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KLASTER METODIDAN FOYDALANISH ORQALI OLIY TA'LIM TALABALARI O'QISH KO'NIKMALARINI TAKOMILLASHTIRISH

Eshankulov Shukhrat Shernazarovich

Jizzax davlat pedagogika universiteti, o'qituvchi

Annotatsiya

Mazkur maqolada oliy ta'lim muassasalarida murakkab ilmiy va badiiy matnlarni o'qib tushunish jarayonida talabalar duch keladigan qiyinchiliklarni bartaraf etishda klaster metodining samaradorligi tadqiq etiladi. Grafik organayzerlar, aqliy xaritalar (mind mapping) va konseptual xaritalar asosida qo'llaniladigan klaster metodi o'qish ko'nikmalarini rivojlantirishning samarali pedagogik strategiyasi sifatida tahlil qilinadi. Tadqiqot o'n yettita ilmiy manba asosida olib borilib, universitet talabalari ishtirokidagi empirik izlanishlar natijalari umumlashtirilgan. Tadqiqot metodologiyasi o'qishdan oldingi g'oyalarni faollashtirish, o'qish jarayonida ma'lumotlarni tizimlashtirish va o'qishdan keyingi sintez bosqichlarini qamrab oladi. Natijalar klaster metodidan foydalangan talabalar an'anaviy o'qitish usullariga nisbatan yuqori natijalarga erishganini, ayrim tadqiqotlarda ko'rsatkichlar 54 foizgacha oshganini ko'rsatadi. Shuningdek, talabalar ushbu metodni xotira yuklamasini kamaytiruvchi va matn tuzilmasini yaxshiroq anglashga yordam beruvchi samarali kognitiv tayanch sifatida baholaganlar. Tadqiqot xulosalariga ko'ra, klaster metodi 5.0 jamiyati sharoitida akademik savodxonlik va uzoq muddatli bilimlarni o'zlashtirishni rivojlantirishning samarali vositasi hisoblanadi.

Kalit so'zlar: klaster metodi, o'qib tushunish, oliy ta'lim, aqliy xaritalar, grafik organayzerlar, ma'lumotlarni eslab qolish, akademik savodxonlik, EFL ta'limi.

СОВЕРШЕНСТВОВАНИЕ НАВЫКОВ ЧТЕНИЯ СТУДЕНТОВ ВЫСШИХ УЧЕБНЫХ ЗАВЕДЕНИЙ С ИСПОЛЬЗОВАНИЕМ КЛАСТЕРНОГО МЕТОДА

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Аннотация

В статье исследуется эффективность кластерного метода как педагогической стратегии развития навыков чтения у студентов высших учебных заведений при работе со сложными научными и художественными текстами. Кластерный метод, реализуемый посредством графических органайзеров, интеллект-карт и концептуальных схем, рассматривается как эффективный инструмент повышения качества понимания прочитанного. Исследование основано на анализе семнадцати научных источников и обобщает результаты ряда эмпирических работ, проведенных со студентами университетов. Методология включает три этапа: активизацию знаний до чтения, структурирование информации в процессе чтения и синтез материала после чтения. Количественные результаты показывают, что студенты, использующие кластерный метод, демонстрируют более высокие показатели по сравнению с традиционными методами обучения, а в отдельных исследованиях улучшение достигало 54 %. Качественные данные свидетельствуют о том, что данный метод воспринимается обучающимися как эффективная когнитивная опора, снижающая нагрузку на память и способствующая лучшему пониманию структуры текста. Сделан вывод о том, что кластерный метод является эффективным средством развития академической грамотности и долговременного усвоения информации в условиях общества 5.0.

Ключевые слова: кластерный метод, понимание прочитанного, высшее образование, интеллект-карты, графические органайзеры, сохранение информации, академическая грамотность, обучение английскому языку как иностранному.

IMPROVING READING SKILLS OF HIGHER EDUCATION STUDENTS USING THE CLUSTER

METHOD

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Abstract

This article investigates the effectiveness of the cluster method as a pedagogical strategy for improving reading comprehension among higher education students dealing with complex academic and narrative texts. Implemented through graphic organizers, mind mapping, and concept mapping, the cluster method is examined as an effective tool for enhancing reading skills. Drawing on seventeen scholarly sources, the study synthesizes findings from multiple empirical investigations involving university students. The methodology encompasses three stages: pre-reading activation of ideas, structural organization during reading, and post-reading synthesis. Quantitative findings reveal that students using the cluster method consistently outperform those taught through traditional instructional techniques, with some studies reporting improvements of up to 54 percent. Qualitative evidence indicates that learners perceive the method as an effective cognitive scaffold that reduces memory load and improves understanding of textual structure. The study concludes that the cluster method is a valuable approach for fostering academic literacy and long-term information retention in the educational environment of Society 5.0.

Keywords: cluster method, reading comprehension, higher education, mind mapping, graphic organizers, information retention, academic literacy, EFL instruction.

In the contemporary academic landscape, characterized by the Society 5.0 development era, information and communication technology (ICT) has fundamentally transformed the nature of literacy. University students are increasingly required to navigate nonlinear, interconnected digital environments that have largely replaced traditional printed media (Habok et al., 2025; Rinantanti et al., 2024). Despite these advancements, the pedagogy of reading instruction in higher education continues to face substantial obstacles. Many undergraduate students, particularly those in English as a Foreign Language (EFL) and English for Specific Purposes (ESP) contexts, encounter difficulties in comprehending structurally dense academic texts (Marginingsih et al., 2025).

Problem Statement and Rationale

The primary challenge identified in the literature involves students categorized as poor readers due to limited vocabulary, complex sentence structures, and a lack of awareness regarding effective reading strategies (Alkhateeb et al., 2016; Devi, 2021). Conventional instructional approaches often rely on monotonous, teacher-centered techniques that fail to provide students with the strategic tools necessary to decode complex discourse (Abeywickrama & Samarakoon, 2021; Chen & Abdullah, 2024). This pedagogical deficit often leads to student boredom and inadequate comprehension of specialized materials in STEM and professional disciplines (Hezam et al., 2022).

The cluster method, also referred to as semantic mapping, mind mapping, or graphic organization, is proposed as a solution to these challenges. This methodology allows students to group ideas into a structured framework, mimicking the brain's natural "Radiant Thinking" process (Buzan, 2008; Nasution et al., 2023). By visualizing the links between concepts using words, colors, and symbols, students can impose structure upon the inherent informational complexity of a text (Marginingsih et al., 2025).

Theoretical Framework

The implementation of the cluster method is grounded in two primary psychological theories. First, Dual Coding Theory posits that information is better retained and processed when it is encoded both verbally and visually (Luo, 2023; Paivio, 1986). By using graphical representations alongside textual input, students build multiple mental models that facilitate easier retrieval. Second, Schema Theory suggests that comprehension improves when new information aligns with a learner's existing knowledge structures (Alfares, 2019; Han, 2025). The cluster method serves as a pre-reading tool that activates formal schemata, allowing students to systematically assimilate new data

into their cognitive frameworks (Phan Thuy Trang, 2017).

Research Questions and Hypotheses

Based on the synthesis of the provided materials, this study seeks to address the following questions:

1. What is the impact of using the cluster method on the reading comprehension scores of university students compared to traditional instructional techniques?
2. How does the application of different cluster formats (e.g., digital vs. paper-based) affect student performance and information retention?
3. What are the perceptions of students regarding the benefits and challenges of integrating the cluster method into their academic reading tasks?

It is hypothesized that students utilizing cluster-based strategies will achieve significantly higher post-test scores and demonstrate superior long-term retention compared to those using conventional linear methods (Bandara & Prahalathan, 2023; Saori, 2020).

Method

The research methodology synthesized from the provided sources predominantly utilizes a mixed-methods explanatory sequential design (Marginingsih et al., 2025; Sagita et al., 2024). This approach combines quantitative quasi-experimental phases with qualitative thematic analysis to provide a comprehensive understanding of the intervention's impact. The quantitative phase involves pre-test and post-test measurements for experimental and control groups, while the qualitative phase involves interviews and student feedback forms.

Participants and Setting

The subjects involved in the various investigations include undergraduate students from diverse international contexts, such as Indonesia, Vietnam, and Taiwan. Sample sizes range from smaller cohorts of 40 students (Bandara & Prahalathan, 2023) to larger groups of 200 participants (Marginingsih et al., 2025). Most participants are in their first or second year of study and are classified at the intermediate (B1) level of English proficiency according to the Common European Framework of Reference for Languages (CEFR) (Celik et al., 2024). Purposive sampling is typically employed to ensure the participants have adequate exposure to technology-related content relevant to their academic majors, such as Information Systems or English Education. The provided materials do not specify the exact gender distribution or socioeconomic background of the participants across all studies.

Procedures and Materials

The cluster-based reading methodology generally follows a three-stage instructional framework:

1. **Pre-Reading Stage (Activation):** The instructor introduces a topic and asks students to share as many related words as possible. These suggestions are recorded in an initial visual cluster or map to activate prior knowledge and provide a content overview (Khatimah & Rachman, 2018; Marginingsih et al., 2025).
2. **Whilst-Reading Stage (Mapping):** As students interact with the text, they identify main ideas, signal words, and discourse markers. They construct a learner's map by drawing a central topic circle and branching out with key phrases that represent the storyline or technical process (Nasution et al., 2023). In digital settings, students utilize software such as XMind, iMindMap, or Canva on tablets (Sagita et al., 2024; Tsai, 2025).
3. **Post-Reading Stage (Synthesis):** After finishing the reading, students add details to their clusters and use their maps to discuss the generic structure of the text in small groups. Finally, students use the visual map as a blueprint for writing a summary of the text (Marginingsih et al., 2025).

Data Collection Instruments

The following instruments were employed across the sources to measure reading skills:

- **Reading Comprehension Tests (RCTs):** Multiple-choice exams (often 10 to 30 items) based on authentic academic or narrative texts. These tests assess word recognition, inferencing, and main idea identification (Celik et al., 2024; Phan Thuy Trang, 2017).
- **Summarization Rubrics:** Validated rubrics used to evaluate students' written summaries across four

dimensions: Accuracy, Paraphrasing, Focus, and Language Structure (Marginingsih et al., 2025).

- Delayed Comprehension Tests (DCTs): Administered two weeks after the initial intervention to measure the long-term impact on information retention (Alkhateeb et al., 2016; Andoko et al., 2020).
- Feedback Questionnaires: Likert-scale and open-ended items designed to capture student attitudes and perceptions toward the cluster method (Bandara & Prahalathan, 2023).

Data Analysis

Quantitative data were analyzed using IBM SPSS to calculate means and standard deviations. Inferential statistics, such as paired-sample t-tests and ANCOVA (using pre-test scores as a covariate), were performed to determine the statistical significance of score improvements (Saori, 2020). Effect sizes were calculated using Cohen's d or Hedges' g to assess the practical importance of the findings. Qualitative data from open-ended responses underwent thematic coding to identify recurring patterns such as "cognitive scaffolding" and "increased motivation."

Results

Overall Reading Performance

The implementation of the cluster method resulted in significant statistical improvements in reading comprehension scores across all reviewed experimental settings. In one representative study involving university students, the experimental group taught with mapping strategies achieved a mean post-test score of 71.76, which was significantly higher than the control group's mean of 60.24 (Saori, 2020). The analysis of covariance (ANCOVA) confirmed this difference was statistically significant ($F = 23.5$, $p < 0.001$), indicating that the intervention accounted for approximately 43 percent of the variance in achievement scores.

A separate study involving 200 Indonesian university students in Information Systems found that students using the cluster method achieved a mean rubric score of 3.46 on a 5-point scale, which is described as above-average competency (Marginingsih et al., 2025). Furthermore, a study in Vietnam reported that the experimental group's post-test mean ($M = 7.65$) was notably higher than that of the control group ($M = 6.4$) after a seven-week intervention period (Phan Thuy Trang, 2017).

Impact on Different Reading Habits

The provided materials indicate that the cluster method is effective for students regardless of their initial reading habits. In a study comparing excellent and poor readers, both groups showed commendable gains. For students with poor reading habits, post-test scores rose from 43.4 to 61.23, representing a substantial performance increase compared to those receiving conventional instruction (Ayiz & Hidayatulloh, 2024).

Information Retention and Recall

Delayed comprehension tests (DCTs) conducted two weeks after the instruction provided evidence of superior long-term cognitive benefits. Students in the "kit-build" mapping conditions could recall 86 percent of the questions whose answers were included in their visual maps, whereas those using a selective underlining strategy recalled significantly less information (Alkhateeb et al., 2016). This indicates that the non-linear, structured nature of the cluster method facilitates more effective memory storage and retrieval.

Table 1

Comparative Student Performance by Rubric Dimension

Rubric Dimension	Mean Score (1 to 5)	Percentage of High Performance (4 to 5)
Focus and Relevance	3.81	57.5%
Accuracy	3.72	57.5%

Rubric Dimension	Mean Score (1 to 5)	Percentage of High Performance (4 to 5)
Language Structure	3.34	44.5%
Paraphrasing	2.98	32.5%

The rubric-based analysis revealed that students performed best in the Focus and Relevance and Accuracy dimensions. This suggests that the cluster method effectively helps students identify main ideas and maintain topical coherence. However, paraphrasing emerged as the weakest area, with only 32.5 percent of students achieving high performance. This indicates that while students visually understand the text, they still struggle to reformulate the information in their own words.

Comparison of Cluster Formats

The materials provided distinguish between the efficacy of various cluster formats. A comparison of text structures found that T-Charts used for cause-and-effect texts ($M = 3.67$) resulted in higher comprehension scores than Venn Diagrams used for compare-and-contrast texts ($M = 3.24$). This difference yielded a medium effect size of Cohen's $d = 0.56$ (Marginingsih et al., 2025).

Regarding technology, digital mind mapping (BU group) outperformed top-down approaches (TD group) in identifying key information nodes and structural links (Tsai, 2025). However, meta-analytical data also highlights a persistent debate: some evidence suggests that traditional paper-based mapping may engage deeper cognitive processing because the physical act of drawing connections by hand is a slower and more intentional process (Han, 2025).

Student Perceptions and Attitudes

Qualitative thematic analysis of 200 open-ended responses revealed a highly positive reception to the cluster method. Three major themes were identified:

1. Cognitive Scaffolding: 78 percent of participants mentioned that the visual framework made structural relationships clear. One student noted that the T-chart helped them see how network security problems cause specific system failures (Marginingsih et al., 2025).
2. Strategy Transfer: 69 percent of students reported that they now automatically look for structural patterns when reading technical manuals in other courses (Marginingsih et al., 2025).
3. Motivation and Engagement: Students expressed that using colors and symbols made learning reading "easy and interesting," often likening the activity to an enjoyable game (Khatimah & Rachman, 2018; Rahat et al., 2020).

Discussion

Interpretation of Findings

The results provide robust evidence that the cluster method serves as a superior methodology for enhancing the reading skills of higher education students compared to traditional techniques. This success is largely explained by Dual Coding Theory and Schema Theory. By requiring students to simultaneously process visual and verbal information, the cluster method engages higher-order cognitive processes of information selection and organization (Tsai, 2025). The visualization of concepts reduces the cognitive load on memory, allowing students to process complex technical information in manageable components (Andoko et al., 2020).

The significant difference in post-test scores (e.g., $M = 71.76$ vs. $M = 60.24$) suggests that the cluster method transforms reading from a passive act of "scanning words" into an active, constructive process (Saori, 2020). The methodology's effectiveness in increasing long-term retention (86 percent recall) further supports the idea that structural visualization creates more durable memory traces than linear note-taking.

Linguistic vs. Structural Benefits

A critical finding of this research is the disparity between structural understanding and linguistic production. While the cluster method allows students to identify main ideas and maintain focus, it does not automatically resolve deficits in paraphrasing and academic writing. Students frequently maintained a visual understanding of the text while still relying on verbatim copying from the source material for their written summaries (Marginingsih et al., 2025). This underscores that visual scaffolding, while powerful, must be combined with explicit linguistic instruction, such as synonym replacement drills and guided rephrasing exercises, to achieve full academic literacy (Parameswari et al., 2024). The provided materials do not specify whether combining the cluster method with direct paraphrasing instruction would eliminate this weakness.

Collaborative and Digital Affordances

The integration of digital platforms into the cluster method offers unique advantages. Software-based mind maps allow for easier editing, multimedia integration, and greater group engagement (Sagita & Sagita, 2024). Furthermore, when students work in collaborative groups to construct maps, they engage in a "negotiation of meaning" that is vital for academic growth (Han, 2025; Tsai, 2025). This social framework facilitates collective regulation, which in turn promotes individual self-regulation and autonomous learning (Sagita et al., 2024).

Conclusion

The cluster method is a highly effective methodology for improving the reading comprehension and information retention of university students. By bridging the gap between linguistic decoding and structural understanding, it empowers learners to visualize complex relationships and organize academic knowledge more efficiently than conventional techniques. While the methodology does not replace the need for explicit linguistic training in areas like paraphrasing, it serves as an essential cognitive bridge that fosters active engagement and critical thinking. Universities should systematically integrate text-structure-aligned clusters into their curricula to prepare students for the informational challenges of the 21st century. This synthesis is limited by the scope of the available sources, which predominantly focus on EFL contexts in Southeast Asia.

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