

**USING PROJECT-BASED EDUCATIONAL TECHNOLOGIES AND ICT TO
DEVELOP GENERAL PROFESSIONAL AND SPECIFIC COMPETENCIES OF
FUTURE TEACHERS IN THE PROCESS OF COLLABORATIVE LEARNING**

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in collaboration with Yanka Kupala State University of Grodno (Belarus).

Abstract: The article explores the impact of project-based educational technologies (PET) and information and communication technologies (ICT) on the development of general professional (planning, leadership, communication) and specific (subject-specific skills) competencies in pedagogical students within a collaborative learning framework. An experiment involving students from KSU and YKSG showed a significant increase in competencies, which underscores the potential for integrating PET and ICT into intercultural educational programs. The data obtained offer recommendations for modernizing pedagogical education.

Keywords: project-based technologies, ICT, general professional competencies, specific competencies, collaborative learning, pedagogical education.

INTRODUCTION

Modern pedagogical education requires a shift from traditional lecture-based methods to active, practice-oriented approaches. Project-based educational technologies (PET), such as problem-based learning (PBL), and information and communication technologies (ICT), including Google Workspace and Canva, play a key role in developing the competencies needed to work in a globalized world. General professional competencies (planning, leadership, communication) and specific competencies (subject-specific skills, such as methods of teaching

mathematics or literature) are becoming the foundation for training teachers who can adapt to the challenges of the 21st century.

Collaborative learning between Kokand State University (KSU) and Yanka Kupala State University of Grodno (YKSG) provides a unique opportunity to integrate PET and ICT into an intercultural environment. The cooperation program, which began in 2023, brings together students from Uzbekistan and Belarus through online platforms and in-person exchanges, creating conditions for sharing experiences and developing digital literacy. A literature review confirms that PBL contributes to the development of critical thinking (Thomas, 2000), while ICT improves access to resources and technology skills (OECD, 2019). However, there is insufficient research on their application in the context of collaborative learning between post-Soviet countries, which makes this study relevant.

The goal of the study: To assess the impact of project-based educational technologies and ICT on the development of general professional and specific competencies of future teachers in the process of collaborative learning.

Objectives:

- * To determine the initial level of competencies of KSU and YKSG students.
- * To implement project-based technologies and ICT into joint training modules.
- * To compare the results of the experimental and control groups.

Hypothesis: The integration of PET and ICT will increase the level of competencies by 15-25% compared to traditional methods.

Significance: The development of recommendations for integrating technologies into international educational programs, which can influence teacher training standards in Uzbekistan and Belarus.

METHODS

Participants: The study was conducted from September 2024 to May 2025 with the participation of 100 students (50 from KSU, faculties of mathematics and philology; 50 from YKSG, faculties of history and natural sciences). The average age was 21 years, with a gender distribution of 60% female and 40% male. The sample was formed randomly.

Study Design: Quasi-experimental, with a division into an experimental group (60 students using PET and ICT) and a control group (40 students with traditional learning). Collaborative learning was carried out via Zoom (online sessions twice a week for 90 minutes) and Moodle (asynchronous assignments). In-person seminars were held as part of an exchange program (2 visits of 5 days each).

Instruments and Procedures:

* Questionnaires: Based on the UNESCO competency scale (2017) for general professional skills (20 questions, Likert scale) and EFSET for specific competencies (subject-specific teaching methods tests).

* Project assignments: Students developed 5 joint projects (for example, interactive mathematics lessons using Canva).

* Observation: Analysis of 15 project sessions (video recordings).

* Interviews: Semi-structured, with 20 students (10 from each university) to evaluate their perception of technologies.

* Portfolios: Analysis of 100 works (presentations, lesson plans).

Procedure:

* September 2024: Pre-testing (questionnaires, EFSET).

* October 2024 - March 2025: Implementation of PET (PBL modules) and ICT (Google Workspace, Canva).

* April 2025: Post-testing.

* May 2025: Data analysis.

Data Processing: ANOVA in RStudio was used to compare the groups, and Pearson's correlation analysis was used to assess the relationship between technology use and competencies. The significance level was $p < 0.05$. Ethical aspects: informed consent was obtained, and data was anonymized.

RESULTS

Initial data: The average level of general professional competencies in the experimental group was 3.5 points (out of 5), and specific competencies were 3.3. In the control group, it was 3.4 and 3.2, respectively ($t=0.32$, $p=0.73$, differences were insignificant).

After the experiment:

* Experimental group: general professional competencies - 4.5 (+28%), specific - 4.4 (+33%).

* Control group: general professional - 3.7 (+8%), specific - 3.5 (+9%).

* ANOVA: $F=12.5$, $p < 0.01$ (significant differences).

Table 1: Competency Dynamics

Competency	Pre-test (Exp.)	Post-test (Exp.)	Pre-test (Cont.)	Post-test (Cont.)
General Professional	3.5	4.5	3.4	3.7
Specific	3.3	4.4	3.2	3.5

Details:

- * KSU students showed an increase in project management (+22%), YKSG students in digital literacy (+30%).
- * Correlation between the number of projects and competencies: $r=0.78$, $p<0.01$.
- * Interviews: 90% of students noted an increase in confidence in using ICT.
- * Graph 2: Linear growth of competencies in the experimental group (graph description).

The overall increase exceeded the hypothesis, reaching 28-33%.

DISCUSSION

The results confirm that PET and ICT enhance collaborative learning, creating conditions for sharing experiences and developing digital skills. This is consistent with Dewey's (1938) theories on experiential learning and Siemens' (2005) research on the connectivist approach. The intercultural context amplified the effect, as students adapted to differences in learning approaches (KSU - practice, YKSG - theory).

Limitations:

- * Uneven access to ICT (10% of KSU students faced internet issues).
- * Differences in the level of digital preparedness.
- * Limited time for in-person meetings.

Recommendations:

- * Integrate PET and ICT into the regular curricula of KSU and YKSG.
- * Develop joint online courses with certification.
- * Provide technical support for regions.

Future research: The impact of technologies on graduate employment, comparison with other countries.

Conclusion

In conclusion, the study convincingly demonstrates that the use of project-based educational technologies and ICT in the process of collaborative learning between KSU and YKSG is an effective means for developing both general professional (planning, leadership) and specific competencies of future teachers, with an overall increase of 28-33%.

These technologies not only enhance the practical orientation of education but also contribute to the formation of digital literacy, which is becoming a key factor in the era of digitalization. In summary, it can be argued that the integration of PET and ICT transforms traditional education

into a dynamic process where students learn to solve real-world problems in an intercultural environment, which increases their competitiveness in the global labor market.

Summarizing the experience of the two universities, it is worth emphasizing that project-based technologies (PBL) allow for the integration of cultural characteristics:

KSU students bring creative ideas from the Uzbek pedagogical tradition, while YKSG adds an analytical approach based on European standards. This leads to a synergy where ICT (Google Workspace, Canva) serve as a bridge for exchange, minimizing geographical barriers. As a result, an educational model is formed that is consistent with the UN Sustainable Development Goals, with an emphasis on innovation and cooperation. In the future, such approaches can be scaled to other universities, contributing to the creation of regional networks for digital resource exchange. However, for maximum effectiveness, it is necessary to overcome limitations, such as unequal access to technology, through government support programs. Ultimately, the study shows that PET and ICT in collaborative learning not only develop competencies but also lay the foundation for the transformation of pedagogical education, making it more future-oriented and inclusive for all participants in the global educational community.

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