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THE FEASIBILITY AND EXPEDIENCY OF GAMIFICATION ACTIVITIES IN HIGHER EDUCATION

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ABSTRACT

This study aimed to identify the feasibility and expediency of gamifying activities in higher education institutions, for which an original methodology was used. However, gamification is complex and carries a high degree of risk in achieving organizational efficiency. It is therefore advisable to adopt a fragmented approach and selectively gamify individual processes and features, focusing on educational and research activities. When introducing gamification, top management should provide conceptual and regulatory support and HR specialists coordination. Using a distribution model of managerial functions for gaming activities and determining priorities, taking the use of artificial intelligence into account, is shown to be expedient.

Contribution/Originality: For the first time, this study is investigates the adoption of modern gamification technologies to increase the effectiveness of educational organizations. In particular, the most suitable areas of activity and management levels for gamification in higher education institutions are proposed.

1. INTRODUCTION

It is an indisputable fact that education plays a strategic role in the development of a society. Properly constructed higher education enables graduates to competing successfully in all sectors of the economy (Azevedo *et al.*, 2012; Kabanova *et al.*, 2016; Prichina *et al.*, 2017; Lehtonen, 2019) at all levels of business activity (Wang *et al.*, 2019) and achieve the desired results and dividends (Belousova *et al.*, 2016).

Successful teaching practice is through the effective use of human potential (Buley *et al.*, 2016), in-depth study, and the competent use of modern technologies (Kirillov *et al.*, 2016).

Recently, increasing attention has been paid to gaming technology: the use of gaming techniques in various fields and situations arising during the labor process. The problem with gamification, though, lies in the viewpoint of theorists and practitioners worldwide. analysis review of the literature reveals that researchers are not taking into account systematic studies of the gamification of activities in business and public sector organizations in general and higher education institutions in particular (Vinichenko *et al.*, 2016b; Alvarez *et al.*, 2017; Rogach *et al.*,

2017). Other problems are associated with the introduction of gamification include age and gender (Martí-Parreño et al., 2016; Hudson et al., 2019), IT security and data privacy issues (Baxter et al., 2016), and cognitive learning (Lumsden et al., 2016). Special consideration should also be given to individual motivations in using gaming techniques (Tondello et al., 2018), as well as to the creation of a favorable working and learning environment (Rogach et al., 2016).

Some researchers suggest focusing on the control system when introducing gaming techniques (Wittenbaum et al., 2004): German scientists proposed the simultaneous integration of control systems and gamification (Bartel et al., 2017).

Students of Generations Y and Z have grown up with the widespread use of innovative technologies (Kirillov et al., 2015) and digitalization of many everyday activities (Eroshkin et al., 2017; Sukhorukov et al., 2017; Veretekhina et al., 2017), while teachers are increasingly faced with the use of computer games, regular online tasks (Moore and Pearson, 2017), social media (Zdravkova, 2016), and innovative models (Landers and Armstrong, 2017) in the learning process. Consequently, American researchers have explored the use of artificial intelligence (AI), computer modeling of cognitive processes and affective inclinations while learning (Lamb et al., 2018). Likewise, Chinese researchers explored how cloud computing affects students' educational performance (Zulqurnain et al., 2018). In practice, Spanish scientists were convinced that the use of information and communication technologies (ICT) and gamification in the classroom improves students' motivation to learn (Serrano and Fajardo, 2017). In fact, students' participation in public life and study is growing due to the skillful formation and implementation of gaming techniques in youth policies.

A connection between educational theory and business practice has been sought through gaming techniques. In Holland, students use the business game Logistic Support Game (LSG), based on the role distribution model, that reinforce the joint activities of teachers, practitioners, and students (Martinetti et al., 2017). Spanish researchers have also investigated the use smartphones in physics lessons at the Polytechnic University of Valencia and found it raised students' curiosity (Sans et al., 2015). In contrast, Finnish researchers have examined concerns about the negative effects and problems associated with modern video games and their influence on gambling (Macey and Hamari, 2018). Questions have been raised about the ethics of using AI and augmented reality (AR) technology, which enhances the real environment with digital information, as well (Saoud and Jung, 2018). Finally, scholars are looking to formulate integrative models for gamification, which should be for further researched (Goncalo and Tiago, 2019).

In relation to the serious issues of graduate employability and identity (Maxwell and Armellini, 2019; Reychav et al., 2019), and the identification and use of talented youth (Beechler and Woodward, 2009; Elia et al., 2017), gamification is under consideration (Kirillov et al., 2016; Vinichenko et al., 2016a).

In general, gaming techniques are being used in business organizations and public institutions, increasing the efficiency of their employees; therefore, numerous studies contribute to the investigation and implementation of the most advanced techniques and individual approaches. However, the question of the feasibility and expediency of gamifying activities in higher education institutions has yet to be fully examined, and is thus reason for this study.

At the same time, though, it should be noted that there have been no systematic studies of gamification in all areas of an organization's activities, including higher education institutions. The potential for an internal synergistic effect by gamifying an organization's activities, and the lack of research studies, initiated this study.

2. METHODOLOGY

The Russian State Social University (RSSU) has reached the second stage of implementing gamification (2018–2019), which was a logical continuation from studying both Russian and global experiences of training gamification during the first stage (2016–2017). The experiences of other universities, business partners of ANCOR Holding, and HeadHunter Group of Companies have been summarized, while teaching staff exchanged their experiences and

discussed research findings at the 2016 Moscow Scientific and Practical Conference, "Gamification: business and society" and the 2018 Fourth International Conference on Higher Education Advances in Valencia.

Studying these experiences reveals the most effective approaches to and methods of introducing gaming techniques into training. This then led to the systematization of gamification approaches and methods, and the potential for full or partial implementation in other areas of universities. As a result, researchers from the RSSU Faculty of Management, Surgut State University, including academic staff, and foreign researchers conducted a sociological study and a combination of content analysis, typology, and comparative analysis to identify the feasibility and expediency of gamifying activities in higher education institutions.

The study comprised two stages: first, the sociological survey between January and February 2019; and second, from March to April 2019, an analysis of the survey results by a focus group and generation of innovative proposals.

First stage. Empirical results were derived from a sociological survey conducted between January and February 2019 using Google Form, a standardized online questionnaire service, and analyzed using mathematical statistics. There were 318 respondents, of whom 72% were men and 28% women, 83% aged between 18 and 35, and 64% with a Russian Incomplete Higher Education Diploma.

A structural and functional scheme for RSSU activity was developed to identify the feasibility and expediency of gamifying the university's activities (Figure 1).
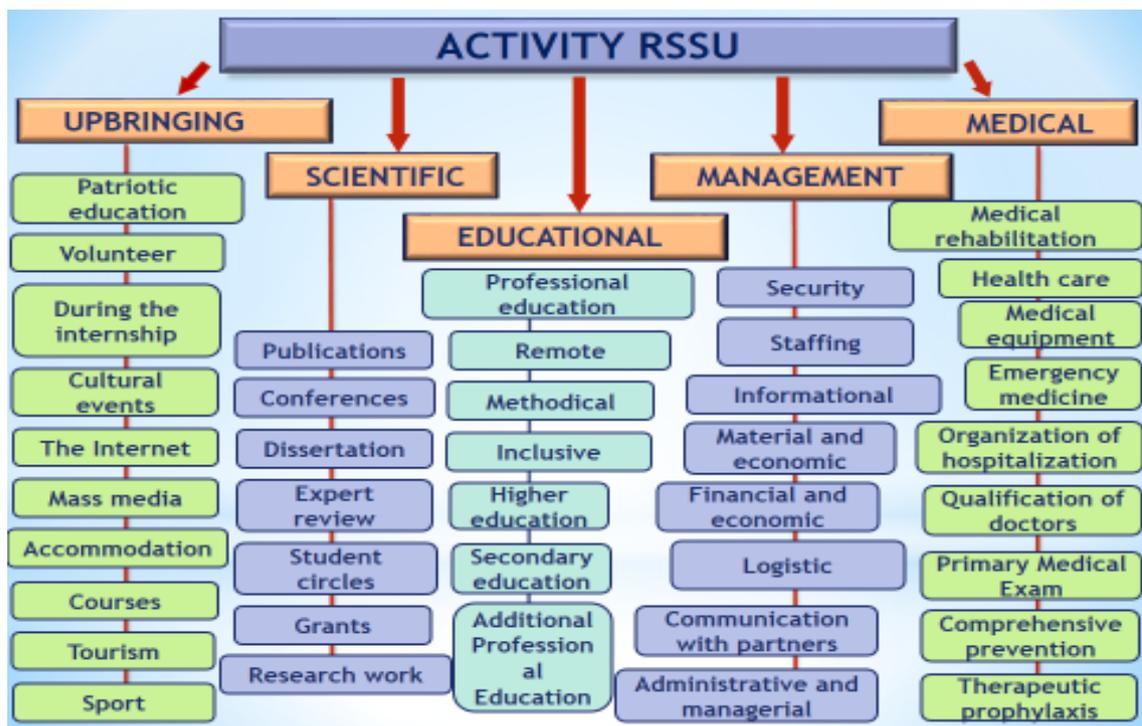

Figure-1. Structural and functional scheme of the RSSU to assess the feasibility of gamifying its activities.

Second stage. A focus group was convened comprising eleven experts: Russian and foreign researchers, faculty members, and administrative and managerial staff of higher education institutions. It was tasked with analyzing the survey results and developing proposals for optimizing the gamification of activities in higher education institutions, taking into account the use of AI. Members were provided with the means for effective online communication, enabling each to receive and discussion the data with their colleagues at remote locations.

In Indonesia, the State Islamic University (UIN) Jakarta had implemented gamification learning methods in the Faculty of Economics and Business in July 2016, starting with Intermediate Macroeconomics and Intermediate

Microeconomics. The aim was to increase motivation, autonomy, cooperation, and socialization in the learning process, as well as create fun, since positive emotions improve motivation and support memorization.

Based on their understanding of the participants and the management processes in educational organizations, focus group members expressed their opinions on the proposed gamification of RSSU's activities. It is consequently suggested that the gamification of activities in higher education institutions is expedient and to a certain extent, feasible at all levels and in all areas of activity.

3. RESULTS

First stage. The sociological survey produced the following results. Most participants responded positively to the question: "Is the gamification of all activities in an educational organization necessary?" (Figure 2).
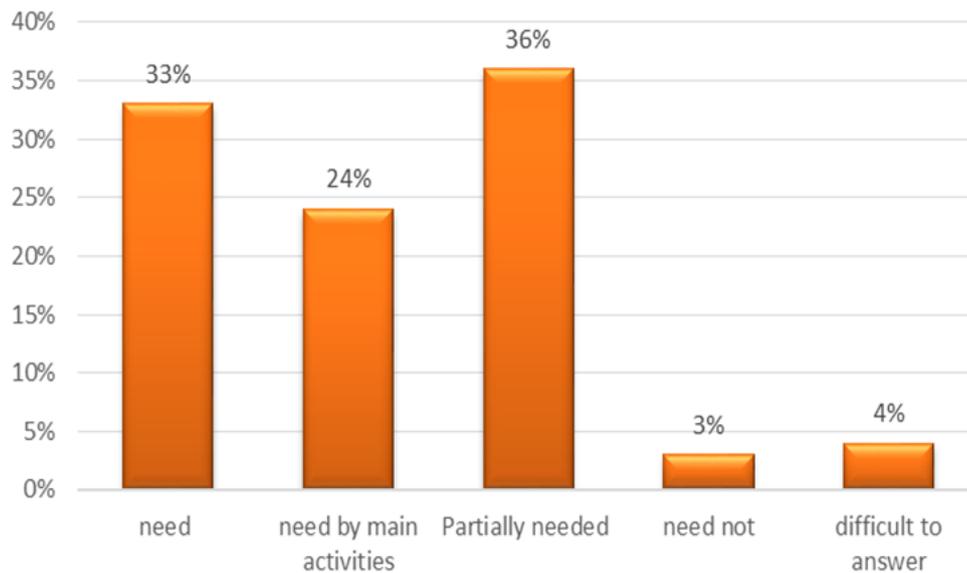

Figure-2. Answers to the question: "Is the gamification of all activities in an educational organization necessary?"

The majority of respondents (93%) agreed that gamification is needed, at least in the main activities (24%). A few (4%) were not sure whether it was needed in educational organizations.

An important aspect was the effect of gamifying activities in an educational organization (Figure 3). Generally, participants believed gamification's positive effects were internal: principally, interest in their work and studies (75%) and organizational efficiency (52%).
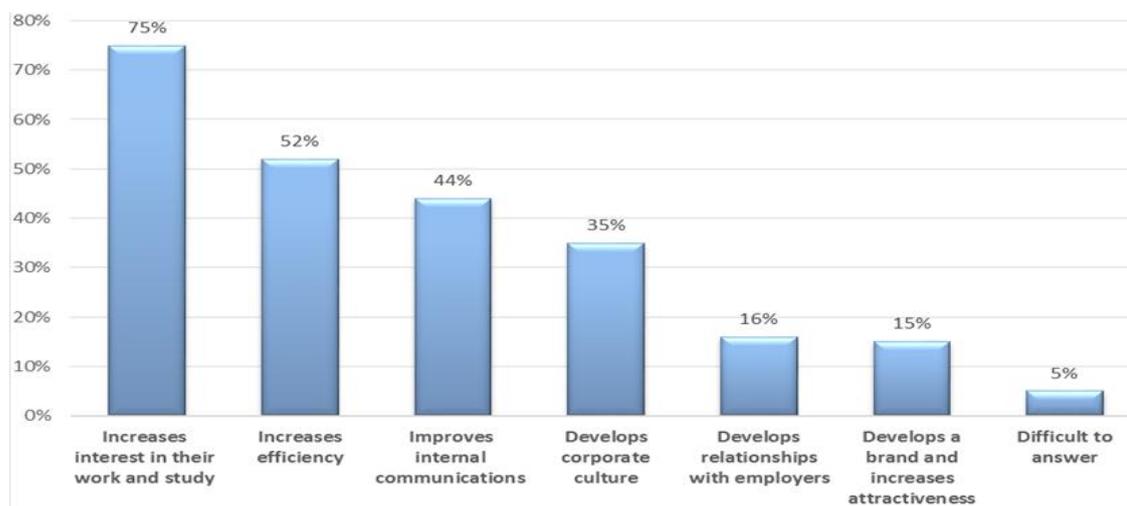

Figure-3. Answers to the question: "What is the effect of gamifying activities in an educational organization?"

Other responses were significantly, with 5% uncertain of the effects.

The feasibility of gamifying all activities in educational organizations was generally confirmed (26%), particularly of the main activities (23%) (Figure 4).
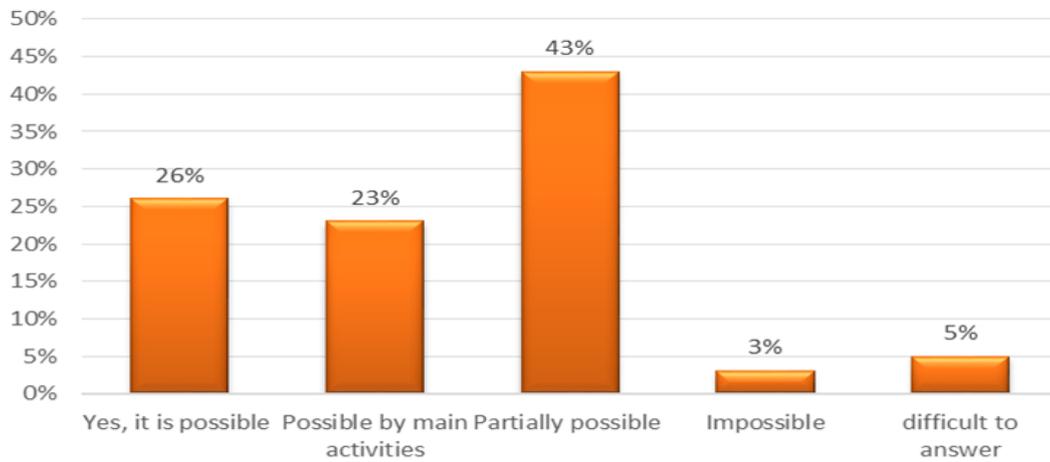

Figure-4. Answers to the question: "Is the gamification of all activities in an educational organization feasible?"

However, a similarly large number of participants stated that gamification was only partially feasible (43%), although very few (3%) responded negatively.

On the whole, participants stated that deans of faculties (46%) and heads of departments (42%) should manage the gamification of activities in educational organizations (Figure 5).
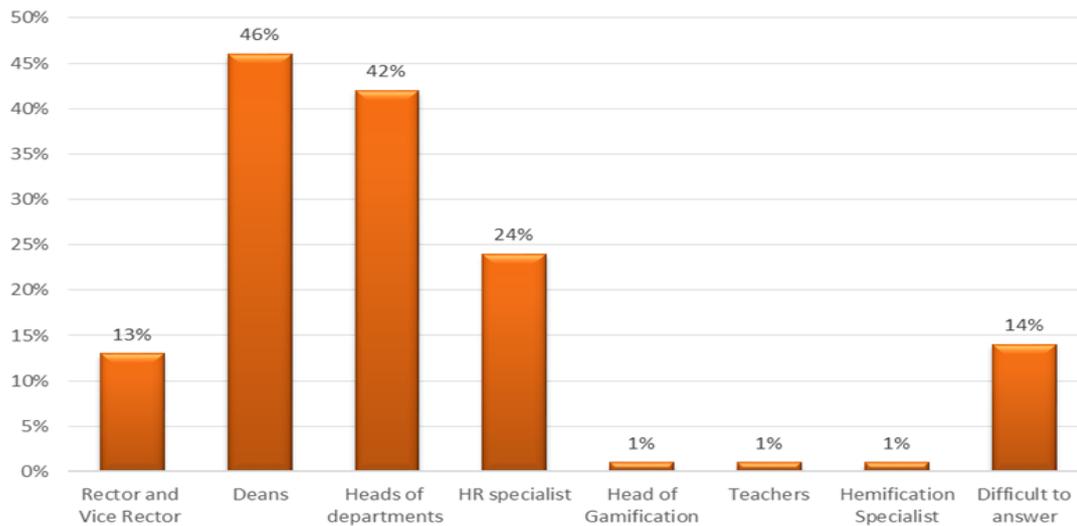

Figure-5. Answers to the question: "Who should manage the gamification of activities in an educational organization?"

A greater number selected the "Not sure" option (14%) for this question, as to select no management option denied the need to control gamification.

Meanwhile, implementing gamified teaching methods at UIN increased students' interest in learning. Enjoying the gaming elements within their lessons, students became more motivated to seek further information related to their course; thus, all students performed well in the mid-semester test, with no particularly one surpassing the others.

Second stage. The focus group discussed the following questions: (1) What does the gamification of activities contribute to educational organizations?; (2) Who should manage the gamification of the educational organization's activities?

During the discussion on the first question, the experts concluded that skillful use of gaming techniques can improve organizational efficiency. In the main, both students' and teachers' interest in the learning process is increased, internal communications are improved, and corporate culture is developed. However, while discussing the second question, the focus group considered that gamification is fragmented in many universities—implemented by individual teachers with no central coordination. In addition, the administration is less involved in projects for gamifying various activities.

The focus group came to the conclusion, though, that the findings of the survey generally corresponded to the reality of management processes in higher education institutions. The prioritization of the main management functions involved in the gamification of activities was correctly allocated.

In terms of the feasibility of using AI in the gamification of activities, the experts judged the issue to be controversial. As a result, two main opinions were identified: (1) AI must be used when gamifying activities in higher education institutions; (2) AI optimizes various activities in higher education institutions, not just gamification.

4. DISCUSSION

In modern educational organizations, the majority of staff and students support the introduction of new teaching methods, as well as new ways of performing their official educational, scientific, administrative, economic, and technical duties. As such, 33% of participants favor gamification of all university activities, although further analysis revealed that most prefer a fragmentary approach. On the other hand, 24% believe that it feasible and expedient to gamify the main activities only, excluding those such as economic, technical, and medical. Only 3% proved to be opposed to all gamification.

While around a quarter of participants believed all activities could be gamified, most (66%) considered selective gamification to be better. Indeed, it would be difficult and inappropriate to create a single, integrated, effective system of gamification for all activities in educational organizations, especially since centralizing and coordinating the management of all university activities, as well as medical ones, has proved problematic. Consequently, gamification is only feasible at all levels and in all areas to a certain extent, which is determined primarily by the scope and level of management.

The focus group also believed it difficult to gamify all university activities, due to not only the length of time and well-trained specialists required but also the labor functions specific to different areas. Each area would need a customized approach and gamification method. Theoretically, a single gamification system could be developed that staff could then adapt as needed through a system of motivation and incentives: one such method is assessing improvements in the learning process, as experiences by RSSU (Kirillov *et al.*, 2015).

The sociological survey revealed department heads and faculty deans were thought best placed to manage gamification, with HR specialists offering guidance on personnel management and the structure and method of gamifying university processes. The participants thought top management could be trusted to provide both conceptual and regulatory support for gamifying activities in educational organizations, without the need to create special gamification positions and units. This result is ambiguous and controversial, however: on the one hand, the existing organizational and staffing structure is optimized and no additional personnel are required; on the other hand, the lack of centralization and a coordinator hinders success.

On the whole, the focus group viewed such an approach positively and proposed a model for allocating managerial roles; however, some members contended that a more stringent managerial system was required. A hierarchy was therefore proposed, clearly showing subordinate managerial levels to determine the structure and method of gamification. The advantage of this approach is its ability to accommodate the variety and time span of labor functions in different university activities, which significantly complicated the coordination and synchronization of gamification. However, the initial point of view prevailed.

The question of the purpose of gamification and its effect on university activities was then raised. An analysis of the sociological survey found that gamification significantly increases interest in work and studies. Gaming techniques can reveal the potential of staff and students and motivate them to develop their talent, which then improves the efficiency of the learning) activities performed by staff and students across an educational organization. Gamification also improves internal communications and develops a corporate culture. However, the effect on brand development and the attractiveness of an educational organization was far less, indicating insufficient implementation and development of gaming technologies and features. The effect on relationships with employers is similar, revealing a gap between the theory and practice of gamification in external communication.

The focus group agreed with these findings, but the discussion disclosed a particular expert opinion: gamification is a tool for increasing the effectiveness of not only activities within the university but also in other areas in which it participates. Gaming techniques should therefore be adapted to specific conditions and technologies, then used appropriately, preferably when improving the given processes and achieving the desired outcomes. Initially, the effect of gaming techniques on specific groups and/or processes should be tested before being rolled out across the university. The focus group also proposed developing a gamification culture in the university, which would improve the university's brand and its attractiveness to potential applicants. These views correlated with research findings in Korea (Lee and Jin, 2019).

Undoubtedly, AI is essential when gamifying university activities. There have been discussions on how AI should be used, with English researchers analyzing various models (Garnelo and Shanahan, 2019). However, the ethical norms of using AI have not yet been fully defined. With the rapid growth of AR technology, though, ethical standards are required to ensure a just coexistence between humans and AI (Saoud and Jung, 2018), especially as the effect of human–computer interaction in both gaming and non-gaming environments is not fully understood (Gustavo et al., 2018).

The focus group continued its discussion into implementation, asserting that, in part, gaming techniques and actual games can be a consequence of AI, since in an electronic environment, they help teachers with the learning process: attracting the attention and increasing the interest of students in learning, revealing the creative and intellectual potential of students, and develop the necessary competences; and also practicing real-world business scenarios, with smartphones for instance (Rahman and Hameed, 2018). In all cases, though, the type of people participating in the games must be considered, as evidenced by researchers from Pennsylvania State University (Christian and Conrad, 2019).

Another form of AI application is using the high information capabilities of digital technologies and robotization of the educational process to work on innovative projects, such as the allocation of managerial functions decision-making in the gamification of the university activities.

The focus group has developed several proposals to optimize the gamification of university activities. A distribution model of managerial functions for gamifying activities in higher education institutions and determining the priorities is proposed, taking the use of AI into account.

5. CONCLUSION

Improving the efficiency and competitiveness of a modern organization depends on the skillful use of all its resources, above all, human. Innovative technologies, including gamification, contribute to these objectives: increasing interest in work and study, improving organizational efficiency and internal communications, and developing corporate culture.

Studying the gamification of an entire educational organization has uncovered the controversy surrounding the introduction of gaming methods into the management system and the implementation of the associated labor and training functions. Comprehensive gamification carries a greater risk in achieving efficiency. The majority of participants confirmed the study's hypothesis that gamifying of activities in educational organizations was

extremely important and to a certain extent, feasible and expedient at all levels for all activities. However, creating a centralized system for gamifying all activities is problematic, and it is more realistic to increase the effectiveness of higher education institution's activities with a fragmented approach: selectively gamifying specific processes and features. The economic, technical, and medical areas in educational organizations are less suitable for gamification.

In gamification, top management should provide conceptual and regulatory support, while direct middle management (department heads and faculty deans take over direct supervision. HR specialists can be given a coordinating function.

The proposed distribution model of managerial functions for gamifying activities and determining priorities in higher education institutions, taking the use of AI into account, can thus serve as a starting point for developing of a gamification project in educational organizations.

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