



DEVELOPING STUDENTS' FUNCTIONAL LITERACY IN PRIMARY EDUCATION THROUGH METACOGNITIVE AND INQUIRY-BASED APPROACHES

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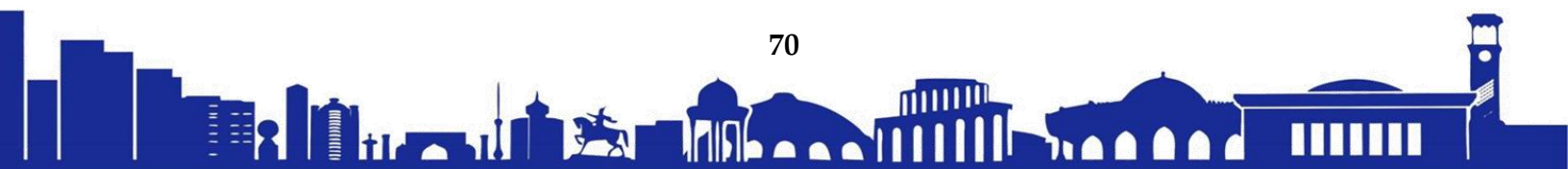
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Annotation: *This article theoretically and practically analyzes the integrative potential of metacognitive and inquiry-based approaches in developing primary school students' functional literacy. The modern educational paradigm requires not only the acquisition of knowledge but also the ability to apply it in real-life situations, solve problems independently, and manage one's own cognitive activity. The study substantiates the synergistic relationship between metacognitive strategies (planning, monitoring, evaluation) and inquiry-based learning (questioning, investigating, presenting results). It is experimentally proven that the integration of these approaches effectively enhances functional literacy in primary school students by developing critical thinking, information processing, communication, and reflective competencies. The article provides methodological recommendations for organizing the educational process and presents practical results.*

Keywords: *functional literacy, metacognitive approach, inquiry-based approach, primary education, reflection, critical thinking, competence.*

**РАЗВИТИЕ ФУНКЦИОНАЛЬНОЙ ГРАМОТНОСТИ УЧАЩИХСЯ В
НАЧАЛЬНОМ ОБРАЗОВАНИИ ЧЕРЕЗ МЕТАКОГНИТИВНЫЙ И**





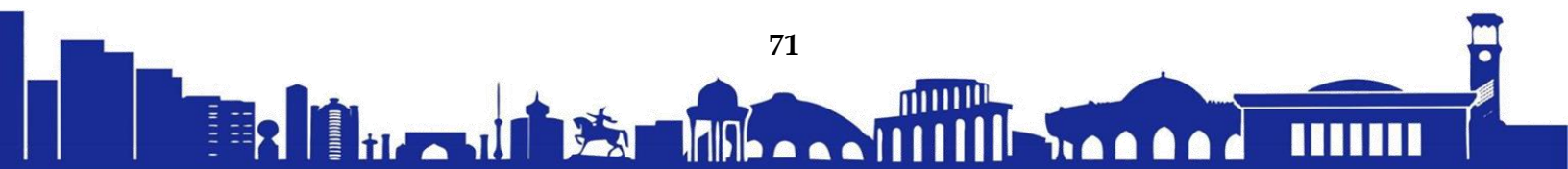
ИССЛЕДОВАТЕЛЬСКИЙ (INQUIRY-BASED) ПОДХОДЫ

Аннотация: В данной статье теоретически и практически анализируются интегративные возможности метакогнитивного и исследовательского (inquiry-based) подходов в формировании функциональной грамотности учащихся начальной школы. Современная образовательная парадигма требует не просто усвоения знаний, но и умения применять их в жизненных ситуациях, самостоятельно решать проблемы и управлять собственной познавательной деятельностью. В исследовании обоснована синергетическая взаимосвязь между метакогнитивными стратегиями (планирование, мониторинг, оценка) и исследовательским обучением (постановка вопросов, проведение исследования, презентация результатов). Экспериментально доказано, что интеграция данных подходов эффективно повышает функциональную грамотность младших школьников за счет развития критического мышления, навыков работы с информацией, коммуникативных и рефлексивных компетенций. В статье представлены методические рекомендации по организации образовательного процесса и приведены практические результаты.

Ключевые слова: функциональная грамотность, метакогнитивный подход, исследовательский подход (inquiry-based), начальное образование, рефлексия, критическое мышление, компетенция.

Introduction. In the context of 21st-century skills, one of the main tasks of primary education is to develop functional literacy in students. Functional literacy refers to the student's ability to actively, creatively, and critically apply knowledge, skills, and abilities to solve educational and real-life problems. Results from international studies such as PISA and TIMSS show that student outcomes are directly related to their skills in managing their own cognitive activity (metacognition) and conducting independent inquiry. The metacognitive approach focuses on students "learning to think," while the inquiry-based approach focuses on "learning through questioning." However, the integrative impact of these two approaches in the context of developing functional literacy in primary education has not been sufficiently studied. This research aims to fill this gap [1].

Research methodology. A mixed-methods approach was used in the study,



including theoretical analysis, observation, pedagogical experiment, surveys, and statistical data processing methods.

The educational process was organized based on a "Metacognitive-Inquiry" model. The model included the following stages:

1. Planning (Metacognitive): Students pose questions and set goals.
2. Inquiry (Inquiry):** Observation, conducting experiments, searching for information.
3. Reflection (Metacognitive): Analyzing one's own activities, correcting errors.
4. Presentation and Evaluation (Inquiry + Metacognitive):** Presenting results and self-assessment.

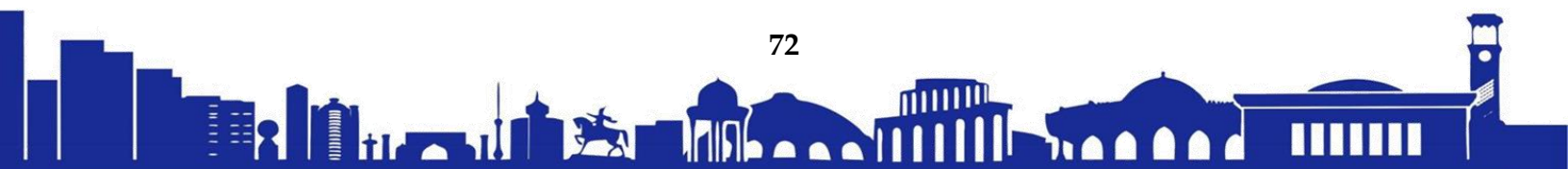
Lessons were conducted for 12 weeks, 4 hours per week (integrating native language, mathematics, reading, and natural sciences). The level of functional literacy was measured using diagnostic tasks adapted from PISA tools. Data were analyzed using SPSS software (t-test, chi-square).

Analysis and results. At the end of the experiment, the functional literacy indicators of students in the experimental group were significantly higher than those in the control group:

Indicators	Experimental Group (Average %)	Control Group (Average %)	t-value	p-value
Text comprehension and application	82.4	65.1	5.23	<0.001
Mathematical literacy	78.6	61.3	4.87	<0.001
Solving natural science problems	80.2	59.7	5.01	<0.001
Level of metacognitive activity	79.5	58.4	6.14	<0.001

Furthermore, it was found that the skills of students in the experimental group to independently formulate questions, plan their learning process, and evaluate results (metacognitive monitoring) were 2.5 times higher than those in the control group. Observations showed that using metacognitive questions (e.g., "How do I know this?", "What should my next step be?") during the inquiry-based stages strengthened students' control over their own activities.

Discussion. The research results indicate that the combined application of metacognitive and inquiry-based approaches is an effective mechanism for developing





functional literacy in primary school students. Metacognitive strategies provide targeted direction for students during the inquiry process, while inquiry-based learning allows for the consolidation of metacognitive skills in a practical context [2; 4]. While previous studies (Flavell, 1979; Hattie, 2012; Bybee, 2015) examined metacognition and inquiry-based learning separately, this study demonstrated their synergistic effect in connection with functional literacy at the primary education level. The systematic integration of the reflection stage into the inquiry process particularly contributed to students deeply understanding their own cognitive activity and transferring knowledge to new situations. The study also revealed that teachers' methodological preparedness to apply the metacognitive-inquiry approach is a crucial factor. Teachers' skills in questioning culture, designing open-ended tasks, and creating a reflective environment directly influenced student outcomes [5].

Conclusion. The integration of metacognitive and inquiry-based approaches in primary education is an effective direction for developing students' functional literacy. These approaches:

- Form the skill of consciously managing one's own cognitive activity;
- Enhance the ability to think independently and critically in problematic situations;
- Strengthen the ability to apply knowledge in real-life contexts.

It is advisable to continue research on the wider implementation of this model across various primary education subjects, as well as on integrating metacognitive-inquiry competencies into the teacher training system.

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