

GAMIFICATION AS A TOOL TO IMPROVE THE LEVEL OF OCCUPATIONAL SAFETY AND HEALTH IN THE COMPANY

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Abstract: In pointing out the sources of success of contemporary enterprises, increasing importance is attached to people and their work, in particular, to safe and healthy working conditions. It is also emphasized that in order to improve occupational safety and health in an enterprise, it is necessary to use appropriate organizational methods to encourage the involvement of employees in these activities. The paper discusses the use of the assumptions of gamification as a tool for increasing employee involvement in raising the level of OSH in the enterprise. The study was aimed at interpreting and critically assessing the previous scientific output devoted to the analysed issues. Within the framework of presentation of case studies of enterprises, critical analysis (including analysis mainly in terms of showing the relationship between shaping occupational safety and health and the use of gamification) concerned the case of an enterprise operating in Poland in which activities for the improvement of working conditions conducive to raising the level of occupational safety and health were conducted on the assumptions of gamification.

Keywords: occupational safety and health, levels of OSH, gamification.

1. Introduction

Modern solutions in the area of human resource management indicate that in order for employees to be dedicated to their work, they must, among other things, receive recognition from their superiors. They should feel satisfied not only with their salaries or status, but also with their working conditions (Sadler, 1997).

Working conditions are most often perceived as factors that are present in the environment that are connected with the nature of the work and the environment where the work is performed (Pocztowski, 1998). There are most often two groups of these factors, i.e. tangible (including material, such as machines and workstation equipment; physical, e.g. lighting, microclimate, and noise; chemical, e.g. organic and inorganic chemical compounds in the work environment;

biological, e.g. pathogenic microorganisms present in the human work environment); and intangible (e.g. working time, social activity, interpersonal relations).

A specific connecting factor between the above-mentioned elements of working conditions is occupational safety and health, understood as the entirety of legal standards and research, organizational and technological resources which are aimed to provide employees with such conditions that they are able to perform their work productively, without unnecessary risk of accidents or occupational diseases and excessive physical and mental load (Koradecka, 2000).

Various, numerous and often complicated connections between factors affecting the state of occupational safety and health in the enterprise indicate the legitimacy of both comprehensive and regular consideration of these relationships. This should be facilitated by the emphasis of the company's management on the value of ensuring safe and healthy working conditions. This approach is an important basis for taking actions to effectively increase the level of this security. Consequently, it seems justified to constantly search for effective organizational methods that are conducive to the implementation of these activities.

Analysis of the related literature leads to the conclusion that when presenting the problems of OSH, the authors pay relatively much attention to the analysis from the perspective of observing legal regulations (Rączkowski, 2016; Tomaszewska, 2014; Cierniak-Emerych, 2005). Definitely, less attention is paid to the search for and bringing closer of the above mentioned organizational methods (tools) conducive to raising the level of knowledge of OSH in enterprises to a wider audience.

It seems particularly interesting to search for such tools used to encourage employees to take actions aimed at raising this level. In practice, the view is increasingly popularized that the development of occupational safety and health should not occur without the participation of employees, i.e. those who are directly affected by such safety.

While attempting to meet the above-mentioned requirement, this paper focuses on gamification as one of the new trends and a tool used in the management process, especially in Polish management reality. Millward Brown analysts mentioned gamification as one of the twelve biggest digital trends already in 2012 (Alagon and Peschier, 2011). Against this background, a question was formulated about the reasons for using gamification, i.e. implementation of game elements in the work environment in order to increase the level of occupational safety and health in the company.

Consequently, the goal of the paper was to bring closer the idea and variables that characterise the so-called levels of occupational safety and health described in the related literature. Herein, special attention was paid to the fact that employees perceive OSH as an important benefit to them that they would like to influence. Hence, the aim of the study was to present the assumptions of gamification and the possibility of using it as a tool conducive to the growth of employee involvement in raising the level of OSH in the company.

2. Research methodology

The research process was conducted according to a research design that included such stages as the formulation of the research problem, the definition of the study aim, choice of research methods, development of research tools, the conducting of empirical studies, analysis of the collected data and information, and preparation of conclusions. Bearing this in mind,

- the study was aimed to interpret and critically assess the previous scientific output devoted to the analysed issues. Consequently, the study attempted to indicate the essence and legitimacy of using the assumptions of gamification in increasing the level of occupational safety and health based on the involvement of employees,
- the results of the author's own empirical research conducted in 2010-2018 were also used. These were aimed at identification of the interests of employees related to their work, and, in particular, the interests concerning ensuring safe and healthy working conditions for them and the employee influence on these conditions,
- within the framework of presentation of case studies of enterprises, critical analysis (including analysis mainly in terms of showing the relationship between shaping occupational safety and health and the use of gamification) concerned the case of an enterprise operating in Poland. Here, activities for the improvement of working conditions conducive to raising the level of occupational safety and health were made by being conducted on the assumptions of gamification.

The research concerning the identification of employee interests and conditions of respecting them in enterprises was conducted in 2009-2018, while in 2009-2011, it was financed by funds within the research project of the Ministry of Science and Higher Education No. NN115 134434. In total, the research covered nearly 640 respondents from nearly 300 enterprises (the purposive sampling was used to allow for cross-sectional differentiation of enterprises and the structure of employees). Respondents participating in the survey represented mainly small enterprises (41% of all respondents) and medium-sized enterprises (58%) in terms of the level of employment. The predominant legal form was a partnership-based company, including the limited liability company. The scope of activity of the majority of the entities surveyed was supra-regional, mainly national and international.

The information was collected using two questionnaire survey forms. One was designed for employees in managerial positions and the other for non-executive employees. Within the proposed choice of 17 answers, the respondents were asked to indicate their important interests. The respondents had the opportunity to choose multiple answers. The basic criterion for the selection of respondents in the survey was their consent to participation in the survey.

The results of this research led to a closer look at the cases of enterprises in which the importance is attached to striving to increase the level of occupational safety and health. At the same time, relationships were sought between this increase in the level of OSH and the use of the assumptions of gamification. Due to the specific nature of the examinations and the

limitation of the volume of the study, the focus of the study was on the presentation of the case of one of such enterprises.

The results of empirical research obtained through applying the above-mentioned methodology cannot be considered as statistically significant, but they should be approached in the categories of the identification of the correctness of the adopted assumptions and the basis for the formulation of further research goals.

3. Levels of occupational safety and health in the enterprise and the reasons for the use of gamification

Among other reasons, the literature also indicates that there are clear links between "investing" in the safety of working conditions and the economic benefits of the enterprises. These benefits were highlighted by OSHA. The organization cited case studies that showed that good OSH management is associated with improved efficiency and profitability (Good OSH is good for business, 2018). The importance of OSH issues is also demonstrated by the fact that between 2010 and 2019, the phrase "work safety" was found 1354 times in the EBSCO database and 18140 times in Sage Journals.

At this point, it seems justified to recall the model developed by M.B. Weinstein that was presented in the literature, and which concerns changes in the levels of occupational safety and health (OSH), (Weinstein, 1997), as summarised in Table 1.

Table 1.
Levels of occupational safety and health in the company

Level	Variables			
	Motivation	Nature of the action	Training	Results in the area of occupational safety and health
I	fear	passive	basic courses	incomplete compliance, results worse than average
II	punishment	reactive	courses, instruction, checking	full compliance, no improvement, average results
III	rewards	active (understanding, trust)	instruction and support, positive competition	correct behaviour, results better than average
IV	internal motivation	proactive (passion, commitment)	good practices, examples, positive competition, self-education	continuous improvement, leadership, excellent results

Adapted from: a study based on M.B. Weinstein: Total Quality Safety Management and Auditing. Boca Raton FL, Wyd. CRC Press LLC 1997, as cited in Nauka o pracy – bezpieczeństwo, higiena, ergonomia. Zarządzanie bezpieczeństwem i higieną pracy, vol. 8, ed. D. Koradecka, CIOP, Warsaw 2000, p. 12.

As presented in Table 1, there are four levels of occupational safety and health. Their variables in the form of, among others, motivation to act, were defined as fear, punishment, reward and level of internal motivation.

Level 1 concerns companies where occupational safety and health is not a particularly important aspect. In these enterprises, the area of OSH is even characterized by tolerating inconsistencies in the approach to ensuring working conditions according to the binding legal regulations, which should be considered particularly reprehensible. Actions to encourage the involvement of employees in the improvement of occupational safety and health are insufficient.

Level 2 of occupational safety and health concerns enterprises in which actions are taken for fear of punishment. Therefore, the priority is to ensure that the provisions contained in the internal documents are consistent with the relevant provisions of legal regulations. In practice, however, the compliance of these provisions might not fully reflect the actual state of occupational safety and health in the enterprise. Furthermore, both employees and employers sometimes do not even see the need to change the approach to occupational safety and health.

Improvement in the state of occupational safety and health, i.e. achievement of their higher levels, is supported only by taking active measures (levels 3 and 4 of OSH). This is about actions based on correct behaviour in the area of OSH. It is important to understand the need to increase the level of occupational safety and health in combination with inspiration, creating good practices and especially positive competition to increase the level of OSH. This positive competition can take different forms and be realized using different tools.

It is more often emphasized in the related literature that the use of game mechanisms increases the motivation and involvement of employees. Gamification is a relatively new concept in Polish conditions as it has only been popularized for several years. Nevertheless, it is quite widely defined in world literature. With the variety of definitions of gamification from the standpoint of this study, it is worth mentioning the definition in which it is stated that gamification means: “the use of elements of the game and thinking in situations other than games” (Werbach and Hunter, 2012, p. 131). Similarly, this term was defined in Poland by P. Tkaczyk, indicating that it means the use of game elements to change the behaviour of people in the real (Tkaczyk, 2012) world.

While looking for reasons for using gamification to improve the level of OSH in a company, it is worth pointing out that, as emphasized in the literature, gamification is used to change behaviour, education and motivation through elements of the game. With the advent of Android and Apple devices, a wider population of people was introduced to technology, while encouraging the development of new players. The current boom has created a generation of “digital natives” (Prensky, 2001).

In fact, there is a growing generation of people entering the labour market whose everyday work is related to the use of new technologies who cannot imagine life without social networking sites or computer games. These are the people whose daily lives are always entangled around technologies (Johnson, 2011). The generation in question consists of young adults and teenagers. Gaming techniques for this community are natural, understandable and, above all, accepted in areas of life other than entertainment. Thus, as it is claimed, there is

a high susceptibility of these people to interactions based on the principles of the game, understanding their use, and also the appreciation of frequently non-material rewards (Piotrowski, Chmielewski and Ziółek, 2005), which is also illustrated by variables presented in Table 1 that characterize levels 3 and 4 of OSH related to the above mentioned positive competition.

Against this background, however, the question arises whether employees belonging to the older generation can find themselves in the world of gamification used as a tool for raising the level of OSH.

The answer to this question certainly requires more research. However, assuming that most people of the older generation were brought up in the world of games (for example board games), this group should also naturally have predispositions to participate in the "game" of improving occupational safety and health.

In the opinion of the authors, another important reason for using gamification as a tool to raise the level of OSH may be, in addition to the aforementioned competition, the fact that it is based on two aspects of games, which are interrelated with the competition. These include (Tkaczyk, 2012; Huizinga, 2007):

- game plot – appropriate design of the game plot, layout, activities and rewards motivates the players/employees to achieve better results,
- transforming monotonous work into interesting and exciting games.

Referring directly to the occupational safety and health, it can be assumed, for example, that an employee competing in a natural way, thanks to properly designed game elements, including the way of achieving rewards, who sees, for example, the published ranking of players, will be, with high probability, looking for new methods to improve the level of OSH so that they occupy a higher and higher place in this ranking.

However, we must not forget that like other tools, gamification can also, after some time, cease to motivate employees. Furthermore, as indicated above, the state of working conditions in many enterprises in Poland allows for classifying them at the second level of occupational safety and health (see Table 1). Therefore, it is not only employees, but also employers who will not always be interested in the use of gamification. Hence, awareness and knowledge about the benefits of gamification are essential.

It is difficult to specify a recipe for the use of gamification in the area of occupational safety and health. Still, it is necessary to take actions related to the basic characteristic phases of game design. It is important to adapt the game world to the needs of players, their workstations, personal and collective protective equipment, but also to external needs, e.g. legislation on occupational safety and health, customer requirements etc. It is also critical to take into consideration the declared participation of employees in such a method to improve occupational safety and health.

With this in mind, one should not forget about disadvantages of gamification, such as pulling employees away from their basic responsibilities to participate in the game, the emergence of manifestations of unfair competition among employees etc.

It seems that Poland continues to be at the stage when the competition in the area discussed in this study is treated as an experiment.

4. Occupational safety and health as a category of employees' interests formed with the use of the assumptions of gamification: selected results of empirical research

Nearly 75% of the respondents gave priority to occupational safety and health among the interests that the employees considered most important to them in the research carried out in 2009-2018. Respondents also indicated OSH as the second category of the choice of 17 interests. Most replies were chosen for a salary adequate to the duties, and the third place in the ranking was employment for an indefinite period of time.

It is important for the respondents to create: “working conditions not threatening the health and life both now and in the future”. It was also noted that the OSH is influenced by the legal regulations being in force. The research showed that respecting them, as indicated by nearly 40% of the respondents, is often within the area of declarations or aimed to meet the legal requirement to a minimum level. This gave rise to the conclusion that in some of the companies surveyed, the level of OSH can be described as level 2, and in a few cases, even level 1.

Employees can be also partly blamed for this status. Some of them pointed out that they sometimes marginalized the issues of caring for the instruments and subjects of labour, and the order at the workplace. Cases of non-use of personal and collective protective equipment were emphasized, which was justified mainly by the lack of comfort in their use.

Considering the above, we should consider as optimistic the cases of enterprises identified during empirical research where respondents pointed to the care taken by employers to protect their sense of working in safe conditions. Interestingly, this occurs with the active participation of employees.

From the standpoint of the topic of the present study, the case of an enterprise where the care for the state of occupational safety and health (and in fact the constant pursuit of raising the level of OSH) occurs with the use of the assumptions of gamification should be considered as particularly interesting.

The automotive manufacturing company operating in the region of Lower Silesia in Poland¹, which implements one of the basic principles of this policy adopted by the enterprise,

¹ The managers did not agree to use the enterprise's name.

i.e. "zero accidents and potential accidents", applied a kind of gamification assumptions in order to achieve this goal. The employees were divided into groups of players (teams). Each group was a team of employees working under the supervision of a master (group leader). Each employee can score points for their team within 30 consecutive working days, as defined in the rules of this 'game'. The detailed rules of the game were developed by managers in consultation with the employees and representatives of the OSH department. Importantly, the rules were accepted by trade union representatives. The introduction of the game was preceded by familiarization of employees with the rules and expected results of the game. At the moment of making the decision about the game, only the employees who expressed their willingness to participate were included. However, it quickly turned out that the majority of the staff was interested in this type of competition.

Points are scored for, among other things, the use of personal protective equipment, the use of collective protective equipment, etc. Furthermore, each team member has the task during the day of his or her work (without reducing the effectiveness of the work) to watch whether other employees carry out their work in a manner consistent with the principles of health and safety. Any situation of non-compliance with the OSH guidelines is to be reported to the OSH department. For each case of such information, the employee scores a specific number of points for their team. Additional points can also be scored for submitting ideas for changes in the area of working conditions conducive to raising the level of occupational safety and health. After 30 days, the points of individual teams are counted and the team that received the most points can choose a prize from the proposed menu. The prizes offered are valuable, although not always material.

Negative points for employees who do not observe occupational safety and health rules were deliberately not introduced. The idea was to motivate the employees in a positive way. Of note, previously and for a long time, coercive measures had been used in the enterprise.

The described actions may seem to be simple, but the difficulty of their application lies especially in that the employees see measurable outcomes not only in the form of rewards, but also in the constant improvement in the level of occupational safety and health. The managers are aware that the game, like any other, may cease to be interesting for its participants. Therefore, its effects are continuously monitored and improvements are made. It is worth noting that participation in the game encouraged some employees to improve their awareness in the area of OSH.

5. Summary

The findings of the empirical research presented in the literature on occupational safety and health (OSH) seem to confirm the legitimacy and the sense of the need of employees for active participation in the development of the level of OSH. This is accompanied by statements about the important need to implement appropriate incentives to encourage workers to comply with the rules and principles of occupational safety and health (Iwko and Iwko, 2018).

The considerations presented in the paper lead to the conclusion that occupational safety and health represent an important interest in the group of respondents covered by the study. However, a relatively large part of the enterprises surveyed continues to act within the second level of occupational safety and health. Consequently, the cases of enterprises working within the third or even fourth level of OSH attracted much attention. In one of these, the links between the increase in the level of OSH and the application of gamification were revealed. It seems that the specific success of the use of gamification is attributable to the specificity of the OSH culture being strongly interrelated with the personal culture of each employee. More specifically, this concerns a culture based on cooperation, healthy competition, observing legal regulations etc.

Due to the lack of representativeness of the research results, it is impossible to reach general conclusions on the application of gamification in the area we are interested in. However, the case of the enterprise presented here, in the opinion of the authors, may, and it should encourage more extensive and in-depth research in this area, especially in the sector of small and medium-sized enterprises. As already stressed, this seems to be particularly justified in a situation where young people enter the labour market, being people from the generation of computer games, still "playing" for their place on social networking sites.

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