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Application of the "flipped learning" technology in educational practice (on the example of educational institutions in Kazakhstan and Belarus)

This article examines the distinctive features of the "flipped learning" educational technology. Its core principle lies in mastering the theoretical foundations of study material through audio-visual content outside the classroom, followed by refining knowledge and competencies during classroom sessions under the guidance of the teacher. The article provides a brief history of the emergence and development of this method, outlines its advantages, characteristics, and challenges in practical application, and emphasizes the effectiveness of integrating the flipped learning model with game-based methods in both school and university education. The study highlights that flipped learning, when combined with interactive approaches, contributes to sustainable learning motivation, student engagement, and the development of essential skills. Practical examples of the implementation of this technology in educational institutions of Kazakhstan and Belarus are presented. The analysis of academic outcomes demonstrates that the quality of education improves not only in terms of academic performance but also through positive shifts in students' motivation and attitudes within general secondary and higher education programs.

Keywords: education, school and university education, interactive learning, educational technology, flipped learning, game-based methods, student motivation.

Introduction

Modern school education is currently experiencing active change. Conventional instructional approaches frequently fall short of motivating today's learners, who have been raised in a digital landscape and live amid a constant stream of information. This situation demands the adoption of new technologies and pedagogical approaches that not only transmit content but also captivate students, cultivate critical thinking, and maintain sustained attention.

Background. The idea of flipped learning first appeared in scholarly work in 1993 with A. King, who proposed it as an alternative to the traditional lecture model. King criticized the passive nature of classic information delivery and promoted active involvement by asking students to read lecture sections in advance and come to class prepared to discuss guided questions that clarified and reinforced the material [1]. Later iterations built on this concept by incorporating peer instruction: students initially studied new content independently—often via video—and then completed tasks and engaged in feedback-driven class discussions and consultations [2].

Main discussion. The specific phrase "flipped classroom" was coined by W. Baker to describe a method where learners first received recorded web-design lectures and then used class time for discussion. Since about 2012, flipped learning has been increasingly adopted in the natural sciences, mathematics, and medical education [3].

Conteporary scholars have proposed many variants of the model, and since 2018 international standards have been developed that catalogue nearly 190 methodological models worldwide [4]. Depending on instructional aims, the flipped approach can be fruitfully combined with:

1. engineering and technical training;
2. competency-based (mastery) learning;
3. individualized strategies that account for socio-ethnic, religious, and other learner-specific factors;
4. collaborative and peer-based learning;
5. gamification [5], which integrates game mechanics and practice-oriented tasks [6].

From the literature review, the principal benefits of flipped learning include:

1. better understanding and retention of material (improved academic outcomes) [7-8];
2. higher levels of student engagement and motivation, observable through participation in discussions;
3. increased learner autonomy;
4. improved communication skills via pair or small-group work and individualized teaching [9];
5. enhanced digital literacy;
6. flexible pacing and scheduling that allow students both to deepen their knowledge and catch up when needed [10];
7. greater learner responsibility for their own education;
8. more active, interactive instructional formats;
9. expanded opportunities for laboratory and research-oriented practical work using devices and field tools [11];
10. strengthened critical-thinking skills.

Distinctive aspects. The flipped classroom is applicable across secondary, undergraduate, and graduate education. Research indicates the greatest gains often occur in the arts and humanities, while effects in mathematics are typically more modest. Strong results have also been reported in physical education and the natural sciences.

The effectiveness of the approach is closely tied to the quality and format of instructor-created materials: short video segments (up to five minutes) are generally more easily assimilated by students than longer readings [12].

Researchers also point to several constraints that hinder broader adoption of the flipped model:

1. technical limitations (insufficient devices, unreliable or slow internet);
2. low technical competence among teachers and students and limited access to equipment, which complicates the production of high-quality materials;
3. students' unfamiliarity with working in this format [13];
4. the model's high demands on instructors' time and effort for preparation [14];
5. students' lack of preparedness for in-class activities, often because they fail to study the material beforehand. This unpreparedness frequently stems from low motivation. To address this, some scholars recommend pre-class quizzes followed by in-class error analysis discussions, and tracking self-study frequency and duration through interactive learning platforms such as Moodle or Padlet [15].

Gamification and didactic games. To boost cognitive engagement, consolidate learning, and increase motivation, didactic games were introduced in Soviet school practice as early as the mid-1960s—initially in preschool, primary, and extracurricular settings. Today, appropriately designed game-based methods and gamification are actively advocated within mainstream education.

Didactic games, as active learning tools, aim to develop independent thought, practical competencies, and initiative. Effective educational games typically include: a problem rooted in real-life context, peer interaction and mutual learning, sensitivity to individual learner traits, encouragement of autonomy and personal growth, elements of creativity or inquiry, and motivational incentives [16].

Combining game-based activities with the flipped model has shown considerable promise for overcoming motivation problems. This hybrid approach is particularly effective in geography instruction at both secondary and tertiary levels.

Experimental application. We implemented this pedagogical technology at the M. Mamyrayev Boarding School (Republic of Kazakhstan) in a 7th-grade geography class to evaluate its effect on student interest and achievement. The study involved 24 students (Fig. 1).

Figure 1. Implementation of game methods during a geography lesson

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Thematic instruction under the flipped-plus-gamification approach covered “Regional Studies and Fundamentals of Political Geography”, including topics such as countries’ geographic positions, historical changes of state borders and territories, world capitals, and national symbols (flags). Instead of delivering content during class, students prepared at home using video lectures and interactive assignments chosen to align with curricular standards and age appropriateness. This format allowed individualized pacing, which promoted deeper understanding and higher-quality learning [17-18].

Classroom time emphasized practical, interactive, game-based tasks: geography term crosswords, flag-identification quests, country–capital quizzes, and intellectual games such as “Geographical Silhouettes” and “Odd One Out.” Online testing was also employed. The gamified activities increased sustained motivation, drew in typically passive students, and fostered a cooperative and supportive classroom climate [19].

Secondary education outcomes. Before the intervention, class knowledge quality (measured via academic performance) was 70.83 %. After one term using the flipped model, it rose to 83 %, an improvement of 17.14 % (Fig. 2).

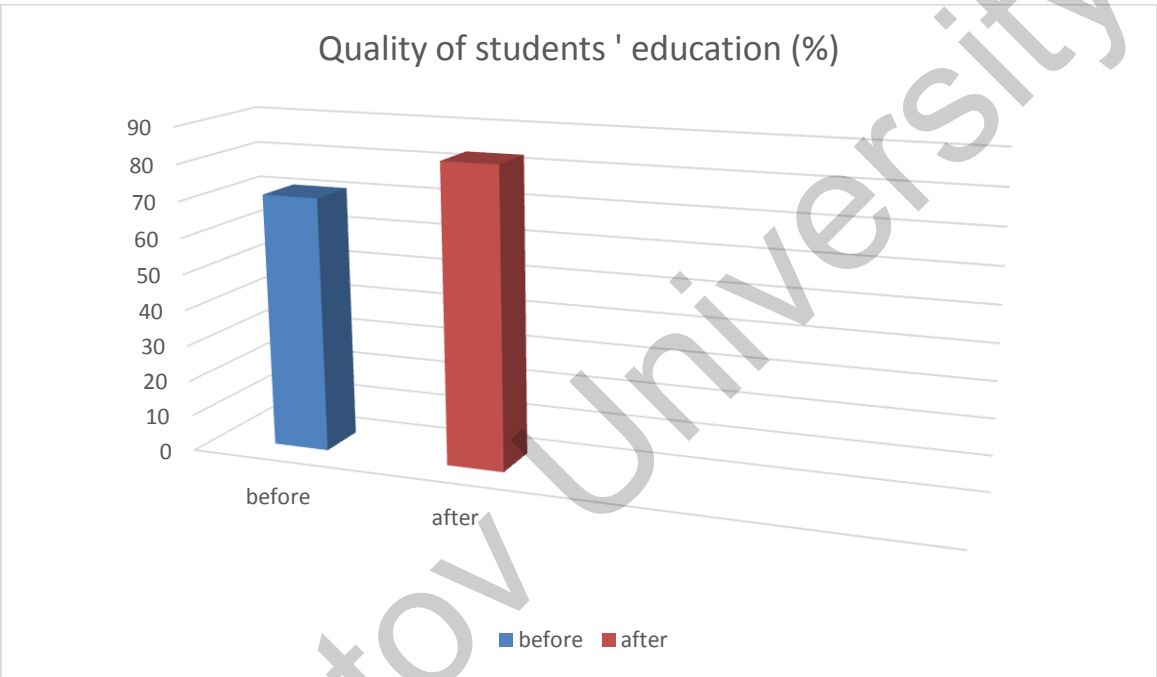

Figure 2. Changes in the quality of knowledge of students participating in the experiment (Before and after)

Higher education implementation. We also trialed the model in a university course—“Soil Geography”—with second-year students in Natural Sciences (Biology and Geography). The experimental group comprised 15 students. Three conceptually demanding lecture topics were selected: “Parent Rocks and the Mineral Component of Soil”, “The Organic Component of Soil and the Soil Absorbing Complex”, and “Soil Morphology” [20].

Students were required to study materials independently via Moodle one week before face-to-face sessions. Pre- and post-tests showed an average gain of 1.47 points relative to traditional lectures, with a total group improvement of 4 points. Notably, larger gains occurred for more complex topics, where motivation was reinforced by testing (Fig. 3).

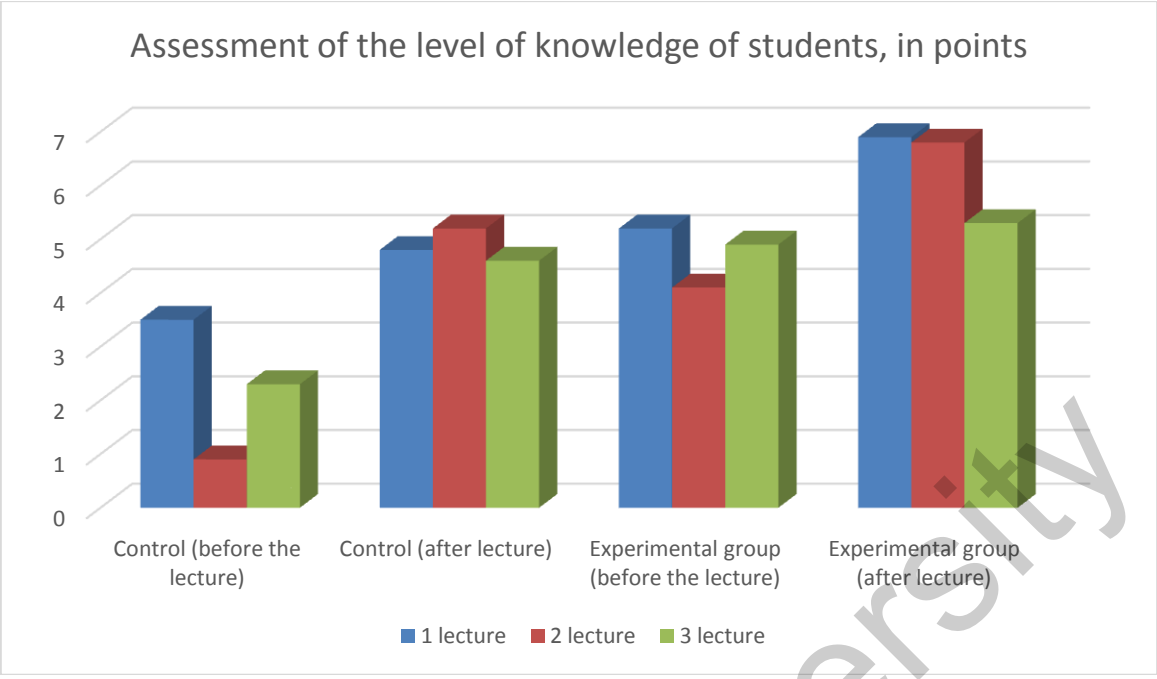

Figure 3. Assessment of the level of knowledge of the students of the control and experimental groups before and after listening to the lecture offline (in points)

Conclusions

In both secondary (17 % increase) and higher education (14.6 % increase), combining the flipped classroom with gamified methods produced measurable improvements in academic performance. Beyond numerical gains, important qualitative shifts were observed: learners became more active, autonomous, collaborative, and motivated, including many previously underperforming or reluctant students. These results support the conclusion that, when thoughtfully designed, contemporary pedagogical practices such as flipped learning and gamification can be both effective and engaging.

References

1 King A. From sage on the stage to guide on the side / A. King // College teaching. — 1993. — 41 (1). — P. 30–35.

2 Mazur E. Peer instruction: a user's manual series in educational innovation / E. Mazur. — New York rentice Hall, Upper Saddle River, 1997. — 253 p.

3 Baker J.W. The classroom flipped: Using web course management tools to become the guide on the side / J.W. Baker // Selected Papers from 11th International Conference on College Teaching and Learning. — Cedarville University, 2000. — P. 9–15.

4 Zawacki-Richter O. Handbook of Open, Distance and Digital Education / O. Zawacki-Richter, J. Insung. — Springer Singapore. — 1463 p. DOI.org/10.1007/978-981-19-2080-6

5 Parra-González M.E. Gamification and flipped learning and their influence on aspects related to the teaching-learning process / M.E. Parra-González, J. López-Belmonte, A. Segura-Robles, A.J. Moreno-Guerrero // HELIYON. — 2021. — Vol. 7. — Iss. 2. DOI: 10.1016/j.heliyon.2021.e06254

6 Федотова О.Д. Альтернативная образовательная технология Flipped learning как реализация идеи радикального пересмотра организационных основ процесса обучения / О.Д. Федотова, Е.А. Николаева // Интернет журнал «Мир науки». Педагогика и психология. — 2017. — Т. 5, № 1. — С. 52–59.

7 Fitria M.I. The Effectiveness of Flipped Classroom Learning Model Assisted on Padlet Platform in Geography Lessons / M.I. Fitria, N.M. Wijaya // Journal of Learning Geography. — 2023. — Vol. 4, No. 2. — P. 63–68. DOI.10.23960/jlg.v4.i2.28607

8 Nyabochoa G.K. Effect of Flipped Learning Approach on Students. Achievement in Geography / G.K. Nyabochoa, F.I. Indoshi, S.O. Oyoo // International Journal for Multidisciplinary Research. — 2024. — Vol. 3. DOI.org/10.36948/ijfmr.2024.v06i03.23674

9 Сухорукова Е.Г. Перевернутый урок / Е.Г. Сухорукова // Дидактика сетевого урока: Мат-лы II Международной научно-практической онлайн-конференции, г. Минск, 16 ноября 2017 г. — Минск: Белорус. гос. пед. ун-т им. М. Танка, 2018. — С. 50–54.

 ISSN 3106–9649 (Print) ISSN 3106–9657 (Online)

10 Fulton K. Upside down and inside out: Flip your classroom to improve student learning / K. Fulton // Learning & Leading with Technology. — 2012. — Vol. 39, No. 8. — P. 12–17.

11 Nor Kalsum Mohd Isa. A Flipped Learning Experience in Geography: A Qualitative Study using Focus Group Discussion. / Kalsum Mohd Isa Nor, Che Leh Fauziah, Junainah Mohd Isa Nor, Yazid Mohd Yunos Mohd, Othman Shahrina, Hairy Ibrahim Mohd // Journal of Advanced Research in Applied Sciences and Engineering Technology. — 2023. — Vol. 31, No. 1. — 119–131. DOI.org/10.37934/araset.31.1.119131

12 Drandrov G.N.L.N. Blended learning in physical education of students / G.N.L.N. Drandrov, M.N. Van // Modern high-tech technologies. — 2024. — Vol. 6. — 140–145.

13 Антонова Н.Л. Модель «перевернутого обучения» в системе высшей школы: проблемы и противоречия / Н.Л. Антонова, А.В. Меренков // Интеграция образования. — 2018. — Т. 22, № 2. — С. 237–247. DOI: 10.15507/1991-9468.091.022.201802.237-247

14 Сутоцкая М.Ю. Применение технологии перевернутого класса в ходе реализации педагогического проекта «сам себе учитель» / М.Ю. Сутоцкая, О.И. Нагорнюк // Международный центр научного партнерства «Новая Наука». Конференция: «Преподаватель года 2023». — Петрозаводск, 13 декабря 2023 г. — С. 293–297.

15 Оспанова Г.К. и др. Основные особенности применения методики «перевернутого класса» на уроках химии / Г.К. Оспанова и др. // Endless light in science. — 2025. — № 31. — С. 55–63.

16 Буракова И.С. Геймификация образовательного процесса как инструмент повышения мотивации обучающихся / И.С. Буракова // Научный журнал «Мир науки, культуры, образования». — 2023. — № 3 (100). — С. 160–162.

17 Гуремина Н.В. Эдьютейнмент как эффективная технология развития творческого потенциала личности в учебном процессе / Н.В. Гуремина, Л.В. Путинцева // Современные исследования социальных проблем. Электр. науч. журн. — 2016. — № 3-2 (59). — С. 88–94.

18 Эскендарова М.А. Использование игровых методов обучения / М.А. Эскендарова, Л.Б. Атлуханова, А.А. Эскендаров // Вестник Социально-педагогического института. — 2011. — № 1 (2). — С. 29–32.

19 Улезкина А.В. Использование игровых приёмов при работе с картой на уроках географии / А.В. Улезкина // Международный научный журнал «Символ науки». — 2021. — № 12-1. — С. 112–116.

20 Давлатова М.А. Смешанное обучение в российской школе: как меняется проектирование образовательного процесса / М.А. Давлатова // Педагогика и психология образования. — 2022. — № 3. — С. 34–54.

В.Л. Андреева, С.А. Талжанов, М.П. Еркін

«Flipped learning» технологиясын оқу практикасында қолдану (Қазақстан мен Беларуссиядағы оқу орындарының мысалында)

Мақалада «төңкерілген оқыту» білім беру технологиясының айрықша ерекшеліктері қарастырылған. Оның негізгі қағидасы сыныптан тыс аудиовизуалды мазмұн арқылы оқу материалының теориялық негіздерін меңгеруде, содан кейін мұғалімнің жетекшілігімен аудиториялық сабақтар кезінде білім мен құзыреттілікті жетілдіруде жатыр. Мақалада осы әдістің пайда болуы мен дамуының қысқаша тарихы келтірілген, оның практикалық қолданудағы артықшылықтары, сипаттамалары мен қиындықтары баяндалған және төңкерілген оқыту моделін мектептегі және университеттік білім берудегі ойынға негізделген әдістермен біріктірудің тиімділігіне баса назар аударылған. Зерттеу көрсеткендей, ауыспалы оқыту интерактивті тәсілдермен үйлескенде тұрақты оқу мотивациясына, оқушылардың белсенділігіне және қажетті дағдыларды дамытуға ықпал етеді. Бұл технологияны Қазақстан мен Беларусьтің оқу орындарында енгізудің практикалық мысалдары келтірілген. Оқу нәтижелерін талдау көрсеткендей, білім беру сапасы тек үлгерімі жағынан ғана емес, сонымен қатар жалпы орта және жоғары білім беру бағдарламалары шеңберінде оқушылардың ынтасы мен көзқарасындағы оң өзгерістер арқылы да жақсарады.

Кілт сөздер: білім беру, мектептегі және университеттегі білім, интерактивті оқыту, білім беру технологиясы, төңкерілген оқыту, ойынға негізделген әдістер, оқушыларды ынталандыру.

В.Л. Андреева, С.А. Талжанов, М.П. Еркін

Применение технологии «перевернутого обучения» в образовательной практике (на примере образовательных учреждений Казахстана и Беларуси)

В данной статье рассматриваются отличительные особенности образовательной технологии «перевернутого обучения». Ее основной принцип заключается в освоении теоретических основ учебного материала с помощью аудиовизуального контента за пределами аудитории с последующим

совершенствованием знаний и компетенций во время аудиторных занятий под руководством преподавателя. В статье приводится краткая история возникновения и развития этого метода, описываются его преимущества, характеристики и проблемы практического применения, а также подчеркивается эффективность интеграции перевернутой модели обучения с игровыми методами как в школьном, так и в университетском образовании. В исследовании подчеркивается, что интегрированное обучение в сочетании с интерактивными подходами способствует устойчивой мотивации к обучению, вовлечению учащихся и развитию необходимых навыков. Представлены практические примеры внедрения данной технологии в учебных заведениях Казахстана и Беларуси. Анализ результатов обучения показывает, что качество образования повышается не только с точки зрения успеваемости, но и за счет положительных сдвигов в мотивации и отношении учащихся к программам общего среднего и высшего образования.

Ключевые слова: образование, школьное и вузовское образование, интерактивное обучение, образовательные технологии, перевернутое обучение, игровые методы, мотивация учащихся.

References

1 King, A. (1993). From sage on the stage to guide on the side. *College teaching*, *41* (1), 30–35.

2 Mazur, E. (1997). *Peer instruction: a user's manual series in educational innovation*. New York rentice Hall, Upper Saddle River, 253 p.

3 Baker, J.W. (2000). The classroom flipped: Using web course management tools to become the guide on the side. *Selected Papers from 11th International Conference on College Teaching and Learning* (pp. 9–15). Cedarville University.

4 Zawacki-Richter, O., & Insung, J. (2023). *Handbook of Open, Distance and Digital Education.* Springer Singapore. DOI.org/10.1007/978-981-19-2080-6

5 Parra-González, M.E., López-Belmonte, J., Segura-Robles, A., Moreno-Guerrero A.J., & Parra-González, M.E. (2021). Gamification and flipped learning and their influence on aspects related to the teaching-learning process. *HELIYON*, *7*(2). DOI: 10.1016/j.heliyon.2021.e06254

6 Fedotova, O.D., & Nikolaeva, Ye. (2017). Alternativnaia obrazovatelnaia tekhnologiia Flipped learning kak realizatsiia idei radikalnogo peresmotra organizatsionnykh osnov protsessa obucheniia [Alternative educational technology of Flipped learning as the realization of the idea of a radical revision of the organizational foundations of the learning process]. *Internet zhurnal «Mir nauki». Pedagogika i psikhologia — The online Journal "The World of Science". Pedagogy and Psychology*, *5*(1), 52–59 [in Russian].

7 Fitria, M.I., & Wijaya, N. M. (2023). The Effectiveness of Flipped Classroom Learning Model Assisted on Padlet Platform in Geography Lessons. *Journal of Learning Geography*, *4*(2), 63–68. DOI.10.23960/jlg.v4.i2.28607

8 Nyabochoa, G.K., Indoshi, F., & Oyoo, S. (2024). Effect of Flipped Learning Approach on Students. Achievement in Geography. *International Journal for Multidisciplinary Research*, *3*. DOI.org/10.36948/ijfmr.2024.v06i03.23674

9 Suhorukova, Ye.G. (2017). Perevernytyi urok [Flipped classroom]. *Didaktika setevogo uroka: Materialy II Mezhdunarodnoi nauchno-prakticheskoi onlain-konferentsii — Didactics of the online lesson: Materials of the II International Scientific and Practical Online Conference* (pp. 50–54). Minsk, Belorusskii gosudarstvennyi pedagogicheskii universitet imeni M. Tanka [in Russian].

10 Fulton, K. (2012). Upside down and inside out: Flip your classroom to improve student learning. *Learning & Leading with Technology*, *39*(8), 12–17.

11 Nor Kalsum Mohd Isa, Fauziah Che Leh, Nor Junainah Mohd Isa, Mohd Yazid Mohd Yunos, Shahrina Othman, & Mohd Hairy Ibrahim. (2023). A Flipped Learning Experience in Geography: A Qualitative Study using Focus Group Discussion. *Journal of Advanced Research in Applied Sciences and Engineering Technology*, *31*(1), 119–131. DOI.org/10.37934/araset.31.1.119131

12 Drandrov, G.N.L.N., & Van, M.N. (2024). Blended learning in physical education of students. *Modern high-tech technologies*, *6*, 140–145.

13 Antonova, N.L., & Merenkov, A.B. (2018). Model «perevernutogo obucheniia» v sisteme vysshei shkoly: problemy i protivorechiia [Flipped Learning in Higher Education: Problems and Contradictions]. *Integratsiia obrazovaniia — Integration of education*, *22*(2), 237–247. DOI: 10.15507/1991-9468.091.022.201802.237-247

14 Sutotskaya, M.Yu., & Nagornyuk, O.I. (2023). Primenenie tekhnologii perevernutogo klassa v khode realizatsii pedagogicheskogo proekta «sam sebe uchitel» [Application of Flipped Class Technology During the Implementation of a Pedagogical Project "My Own Teacher"]. *Mezhdunarodnyi tsentr nauchnogo partnerstva «Novaia Nauka». Konferentsiia: «Prepodavatel goda 2023» — The International Center for Scientific Partnership "New Science". Conference: "Teacher of the Year 2023"* (pp. 293–297). Petrozavodsk [in Russian].

15 Ospanova, G.K. et al. (2025). Osnovnye osobennosti primeneniia metodiki «perevernutogo klassa» na urokakh khimii [The main features of the application of the "inverted class" methodology in chemistry lessons]. *Endless light in science*, 31, 55–63 [in Russian].

16 Burakova, I.S. (2023). Geimifikatsiia obrazovatelnogo protsessa kak instrument povysheniia motivatsii obuchaiushchikhsia [Gamification of the Educational Process as a Tool to Increase Motivation of Students]. *Nauchnyi zhurnal «Mir nauki, kultury, obrazovaniia» — Scientific journal* "*The world of Science, Culture, Education",* 3 (100), 160–162. DOI: 10.24412/1991-5497-2023-3100-160-162 [in Russian].

17 Guremina, N.V., & Putintseva, L.V. (2016). Ediuteinment kak effektivnaia tekhnologiia razvitiia tvorcheskogo potentsiala lichnosti v uchebnom protsesse [Edutainment as an Effective Technology of Creative Potential Development in the Learning Process]. *Sovremennye issledovaniia sotsialnykh problem. Elektronnyi nauchnyi zhurnal — Modern Research of Social Problems. Electronic Scientific Journal*, 3-2 (59), 88–94 [in Russian].

18 Eskendarova, M.A., Atlukhanova, L.B., & Eskendarov, A.A. (2011). Ispolzovanie igrovykh metodov obucheniia [The use of game learning methods]. *Vestnik Sotsialno-pedagogicheskogo instituta — Bulletin of the Socio-Pedagogical Institute*, 1 (2), 29–32 [in Russian].

19 Ulezkina, A.V. (2021). Ispolzovanie igrovykh priemov pri rabote s kartoi na urokakh geografii [Using game techniques when working with a map in geography lessons]. *Mezhdunarodnyi nauchnyi zhurnal «Simvol nauki» — International Scientific Journal “Symbol of Science”*, 12-1, 112–116 [in Russian].

20 Davlatova, M.A. (2022). Smeshannoe obuchenie v rossiiskoi shkole: kak meniaetsia proektirovanie obrazovatelnogo protsessa [Blended learning in the Russian secondary schools: Changes in Designing Educational Process]. *Pedagogika i psikhologiia obrazovaniia — Pedagogy and Psychology of Education*, 3, 34–54. DOI: 10.31862/2500- 297X-2022-3-34-54 [in Russian].

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