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**SERIOUS GAMES AS A RECRUITMENT TOOL IN
EDUCATIONAL PROJECTS**

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Abstract

Computer games can now be considered in a new perspective. Such games enables to investigate, systematize, solve non-trivial, educational and research tasks. Serious games today represent one of the most popular trends in the system of education. Intercommunion of the learner with the interactive system generates a huge amount of data that can be used to adjust the educational process and create individual educational trajectories. In this paper, we also consider the use of serious games in various types of selection: personnel search for companies studying in educational projects, researchers search for applied and scientific projects. Serious games make it possible to evaluate the logic and systemic thinking of a candidate when selecting for different positions, his/her research behavior, analytical skills, resource management, social skills, language skills, mentoring and patience, creativity and initiative, teamwork and efficiency. To solve this problem, one may use Educational Data Mining methods. In addition, the article discusses the experience of selecting participants for educational and research projects like educational intensive project “Island 10-21”. This project is the first Russian personnel training program for the digital economy, in which technology leaders, entrepreneurs, regional and federal officials, specialists in the field of digital disciplines and many others took part. The selection for this project, as well as individual educational trajectories were built using data mining, obtained in the process of serious games. The process of participants selection for this project, as well as individual educational trajectories were constructed by using data mining, obtained during serious games.

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1. Introduction

Nowadays serious games are becoming more common. The scope of the game is constantly expanding. For instance, Alvarez & Michaud (2008) identified seven Serious Games markets: Defense, Training & Education Games, Advertising, Information & Communication, Health, Culture, Activism. Djaouti, Alvarez, & Jessel (2011) expand the list: State & Government, Military & Defense, Healthcare, Education, Corporate, Religious, Culture & Art, Ecology, Politics, Humanitarian, Advertising, Scientific Research. Laamarti, Mohamad, & Saddik (2014) distinguish Education and Training, Well-Being, Advertisement, Cultural Heritage, Interpersonal Communication, Bio-medical and Health Care.

Extensive use of games in various fields is associated with an attractive form of presentation, which allows solving important issues with pleasure and motivation.

For example, in education, the main and interrelated results of using serious games are motivating and learning effects (Connolly, Boyle, MacArthur, Hainey, & Boyle, 2012). Zheng & Gardner (2017) consider three main goals of using computer games in education: increasing motivation, feedback and skills development. The possibilities of educational games are, however, far from being exhausted by these goals. Kuk, Rančić, Pronić-Rančić, & Ranđelović (2016) note that the games in the educational process are structured in such a way as to leverage specific objectives in connection with learning objectives (LO). The ability to estimate a person's game activity in accordance with numerous criteria for evaluation allows you to use games as an analogue of testing, including both the assessment of knowledge, skills, and personality traits.

Thus, one of the interesting and relatively new areas of game use is the selection of candidates with certain skills and abilities. We can talk not only about recruitment, but also about the selection of candidates for participation in various scientific, educational and research projects. There are games even providing diagnose of some diseases. For example, to diagnose Parkinson's disease a Novint falcon haptic interface is used (Atkinson & Narasimhan, 2010).

It is clear that in contemporary world of rapidly developing information and communication technologies, accompanied by socio-technical transformations (Aladyshkin, Kulik, Michurin, & Anosova, 2017), the search and selection of candidates is gradually moving into the online sphere (Winsborough & Chamorro-Premuzic, 2016). The Internet has the ability to mobilize a huge number of people for a particular activity (Evseeva, Obukhova, & Tanova, 2017). Online recruitment has significant advantages, first of all, related to the size and quality of the applicant pool and the time spent on hiring (Aboul-Ela, 2014; Melanthiou, Pavlou, & Constantinou, 2015).

The US military, as well as IBM, have been experimenting with games for potential employees for several decades, so the idea of evaluating candidates in the form of a game cannot be called fundamentally new. However, modern technologies make it possible to expand existing opportunities, for example, to use big data technologies to estimate hundreds of parameters of a player's activity. In California, the Wasabi Waiter game was created, which allows testing candidates in the role of a waiter, who must quickly, efficiently and focusing on emotions serve visitors in a crowded restaurant. In 2013 the Skiliks project was created in Russia, offering in a game form to evaluate the speed of activity and effectiveness of the middle managers' work. The Secret Service game of the United Kingdom offers for operations officer to work in

a lack of time situation, which enables to evaluate the judgment and decision- making capabilities of candidates.

One of the key issues is the relevance of candidate ratings. The accuracy of the formulation of requests for each of the analyzed parameters is quite a challenge. For a clearer view of the desired image of the candidate, ConnectCubed (USA), for example, firstly tests employees of the company, who represent the "standard" of necessary qualities, and then selects the candidates mostly relevant to this profile. Having disappointed in expensive, lengthy and inaccurate tests of personnel selection on the market, the Russian company NPM group also developed the "Our Person" method and now is successfully using it. This technique is based on the diagnostics of metaprograms - "software" of our brain, diagnoses an updated list of success factors relevant for a new type of business: responsibility, awareness, constructiveness, etc., contains new profiles of roles in a team that are appropriate to horizontal structures and flexible management technologies of projects. This allows a person and a team to choose each other according to "inner settings" and create an organic creative union.

The numerous competencies required are in complex interdependencies. More often it becomes necessary to select specialists possessing metasubject competencies and soft skill. According to analysts, in the near future critical thinking, creativity, emotional intelligence, speed of decision making complex problem solving, cognitive flexibility, awareness, work in conditions of uncertainty, multiculturalism and openness will be attributed to the most sought-after competencies. For example, experts associate language competencies with multicultural competence (Almazova, Khalyapina & Popova, 2017; Chernyavskaya, 2016), which can be considered on the example of Diversity, the main trend in the world of big international business. It turned out that if you look at the problem from different positions, then the probability of finding a non-trivial solution is several times higher. However, it requires openness of mind, ability to listen and hear alternative ideas, to perceive them and to be flexible. Since the best ideas can be born in different parts of the world, members of the team should be from different countries and cultures. You will need the ability to successfully communicate with other people, accept them and use their capabilities to solve business problems.

Another creative approach to using games in the selection of candidates is the set of those who share the interests and ideals of the company. For this purpose, WibiData specially supplemented the game Portal 2 with new levels in which the company's virtual office was created. The goal of the candidates was to decide the game tasks and pick a password that allows you to send a resume.

On the other hand, the researchers note that the virtual person existing on the network may not coincide with the real person (Gashkova, Berezovskaya, & Shipunova, 2017). Wozniak (2015) also indicates that a "game-logic" will be different from "everyday-logic". Researchers also consider that modern man assumes his own life to be a certain role-playing game (Timermanis, Ivanov, Zamorev, & Smaragdina, 2017), and the postmodern reality has blurry boundaries (Serkova, Pylkin, Safonova, & Savitskaya, 2017). The study by Dery, Tansley, & Hafermalz (2014) shows that graduates themselves are prone to "gamify" a recruitment process. However, it is impossible not to acknowledge the existence of a problem in mediating the selection of personnel with a virtual simulation associated with human-to-technology interactions (Spahunova, Rabosh, Soldatov, & Deniskov, 2017).

If we talk about learning in virtuality or serious games in education, then we can consider Russian research and production association (RPA) “Game Education”, which helps to carry out group training taking place in a colorful, dynamic multiplayer gaming environment. 10–21 July 2018 University of the National Technology Initiative "20.35" held its first intensive project on Russky Island on the basis of Far Eastern Federal University. Over 1000 people took part in this event, leaders of the technological development of Russia. The organizers used for the selection and training a variety of serious games developed specifically for this project by RPA "Game Education." Such games as “Behavioral Style”, “Management Skills” and “Organizational Culture” helped to create a portrait of the contestants (it included behavioral patterns and leading motivators) and select the most appropriate ones.

2. Problem Statement

Nowadays specialists try to understand: how real the identification of professional and personal qualities in the game is, necessary for performing highly skilled tasks. The impossibility of standardizing the task and the importance of such personal qualities as, for example, creativity, make the task of selecting professionals for research or educational projects difficult. Can gamification assist in personnel selection?

3. Research Questions

- gamification advantages in selecting participants for educational and research projects on the example of “Islands 10-21”, the first educational program in Russia for intensive training of personnel for the digital economy and the National Technology Initiative;
- disadvantages of using games for selection in educational and research projects.

4. Purpose of the Study

The purpose of the study is to assess the use of serious games in the selection of specialists for solving highly qualified research and educational tasks.

5. Research Methods

The study of the selection experience through the included observation in the educational project "Island 10-21".

6. Findings

As the main results of the study, we consider the analysis of information obtained during the included observation in the framework of participation in the selection for the project "Island 10-21". When identifying suitable candidates, a set of game techniques was used, which allowed us to evaluate behavioral patterns, psychophysiology features, familiar corporate and organizational culture in order to select people and determine their place in a particular project or team.

The analytical tools used in selection games reveal a behavioral pattern — an individual combination of preferred behavioral styles. The behavioral pattern does not show “what” a person prefers to do, but in which role he prefers to participate in activities. In the framework of the applied methodology, human behavior is considered as a constructor, a set of preferred behavioral tools, each of which has both strengths

and weaknesses. In different situations, a person will use one or the other combination of styles of his pattern, but his behavior in general will not go beyond it. The tool has no direct analogues, it was developed by the RPA "Game Education" based on a detailed analysis of the concepts of DISC, Business Chemistry, Jungian archetypes, Belbin and Adizes typologies, and 16 other behavioral typologies.

An analysis of the leading motivators reveals the internal drivers leading the person to action. Identifying information was collected in the format of situational questions in the gaming environment. Motivator analysis is used in activity pedagogy and game education to increase involvement in the learning process and create educational environment that is appropriate for student motivators. The methodology for the analysis and subsequent use of motivators has also been developed by the RPA 'Game Education'. The closest analogue is the analytical tool "Octalize", an analysis of the scheme of the eight key elements of gamification, developed by Yu-kai Chou. In other words, "Octalize" is an analysis of the scheme of eight main factors of human motivation, which formed the basis of "personalized" gamification. Now the majority of systems are "directed at action" and designed in such a way that work is done as quickly as possible. It looks like a factory where people work because they have to. At the same time, the "personalized" (aimed at the person, not at the action) structure remembers that people who are in the system have feelings, lack of self-confidence and the reasons for which they want or don't want to do some things. Therefore, such a structure ensures the optimization of their feelings, motivation and involvement. The octagonal by Yu Kai Chou shows an analysis of human motivation factors and explains the use of basic behavioral stimuli that motivate the user to more effectively accomplish a task through interactive experience. Now the structure of "Octalize" is used in the field of health, fitness, education, training and product design to increase user activity, return on investment and motivation.

For the selection of highly qualified specialists for the "Island 10-21" project, a set of various games was used, combining signs of a quest, psychological testing, knowledge tasks, etc. The players got the opportunity to show not only their intellectual abilities, but also to demonstrate the peculiarities of their behavior in a situation of uncertainty, personal preferences and skills of information processing and perception. For example, one of the game considered a situation where a participant in the fight against a space threat must choose a team to counter it, and then, as part of the player's performance of at least 20 tasks, allowed him to determine his behavioral patterns (Figure 1). These patterns are the basis for making decision on the selection of a candidate for a project and also for building his/her individual educational trajectory.

The profile of the candidate obtained as a result of processing the answers and actions in the gaming environment, thanks to data mining, reflects the potential and competencies of the person participating in the project. Thus, the capabilities of the accepted candidates can be best applied when participating in the recommended parts of the project. Identification of qualities that require development allows us to create individual recommendations for participating in trainings, seminars and building an individual educational route.

How, then, out of 10,000 participants, 1000 was selected, who eventually began to study? As we have already mentioned, each participant was rated due competences assessment on the basis of the passed games and information provided on the projects being implemented. The same serious games were held by the leaders of the digital economy and the technological development of Russia. After that, the personal

qualities of the selected participants were compared with leaders who showed maximum level of competence and were successful in certain areas of activity. Their potential was evaluated basing on these results. The main activities included: organizer, community leader, business architect, technologist, technology entrepreneur, data analyst. Just over a thousand applicants who showed the highest results became participants in the educational intensive project. They were asked to choose a direction of activity with maximum values of potential or manifested competences for their further development.

Based on this choice, each participant also received recommendations on an individual educational trajectory, including a selection of online courses and books. At the same time, the set of courses and books can vary depending on the direction chosen by the participant, for example, they were different for the organizer and the leader of the communities. Among the recommended courses, most are associated with the National Technology Initiative of the Russian Federation, innovative projects management, formulation of tasks for software development, business processes, etc. Among the recommended books were presented works aimed at the study of goal-setting, thinking and management of organizations, such as M. Mamardashvili "Aesthetics of Thinking", L. Vygotsky "Thinking and Speech", E. Goldratt "Goal", etc.

The most interesting are the recommendations related to the ability to interact with other members of the project. As a result of the games, participants received recommendations on educational resources and trajectories and links to profiles of other project participants, interaction with whom can be productive for them. On the one hand, they recommended to connect with the participants, with whom with a high degree of probability they can try to become a team, and on the other hand, they may develop their deficient competence.

With all variety of opportunities that the project gives with the selection of candidates using the game mechanism, we tend to soberly assess the lack of development of the mechanism underlying the selection of candidates. The human person decomposed into a set of components seems to be too complicated material for algorithmization. It is not always possible to assess which set of qualities is optimal for a particular educational or research project. However, the more accumulated experience in the field of data mining, the greater opportunities for improving gamification system of highly qualified specialists selection.

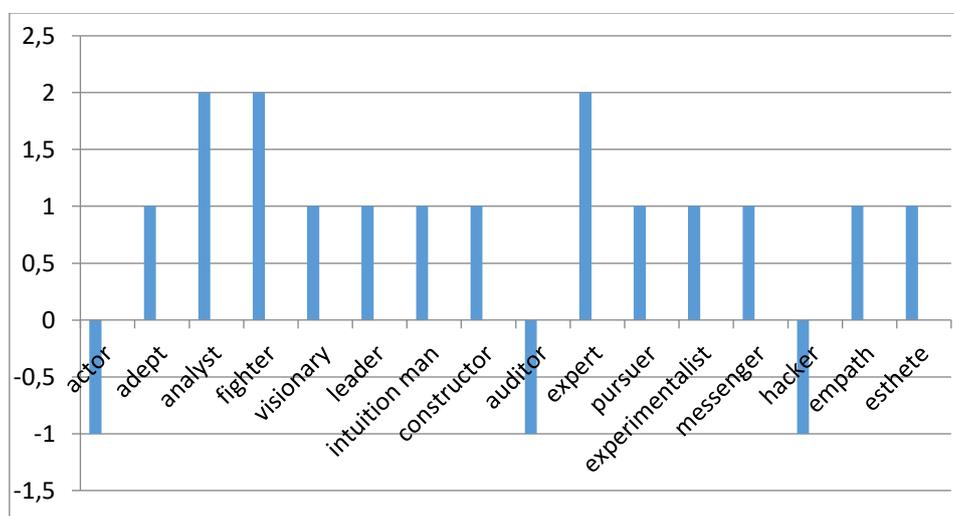


Figure 01. Behavioral patterns

7. Conclusion

The game has an evident advantage over traditional testing because it is motivating and may attract more interested participants. Moreover, the processing of the received information does not require a lot of time, since it is sufficiently automated. At the same time, it is clear that it is impossible to fully rely on a computerized assessment in the selection of highly qualified specialists, but such an assessment is able to separate obviously unsuitable candidates.

Game opportunities in the selection of candidates are not yet fully used at present, however, it is obvious that this method has great potential for development and a promising future.

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