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GAMIFICATION IN TEACHING ECONOMIC AND MANAGEMENT DISCIPLINES TO PHARMACY MASTER'S STUDENTS

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The article examines and substantiates the feasibility of implementing gamification in the teaching of economic and managerial disciplines for higher education students majoring in 226 "Pharmacy, Industrial Pharmacy" in the context of the digitalization of the educational process and the challenges posed by external factors (the COVID-19 pandemic and martial law in the country). It is emphasized that modern students are characterized by a high level of digital competence and expect interactive, visually engaging learning formats, which underscores the relevance of student-centered technologies. Gamification is identified as an effective tool for enhancing engagement, intrinsic motivation, and emotional resilience, as well as for developing practical skills and soft skills in future Masters of Pharmacy.

The study employed theoretical analysis of scientific sources and digital platforms, along with an empirical approach in the form of an anonymous survey of 71 fourth-year students of the Faculty of Pharmacy at Bogomolets National Medical University. The findings revealed that 94.4% of respondents positively evaluated the importance of gamification in learning, while the most in-demand methods were those involving real-life case modeling, team quests and role-playing games. This indicates students' preference for interactive learning formats that are closely aligned with professional practice.

The implementation of gamified methodologies in teaching the disciplines "Pharmaceutical Management and Marketing" and "Holistic Marketing in Pharmacy" fosters the development of critical thinking, communication skills, teamwork abilities, and the formation of managerial and entrepreneurial competencies essential for professional success in a competitive pharmaceutical market. The results of the study confirm the effectiveness of gamification as a modern educational tool capable of providing practice-oriented training and enhancing the quality of higher pharmaceutical education.

Key words: gamification, higher education in pharmacy, professional training, pharmacy master's students, digital learning tools.

Сахнацька Наталія, Алєкперова Наталія, Косяченко Костянтин. Гейміфікація у викладанні економічних та управлінських дисциплін майбутнім магістрам фармації

У статті розглянуто та обґрунтовано доцільність упровадження методу гейміфікації у викладанні економічних та управлінських дисциплін для здобувачів вищої освіти за спеціальністю 226 «Фармація, промислова фармація» в умовах цифровізації освітнього процесу та викликів, спричинених зовнішніми факторами (пандемія COVID-19 та воєнний стан у країні). Визначено, що сучасні студенти характеризуються високим рівнем цифрової компетентності та очікують інтерактивних і візуально привабливих форматів навчання, що актуалізує застосування студентоцентричних технологій. Гейміфікація визначена як ефективний інструмент підвищення залученості, внутрішньої мотивації, емоційної стійкості та формування практичних умінь і soft skills у майбутніх магістрів фармації.

У дослідженні використано методи теоретичного аналізу наукових джерел і цифрових платформ, а також емпіричний підхід у вигляді анонімного анкетування 71 студента 4 курсу фармацевтичного факультету НМУ імені О. О. Богомольця. Виявлено, що 94,4 % респондентів позитивно оцінили важливість гейміфікації в навчанні, а найбільш затребуваними виявилися методи, пов'язані з моделюванням реальних кейсів, командними квестами та рольовими іграми. Це свідчить про прагнення студентів до інтерактивних форматів навчання, які максимально наближені до професійної практики.

Використання гейміфікованих методик під час викладання дисциплін «Фармацевтичний менеджмент та маркетинг» і «Холістичний маркетинг у фармації» сприятиме розвитку критичного мислення, комунікативних навичок, здатності працювати в команді, а також формуванню управлінських та підприємницьких компетентностей, що є необхідними для успішної діяльності в умовах конкурентного фармацевтичного ринку. Результати дослідження підтвердили ефективність гейміфікації як сучасного освітнього інструменту, здатного забезпечити практикоорієнтовану підготовку та підвищити якість вищої фармацевтичної освіти.

Ключові слова: гейміфікація, вища фармацевтична освіта, професійна підготовка, магістри фармації, цифрові інструменти у навчанні.

Introduction. The current state of higher pharmaceutical education in Ukraine is marked by increasing demands for the quality of student training, particularly in the development of managerial, economic, and entrepreneurial competencies that determine the ability of future Master's graduates in pharmacy to function effectively in a competitive pharmaceutical market [1]. Simultaneously, the digitalization of the educational process and the transformation of students' learning styles under the influence of global and local challenges have highlighted the need to implement student-centered approaches to learning organization, one of which is gamification [2].

Modern students belong to Generation Z, shaped in an environment of high digital literacy, constant access to information, and active interaction in virtual spaces. The COVID-19 pandemic accelerated the adoption of distance learning and emphasized the importance of integrating digital educational tools [3]. At the same time, martial law in Ukraine, triggered by large-scale armed aggression by russia, has created new challenges for the educational system: external instability, high levels of stress among students, and the need for flexible learning formats. In this context, gamification serves not only as a tool for enhancing learning engagement but also as a means of supporting intrinsic motivation, emotional involvement, and resilience among higher education students [4].

The study aims to explore the potential of applying gamification in teaching economic and managerial disciplines to future Master's students in pharmacy, taking into account current challenges in higher education, the digitalization of the learning process, and the need to develop professional managerial competencies among students.

Materials and Methods. The research employed methods of theoretical analysis of scientific literature and digital educational platforms used to implement gamified elements into the learning process. The empirical basis of the study comprised the results of an anonymous questionnaire survey conducted among 71 fourth-year students enrolled in the speciality 226 "Pharmacy, Industrial Pharmacy". The sample size is considered sufficient for this study, as it pertains to evaluating the effectiveness of an educational methodology within a single speciality and academic program.

Research results. As the concept of "gamification" is relatively new in the pedagogical context, it is appropriate to analyse its conceptual framework briefly. In the scientific literature, the term is interpreted in various ways, which necessitates clarification. The term gamification was first introduced by British video game developer Nick Pelling in 2002 to describe game-like elements integrated into user interfaces [5]. However, the widespread application of gamification as an approach in education, business, healthcare, and management began around 2010.

The term "gamification" is derived from the English word game and refers to the process of transforming non-game contexts into game-like experiences. It should be distinguished from the related but not identical concept of edutainment, which combines education with entertainment. While edutainment emphasizes an entertainment format with educational content, gamification applies game-based techniques in academic contexts to enhance engagement, motivation, and the development of practical skills among future pharmacists.

In teaching economic and managerial disciplines to pharmacy master's students, gamification serves a dual purpose, encompassing both pedagogical and practice-oriented components of professional training. Pedagogically, gamification boosts students' cognitive engagement by enhancing their perception, comprehension, and assimilation of learning material. The use of interactive educational tools fosters emotional and intellectual involvement, supports intrinsic motivation, and promotes independent learning. Moreover, gamified environments contribute to the development of "soft skills" such as teamwork, time

management, critical and creative thinking, and emotional intelligence – essential components of a modern pharmaceutical professional's training [6].

Practically, gamification enables the modelling of real-life scenarios relevant to pharmaceutical professionals. Game-based scenarios may involve tasks such as developing a marketing strategy for a pharmacy or pharmaceutical company, planning human resources, making managerial decisions, and interacting with suppliers [7].

This study pays particular attention to the implementation of gamification elements in teaching the core course "Pharmaceutical Management and Marketing" and the elective "Holistic Marketing in Pharmacy," both taught at the Department of Organization and Economics of Pharmacy at Bogomolets National Medical University. These educational components served as the basis for the development and piloting of gamified methodological approaches aimed at improving the learning process and fostering students' critical thinking [8]. Table 1 presents a systematization of the primary gamification methods along with specific examples of their application in the educational process.

The implementation of the above-mentioned gamified methods in the teaching process of economic and managerial disciplines prompted interest in evaluating their effectiveness from the perspective of higher education students. To this end, a questionnaire survey was conducted among fourth-year pharmacy students at Bogomolets National Medical University. The aim was to assess their attitude toward gamification, their level of engagement in the learning process, and their perception of interactive content delivery methods. The next part of the study presents an analysis of the survey results, which provide insights into the appropriateness and effectiveness of the gamified approach in teaching professional training disciplines for future Master's students in pharmacy.

One of the key questions in the survey aimed to determine students' subjective assessment of the importance of gamification as an educational tool. Respondents were asked to evaluate how important, in their opinion, the implementation of gamification is for more effective assimilation of learning material. The assessment was conducted using a five-point Likert scale, where 1 indicated "not important" and 5 indicated "very important."

Notably, 66.2% of respondents (47 students) gave the highest score of 5, while 28.2% (20 students) rated it as 4. Only 5.6% (4 students) selected a score

Table 1

Gamification Methods and Examples of Their Application in Teaching Economic and Managerial Disciplines

Gamification Method	Example of Application in the Discipline
Point-based reward system	Students earn points for completing various types of tasks, which are displayed in a public progress table (Google Sheets or Moodle LMS). Reaching a certain number of points unlocks access to additional learning materials, bonus points, etc.
Educational quests	The storyline models a situation in which students act as a product management team for a pharmaceutical company and, under time constraints, develop a strategy for launching a new drug to the market. Students must propose a product name and positioning, define the target audience based on demographic and behavioral traits, develop a core marketing message that communicates the product's competitive advantages, and estimate the budget for the first advertising campaign, considering the selected communication channels.
Role-playing scenarios	Students are divided into two groups: representatives of a pharmaceutical distributor and a pharmacy chain. Each side must justify its commercial interests during simulated negotiations on medicine supply agreements. Participants prepare commercial offers, prioritize product assortments, justify order volumes, and discuss delivery timelines, discount systems, and bonuses, replicating the fundamental B2B negotiation dynamics.
Online quiz platforms (Kahoot, Quizizz)	Each topic is structured as a quiz with multiple-choice questions, including images of medicine packaging, ad slogans, and brief market case studies. Participants earn points for correctness and response speed. After each question, a short explanation is provided. A leaderboard is generated to stimulate a competitive environment.
Team competitions	Students are divided into teams tasked with developing a marketing strategy for promoting a specific medicine (e.g., a cold remedy, vitamin complex, or pain relief product). Teams present their proposals, which include audience targeting, communication channels, slogan, product visuals, pricing strategy, and distribution points. After presentations, teams could question each other, comment on opponents' decisions, and score each other based on creativity, market justification, and marketing alignment.
Visual online boards (Miro, Padlet)	Students collaboratively used sticky notes to post ideas, build flowcharts, drawings, and emojis to structure their models visually. The final stage was a pitch – a presentation of their models to other teams followed by group discussion.

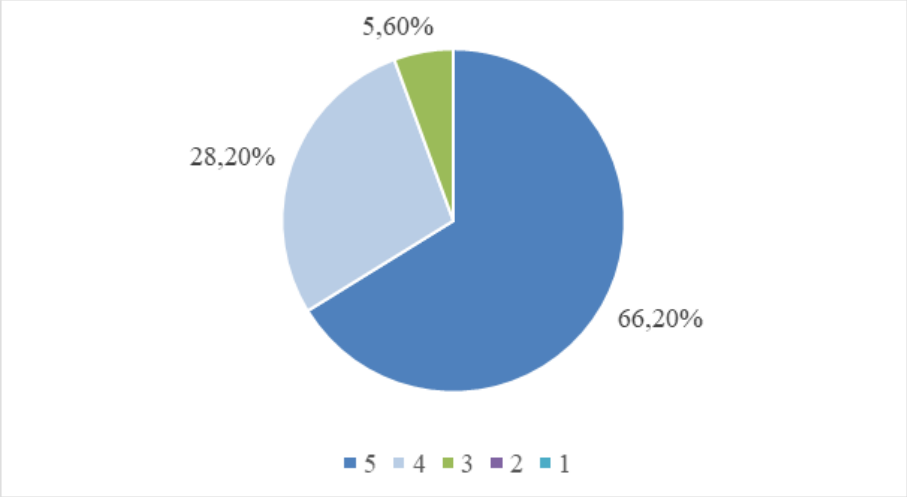


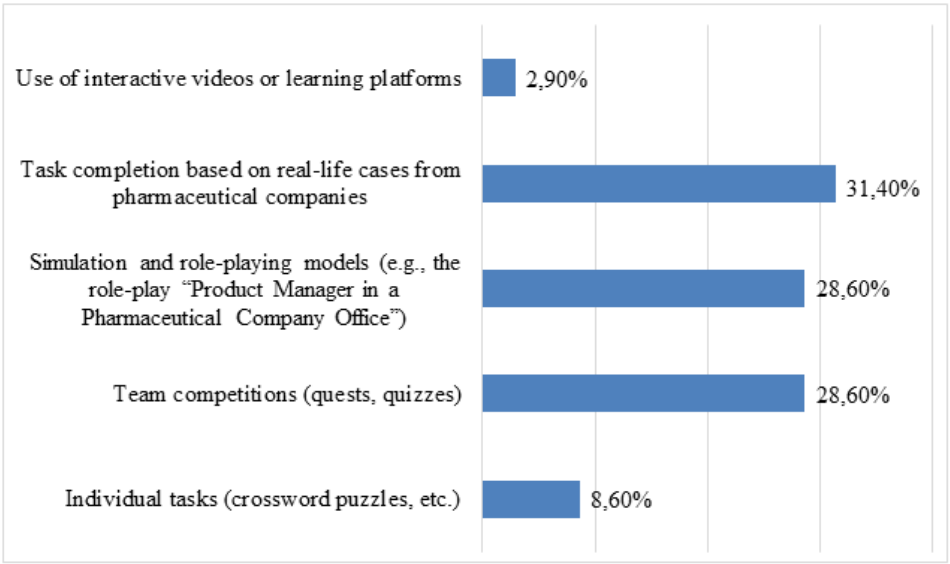
Fig. 1. Students' perception of the importance of gamification in learning
(based on a five-point scale, where 5 – very important, 1 – not important at all)

of 3. Importantly, none of the students chose scores of 1 or 2, indicating the absence of negative attitudes toward gamification among the participants (Fig. 1).

The obtained data indicate a positive perception of gamification among students and confirm its relevance within the context of modern pharmaceutical education, which is characterised by a focus on interactivity, visual engagement, and practical orientation.

As part of the survey, students were also asked to identify which types of gamifications they found most interesting and appropriate in the context of teaching economic and managerial disciplines. Respondents were allowed to choose one or several options from a provided list (Fig. 2).

The highest level of interest was shown in tasks based on real-life cases, selected by 31.4% of respondents. In second place, with equal percentages, were team competitions (quests, quizzes) and simulation and role-playing models – each chosen by 28.6%. Individual tasks (e.g., crosswords) were preferred by 8.6%, while only 2.9% selected interactive videos or learning platforms. These results indicate a predominant student orientation toward collaborative formats of active learning, associated with practical activities and real-life scenario modeling. This further supports the relevance of using case-based methods, role-plays, and team interaction in the development of professional competencies among future Master's students in pharmacy.



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Conclusions. The results of the study confirm the relevance and effectiveness of applying gamified methods in teaching economic and managerial disciplines to Master's degree students majoring in 226 "Pharmacy, Industrial Pharmacy." The integration of game elements contributes to increased learning motivation, the development of cognitive activity, and the enhancement of managerial and communication skills – competencies essential for modern pharmaceutical professionals. The student survey demonstrated a high level of positive perception of gamification and a preference for active, team-based, and practice-oriented learning formats. The most significant interest was shown in methods involving real case-solving, simulation of managerial situations, and teamwork. The findings can be used to further enhance educational programs, develop interactive courses, and implement student-centered approaches in the training of future Master's students in pharmacy.

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