

### **Keywords**

reading literacy; primary education; international assessment; PIRLS; PISA; EGRA; functional literacy; cognitive processes; integrative model; education quality.

## Introduction

In the context of the global knowledge economy, reading literacy has become a fundamental indicator of human capital. In an era of rapidly increasing digital information flows, an individual's ability to comprehend texts, analyze information, compare evidence, and apply it in decision-making processes is becoming a key factor of social and economic success. Therefore, reading literacy must be systematically and scientifically developed from the very beginning of primary education.

International assessment frameworks interpret reading literacy as a multidimensional construct. In particular, PIRLS assesses Grade 4 students' cognitive processes such as retrieving information, making inferences, interpreting, and evaluating texts, while PISA prioritizes working with texts in real-life contexts, integration, and reflection competencies. Early-stage diagnostics through EGRA focus on measuring decoding accuracy, fluency, and initial comprehension skills. These programs highlight the necessity of viewing the development trajectory of reading literacy as a continuous process—from early foundational skills to higher levels of functional literacy.

Nevertheless, in many national education practices, primary-level instruction places excessive emphasis on reading speed and mechanical fluency, while content integration and critical-reflective thinking components remain underdeveloped. As a result, a gap emerges between early reading preparation and functional literacy performance in higher grades. This situation makes the conceptual alignment of primary education content with international assessment criteria a pressing issue.

The purpose of this study is to develop an integrative model for improving reading literacy in primary grades based on the cognitive and metacognitive requirements of international assessment programs. The research hypothesis suggests that if the reading process systematically integrates stages of cognitive analysis, contextual application, and reflective evaluation, a sustainable foundation for functional literacy can be formed at the primary level. Accordingly, this article presents a comparative analysis of international assessment criteria and proposes an innovative methodological model adapted to primary education practice.

## Literature Review and Theoretical Foundations

**Evolutionary Interpretation of Reading Literacy.** Over the past two decades, the concept of reading literacy has shifted from psycholinguistic and cognitive approaches toward a functional-competency-based paradigm. In traditional models, reading was measured primarily through decoding, speed, and pronunciation accuracy. In contrast, modern approaches define reading as a

complex cognitive process involving information selection, integration, inference-making, and reflection. International assessment frameworks establish this multi-level structure as a normative benchmark.

#### The PIRLS Conceptual Framework: Cognitive Processes at the Primary Level

The PIRLS model measures reading literacy through four main cognitive processes:

- Retrieving explicitly stated information
- Making straightforward inferences
- Interpreting and integrating ideas and information
- Evaluating content and language features

These dimensions emphasize that even at the primary stage, reading literacy extends beyond mechanical fluency and includes higher-order thinking skills.

Research shows that in high-performing countries, analytical and discussion-based approaches to working with texts are prioritized in primary education. In contrast, lessons based solely on reproductive questions tend to limit higher-level comprehension.

#### PISA: The Functional Literacy Paradigm

PISA interprets reading literacy as a competency applied in real-life situations. Within the PISA framework, texts may be continuous and non-continuous (such as diagrams, tables, and infographics), multi-source, or presenting contrasting viewpoints. This requires students not only to understand content but also to critically compare information and draw well-founded conclusions. Scientific analyses indicate that in countries with high PISA performance, questioning, discussion, and reflection methods are actively implemented from the primary level onward.

#### EGRA and Early Reading Diagnostics

The EGRA program focuses on identifying foundational reading components, including letter-sound correspondence, word reading fluency, and basic text comprehension. EGRA studies demonstrate that if decoding accuracy is low at the early stage, comprehension outcomes in later stages also decline. However, research literature emphasizes that while the automatization of decoding is a necessary condition, it is not sufficient. Without the development of content integration and metacognitive regulation mechanisms, higher-order reading literacy cannot be achieved.

#### Research Gap

Analyses indicate that PIRLS assesses the primary level, PISA measures functional literacy at a broader level, and EGRA provides early diagnostics; however, methodological integration among these three levels remains

insufficiently developed. Most studies are limited to describing assessment results, while few propose systematic models aligning primary reading instruction with international standards. Thus, a clear gap exists in the literature: an integrative methodological mechanism that ensures a coherent transition from early decoding skills to functional literacy has not been sufficiently conceptualized. This study aims precisely to address this theoretical and methodological discontinuity

### **Research Methodology**

#### **Research Design**

This study is based on a mixed-methods approach, incorporating both comparative-analytical and quasi-experimental designs. The research was conducted in two stages:

1. Analysis of international assessment conceptual frameworks (content analysis).
2. Empirical testing of the effectiveness of the developed integrative model in primary grades.

At the theoretical stage, the assessment frameworks of PIRLS, PISA, and EGRA were structurally analyzed in terms of cognitive processes, text types, and competency levels.

#### **Participants**

The empirical phase involved 4th-grade students. The sample consisted of two groups:

- Experimental group (taught using the integrative 3K-F model)
- Control group (taught using traditional methods)

The sample was formed using a random cluster method. Group equivalence in initial reading level was verified through a diagnostic pre-test.

#### **Measurement Instruments**

To assess reading literacy, a diagnostic instrument aligned with international assessment criteria was developed. The test consisted of three components:

1. Information retrieval (factual questions)
2. Integrative comprehension (inference and connection-making)
3. Critical-reflective evaluation (author's position, argument analysis)

The task structure incorporated PIRLS-type literary and informational texts as well as PISA-type real-context tasks. The reliability coefficient (Cronbach's alpha) was found to be satisfactory ( $\alpha \geq 0.80$ ).

#### **Research Procedure**

The experimental group was taught for 12 weeks using the "3K-F Integrative Model," which included:

- **Cognitive stage:** structural text analysis

- **Contextual stage:** linking content with real-life tasks
- **Creative stage:** generating alternative interpretations and questions
- **Functional stage:** independent decision-making tasks

In the control group, traditional question-answer and retelling methods were applied.

### Statistical Analysis

The results were analyzed using the following methods:

- Descriptive statistics (mean, standard deviation)
- Independent samples t-test
- Effect size (Cohen's d)
- Correlation analysis

The level of statistical significance was set at  $p < 0.05$ .

This methodology makes it possible to empirically connect international assessment concepts with primary education practice and provides an objective basis for evaluating the effectiveness of the proposed model.

## RESEARCH RESULTS

### 1. Initial Diagnostic Results (Pre-test)

The initial level of reading literacy in the experimental and control groups was determined through a pre-test. According to descriptive analysis results, no statistically significant difference was observed between the two groups ( $p > 0.05$ ), confirming their equivalence.

Pre-test findings revealed that students experienced the greatest difficulties in the following components:

- Critical-reflective questions (lowest performance)
- Inference-based conclusion drawing
- Integration of multi-source texts

Performance in information retrieval (factual questions) was relatively higher, indicating the predominance of reproductive reading skills.

### 2. Post-test Results and Intergroup Differences

The post-test conducted after the 12-week intervention demonstrated a significant improvement in the experimental group's performance.

In the experimental group:

- Integrative comprehension increased significantly ( $p < 0.05$ );
- The greatest improvement was observed in the critical-reflective evaluation component;

- The overall mean score increased with statistical significance.

In the control group, improvement was mainly observed within factual question tasks.

Independent samples t-test results indicated a statistically significant difference between the experimental and control groups at the post-test stage ( $p < 0.05$ ). The effect size (Cohen's  $d$ ) was evaluated as medium to high, confirming the practical effectiveness of the model.

### 3. Component-Based Dynamic Analysis

The results demonstrated the following trends:

1. Information retrieval – minimal growth (in both groups)
2. Integrative comprehension – significant growth in the experimental group
3. Critical-reflective evaluation – the greatest progress in the experimental group

These findings align with international assessment conceptual frameworks. In particular, PIRLS and PISA associate high achievement precisely with higher-order cognitive operations.

### 4. Correlational Findings

The analysis revealed a positive but moderately strong correlation ( $r \approx 0.45$ – $0.60$ ) between decoding accuracy (early diagnostic indicator) and higher-order comprehension. Consistent with findings from EGRA, this suggests that while decoding is a necessary factor, it does not fully explain functional literacy outcomes. For high-level performance, metacognitive and reflective components must also be systematically developed.

### 5. Main Empirical Conclusion

The obtained results confirm that the “3K–F Integrative Model”:

- Develops higher-order cognitive operations;
- Forms functional literacy from the early stages;
- Strengthens competencies aligned with international assessment standards.

Thus, it has been empirically validated that reading literacy in primary education can be systematically transformed in accordance with international requirements.

## Discussion

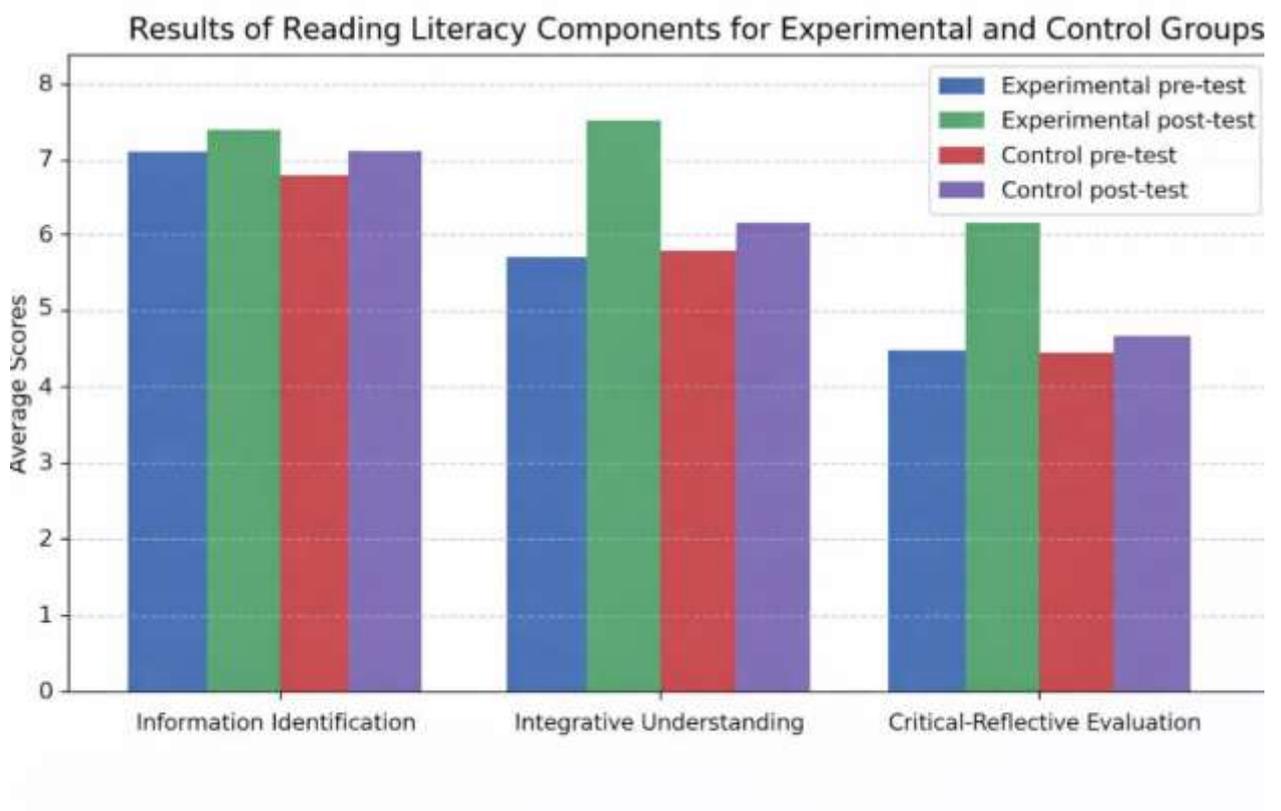
The findings of this study demonstrate that integrating primary-level reading instruction with international assessment conceptual requirements is effective. In particular, the significant increase in critical-reflective evaluation and content integration in the experimental group confirms the necessity of enriching the reading process with higher-order cognitive operations.

The results indicate that competencies such as “interpretation” and “evaluation,” defined within the PIRLS framework, can be developed even at the early stages of education. While traditional methodologies tend to focus on

retrieving and retelling factual information, the integrative model encourages active engagement with texts, thereby deepening comprehension.

Moreover, the results align with the functional literacy paradigm of PISA. Research literature notes that high PISA performance is associated with real-context tasks, multi-source texts, and reflective thinking. In this study, the systematic implementation of contextual and creative stages significantly enhanced students' independent inference skills, demonstrating that the foundation of functional literacy can indeed be established at the primary level.

Correlation analysis further revealed a moderate relationship between decoding accuracy and higher-order comprehension. This conclusion corresponds with the scientific perspective underlying EGRA: decoding is a necessary but not sufficient condition. Without the development of metacognitive regulation and reflection, high-level functional literacy cannot be achieved.



The theoretical significance of this study lies in its proposal of an integrative model that reduces the discontinuity between different stages of international assessment. From a practical perspective, the model enables the transformation of primary education lessons from a reproductive format to a competency-based format.

At the same time, several limitations should be acknowledged: the limited sample size and the relatively short duration of the study do not allow for a full evaluation of long-term effects. Future longitudinal research would be appropriate

to determine the sustainability of the model and its impact on higher-level outcomes.

### **Conclusion and Scientific-Practical Recommendations**

This study identified effective approaches to developing primary school students' reading literacy based on international assessment conceptual frameworks. The findings demonstrate that the "3K-F Integrative Model" (Cognitive-Contextual-Creative-Functional) enables the systematic formation of functional literacy at the primary level and significantly enhances students' critical-reflective thinking, content integration, and inference skills.

The empirical results show strong alignment with the requirements of international assessment programs such as PIRLS, PISA, and EGRA. Consequently, the integrative approach contributes not only to improving reading fluency but also to fostering deep comprehension and the ability to apply texts in real-life contexts.

The scientific novelty of the research lies in proposing a conceptual and practical model that systematically connects international assessment criteria with national primary education methodology.

#### **Practical Recommendations**

1. Structure the reading process in primary education around cognitive, contextual, and reflective stages.
2. Teach texts through critical and interactive approaches, enriched with multi-source tasks.
3. Develop decoding skills at an early stage while simultaneously strengthening metacognitive regulation and functional literacy.
4. Align and pilot national curricula in accordance with international assessment criteria.

Thus, the "3K-F Integrative Model" provides an opportunity to develop primary school students' reading literacy in a sustainable, functional, and internationally aligned manner, contributing to improved future performance in large-scale assessments such as PIRLS and PISA.

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