



MINISTRY OF EDUCATION OF TURKMENISTAN
MAGTYMGULY TURKMEN STATE UNIVERSITY



CERTIFICATE OF PARTICIPATION

This is to certify that

Ali Shiri

from

Ferdowsi University of Mashhad, Islamic Republic of Iran

actively participated in the International Scientific and
Practical Conference "The Role of Innovative Technologies
in Improving Methods of Teaching Chemistry"
held by Magtymguly Turkmen State University
in Ashgabat, Turkmenistan, 15-17 October 2025.

Rector

O.OVEZSAHEDOV



SECTION I

INNOVATIVE METHODS OF CHEMISTRY TEACHING

October 16, 2025

Venue: Academic building of the Faculty of
Chemistry of Magtymguly Turkmen State University

Time: 9:00 – 13:00

→ **Chairman of section:** **Ali Shiri** (The Islamic Republic of Iran)
Muhammetberdi Gurbanov (Turkmenistan)
Secretary: **Meretdurdy Meredov** (Turkmenistan)

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1. **Ali Shiri** (The Islamic Republic of Iran)
Game-Based Learning as a Catalyst for Students' Engagement and Achievement in Organic Chemistry
 2. **Nasiba Pirnazarova, Saodat Jumagulova, Sanjar Eshmuminow** (The Republic of Uzbekistan)
Thioamidation of 2-methylbenzimidazoles in the Presence of Isomeric Nitroanilines
 3. **Nataliya Stožko, Galina Belysheva** (The Russian Federation)
Virtual experiment for studying chemical disciplines
 4. **Bahtiyor Ganiev, Gulyara Holikova, Dilroz Primkulova** (The Republic of Uzbekistan)
Quantum-chemical Methods as a Tool for Predicting the Properties of New Compounds
 5. **Nadezhda Stepkina** (The Russian Federation)
Application of game-based learning in the Inorganic Chemistry course
 6. **Damen Nurgaliyeva, Amadey Moiseyenko** (The Republic of Kazakhstan)
Methodology for Solving Problem on Mixture Using Algebraic Equations
 7. **Mohammad Izadyar** (The Islamic Republic of Iran)
The Role of Innovative Technologies in Enhancing Chemistry Education: Digital Chemistry
 8. **Gulyara Holikova, Bahtiyor Ganiev, Sultonali Samiev** (The Republic of Uzbekistan)
Digital Technologies and Virtual Laboratories in Chemistry Teaching
 9. **Anna Syguta, Anastasia Mojarova, Violetta Shashina** (The Russian Federation)
Developing Interdisciplinary Connections in Education: The Example of Creating a Chemistry Learning Application

Game-Based Learning as a Catalyst for Students' Engagement and Achievement in Organic Chemistry

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The rapid advances in the world emphasize the urgent need for innovative educational strategies, especially in Chemistry. Game-Based Learning (GBL) has become a powerful solution, transforming passive learners into active participants and offering a dynamic, interactive approach to instruction. Unlike gamification, which adds points, badges, and leaderboards to existing lessons, GBL directly integrates learning objectives into the gameplay experience. Students learn by exploring virtual scenarios, solving problems, and making decisions that directly affect their progress, leading to deeper engagement and better understanding. We will highlight seven key benefits of GBL: (1) increased engagement and enjoyment, (2) a safe environment for failure, (3) immediate feedback, (4) improved problem-solving skills, (5) better memory and retention, (6) active participation, and (7) measurable improvements in test scores. Overall, these findings position GBL as a transformative educational approach capable of closing learning gaps, developing cognitive skills, and boosting academic achievement when aligned with curricular standards.

References:

1. G. L. Battersby, C. Beeley, D. A. Baguley, H. D. Barker, H. D. Broad, N. C. Carey, E. S. Chambers, D. Chodaczek, R. A. R. Blackburn, and D. P. Williams, *J. Chem. Educ.* 2020, 97, 2226-2230.
2. C. I. C. Crucho, J. Avo, A. M. Diniz, and M. J. S. Gomes, *J. Chem. Educ.* 2020, 97, 3211-3216.
3. S. Jamshaid, *J. Chem. Educ.* 2025, 102, 963-969.
4. B. Roy, S. Gasca, and J. Y. Winum, *J. Chem. Educ.* 2023, 100, 1382-1391.

KEYWORDS: Game-Based Learning, Gamification, Student Engagement, Problem-Solving, Educational Technology