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**EXPLORING THE USE OF GAMIFIED SYSTEMS  
IN TRAINING AND WORK ENVIRONMENTS**

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**Abstract:** *Gamification has been described as the employment of game thinking and game mechanics to support long-term user engagement, behaviour change and problem solving. It has driven novel approaches in diverse industries ranging from education, healthcare, sales, or travel, opening up disruptive channels of interaction and enriched means to foster motivation. In the business world, gamification can be put into action in a wide variety of areas within an enterprise, such as recruitment, training, project management, performance management, employee collaboration, team-building, etc. The role of gamification is to enable goals to be reshaped in order to make them more appealing and achievable for end-users (learners, employees, or customers). The golden rule behind gamification is to motivate users with a challenging blend of contests, quests, and good performance incentives. Even if the concept of gamification is widely popular, it remains a very specific challenge to engage individuals in a smart way and be innovative in the process. To better comprehend how gamification can revolutionize daily activities (training/learning, hiring, team-building, performance management, staff evaluation), this paper explores the perception of gamification and opportunities for its exploitation in work environments. Based on the case study carried out, the authors present examples of gamification systems that can be applied in training and work environments.*

**Keywords:** *gamification system; game element; questionnaire.*

## I. INTRODUCTION

Gamification concerns the transformation of non-game contexts into game-like experiences by leveraging characteristics and attributes derived from game technology. Gamification's main goal is to engage people at an emotional level, making it more efficient than typical transactional engagement strategies [1].

Gamification has started in education and it concerns the employment of the concept of "play" for learning with the purpose of stimulating thinking, involvement and motivation by using various remuneration mechanisms. Global revenue invested in gaming-based learning methods in 2016 reached \$ 2.6 billion, a global annual increase of up to \$ 7.3 billion is expected by 2021 [2]. Gamification can be more effective than traditional teaching methods because students are actively involved and competing with others. According to education studies conducted by the Global Education Gamification Market for 2016-2020, gaming in education was attractive for trainees; investment in this market is projected to reach \$ 1.2 billion by 2020.

Through gamification the learning motivation can be changed from extrinsic to intrinsic. In education, gamification can create learning environments that compress learning time and allow students to explore concepts while increasing the intrinsic motivation for learning. The interaction with a gamified environment leads to a higher level of involvement.

Researchers [3, 4] argue that gamification can be employed to motivate employees to achieve high skills levels and attain highest efficiency levels. It is however important to take into account the fact that different gamification mechanisms address different dimensions of the user preferences [5], and that gamification implementations are as unique as the specific needs they address. Moreover, the impact of gamifying mechanics on individual motivation can vary when implemented in actual applications [6] and the outcomes may differ substantially from expectations. Some researchers [7] underline the importance of applying good design in gamification practice, while others [8] highlight the fact that implementing gamification mechanics such as point, badges and leader boards, without a consistent model hinders the user's experience.

In the last decade, enterprises gamification has gained momentum and enterprises have considered gamification as a valid option to engage their workforce, drive attitude change, increase enjoyment, and achieve usefulness [9, 10]. Moreover, gamification is considered a catalyst that generates win-win situations for both employers and employees, especially when blended with social networking [11].

In this context, the paper explores the perception of gamification and opportunities for its exploitation in training and work environments. In line with the research carried out by [12], the authors have created and distributed an online questionnaire to analyse contextual factors that can enhance the efficacy and impact of gamification. The main purpose was to gather insights on the gamification elements that are more appealing, on individual preferences for gamified systems applied in order to stimulate the completion of challenging and/or dull tasks, and on the social contexts associated with gamified environments. A particular focus has been on understanding the playing characteristics of the respondents, as well as on quantifying individuals' interest in using and buying gamified applications.

## **II. GAMIFIED ENVIRONMENTS: PERCEPTIONS AND EXAMPLES**

This section discusses the feedback collected via an online questionnaire on “*Gamification in training and work environments*” and presents insights and examples of gamified systems that were constructed based on the key findings.

### **2.1 Questionnaire on Gamification in training and work environments**

To gain a better understanding of the perception of gamification among employees of public and public organizations, a questionnaire has been created and distributed online. The questionnaire consisted of 16 questions. 55 responses were collected. The participation was equally distributed, respondents being 51.8% female and 48.2% male. The age of the respondents was also diverse: 26.8% were 25-34 years old, 32.1% were 35-44 years old, while the 45-54 and 55-64 age group gathered each a participation of 16.1%. Most participants were from Romania, but there were respondents from France and United Kingdom. 39.2% of the respondents work for public organizations, 27.5% work for large companies, while 21.6% work for SMEs. 55.4% of the respondents play games once in a while. The categories of those that play every day or once a week each gathered 17.9% of the respondents. Most of the respondents (52.7%) characterize themselves as casual players, while 25.5% of them consider themselves dedicated players.

The most motivating game elements that have been voted by participants were levels (41.8%), challenges between users (27.3%), points (20%), and rewards (20%).

More than half of the participants have used gamified applications, and have participated in gamified training activities. Most participants considered that they would be more productive if your work was more game-like, and that they would learn faster if training sessions included game elements, with less than 10% not being sure of the impact that gamification would have on their performance.

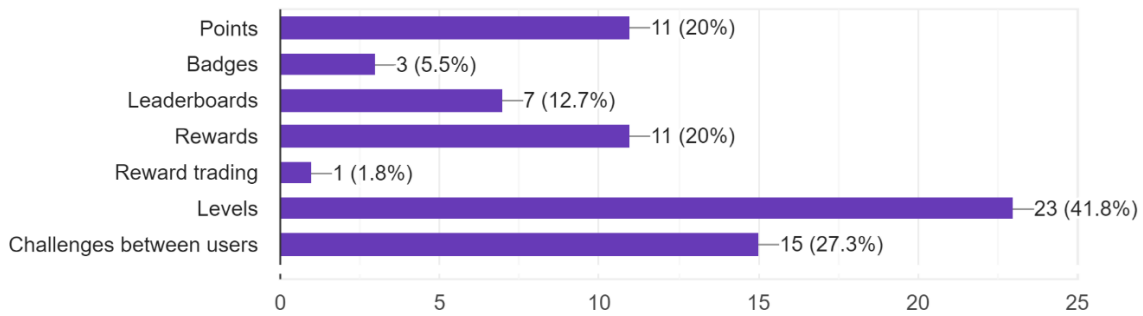


Figure no. 1. Motivating game elements

A significant percentage of participants (Figure 2) considered that gamification can positively impact the organizational culture (45.5%), can motivate young professionals (41.8%) and can motivate employees (38.1%). 29,1% stated that gamification can improve the outcomes of employee training, which links to the majority of respondents being willing to participate in partly gamified activities (Figure 6). It is important to highlight the fact that, even if gamification can impact work environments, most participants do not consider it can optimize the business workflows (89.1%), leading to the conclusion that gamification can be employed as a motivational and engaging factor in organizations, but it is not a disruptive force that impacts the core of businesses.

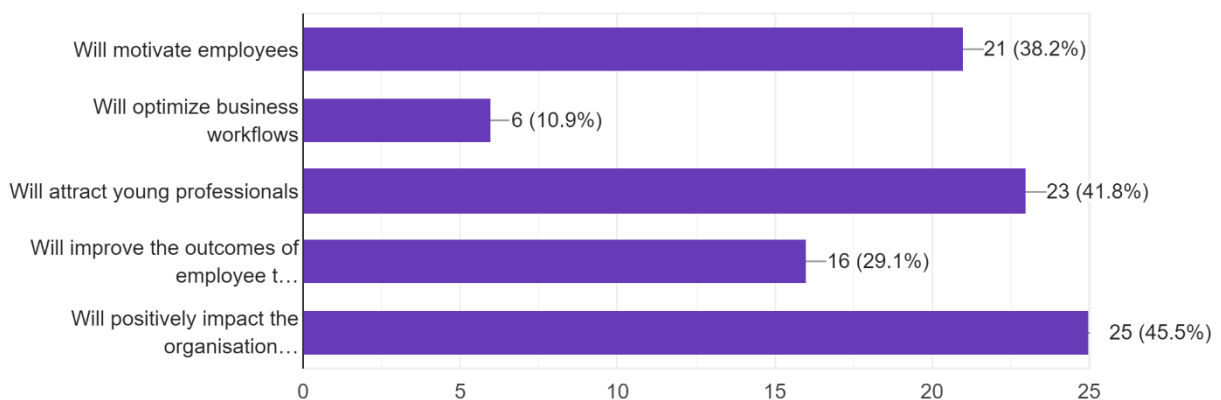


Figure no. 2. The use of gamification in work environments

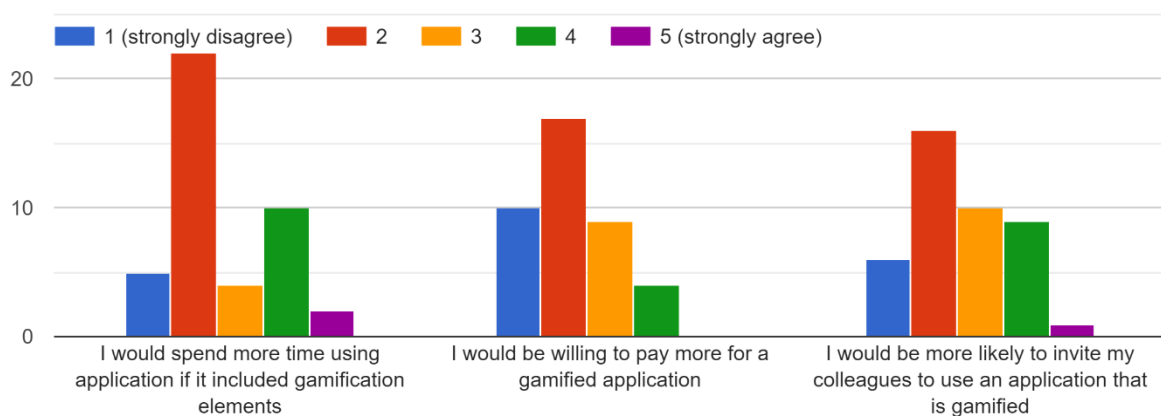


Figure no. 3. The use of gamified applications

The feedback received (Figure 3) has highlighted the fact that most participants would not spend more time using an application if it included gamification elements, would not be willing to pay more for a gamified application and would not be more likely to invite their colleagues to use an application that is gamified. Therefore, even if gamification can be used to increase the dynamics of training and work environments, employees do not consider it a must-have.

As shown in Figure 4, more than half of the participants (52.7%) considered that they would be more motivated to complete a challenging task that would improve their skills. 27.3% of the participants expressed their interest in completing a gamified challenging task, while 37.7% were willing to help their colleagues. In the context of challenging tasks, 23.6% considered that gamified activities would make them feel more socially connected.

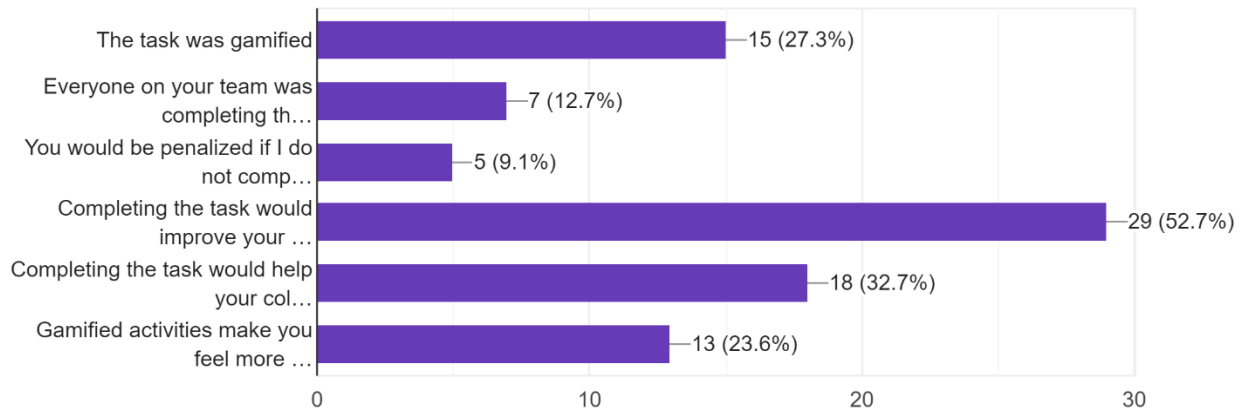


Figure no. 4. Gamification as a motivation factor to complete challenging tasks

Almost half of the participants (45.5%) stated that they would be more motivated to complete a dull task if the task was gamified (Figure 5). We can observe that gamification, as a motivational factor, is consistently more relevant when participants were considering completing a dull task, than a challenging task. A second incentive for completing dull activities would be skill improvement (43.6%). Even if the percentage is important, it is almost 10% lower than the percentage for completing challenging tasks to improve skills. Just as in the previous case addressing challenging tasks, penalties were not considered as a significant motivation to complete a task (7.3%). 27.3% of the participants were willing to help their colleagues complete a task and 25.5% considered that gamified activities will make them connect with others easier.

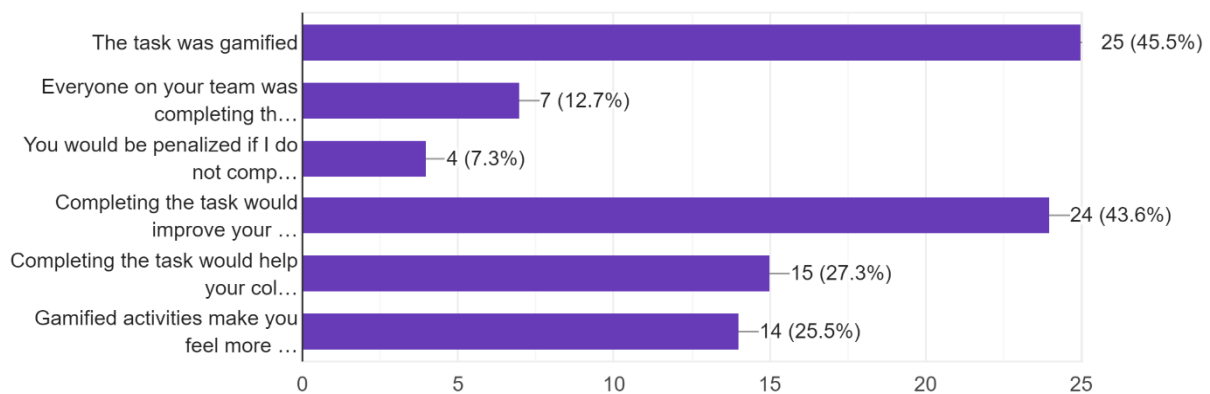


Figure no. 5. Gamification as a motivation factor to complete dull tasks

Figure 6 shows that a significant percentage of the respondents (61.8%) stated that they are interested in partly gamified learning activities, while 27.3% opted for fully gamified training. Only 10.9% stated they prefer training sessions that are not gamified. This connects to the fact that most participants are casual player, with a 25% of them being dedicated players, proving the long-term impact that games have on individuals.

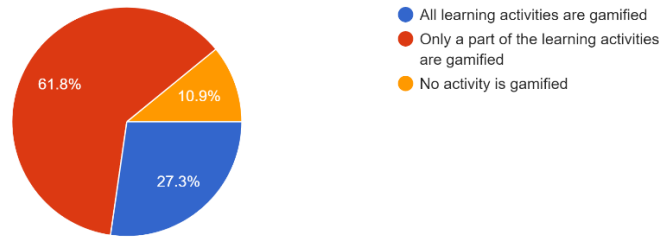


Figure no. 6. Preferences on participation in gamified training sessions

## 2.2 Implementing gamification systems in corporate environments

Gamification should be thought of in a holistic way in order to achieve the proposed goals. It requires creating fun, and challenging experiences, motivating individuals to acquire the knowledge and skills that will improve their competences, while achieving specific goals. The main role of using gamification in education has been to attract and retain attention, and to devise strategies that motivate students to achieve the proposed goal. Game elements have been introduced to encourage participation and interaction by awarding points, badges, and rewards. Rankings have also been used to motivate the learners by displaying the progress of other learners throughout the gamified activities. Gamification systems stimulate the accumulation of new knowledge, and support the improvement of general knowledge. Learners are engaged through rewards systems in a relaxing and captivating way. Whether gamification is regarded as a set of strategies, tactics or learning methods, the most effective uses will be those that allow a positive change, bringing satisfaction through the results obtained.

The use of gamification for corporate training remains similar to its use in education. The objective of gamification systems is to achieve higher levels of involvement, changing behaviours, and stimulating collaboration and innovation. Opportunities for companies are excellent - from more committed customers to collaborative platforms that allow innovation or improve employee performance. Game-driven motivation can be an efficient method for individual and team engagement, stimulating interactions in social contexts.

The Gamification 2020 Report [13] forecasts that by 2020 combined new technologies will have a significant impact on corporations as a whole, as well as employers' performance and customer engagement. Table 1 presents some of the most adopted game elements for the gamification of learning [14].

Table 1. Game elements

Game elements	Examples	Usefulness
Achievements	points, badges, levelling, leaderboards, certificates	By awarding points, badges, levelling, rankings, the employee gets satisfaction, develops skills, gratitude, motivation and achievement, and continuous effort is paid.
Rewards	equipment, tools and resources, to use in the game, collectible, bonuses	Depending on the achievements, rewards provide extrinsic motivation and recognition for the time spent, and last but not least, the acquired skills.
Time	schedule, countdown	Rewards against time, countdown clocks create a sense of urgency

Personalization	avatar choice, avatar customization, interactive conversation	Personalization is carried out at application level. Selecting the avatar is done according to the preferences of each user.
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The structure of a gamified English course is presented as an example in Table 2. Each course includes an assignment, a challenge, and a hidden treasure. Assignments are rewarded gradually, as the courses get more difficult. The completion of challenges is awarded badges. Treasures can be hidden in the content of the course. Hints can be provided, as the case may be. Collection objects can be tokens, cups of tea, cups of coffee, markers, pencils, pens, etc. To make the gamification more motivating, collection objects can consist of fun items such as cheating lists. Tokens can be collected and exchanged with rewards at the end of the course. There are also additional activities that trainees can attend to gain extra points. Rewards at the end of the course can be books, dictionaries, games, etc.

Table 1. Gamification system for an English course

English course	Points
<i>Course 1</i> - Assignment 1 - Challenge 1 - Hidden treasure 1	<i>Rewards</i> - 1 points - 1 badge - Collection object
<i>Course 2</i> - Assignment 2 - Challenge 2 - Hidden treasure 2	<i>Rewards</i> - 2 points - 1 badge - Collection object
<i>Course 3</i> - Assignment 3 - Challenge 3 - Hidden treasure 3	<i>Rewards</i> - 3 points - 2 badges - Collection object
<i>Course 4</i> - Assignment 4 - Challenge 4 - Hidden treasure 4	<i>Rewards</i> - 4 points - 1 badge - Collection object
<i>Course 5</i> - Assignment 5 - Challenge 5 - Hidden treasure 5	<i>Rewards</i> - 5 points - 3 badges - Collection object
Vocabulary Practice Worksheet	10 points
Grammar Practice Worksheet	10 points
Conversation Session	10 points

To increase engagement, trainers can apply secret gamification systems that do not disclose the reward rules. Points can be replaced with tokens or Monopoly money that trainees can collect after each activity. A special session, e.g. a market place, can be organized at the end of the course, where trainees can exchange the tokens or the money they have collected with various goods.

Gamification can also be applied in work environments to increase employer motivation and stimulate participation in activities that are monotonous or less challenging. Based on the feedback discussed in section 2.1 (Figure 1), Table 3 presents examples of gamification methods that can be applied for daily activities employees should carry out.

Table 3. Gamification systems

Gamification method	Description
Points	A set of tasks are selected for each employee or at the department/organization level. The tasks are included in a gamification system and are associated with goals, obstacles, and incentives. Reward rules are defined for the selected tasks. Each task is associated with a number of points. Employees can collect points by completing tasks from their list. Points can be exchanged for rewards.
Levels	To create a more complex gamification system, several elements much be considered: <ul style="list-style-type: none"> <li>- The objectives that are targeted.</li> <li>- The number of levels for the gamified system.</li> <li>- The list of activities that need to be completed for each level of the gamified system.</li> <li>- The rewards for completing each activity.</li> <li>- The rewards for completing each of the levels.</li> <li>- The bonus rewards that employees can receive, for example if they participate in social activities or if they help a co-worker.</li> </ul>
Rewards	Reward rules can be defined for specific tasks employees should carry out. Rewards can consist of: <ul style="list-style-type: none"> <li>- Double time for the lunch break.</li> <li>- A prize (e.g. a memory stick, a game, a cup of coffee, etc).</li> <li>- Leaving early on Friday.</li> <li>- Getting an entire day off.</li> </ul>

Gamification systems should have clear objectives, well-defined rules, and challenging tasks for trainees or employees. Gamified systems make trainees and employees more motivated to concentrate in order to reach specific objectives. Using gamification has the potential to generate positive outcomes within organizations, and its implementation does not involve high costs.

### III. DISCUSSIONS AND CONCLUSIONS

Gamification systems are used to motivate individuals to achieve specific goals. They focus on improving a trainee's capacity to master a skill or an employee's ability carry out a certain task. This paper has analysed the perception of gamification among employees of private and public organizations. The feedback collected via the online questionnaire entitled "*Gamification in training and work environments*" has revealed that most participants have had contact with gamified activities. This represents proof that gamification is being applied in different types of organizations, especially public organizations, large companies, and SMEs. Another interesting finding is the age range of the participants in the survey, the core age interval ranging from 25 to 54-year-olds. This highlights the fact that the use of gamified systems is not exclusively connected to younger generations, and that individuals of all ages are interested in gamified systems. Moreover, the use of gamified systems is not occurring solely at a theoretical level, but these systems have actually been explored in practice by individuals of various ages and with the different gaming experience.

Of particular importance is that the participants in the survey would not be more interested to use an application more or pay for an application more just because it is gamified. This significantly impacts the business models for information technology developers. Even if gamification systems are desirable, they do not represent a key decision factor for choosing an application over another, leading to the conclusion that the main features of an application remain the decisive factor when making a purchasing decision. Also, the fact that an application is gamified does not represent a key motivational

driver to invite a colleague to use such an application, proving again that gamification is a nice thing to have, but not critical.

We can conclude that gamification has changed the ways in which training and work activities are carried out. However, it remains difficult to balance what represents too much or too little gamification and further research is needed to gain insights on the added value of gamification in the workplace. It is, therefore, important to take into consideration the fact that gamification has to be properly designed in order to achieve the expected outcomes, and a deeper impact in work environments.

It is equally important to analyse the impact that advances in technology have on gamification. Multimodal environments that include visual, tactile and auditory stimuli can allow advanced illustration of abstract concepts and easy to understand scenarios. When the learning task becomes challenging (i.e., an abstract concept difficult to grasp with the mind), a lapse in the learner's interest and a drift away from engagement occurs. Interestingly, a gamification approach that employs tactile features has the potential to improve the learner's interest, as well as his/her learning capability. Combining multiple modalities (visual, tactile and auditory) can increase the bandwidth of the communication channel, stimulate the learner's attention and, consequently the retention of complex concepts. Example of such visual-tactile games have been explored for K-12 physics, teaching hydraulics principles [15], college level physics illustrating static vs. dynamic friction [16] and more recently, teaching abstract concepts like gyroscopic precession [17].

Future work will explore the implementation of various gamification systems in training and work environments, with the purpose of gaining a deeper understanding of user preferences and playing styles, as well as of the potential of blending new technologies into gamification systems.

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