Serious Games as innovative tools in HR policy

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Abstract. In the life of modern society information and communication technology occupy a significant place, being an active principle of social changes. Practically all processes, one way or another, go along with technologies. The total penetration of information and communication technologies into all spheres of life initiates the transformation of established social relations and norms. Particular attention we pay to the study of social norms in virtual reality. We observe the main forms of deviant behavior in the network, and the mechanism of social control, aimed at their regulation. At the same time, we prove that the areas of regulation are quite mobile and do not have a clear framework. Although we try to define three main areas of this type: area of law regulation, area of moral regulation, unregulated field. All the presented areas describe the visible phenomena. The essence of the virtualization process, however, turns out to be undetected. But after all, society itself can set a socially acceptable framework for the functioning of information and communication technologies, which can vary depending on religion, national circumstances or level of economic development. As a result, it can be noted that in the modern world the social landscape is changing dramatically.

1. Introduction

The increasing role of Information and Communication technology changes people's life in all areas of human activity dramatically [1]. Having become an important part of the global Internet space, game universes enter into daily existence of people [2]. Currently there are 2.3 billions of active gamers all over the world, i.e. people who are considered as regularly playing computer or videogames for about thirteen hours per week on average [3]. But there are gamers who are not satisfied by having been playing for several hours a day, for instance there's more than six million of people in China that spend at least twenty two hours a week. In Great Britain, France and Germany above ten million of people spend minimum twenty hours a week for this activity and more than five million of "extreme" gamers play for forty five hours weekly on average in the USA [4].

The appearance of a phrase "serious games" that initially sounded as a paradoxical collocation means that games are playing more significant role for society, but not limited to the sphere of entertainment. A game framework facilitated achieving serious goals faster and with pleasure. The first definition of the term "serious game" belongs to Abt who claimed that these games have an explicit and carefully thought-out educational purpose and are not intended to be played primarily for amusement [5].

Traditionally, it's supposed that the US army was the first who used games for serious purposes during World War II in order to improve its image among the people. Nevertheless, the early stage of the games with serious intentions was dominated by educational ones. Sometime later the scope of serious games applications has expanded tremendously. In 2018 Çiftci conducted a study of scientific
publications devoted to serious games (dated from 2007 and later in) and found some researches in such fields as psychology, health care sciences, environmental sciences, ecology, public environmental occupational health, rehabilitation, business economics and psychiatry and other disciplines [6]. Alvarez and Michaud identified seven serious Games markets: Defense, Training & Education Games, Advertising, Information & Communication, Health, Culture, Activism [7]. Djaouti, Alvarez and Jessel expand the list: State & Government, Military & Defense, Healthcare, Education, Corporate, Religious, Culture & Art, Ecology, Politics, Humanitarian, Advertising, Scientific Research [8]. Laamarti, Mohamad and Saddik distinguish Education and Training, Well-Being, Advertisement, Cultural Heritage, Interpersonal Communication, Bio-medical and Health Care [9]. However in the sphere of HR policy serious games have been spread not so long ago.

2. Methodology
A thorough analysis of hundreds of games allowed us to define goals, applications and peculiarities of construction of games in the field of personnel policy. Research methods are represented by a set of different approaches of theoretical and applied scientific knowledge, providing the implementation of analytical tools. In particular, methods of system, functional, complex and process comparative analysis and synthesis, grouping of actual data.

In this study an interdisciplinary approach was used, which allowed to consider innovative tools in HR policy as a complex social phenomenon in the perspective of the theory of organization based on the achievements of Economics, sociology and psychology. The analysis of several hundred serious games allowed to define the purposes of application and peculiarities of game construction and to make their categorization in the field of HR policy.

We have summarized various approaches that reveal the features of attracting potential employees, adaptation of newcomers, engagement and motivation, personnel selection, training and education of employees with the help of serious games in the conditions of modern reality. We have also used such methods of scientific research as the construction of logic frameworks, graphical interpretation of theoretical information and empirical data.

3. Results and Discussion
In terms of areas of use games could be divided into five categories in HR management: 1) staff education and training; 2) attracting prospective manpower; 3) employee selection; 4) adaptation of newcomers; 5) engagement and motivation. The figure 1 shows games' characteristics that are defined as key features according to analyses of corresponding spheres of implementation in HR policy.

3.1. Games for staff education and training.
This is the most extensive area of games used for staff education and training. The history of this kind of game development in HR stemmed from 1991 when recruits were taught how to drive the tank with the help of the game "The Bradley Trainer" in US armed forces.

In the category of educational games there are many specific goals: hard and soft skills training, teambuilding, management, diversity-related conflict management, leadership, ensuring information security of the company, the rules of behavior in the workplace, including good habits in terms of ecology.

Depending on employer's requirements of staff acquisition of special knowledge and skills the educational games could get various forms. The simplest principle of learning is based on the gamification of the educational/controlling process. For instance, correct answers to questions can be visualized as climbing a mountain ("Guru" is used when launching the complex digital marketing tool "Mobile Connect" at "Exact Target") or as a good monster hit (in the game "Coaching Champion" of the company "Designing digitally" for coaching skills development of managers).

The majority of games aimed at developing specific professional skills. For example, in the company Proplex the game helps to work out the skill of ongoing dialogue with clients, in the chain of American stores "Giant Eagle" cashiers work out routine activities thanks to the games. And some
more facts, the game "True Office" in the field of financial services provides compliance training, Bankers Lab specializes in building award-winning “flight simulators” for bankers.

It should be noted that a special and wide category of staff training games are business games, which are part of the managers' training practice, and can be used in the staff training process in different enterprises. Such kind of games place people into a virtual economic environment and help them "to acquire some economic and financial skills" [10]. Most commonly in these games traditional business procedures could be practiced: procurement, controlling, production, sales and marketing (e.g. Business Model Gaming, Up Start). Some of the games emphasize logistics (e.g. Beer game). J.k.h. Riedel, J. B. Hauge underscore the need of use of multidisciplinary and multi-person games at the enterprise for hard and soft skills development [11]. But games with the aim to develop soft skills appeared much later than the classic business games and they can often contain a large amount of entertainment content. For example, communication skills can be practiced in the game "Merchants", where the player learns to negotiate and resolve conflicts while playing the role of the Venetian merchant of the 15th century. And in the company Slalom Consulting gamification includes a special game to remember names, faces, and technical expertise of coworkers on the floor.

A new trend is the development of games related to ethics and environmental behavior. The game Simulated Ethics Serious 2D Game from Designing Digitally demonstrates situational harassment topics in 2D from the point of view of the offender and the victim, helping to master the norms of behavior.

![Diagram showing the scope of serious games in HR policy and games' features](image-url)

**Figure 1.** Key features of serious games in different spheres of HR policy.
3.2 Games for attracting prospective manpower.
American Army's first-person shooter game was created in 2002. It includes training and military missions and it can be recognized as one of the first games designed to attract potential employees. The game was distributed for free and was named “the first successful and well executed serious game that gained total public awareness” [12].

Games can be a great way to create an image of an organization. however, educational games can sometimes serve the same purpose [13].

In this context, it is interesting that some games could combine several goals at the same time, which is certainly beneficial for the company and allows to create a high-level game. The clear example is My Marriott Hotel (the game in Facebook), where you can try to work in the hotel, and this can both attract potential employees and give them an idea about the features of the work, and also it can be used training process of new recruits. The game Plantville from Siemens is used for the same purposes due to training such activities as plant management, financial and production processes management, purchase and installation of Siemens equipment and others.

Games that serve to attract and select candidates often allow the player to get feedback. So playing Supply Chain, Finance, Sales and Marketing, you can get an estimate of your success in each of the sections.

3.3 Games for the employee selection
The most difficult thing is the specification of criteria for assessing gaming activities in the process of games development for staff selection. And the higher the required qualification, the more difficult this task becomes. For instance, the game Wasabi Waiter (California) perfectly copes with the assessment of potential waiters on the criteria of speed, quality and empathy to virtual customers. The game The Secret Service (the United Kingdom) offers operations officer to work in a situation of lack of time to assess such qualities as judgment and decision-making. And for the selection of qualified personnel the company Connect Cubed (USA) initially tests the existing employees of the company, which are the "standard" of the necessary qualities, and then selects the candidates which are most appropriate to this profile.

Wibi Data uses another creative approach in seeking for people who share the ideals of the company. The company deliberately added new levels in the game "Portal 2", where the company presents its virtual office. In order to send resume, it is necessary to do all the game tasks and get a password.

3.4. Games for adaptation of newcomers (new recruits)
We have singled out the category of games which associated with the adaptation of newcomers to the enterprise, although this function can often be considered as optional when attracting or training personnel. But some big companies are developing purposefully adaptive games. For example, a large Russian company "Gazprom Neft" began gamification of work with personnel with the development of the game - a virtual tour, quests for beginners, allowing to get acquainted them with the various divisions of the holding (Corporate center, oil field, refinery, petrol station and so on) and understand the business peculiarities).

3.5. Games for an engagement and motivation
Motivational games set goals that are most difficult to quantify. In this area it is impossible to do separate game elements. Most commonly, a whole stimulating communicative game system is developed, which allows to link on-line and off-line activities, interact and create ratings of employees. For instance, the company Enter uses a motivational game "OlimpiaDa" (which is connected with intranet) that allows to transfer not only the success of employees, but also participation in various social activities into a unified game rating in the field of immediate results (e.g. the recommendations of experts in the company, conducting/ participating in training workshops, a help to newcomers, adopted innovative ideas).
Moreover, the game is quite flexible, its rules are modified in accordance with the current goals of the company: the most demanded activities are encouraged by large points. The most popular universal online system of non-financial incentives is "Gingerbread" in the field of motivation in Russia. The virtual "Gingerbread" is a virtual thanks, the way of to thank colleagues (necessarily reasoned), as well as a virtual currency that can be exchanged in the store for the benefits offered by the company. In addition, the system provides for the distribution of badges, which can be assigned automatically according to the results or manually by managers, as well as work with the rating associated with the performance of tasks [21-25].

If the work itself takes place in a computer environment, the motivational system can be tied to the direct execution of tasks. There's an interesting experience when turning work with bugs in the Russian social network Odnoklassniki in the game: the so called "box bugs" were compiled accompanied by photos of complaining users, each of this was supported by a description of pumped skills in the process of elimination of these bugs. Accordingly, the task was the maximum "pumping" skills.

However, experiments to transfer responsibility for the control of employees' activities to artificial intelligence (for example, in the Russian office of Phobos) show that it is impossible to automate the assessment of all aspects of activity even working in the field of computer technology.

One of the issues related to the game motivation system is the question of the final rewards of employees with the highest ratings, which is carried out off-line in the majority of the considered games. For example, in the game "Alfa-city", that is implemented by the Russian Bank "Alfa Bank", a player can spend the points received for the successful completion of working tasks on the construction of buildings.

4. Conclusion
The technologies developed in the field of personnel motivation demonstrate the direction of future development in the field of gamification in HR.

Interactive formation of a stimulating communication system that demonstrates success in work, training, social activities and other encouraged actions allows employees not only to clearly see the possible goals and prospects of their own development, but also the general logic of the organization. As a consequence there is a virtual gamified model of the organization. Merging such a system with a game training will bring personnel management to a new level, which allows to track the weaknesses of the workforce and eliminate them in a proper time.

References
[1] Shipunova O D, Berezovskaya I P, Mureyko L M, Evseev V V and Evseeva L 2018 ESPACIOS 39(40)
[2] Shipunova O D, Berezovskaya I P, Mureyko L M, Kolomeyzev I V Serkova V V 2017 Cultural Code in Controlling Stereotypes of Mass Consciousness European Research Studies J. 20(4)
[3] Shipunova O D, Berezovskaya I P and Gashkova E M 2017 St. Petersburg State Polytechnical University J. Humanities and Social Sciences 8
[4] Silkina G Yu 2017 Proceedings of the 29th International Business Information Management Association Conference - Education Excellence and Innovation Management through Vision 2020: From Regional Development Sustainability to Global Economic Growth pp 1165-76
[5] Didenko N I, Skripnuk D F and Mirolyubova O V 2017 Proceedings of 2017 10th International Conference Management of Large-Scale System Development p 8109611
[6] Babkin A V, Karlina E P and Epifanova N Sh 2016 Proceedings of the 28th International Business Information Management Association Conference - Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth pp 11-17
[7] Lichy J, Kachour M and Khvatova T 2017 J. of Marketing Management 33(9)
[8] Korneychuk B 2018 Digital Transformation and Global Society. DTGS 2018. Communications in Computer and Information Science 858
[9] Markeeva A V 2015 Leadership and Management 2(3)
[10] Wijman T 2018 Mobile Revenues Account for More Than 50% of the Global Games Market as It Reaches $137.9 Billion in 2018. Available at: URL https://newzoo.com/insights/articles/global-games-market-reaches-137-9-billion-in-2018-mobile-games-take-half (accessed 4 November 2018)
[11] McGonigal J 2011 (NewYork: Penguin)
[12] Abt C C 1970 Serious Games (NewYork: TheVikingPress)
[13] Çiftci S 2018 J. of Education and Training Studies 6(2)
[14] Alvarez J and Michaud L 2008 Serious Games: Advergaming, educaging, training and more (France: IDATE)
[15] Djaouti D, Alvarez J and Jessel J P 2011 Handbook of Research on Improving Learning and Motivation through Educational Games: Multidisciplinary Approaches (Hershey, PA: IGI Global)
[16] Laamarti F, Mohamad E and Saddik A E 2014 J. of Computer Games Tech.
[17] Dufourny S and Dhaenens C 2016 IFAC-PapersOnLine 49(12)
[18] Riedel J and Hauge J B 2011 17th International Conference on Concurrent Enterprising (Aachen:IEEE)
[19] Djaouti D, Alvarez J, Jessel J-P and Rampnoux O 2011 Origins of serious games, Serious Games and Edutainment Applications (Berlin: Springer)
[20] Fersman N G, Zemlinskaya T Ye and Novak-Kalyayeva L 2017 Proceedings of the 30th International Business Information Management Association Conference, IBIMA 2017 - Vision 2020: Sustainable Economic development, Innovation Management, and Global Growth
[21] Anfinogentova A A, Dudin M N, Lyasnikov N V and Protsenko O D 2018 Economy of Region 14 (2)
[22] Bonnechère B, Sholukha V, Omelina L, Jan S V S and Jansen B 2018 Sensors (Switzerland) 18 (7)
[23] Bonnechère B, Sholukha V, Omelina L, Van Vooren M, Jansen B and Jan S V S 2017 Gait and Posture 57
[24] Bonnechère B, Sholukha V, Omelina L, Jansen B and Jan S V S 2016 ACM International Conference Proceeding Series pp 45-48
[25] Mavridis A, Leftheris I, Tsiasatos T and Kudryavtseva N 2012 15th International Conference on Interactive Collaborative Learning, ICL 2012 p 6402169