



Conference Article

The Role and Potential of Artificial Intelligence and Gamification in Education: The Example of Vakıf Participation Bank

Zeynep Örpek^{1*}, Büşra Tural², İlknur Çoşkun³

¹ Vakıf Participation Bank R&D Center, <https://orcid.org/0000-0001-7130-9118>,
zeynep.orpek@vakifkatilim.com.tr

² Vakıf Participation Bank R&D Center, <https://orcid.org/0000-0003-3645-8761>,
busra.tural@vakifkatilim.com.tr

³ Vakıf Participation Bank R&D Center, <https://orcid.org/0000-0002-3740-6229>,
ilknur.coskun@vakifkatilim.com.tr

*Correspondence: zeynep.orpek@vakifkatilim.com.tr; Mobile Phone: (+905076033947)

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Abstract

The radical changes brought about by technological advances in education transform and enrich learning experiences by going beyond traditional education methods. Artificial intelligence technologies have the potential to offer personalized educational experiences according to students' individual learning speeds, priorities, and needs. The gamification method makes learning more fun and interesting and increases students' motivation, and gamification components such as competition, cooperation, and reward allow students to learn more deeply. The combined use of artificial intelligence and gamification has the potential to provide students with a more effective, engaging, and personalized educational experience and will continue to shape changes in education in the future. This study aims to examine the role, potential, and effects of artificial intelligence (AI) and gamification, two innovative approaches in education. Through the example of Vakıf Participation Bank, the impact of the gamification method used in performance monitoring



and internal communication on the internal communication, behavioral psychology, job performance, and training of the organization's employees is highlighted. With this study, it is thought that the use of gamification methods in internal communication, employee performance management, and training methods will benefit organizations by shedding light on their work in these areas.

Keywords: Gamification, Artificial Intelligence, Educational Technologies, Behavioral Psychology

1. Introduction

In the literature, the concept of education can be explained as a dynamic process that starts with the interaction of the individual with his/her family and environment from the moment he/she is born and continues at school, aiming to provide knowledge and skills to the individual [1].

Traditional education methods have focused on transferring knowledge through specific curricula and classroom environments for many years. These methods, which have a teacher-centered structure, are generally based on students passively receiving information in the classroom. However, with the rapid advancement of technology, the field of education has undergone major transformations, leading to the adoption of a student-centered approach. This transformation enables the learning process to be more effective, flexible, and personalized. Traditional learning methods have evolved and transformed into an innovative approach with the integration of new technologies such as artificial intelligence and gamification. While artificial intelligence determines students' learning levels and offers customized education programs, gamification techniques make the learning process more interactive and fun.

On the other hand, using gamification techniques in education is one of the approaches that have attracted attention in recent years. According to Zicherman and Cunningham, gamification is defined as "the use of game thinking and game rules to engage users and solve problems" [2]. The aim of gamification is to motivate people to achieve certain goals or behaviors by taking advantage of their desire for achievement, recognition and social interaction [3]. Unlike traditional education methods, this approach combines learning with game elements and makes it more fun by involving students in the learning process. Using the gamification technique allows students to develop problem-solving skills, collaborate and direct their own learning processes. Studies show that gamification studies have a positive effect on people [4] [5] [6]. When the studies in the literature are



examined, gamification technique encourages students to achieve higher levels of learning goals and to be more involved in the learning process [7] [8].

Another approach that we frequently encounter in education is the use of artificial intelligence technologies. The education sector is undergoing a significant transformation with the use of artificial intelligence technologies. As stated in the Horizon 2018 report, artificial intelligence is also used in the field of educational technology [9]. Many countries such as Russia and China have gradually started to integrate artificial intelligence technologies into education processes [10].

According to Coppin (2024), artificial intelligence is the ability of machines to make intelligent predictions and solve complex problems that require a certain level of intelligence in humans [11]. According to Aydın et al. (12), with artificial intelligence, it is possible to develop computer systems that artificially produce intelligent thoughts and behaviors of beings in nature [13].

AI algorithms analyze student data and provide personalized recommendations and resources based on individual learning needs and preferences [14]. The potential of using AI in education to become mainstream is increasing [15]. The combination of gamification techniques and artificial intelligence technologies in education attracts students' interest and gains even more popularity by achieving a flow throughout the learning process [16].

It is still quite normal for students to become distracted or bored during the learning process, even when intelligent educational technologies and gamification elements are used [17]. The combination of AI and gamification technologies in education can support students' learning processes, provide customized learning experiences, and enable teachers to support students more effectively. In this context, AI-based systems can analyze students' learning styles, provide personalized content, and guide teachers by evaluating student performance. With the use of Generative AI (creative artificial intelligence) techniques, which take AI technology one step further to support students' learning processes in the education sector, it has become possible to produce new content that is very difficult to distinguish from those produced by humans [18]. Generative AI can be used to improve students' creative thinking skills, create original content or encourage problem solving skills.

2. Materials and Methods

Gamification is the process of providing motivation, using and interacting for educational purposes by using game design techniques and elements. It aims to attract



user's attention, increase participation, and make learning more fun by integrating gamification elements into the processes. Gamification offers a strategic approach to engage users and encourage them to achieve specific goals.

Gamification technology combines elements from different fields such as game design, human-computer interaction, artificial intelligence, and, data science. These technologies are integrated into gamification processes to improve user experience and achieve targeted results more effectively.

Artificial intelligence plays a critical role in gamification technology. It stands out with its capacity to offer personalized experiences by analyzing user behavior. Artificial intelligence uses learning algorithms to offer users a more personal interaction. For example, by understanding a user's preferences and previous experiences, it can change the difficulty levels in the game and offer a more satisfying experience by recommending user-specific content. This allows content produced with gamification technology to establish greater connections with users and increase their motivation. Artificial intelligence-supported gamification further enriches users' learning experiences by making their learning processes more effective and personalized.

Artificial intelligence is a branch of computer science that enables machines to perform human-like tasks. Artificial intelligence has capabilities such as learning, intelligent decision-making, and interaction with the environment and is rapidly becoming widespread.

The main basic concepts of artificial intelligence are:

- **Machine learning:** It is a branch of artificial intelligence that enables computer systems to improve a specific task through experience and data analysis. It is used in areas such as image recognition, speech recognition, fraud detection, personalization of services, and healthcare
- **Artificial Neural Network:** These are machine learning algorithms that have a structure similar to the functioning of the human brain. It is widely used in fields such as image recognition and natural language processing.
- **Deep learning:** It is a subfield of machine learning that involves training multilayered neural networks to recognize patterns in data. It is used for complex tasks involving large amounts of data, such as image and speech recognition, natural language processing, and autonomous driving.
- **Natural Language Processing:** It is a subfield of artificial intelligence that involves training machines to understand, interpret, and produce human language. It allows machines to process and analyze large amounts of text and speech data,



enabling applications such as language translation, sentiment analysis, and chatbots.

- Generative artificial intelligence: It refers to a branch of artificial intelligence that can create new and original content. Such artificial intelligence systems can generate new data, text, images, sounds, or other types of content using patterns learned from a particular dataset.
- Computer vision: It is a field of study and engineering that focuses on enabling machines to interpret and analyze visual data from the world around them. It involves the development of algorithms and techniques that allow devices to recognize, process, and understand images and videos. It includes object recognition, image segmentation, optical character recognition, augmented reality, and robotics studies.

Based on all these, higher efficiency and competitive advantage can be achieved by using artificial intelligence and gamification in business life, especially in the field of competence development. When the studies in the sector are examined in this context, it is seen that Vakıf Participation, one of the youngest members of participation banking, carries out gamification studies in its internal processes.

Vakıf Participation was established on 03.03.2015 with the vision of becoming a reference institution in participation banking and continuing its activities as the most important institution of the "Foundation Culture". Vakıf Participation continues to carry out its activities with the vision and mission it has undertaken, with the principle of being beneficial not only to its partners, employees, or customers but also to the whole society. Therefore, it aims not only to provide services in the financial sector but also to enhance the competencies of its employees by keeping track of education, talent management, and technological advancements. The goal is to maintain a development-focused working environment where employee satisfaction continues to increase.

Vakıf Participation aims to enhance the competence development of its employees and improve performance evaluation processes through a gamification project. The project is designed to enable employees to acquire new knowledge, skills, and attitudes, enhance their existing competencies, and build competence memory during the feedback process. The ultimate goal is to increase competence development by providing constructive feedback to employees.

2.1. Gamification Used in Competency Development and Performance Evaluation: Analysis and Design Studies



Within the scope of the project, the concept of gamification and gamification elements were investigated in depth and usage scenarios suitable for this method were developed. The developed use cases were integrated into the distance education system and performance management system. The use cases were designed based on the dynamics, components, and mechanics found in the elements of gamification, such as reward earning and badges that support motivation, tasks that support incentive and learning rotation, and leaderboards that support competition [19]. The target audience of the project includes Vakıf Participation Bank employees.

The gamification elements used in the project are as follows:

Dynamics: Employees can access the distance learning system and performance evaluation system, in which the gamification method is integrated, 24/7 and view their progress when they fulfill the tasks assigned to them. In addition, employees can enter the STAR record created for themselves or their teammates through the performance management system at different levels as positive or development-oriented.

Mechanics: Employees are rewarded according to their success categories at certain periods of the year due to their success. In addition, feedback is given on the STAR records created based on performance in performance evaluations carried out at certain periods of the year.

Components: Employees can earn points by completing the tasks assigned to them and can earn badges in different categories depending on the type of task. Employees are shown on the leaderboards according to the number of badges earned. In addition, employees can enter STARs for competence-based situations/incidents that they and their teammates experience while working.

2.2. Gamification Used in Competency Development and Performance Evaluation: Testing and Commissioning Studies

To achieve the targeted results in the project, the test phase of the project was carried out in a controlled and planned manner. Within the scope of the test studies, the project was divided into 3 separate phases and was tested and commissioned in stages. The target group of the project in the test studies consisted of the Customer Contact Centre and Human Resources employees in the bank. As a result of the test work carried out within the range of pre-planned dates, the effectiveness, efficiency, and the stages foreseen to be developed were determined. After the necessary improvements were made, the next test

phase was started. After all test phases were completed, the project was launched and commissioned in the organization.

Test phases of the project:

Test Case 1: Within the scope of gamification used in competence development, the number of badges and tasks were limited as shown in the screenshot below. At the same time, a leaderboard was created according to the points earned by employees as they completed the tasks.

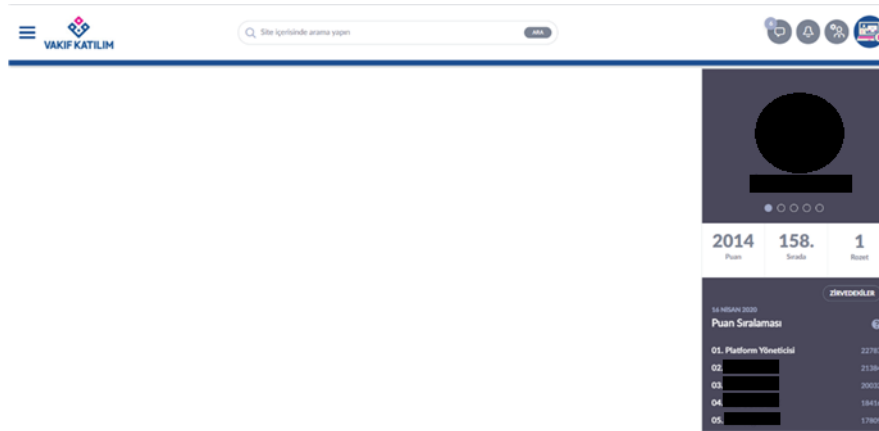


Figure 1: Vakıf Participation Distance Education System Gamification Profile

STARs related to the competence-based situations/events that employees experience while working for themselves and their teammates were limited to be made only for basic competencies. In this context, as a result of the test study carried out for a total of 6 months, it was seen that tasks and badges were not sufficient for the competence development of employees.

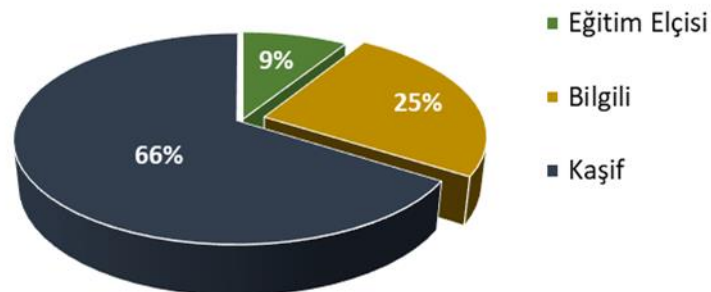


Figure 2: Percentage of Employees Earning a Badge-by-Badge Name

Test Case 2: Tasks were diversified and linked to badges. Different badges were determined and a concept in which emojis were used in badges was determined. In



addition, badges were categorized and award contents were determined according to the categories.



Figure 3: Renewed Badges in the Project

At the same time, a leader table was created according to the number of badges earned. As a result of these improvements in the project, the 2nd test was started. As a result of the 2nd test, which lasted 6 months, it was determined that the relationship between points and badges in the project was insufficient. In addition, an information document about the competencies was added to the STAR screen.

Test Case 3: According to the findings of the previous test run, reward contents were changed and 1-year reward gifts were supplied in bulk. In addition, to appreciate the achievements of the employees of the institution within the scope of gamification and to announce the innovations related to the project, a social group was created in the distance education system and tasks such as becoming a member of this social group and sharing were determined and these tasks were associated with earning various badge.

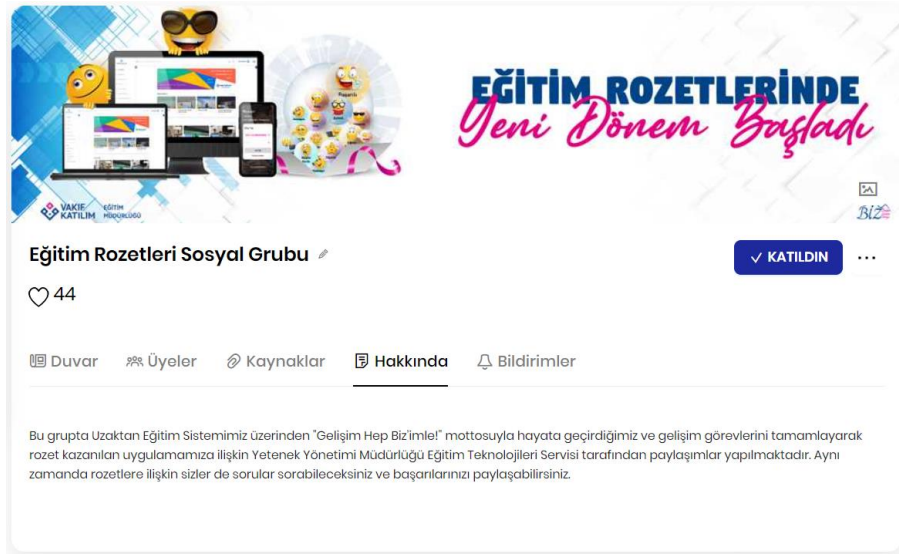


Figure 4: Social Group Used for the Project

Then, a test study lasting 3 months was started. In the test study, the fulfillment of the tasks determined for each badge the points obtained from the tasks, and the badge acquisition status were tested.

Figure 5: Vakıf Participation Performance Evaluation System Gamification Profile

As a result of the tests carried out, the project reached its final version. Subsequently, the project was commissioned by ensuring the participation of all employees of the organization in the system.



3. Result

The role and potential of artificial intelligence and gamification in education are critical factors in shaping the learning environments of the future. Gamification can make learning fun by encouraging students to become more involved. On the other hand, artificial intelligence has a revolutionary potential to provide personalized learning experiences by analyzing students' strengths and weaknesses, understanding their individual needs, and optimizing the learning process. For example, artificial intelligence and gamification-supported learning applications can offer students customized games and activities. Thus, it can make the learning experience more interactive and rewarding. This combination provides a powerful set of tools for creating a more effective and engaging educational environment. However, these technologies must be applied in a balanced and ethical manner.

In this period when new world skills are on the agenda, Vakıf Participation increased the performance and learning motivation of its employees by using gamification in the competency development and performance evaluation processes of its employees. At the same time, it encouraged its employees to be more involved in the opportunities offered for competency development. As a result, it was observed that the performance of employees increased by 67 percent. It was also observed that this situation enabled employees to complete the tasks assigned to them in a planned manner and to create a competence memory.

As a result, the combination of gamification and artificial intelligence methods in education can increase employee motivation and performance. In addition, encouraging guidance and action plans can be created to improve employees' weaknesses in their competencies and creative thinking skills.

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