

## COLLABORATIVE LEARNING TECHNOLOGIES: EFFECTIVENESS OF WORKING WITH SMALL GROUPS IN HIGHER EDUCATION

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### Abstract

The article examines the strategic implementation of collaborative learning technologies within the higher education system, focusing on the dynamics of small group interaction. The study analyzes how structured peer-to-peer engagement facilitates cognitive development, enhances problem-solving capabilities, and fosters professional communication skills. Through a comparative analysis, the research demonstrates that students participating in small group collaborative tasks show significantly higher academic performance and information retention rates compared to those in traditional lecture-based environments. The findings suggest that small group work is an essential tool for modernizing pedagogical approaches in specialized fields.

**Keywords:** Collaborative learning, small groups, pedagogy, student engagement, higher education, peer interaction, active learning.

## ТЕХНОЛОГИИ ОБУЧЕНИЯ В СОТРУДНИЧЕСТВЕ: ЭФФЕКТИВНОСТЬ РАБОТЫ С МАЛЫМИ ГРУППАМИ В ВЫСШЕМ ОБРАЗОВАНИИ

### Аннотация

В статье рассматривается стратегическое внедрение технологий совместного обучения в систему высшего образования с упором на динамику взаимодействия в малых группах. В исследовании анализируется, как структурированное взаимодействие между сверстниками способствует когнитивному развитию, расширяет возможности решения проблем и развивает навыки профессионального общения. Посредством сравнительного анализа исследование демонстрирует, что студенты, участвующие в совместных задачах

в малых группах, показывают значительно более высокую академическую успеваемость и уровень удержания информации по сравнению со студентами в традиционных лекционных условиях. Полученные результаты позволяют предположить, что работа в малых группах является важным инструментом модернизации педагогических подходов в специализированных областях.

**Ключевые слова:** Совместное обучение, малые группы, педагогика, вовлеченность студентов, высшее образование, взаимодействие сверстников, активное обучение.

## HAMKORLIKDA O'QITISH TEXNOLOGIYALARI: OLIY TA'LIMDA KICHIK GURUHLAR BILAN ISHLASH SAMARADORLIGI

### Annotatsiya

Maqolada oliy ta'lim tizimida hamkorlikda o'qitish texnologiyalarini strategik joriy etish, kichik guruhlardagi o'zaro aloqalar dinamikasiga e'tibor qaratilgan. Tadqiqotda tengdoshlarning tizimli o'zaro muloqoti kognitiv rivojlanishga qanday yordam berishi, muammolarni hal qilish qobiliyatini oshirishi va professional muloqot ko'nikmalarini shakllantirishi tahlil qilinadi. Qiyosiy tahlil orqali tadqiqot shuni ko'rsatadiki, kichik guruhlarda hamkorlikdagi topshiriqlarda qatnashadigan talabalar an'anaviy ma'ruza muhitidagi talabalarga qaraganda sezilarli darajada yuqori akademik ko'rsatkichlar va ma'lumotni eslab qolish darajasini ko'rsatadilar. Tadqiqot natijalari shuni ko'rsatadiki, kichik guruhlarda ishlash ixtisoslashtirilgan sohalarda pedagogik yondashuvlarni modernizatsiya qilishning muhim vositasidir.

**Tayanch iboralar:** Hamkorlikda o'qitish, kichik guruhlar, pedagogika, talabalar faolligi, oliy ta'lim, tengdoshlar o'zaro ta'siri, faol o'qitish.

### INTRODUCTION

The global evolution of higher education necessitates a shift from the "instructional" paradigm to a "learning" paradigm. In this context, collaborative learning technologies emerge as a vital solution for developing the competencies required in the 21st-century labor market. Collaborative learning is defined as a pedagogical approach where students work together on a collective task, but its success relies heavily on the specific organization of small groups.

Small group work is not merely a logistical arrangement; it is a cognitive catalyst. According to social constructivist theories, knowledge is constructed through social negotiation. When students are placed in a small group setting (typically 3 to 5 people), they are forced to externalize their thought processes, defend their logic, and

reconcile conflicting viewpoints. This level of engagement is rarely achieved in traditional auditoriums where the flow of information is unidirectional—from the professor to the student.

The relevance of this study is underscored by the increasing complexity of academic disciplines. In fields requiring high analytical precision, such as medicine or engineering, the ability to collaborate is as critical as theoretical knowledge. This article aims to explore the mechanisms that make small group work effective and to provide empirical evidence of its superiority over conventional teaching methods.

## METHODS

To investigate the impact of collaborative technologies, a comprehensive methodological framework was established. The study involved a controlled educational experiment conducted within a specialized department of a higher education institution.

1. Participant Selection and Grouping: A total of 60 students participated in the study. They were divided into an experimental group (using collaborative technologies) and a control group (using traditional seminars). The experimental group was further subdivided into small groups of 4 members each. These groups were carefully balanced to include students with diverse academic backgrounds and skill sets to ensure "positive interdependence."

### 2. Implementation of Technologies:

- The Jigsaw Technique: This method was used to ensure individual accountability. Each member of the small group was assigned a unique segment of the lesson. They had to master their segment and then teach it to their teammates. This ensured that the group's success depended on every single member.

- Case-Based Collaboration: Groups were presented with complex scenarios that lacked a single "correct" answer. They were required to reach a consensus through evidence-based discussion and present a unified report.

### 3. Data Collection and Analysis:

Academic progress was monitored through three stages: a pre-test (to establish a baseline), a post-test (immediately following the module), and a delayed retention test (30 days later). Additionally, structured observations were conducted to evaluate the quality of group interactions and the distribution of roles.

## RESULTS

The data analysis revealed a significant positive correlation between small group collaboration and academic mastery.

### Academic Achievement:

The post-test results showed that the experimental group achieved an average score of 89%, while the control group averaged 71%. More importantly, the gap was most pronounced in "high-order thinking" tasks, such as synthesis and critical evaluation. Students in small groups were able to identify nuances in the material that were overlooked by students working individually.

### Knowledge Retention:

One of the most striking findings was the rate of information retention. After one month, the control group's scores dropped significantly (averaging 55%). In contrast, the collaborative group maintained a high retention rate (averaging 82%). This suggests that the process of discussing and teaching peers helps transfer information from short-term to long-term memory.

**Table 1: Comparative Growth and Retention Analysis**

Variable	Control Group	Experimental Group	Difference
Baseline Score	68%	67%	- 1%
Post-Implementation	71%	89%	+18%
30-Day Retention	55%	82%	+27%

### Soft Skills Development:

Qualitative feedback through surveys indicated that 94% of students felt more confident in their communication skills after the experiment. They noted that the small group format allowed for a "low-stakes" environment where they felt comfortable asking questions and making mistakes without the fear of public failure before a large audience.

## DISCUSSION

The results of this study confirm that the organizational structure of small groups is the key to successful collaborative learning. The data supports the idea that "learning is a social act." The significant increase in retention rates in the experimental group can be explained by the Cognitive Elaboration Theory, which posits that if a student explains new information to others, they will integrate that information more effectively into their own cognitive structures.

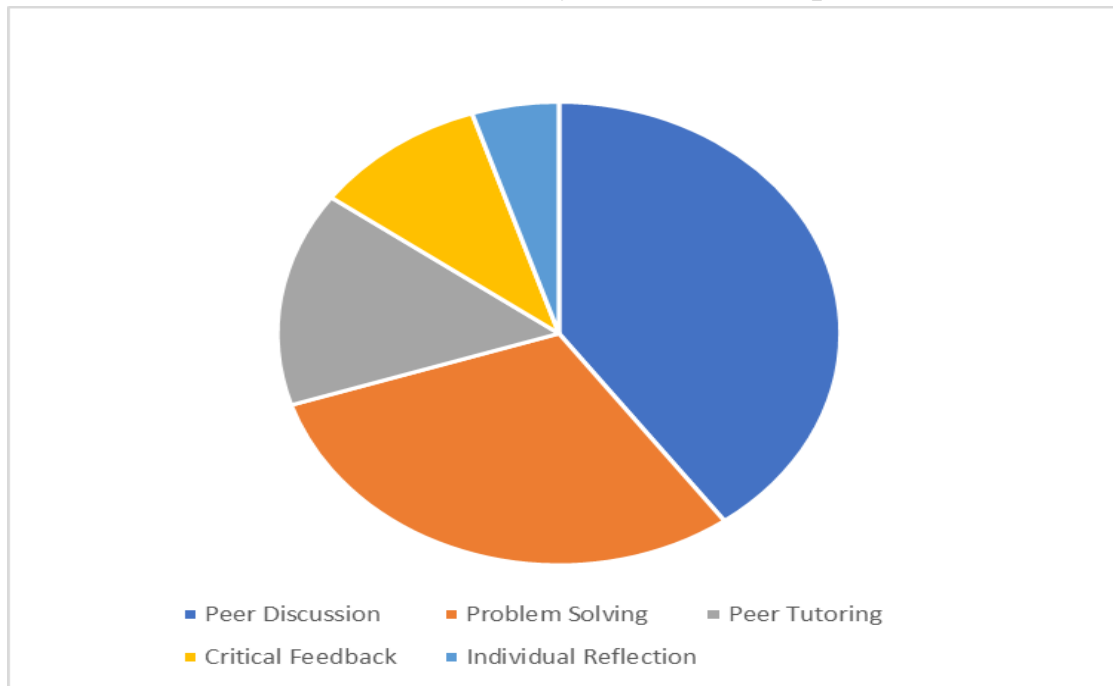
However, the transition to these technologies is not without obstacles. During the experiment, it was observed that "free-riding" (where one student does nothing while the group works) can occur if the task is not properly designed. To mitigate this, the study emphasizes that every group task must have:

1. Individual Accountability: Each person must have a deliverable.
2. Face-to-Face Interaction: Regular discussion is mandatory.

3. Group Processing: The group must reflect on how well they are working together.

For educators, this means the focus shifts from preparing content to preparing tasks. The instructor becomes a moderator who monitors group dynamics and intervenes only when the group is unable to resolve a technical or interpersonal conflict.

**Figure 1. Distribution of Student Activity in Small Groups**



## CONCLUSION

Collaborative learning technologies, when implemented through structured small group work, provide a robust framework for enhancing student performance in higher education. This research proves that such methods lead to superior academic results, better long-term retention of complex material, and the development of essential professional soft skills.

As higher education continues to adapt to the needs of the modern world, the integration of collaborative technologies should become a standard practice rather than an experimental exception. Future research should focus on the digital transformation of these methods, exploring how small group collaboration can be effectively replicated in online and hybrid learning environments.

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