

Analysis of The Experimental and Testing Work on Improving The Problem-Based Teaching Methodology in Geography Lessons

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ABSTRACT

Objective: This study investigates the effectiveness of the Problem-Based Learning (PBL) approach in enhancing geography education by fostering independent thinking, deepening theoretical knowledge, and strengthening practical skills among students. **Method:** A quasi-experimental design was employed, involving three stages of testing across schools in the Jizzakh, Samarkand, and Tashkent regions of Uzbekistan. Students were divided into experimental and control groups, with the experimental group taught using PBL strategies such as case studies and interactive tasks, while the control group received traditional instruction. **Results:** The findings reveal a 14.7% improvement in academic performance among students in the experimental group compared to the control group, demonstrating the effectiveness of the PBL approach in advancing educational outcomes. **Novelty:** This study provides empirical evidence supporting the integration of PBL in geography lessons within the context of Uzbekistan's education system, offering a validated, innovative instructional model aimed at promoting analytical skills, self-directed learning, and academic achievement in secondary education.

INTRODUCTION

In the modern education system, alongside providing students with quality education, it is essential to train them to think independently, engage in critical analysis, and develop problem-solving skills. The need to update the content of education, increase student engagement, and enhance their practical competencies has intensified the importance of integrating advanced pedagogical technologies into the teaching process. From this perspective, pedagogical experimental work serves as a key instrument for introducing innovative instructional methods into practice and scientifically evaluating their effectiveness [1].

In particular, the application of the Problem-Based Learning (PBL) methodology in geography lessons can foster students' logical reasoning, analytical thinking, and ability to solve real-life problems. To assess the effectiveness of this approach, it becomes necessary to conduct experimental studies, analyze the outcomes, and develop evidence-based recommendations for improving the teaching process. Through the implementation of PBL, students' interest in the subject can be heightened, their capacity for self-directed learning can be strengthened, and they can be better prepared to make informed decisions in real-world contexts.

RESEARCH METHOD

This study utilized a quasi-experimental design [2, 3] involving students from six general education schools across the Jizzakh, Samarkand, and Tashkent regions. The research was carried out in three phases: diagnostic, formative, and summative.

Participants were divided into experimental and control groups. The experimental group was instructed using the problem-based learning (PBL) approach, employing strategies such as case studies, project-based learning, and interactive tasks [4, 5]. The control group received traditional instruction. Data were collected through surveys, diagnostic tests, and academic assessments, and were analyzed using statistical methods [6, 7], including the Student-Fisher criterion [8], to evaluate the effectiveness of the PBL approach.

RESULTS AND DISCUSSION

For this research, six schools were selected from three different regions across the country, and the experimental work was carried out in three stages:

1. Diagnostic and emphasis-based experimental work
2. Formative experimental work
3. Final experimental work

In the first stage of experimental work, various significant tasks were carried out. Initially, schools from different regions were selected, including Jizzakh Province, where the 27th General Education School of Jizzakh City and the 32nd General Education School of Sharof Rashidov District were chosen; Samarkand Province, with the 80th General Education School of Samarkand City and the 7th General Education School of Oqdaryo District; Tashkent Province and Tashkent City, where the 278th General Education School of Olmazor District in Tashkent City and the 1st General Education School of Chirchik City were selected. Teachers of geography from these schools were also involved.

Furthermore, in this stage, in order to study the current implementation of the Problem-Based Learning (PBL) methodology in geography lessons [9], special surveys were conducted among the students of the selected schools. These surveys aimed to gather information on the current status of PBL in general education schools, as well as the attitudes of students and teachers toward this approach and its effectiveness. Based on the data obtained in this stage, initial conclusions were drawn, and recommendations were made to improve the effectiveness of PBL.

The second stage of the experimental work – the formative experimental work stage – involved conducting lessons with students based on the established program. Students' level of knowledge and their ability to absorb the material were assessed, and the selected methodology was directly applied to the teaching process. During this stage, new pedagogical technologies such as problem-based teaching, project methods, practical exercises, and interactive learning methods were introduced. Additionally, special assignments and case studies were provided to help students deeply understand the topics [10, 11, 12].

In this stage, the students were divided into two independent groups: the experimental and the control groups. The students in the experimental group were taught using the PBL approach, which focused on analyzing problem situations, conducting independent research, and formulating specific conclusions during the lessons [13]. In contrast, the control group was taught using traditional pedagogical approaches, with the main focus on acquiring basic knowledge.

Various didactic tools and evaluation methods were used during the experimental work to ensure the reliability of the research. To organize the educational process based on problem-based learning, a set of specially developed tasks, case study analyses, interactive lesson plans, and multimedia electronic resources were used as educational materials [14]. These tools helped students develop the skills to analyze problem situations, engage in independent research, and enhance their analytical thinking abilities.

To assess the effectiveness of the experiment, various evaluation methods were used. In particular, diagnostic tests were administered at both the initial and final stages to measure students' knowledge levels.

The final stage of the experimental work is the most crucial part of the scientific study, where the results of the experimental and control groups were analyzed, and the differences between them were examined [15]. The effectiveness of the experimental work was evaluated using clear criteria and corresponding levels. Based on these criteria, the results of the 371 respondents who participated in the experiment were analyzed in terms of regions and groups.

The results of the research showed that the students in the experimental group, who were taught using the PBL approach, performed better than the control group (see Figure 1).

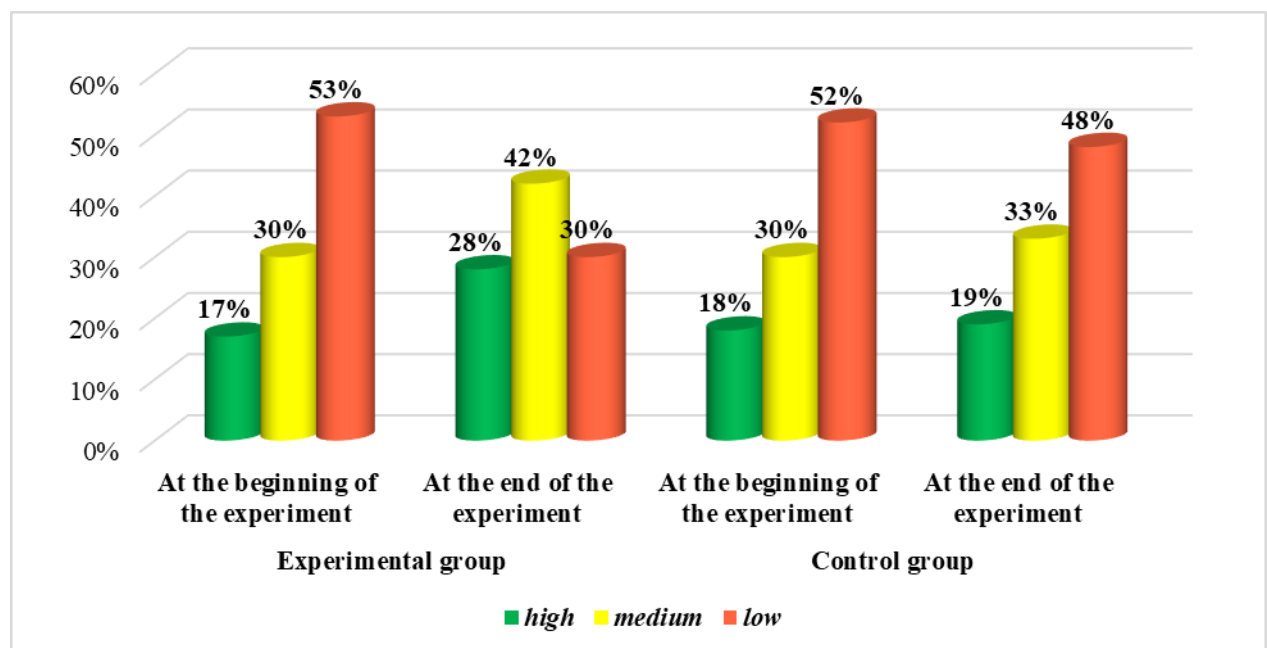


Figure 1. Comparative Analysis of Experimental Work by Groups

The data analysis of the diagram above indicates that the proposed and tested approach showed positive results compared to the initial indicators recorded at the beginning of the experiment. Specifically, the percentage of students who achieved a “high” level increased from 17% at the start of the experiment to 28% by the end. The number of students at the “medium” level rose from 30% to 42%, while the percentage of students at the “low” level decreased from 53% to 30%.

The retention rate was analyzed using the Student-Fisher criterion, and it was determined that the experimental group's performance had improved by 14,7% compared to the control group.

CONCLUSION

Fundamental Finding : This study scientifically confirms that the Problem-Based Learning (PBL) approach significantly enhances students' theoretical knowledge, practical skills, and independent thinking abilities in geography education. **Implication :** The results imply that adopting PBL strategies can meaningfully improve educational effectiveness and should be considered as a central pedagogical method in curriculum reform efforts, particularly in promoting analytical and self-directed learning among students. **Limitation :** Nevertheless, the study's scope was limited to a specific geographic context and subject area, which may affect the generalizability of the findings to other disciplines or broader educational settings. **Future Research :** Future studies should explore the application of PBL across different subjects and diverse educational environments, and incorporate longitudinal designs to assess the long-term impacts of PBL on student performance, motivation, and critical thinking development.

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