UDC 37.016

INQUIRY-BASED LEARNING VS. TRADITIONAL TEACHING: A COMPARATIVE STUDY OF CRITICAL THINKING, MOTIVATION, AND ACADEMIC ACHIEVEMENT

Mayya Esenova[1]
senior teacher
Atajan Jeyhun ogly Jeyhunov[2]
lecturer
tdu@tdu.edu.tm
Ogulmengli Atabayevna Kurbanova[3]
trainee teacher
[1]Dovletmammet Azadi Turkmen National Institute of World Languages
[2]Magtymguly Turkmen state university
[3]Oguz han Engineering and Technology University of Turkmenistan
Ashgabat, Turkmenistan

Abstact. This study explores the comparative effectiveness of Inquiry-Based Learning (IBL) and traditional teaching methods on students' academic performance, motivation, and development of critical thinking. Conducted across three universities in Turkmenistan, including Turkmen State Institute of World Languages, Turkmen State University, and Turkmenistan Engineering and Technology University, the research involved 90 students who were divided into experimental and control groups. The experimental group (EG) was taught using Inquiry-Based Learning, while the control group (KG) followed traditional lecture-based instruction. The study lasted for 4 weeks and employed a combination of pre-tests, post-tests, motivation surveys, critical thinking assessments, and qualitative interviews. The findings indicate that IBL significantly improved academic achievement, fostered higher motivation, and enhanced critical thinking skills compared to traditional

methods. Students in the EG reported greater engagement, a deeper understanding of the subject, and a more active role in their learning process. These results suggest that IBL can be a highly effective pedagogical strategy, particularly in promoting independent learning and critical analysis. However, the success of IBL depends on the context of the discipline and the readiness of instructors to implement this approach effectively.

Key words: Inquiry-Based Learning, traditional teaching methods, academic performance, motivation, critical thinking, student engagement, higher education, active learning, pedagogical strategies.

In recent years, innovative educational approaches that actively engage students in the learning process have become increasingly popular. One such approach is Inquiry-Based Learning (IBL), which places students at the center of the learning process, providing them with the opportunity to ask questions, investigate, analyze, and find solutions to problems [1]. In contrast to traditional teaching methods, which primarily involve direct knowledge transfer from the instructor to the student, IBL emphasizes student independence and the development of critical thinking skills. This study aims to compare the impact of IBL and traditional teaching on students' educational outcomes [2].

Research Objective

The objective of this study is to identify differences in the educational outcomes of students taught using Inquiry-Based Learning and traditional methods, across various universities, and to analyze how each approach influences academic performance, motivation, and the development of critical thinking skills.

Research Methods

1. Sample and Context

The study involved 90 students from three universities:

- Turkmen State Institute of World Languages named after Dovletmammet Azadi (focus on humanities),
- Turkmen State University named after Maghtumguly (focus on general humanities and natural sciences),
- Turkmenistan Engineering and Technology University named after Oguz Khan (focus on engineering and technical disciplines).

The students were divided into two groups at each university:

- Experimental Group (EG) – 45 students, taught using Inquiry-Based Learning methods.
- Control Group (KG) – 45 students, taught using traditional methods (lectures, seminars, testing).

The study lasted for 4 weeks, focusing on short academic modules at each university.

2. Teaching Materials and Assessment Tools

- The curriculum for the course "Fundamentals of the Discipline" was adapted to suit each university's specialization. The same theoretical materials were used for both groups, but the approach to studying them differed.
- Assessment Tools:
  - Pre-test and post-test to measure academic achievement (maximum score – 100 points).
  - Motivation survey using the ARCS scale (Keller) [3].
  - Critical thinking test (adapted version of the "Critical Thinking Skills Test").
  - Semi-structured interviews and observations for qualitative analysis of student engagement.

3. Procedure

1. Preparation Stage:

Pre-test and surveys were conducted for all participants. This data helped to establish the baseline knowledge and motivation levels of the students.

2. Implementation of Teaching Methods:

- Experimental Group (EG) at each university was taught using Inquiry-Based Learning. Students were tasked with solving practical problems, working on group projects, posing questions, and exploring solutions.
- Control Group (KG) was taught using a traditional curriculum, with a focus on lectures, seminars, and knowledge assessments through tests and exams.

3. Final Stage:

After 4 weeks of instruction, the post-test and follow-up surveys were conducted. Qualitative interviews were also conducted to gather feedback on the different teaching methods.

4. Data Analysis Methods

- Quantitative data (test scores, survey results) were analyzed using descriptive statistics (mean, standard deviation) and the independent samples t-test.
- Qualitative data (interviews, observations) were analyzed using thematic analysis to identify key themes related to student engagement, motivation levels, and perceptions of the learning methods.

Results

1. Academic Achievement

The post-test results showed a significant improvement in the experimental group, with an average score increase of 18%, compared to 10% in the control group. This difference was statistically significant ($p < 0.05$), indicating that the IBL approach had a more pronounced positive effect on academic performance.

2. Motivation to Learn

Motivation surveys revealed that students in the experimental group had significantly higher levels of intrinsic motivation compared to the control group. The average score on the ARCS scale in EG was 4.5, while in KG it was 3.6. Students in EG reported being more engaged in the learning process, which contributed to their overall academic enthusiasm.

3. Critical Thinking

The critical thinking test results showed that students in EG performed better in analyzing information and forming arguments. The level of critical thinking in EG was 20% higher than in KG, particularly in the universities with a humanities focus (Turkmen State Institute of World Languages and Turkmen State University).

4. Qualitative Analysis

Interviews and observations indicated that students in EG were more actively engaged in discussions and question-asking. This suggests the importance of student involvement in the learning process, especially in the context of humanities and engineering disciplines.

Discussion

The results of this study demonstrate that Inquiry-Based Learning leads to greater student engagement and the development of critical thinking skills compared to traditional teaching methods. The positive impact of IBL on motivation and academic achievement was evident in all three universities. Notably, the improvements were most pronounced in the universities focused on humanities, such as the Turkmen State Institute of World Languages and Turkmen State University, which may be due to the nature of the subjects that require independent thinking and critical analysis.

However, traditional teaching methods, while less effective in fostering deep engagement, still play a crucial role in disciplines that require a structured and systematic approach. It is important to recognize that the success of IBL depends on the preparedness of the instructors and the willingness of students to engage in active learning.

Conclusion

The results of this study confirm that Inquiry-Based Learning (IBL) is more effective than traditional teaching methods in fostering critical thinking, enhancing student motivation, and improving academic achievement. Students who were taught through IBL demonstrated a higher level of engagement, greater enthusiasm for learning, and an improved ability to analyze complex problems. These improvements were evident not only in the test scores but also in the qualitative feedback provided by students, which emphasized their increased sense of ownership over the learning process. The method encouraged them to explore content deeply, ask questions, and collaborate with their peers, which is essential for developing critical thinking skills.

However, it is crucial to note that the effectiveness of IBL may vary depending on the context and specific characteristics of the academic discipline. For example, disciplines that involve more procedural knowledge or technical expertise, such as engineering and the sciences, may require more structured approaches that balance inquiry with direct instruction. Additionally, the successful implementation of IBL heavily depends on the readiness and skill set of the instructors. Educators must be

well-trained in facilitating inquiry-based learning environments and providing the necessary support to guide students without dominating the learning process.

These findings suggest that while IBL has shown promise in improving educational outcomes, its integration into the curriculum must be thoughtfully planned and tailored to meet the needs of different disciplines and student groups. This research can serve as a foundation for future studies exploring the scalability of IBL across various academic fields and institutions. Moreover, it provides valuable insights for universities in Turkmenistan and other regions, offering a potential pathway for enhancing teaching strategies and creating more dynamic, student-centered learning environments. The evidence from this study encourages educators and policymakers to consider the broader adoption of IBL in higher education to cultivate critical thinking, increase student motivation, and achieve better academic results in the long term [5].

References:

1. Anderson L. W., & Krathwohl D. R. (2001). A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. Longman.

2. Dewey J. (1938). Experience and Education. Macmillan.

3. Hmelo-Silver C. E., Duncan R. G., & Chinn C. A. (2007). Scaffolding and Achievement in Problem-Based and Inquiry Learning: A Response to Kirschner, Sweller, and Clark. Educational Psychologist, 42(2), 99-107.

4. Keller J. M. (2010). Motivational Design for Learning and Performance: The ARCS Model Approach. Springer Science & Business Media.

5. Thomas J. W. (2000). A Review of Research on Project-Based Learning. The Autodesk Foundation.

УДК 37.016

ОБУЧЕНИЕ НА ОСНОВЕ ИССЛЕДОВАНИЯ И ТРАДИЦИОННОЕ ОБУЧЕНИЕ: СРАВНИТЕЛЬНОЕ ИССЛЕДОВАНИЕ КРИТИЧЕСКОГО МЫШЛЕНИЯ, МОТИВАЦИИ И АКАДЕМИЧЕСКОЙ ДОСТИЖИМОСТИ

Мая Эсенова[1]
старший преподаватель
Атаджан Дж. Джейхунов[2]
преподаватель
tdu@tdu.edu.tm
Огулменгли А. Курбанова[3]
преподаватель-стажер
[1]Туркменский национальный институт мировых языков имени Довлетмаммета Азади
[2]Туркменский государственный университет имени Махтумкули
[3]Инженерно-технологический университет Туркменистана имени Огуз хана
г. Ашхабад, Туркменистан

Аннотация. В этом исследовании изучается сравнительная эффективность обучения на основе исследования (IBL) и традиционных методов обучения на успеваемость, мотивацию и развитие критического мышления студентов. Исследование проводилось в трех университетах Туркменистана, включая Туркменский государственный институт мировых языков, Туркменский государственный университет и Туркменский инженерно-технологический университет. В исследовании приняли участие 90 студентов, которые были разделены на экспериментальную и контрольную группы. Экспериментальная группа (ЭГ) обучалась с использованием

исследовательского обучения, в то время как контрольная группа (КГ) следовала традиционному лекционному обучению. Исследование длилось 4 недели и включало комбинацию предварительных тестов, посттестов, опросов мотивации, оценок критического мышления и качественных интервью. Результаты показывают, что IBL значительно улучшило академические достижения, способствовало повышению мотивации и развитию навыков критического мышления по сравнению с традиционными методами. Студенты в ЭГ сообщили о большей вовлеченности, более глубоком понимании предмета и более активной роли в процессе обучения. Эти результаты свидетельствуют о том, что IBL может быть высокоэффективной педагогической стратегией, особенно в содействии независимому обучению и критическому анализу. Однако успех IBL зависит от контекста дисциплины и готовности преподавателей эффективно внедрять этот подход.

Ключевые слова: исследовательское обучение, традиционные методы обучения, академическая успеваемость, мотивация, критическое мышление, вовлеченность студентов, высшее образование, активное обучение, педагогические стратегии.

Статья поступила в редакцию 30.01.2025; одобрена после рецензирования 21.03.2025; принята к публикации 31.03.2025.

The article was submitted 30.01.2025; approved after reviewing 21.03.2025; accepted for publication 31.03.2025.