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**SENIOR STUDENTS' INNOVATION AND CREATIVITY AND  
THEIR INVOLVEMENT IN MMORPG**

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***Abstract***

The paper presents a theoretical and empirical analysis of involvement phenomenon in massive multiplayer online role-playing games among high school students. The main features of the games that make them the most attractive to users and contribute to their active involvement in the game process are highlighted. The advantages of mass multiplayer online role-playing games are substantiated. On the basis of theoretical analysis the aim of the study was formulated — to identify differences in the manifestations of innovation and creativity in students involved and not involved in MMORPG. Hypotheses about the existence of significant connections and differences in the manifestations of innovation and creativity in those involved and not involved in this type of games are formulated. The study involved 120 students of 10-11th forms and was based on the following methods: 1) questionnaire to assess the degree of enthusiasm in role-playing computer games (E.V. Belovol, I.V. Kolotilova); 2) questionnaire for the study of gaming activity, experience and gaming genre preferences of the individual (the author - N. V. Omelchenko); 3) self-assessment scale of personal innovative traits (N. M. Lebedeva, A. N. Tatarko); 4) a multidimensional questionnaire "Innovation of a personality" - MQIP (O. B. Mikhailova); 5) "Creativity" test (N. Vishnyakova). As a result of the study, empirical data confirming the hypotheses were obtained. The conclusion presents a number of recommendations on the use of the plot potential of multiplayer online role-playing games for the development of high school students' personality in modern teaching practice.

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## 1. Introduction

Virtual world is becoming an integral part of reality, and its potential in influence the human psyche cannot be underestimated. It is important for modern researchers to study psychological, psychotherapeutic and developing possibilities of virtual space. According to Belozarov's (2015a) definition, the virtual world is an intangible environment that has a set of properties which allows considering the virtual world as an alternative to the physical world in psychological, social and economic sense.

Studies have shown that massive multiplayer online role-playing games or MMORPG (a genre of online computer role-playing games) are very popular among computer games fans (Omelchenko, 2011). The importance of studying both the content of the game and the psychological characteristics of MMORPG participants is due to the fact that the dynamics of changes in the level of involvement and the degree of this type of media influence intensity on a personality development can be best traced by the example of this type of games.

Any product of modernity is inextricably linked with the concepts of creativity and innovation, as the level of their development at each stage, from the idea generation to ending with the finished product's promotion on the market, determines the success of the idea. Computer games are no exception, on the contrary, a unique, memorable product in this area, able to attract a large audience and maintain its interest for many years, must meet the high level of requirements, be creative, permeated with novelty and be competently advanced in the market, i.e. be innovative.

Those users of the media product, who have an adequate level of involvement, can fully use the acquired knowledge for their own purposes, i.e. to be more creative by studying a huge amount of new, interesting material and ideas obtained through the gameplay and integrated into the personality as a new experience, as well as to have a higher level of innovation, because the world of computer games is inextricably linked with the world of computer technology, which requires its users to constantly adjust to the endless stream of innovative changes.

## 2. Problem Statement

Computer games, especially massive multiplayer online role-playing ones, have a number of advantages over any other product of the media which is the active inclusion into the process, the impact of decisions on the game outcome, the ability to live and act in the virtual world. Participants are attracted primarily by the opportunity to influence the processes taking place in the game world by making a certain set of decisions chosen from a variety of options provided by the game. Thus, the player is actively influenced by the program, which is able to form certain skills, behavior and social interaction stereotypes (Omelchenko, 2011; Nasyrova & Petrova, 2014; Pozharov, 2014). Features of creativity and innovation among MMORPG participants of senior school age are a relevant and widespread problem, the study of which will use the potential of computer games as a resource for personal development.

Over the past decade, there have been many studies that have described both the destructive and constructive impact of online multiplayer games on their participants. The virtual world can significantly improve the quality of people's lives and destroy the adequate development of the psyche. A number of

modern researchers believe that mediated activities in virtual worlds can satisfy the basic human psychological needs. For disabled people with mobility problems, who are in a state of physical or social isolation, communication in the virtual world can be an effective means of social self-rehabilitation (Sublette & Mullan, 2012; Dong, Wang, Yang, & Zhou, 2013; Graham, 2013; Koles & Nagy, 2013; Pozharov, 2014; Lindsey, Vallejos, & Vallejos, 2015; Voiskunskii, 2015; Belozerov, 2015a, 2015b; Frank, 2017).

The virtual space is considered by Belozerov (2015b) as an environment alternative to the social and psychological problems of the real world. The researcher identifies several advantages that virtual space offers to a modern person: 1) subjective well - being; 2) friendly communities and strengthening of interpersonal relationships; 3) romantic relationships and positive emotions; 4) the state of group insight; 5) psycho- and self-therapy; 6) improvement of social conditions for disabled and physically/socially isolated people. According to the author, it is some "virtual reality analgesia" for traumas and problems of the real world (p. 75).

In the course of research, it was found that the satisfaction of social interaction, friendship and communication becomes as significant for the game participants as the game excitement (Belovol & Kolotilova, 2011; Frank, 2017). In addition, scientific sources claim that multiplayer online games are now played by families and friendly companies, thus maintaining common interests (Sergeeva, Tsareva, & Zinov'eva, 2017). Multiplayer games form the skills to overcome difficulties, work in a team, and develop the social intelligence of participants. At present, the MMORPG plots are considered to be resources of personal identity formation (Shirokanova, 2014), as a new kind of cultural communication (Pozharov, 2014), as the methods of active social interaction, which develop punctuality, leadership qualities, social interaction, time planning and decision-making (Yee, 2006).

Russian and foreign authors' works demonstrate a positive impact of computer games, including MMORPG, on the socio-psychological, personal characteristics of the involved players, as well as on the level of their self-consciousness (Fomicheva, Shmelev, & Burmistrov, 1991; Kuss, Griffiths, & Binder, 2013; Lindsey et al., 2015; Hamade, 2017). This influence is determined by the player's need to enter a process in which there is a need to control the actions taken and to think over the consequences of such control, to analyze what is happening, to be focused, concentrated on the process of the game, to reflect, noticing changes in oneself, to participate in social interaction, through which the absence of such interaction in real life is compensated. Thus, the game is a source of rich experience for the individual, in which development is necessary to analyze one's achievements and failures, which leads to a change in personal structures, "self"- image and locus of control.

In his works, Voiskunskii (2015) distinguishes psychotherapeutic effect from the gameplay: "convergence" of real "self" and ideal "self"; the importance of the experience of positive emotional experiences of a game situation; recreational functions of the computer game" (p. 6).

Fomicheva et al. (1991) argue that "computer games players differ from the "non-gamers" in certain character traits: logical thinking, emotional stability, dominance, rationality, ability to dream, straightness, relaxation" (p. 29).

Nasyrova and Petrova (2014) emphasize the importance of computer games in learning, as they contribute to the development of perseverance, the formation of attention and persistence, and also help to

organize the activities. It is also important to note that the computer game contributes to the development of hand coordination, visual perception and memory, organizational skills, develops the decision-making process. MMORPG can contribute to the development of communication skills, entry into social groups and overcoming shyness.

In addition to works on the positive impact of computer games, there are a large number of studies aimed at studying their negative impact. There are such negative consequences of computer games as: changing the range of interests, its narrowing, the most active transformation of the motivational sphere in adolescence, their impact on cognitive abilities, escapism and autism, an increase in the level of aggressiveness and anxiety (Ivanov, 2004; Widyanto & McMurren, 2004; Van der et al., 2009; Young & de Adreu, 2011; Lindsey et al., 2015).

### **3. Research Questions**

There are fundamental differences between addiction and involvement in the world of computer games. An addict experiences a pathological attraction to a dependency object and being distracted from it, experiences a growing desire to return. The inability to satisfy this urge for some time entails negative feelings — depression, anxiety, irritability, aggressiveness. The involved person does not have such strong negative consequences of distraction from the object of interest. The person can safely switch to other activities without discomfort if it is impossible to return to the object of involvement for a long time (Dong et al., 2013; Kuss et al., 2013; Graham, 2013; Lindsey et al., 2015).

The interests and motives of the behavior of a person dependent on the game are subordinated to the main motive — to return to the object of dependence as soon as possible. All other activities fall into the focus of his attention only because they can serve as a means to achieve this goal. An addict finds it very difficult to concentrate, to remember, to bring to an end what turned out to be outside the dependency object. A person, who is free from dependence, even though he is involved, does not have such a prominent gap in the scale of priorities. The person involved keeps in touch with reality, does not avoid it (Yee, 2006; Kim, 2015; Hamade, 2017).

### **4. Purpose of the Study**

On the basis of the conducted theoretical analysis it should be assumed that there are significant differences and specificity of relationships in the manifestations of innovation and creativity in groups of high school students involved and not involved in MMORPG. By innovation we mean an integrative combination of personality traits that provide perception, evaluation, refinement, operational and practical implementation of new, also original, ideas (Mikhailova, 2016).

Creativity is defined in this paper as a cognitive component of the individual's innovative potential. Creativity, expressed by intellectual activity, is an integral part of the individual's innovative potential. If creativity is considered as a set of qualities that create an idea, then innovation is a set of personal qualities that allow to transform a creative idea into reality (Mikhailova, 2012).

## 5. Research Methods

Data was collected using the following research methods: 1) a questionnaire to assess role-playing games engagement levels (Belovol & Kolotilova, 2011); 2) a questionnaire for the study of gaming activity, experience and gaming genre preferences of the individual (Omelchenko, 2011); 3) a self-assessment scale of innovative personality traits; 4) a multidimensional questionnaire " Personality's innovation " - MQPI (Mikhailova, 2013, 2016); 5) "Creativity" test. To interpret and evaluate the data, comparative evaluation and correlation methods of statistical analysis were used: a nonparametric Mann-Whitney U-test, Spearman's rank correlation coefficient.

The following students took part in the research: 10-11 form students of the municipal budget educational institution "Khot'kovskaya secondary school № 5" (Khot'kovo, Sergiyev-Posad municipal district, Moscow oblast) – 58 students in total (27 boys and 31 girls aged 16-17 years old) and pupils of Moscow general education institution, secondary school № 48, 62 students in total (31 boys and 31 girls). The final sample consisted of two groups: the first group — involved high school students (22 girls, 38 boys) and the second group — not involved high school students (30 girls, 30 boys).

## 6. Findings

The separation of adolescents into groups was carried out through a questionnaire and survey; a questionnaire by Omelchenko (2011) for the study of the individual's gaming activity, experience and gaming genre preferences and a questionnaire to assess role-playing computer games engagement levels by Belovol and Kolotilova (2011) were used as methods. The questionnaire included questions about whether the respondent has ever played computer games, his/her gaming preferences, time spent on the game, the features of game behavior, motivation of the subjects: with the help of the questionnaire the level of MMORPG involvement in the first group was studied. To statistically check differences in psychological characteristics of innovation and creativity of high school students involved and not involved in MMORPG, a nonparametric Mann-Whitney's U-test was applied (Table 1).

**Table 01.** Results of comparative analysis of differences in all methods in the two groups (n=120)

The scale of methods		U emp.
Scale of self-assessment of innovative personality	Creativity	640**
	Risk for success	456**
	Orientation towards future	881.5**
	Innovativeness index	445.5**
The multidimensional questionnaire of individual innovativeness	Risk for the sake of new achievements	352.5**
	Adaptability to change	464**
	Persistence	263.5**
	Independence	933*
	Positive attitude	971.5*
	Openness to something new	1229
	Intuition	1038.5

Creativity	Creative focus	1158.5
	Constructive leadership	139**
	Common indicator	276**
	Creative thinking	534.5**
	Curiosity	1176
	Originality	363.5**
	Imagination	893.5**
	Intuition	1119
	Emotional empathy	1111.5
	Sense of humor	264**
	Creative attitude to the profession	1117.5

Note: \* - significance level  $p < .05$ ; \*\* - significance level  $p < .01$

Analysis of data using "Scale of self-assessment of the person's innovative traits" method revealed differences in groups of high school students on all scales both in comparison of average values, and as a result of the nonparametric Mann-Whitney's U-criterion use. A group of high school students involved in computer games showed better results on all the scales of the methodology (Table 1). Statistically significant differences were obtained at 0.01 level ( $p < .01$ ).

The results of research on MQPI method showed that there are statistically significant differences at 0.01 level ( $p < .01$ ) on such indicators of innovativeness as risk for the sake of new achievements, adaptability to changes, persistence, constructive leadership, as well as statistically significant differences by 0.05 ( $p < .05$ ) level on such characteristics as independence and positivity (Table 01).

High school students, who are passionate about MMORPG, are characterized by greater adaptability to changes, ability to take risks, perseverance in comparison to their peers who are not involved in massive multiplayer online role-playing games.

The results of the study of differences method "Creativity" showed that there are statistically significant differences in the involved and non-involved sample by 0.01% ( $p < .01$ ) levels on such scales as creative thinking, originality, imagination and sense of humor, as the obtained empirical criterion indexes on them exceed the critical ones for a given number of subjects (Table 01).

High school students involved in MMORPG at a statistically significant level ( $p < .01$ ) are characterized by higher rates on the scales of originality, imagination and creative thinking in comparison with the second group representatives (Table 01 and Table 02). High school students involved in MMORPG have higher rates of sense of humor than students not involved in massive multiplayer online role-playing games. However, involvement in MMORPG is not a marker that determines the high school students' manifestation of such components of creativity as curiosity, intuition, emotional empathy and creative attitude to the profession.

The results of the correlation analysis revealed a number of specific links in the manifestations of innovation and creativity in the representatives of both groups.

**Table 02.** The results of correlation analysis by the methods of MQPI and “Creativity” in groups with different levels of involvement (n=120)

Scales of the Multifactorial questionnaire of personality innovativeness	Groups 1 and 2	“Creativity” methodic scales							
		Creative thinking	Curiosity	Originality	Imagination	Intuition	Emotional empathy	Sense of humor	Creative attitude to profession
Risk for the sake of new achievements	Group 1	-.053	.111	.040	-.067	.279*	.056	.031	.046
	Group 2	.076	-.194	.103	-.020	.065	-.033	.133	.087
Independence	Group 1	.009	.071	.215	-.191	.038	.020	.016	.140
	Group 2	.075	-.002	.133	-.121	.095	-.017	-.265*	.055
Positive attitude	Group 1	-.007	-.301*	-.139	.154	-.058	.009	-.052	.276*
	Group 2	.074	-.107	.222	.129	.081	.062	-.191	.210
Openness to something new	Group 1	.240*	.060	.061	.046	.052	-.007	.179	.046
	Group 2	-.161	.191	-.095	.152	.120	-.131	-.028	.018
Intuition	Group 1	.028	.066	.078	-.207	.018	-.122	.028	-.249*
	Group 2	-.011	-.089	-.079	.019	.189	.320*	.065	.081
Creative focus	Group 1	.209	-.061	-.067	.109	.283*	.147	.041	-.146
	Group 2	-.026	.044	-.065	-.091	.025	.096	.187	.123
Constructive leadership	Group 1	.045	-.119	.111	.024	.004	.312*	.140	.016
	Group 2	.081	-.148	.091	-.092	-.119	.052	.138	.220

Note: \* - significance level  $p < .05$ . Group 1 — involved, Group 2 — not involved.

The analysis of correlations between the scales of test methods of MQPI and "Creativity" revealed positive and negative significant relationships (Table 02).

The group of those involved is characterized by significant correlations between risk for the sake of new achievements and intuition. Perhaps these results are due to the specifics of the game plot, when the player needs to trust his feelings to make the right choice to achieve this goal. The second group of high school students showed a negative significant correlation between the scales of independence and a sense of humor. Independence of this group is perceived as a serious quality that does not cause positivity.

The first group of respondents has a significant negative correlation between positivity and curiosity, as well as a significant positive correlation between positivity and creative attitude to the profession. Perhaps a group of high school students involved does not show positive emotions in the interest in the world, but this group is characterized by an optimistic attitude to the future of professional creativity. In addition, for the representatives of the first group, a positive correlation on the scales of openness to new things and creative thinking is significant. Perhaps this is due to the need for in-game research activities that develop creative thinking through quests, but it requires the player to be open to

new information, knowledge and experience. Both groups of respondents expressed a manifestation of links with the scale of intuition. However, among those respondents involved in MMORPG intuition is aimed at creative attitude to the profession and creativity, while the representatives of the second group associate it with the emotional empathy manifestation. Intuition of the first group representatives is more focused on creativity and professional activity manifestation.

In addition, the first group of high school students demonstrates a significant positive correlation between the scales of constructive leadership and emotional empathy. Empathy expression is characteristic of both groups, but in the first group, empathy is associated with the characteristics of leadership, and for the representatives of the other group, empathy is intuitive and not purposeful.

Let us consider the results between the "MQPI" method of innovation and the method of self-assessment of innovative personality by, presented in Table 03.

**Table 03.** The results of the correlation analysis by the MQPI methods and the Scale of personality innovativeness self-assessment in groups with different levels of involvement (n=120)

MQPI method scales	Groups	Scale of personality innovativeness self-assessment		
		Creativity	Risk for the sake of success	Focus on the future
Risk for the sake of new achievements	Group 1	-.016	-.311 *	-.054
	Group 2	.011	-.215	-.156
Persistence	Group 1	-.092	-.423**	-.243*
	Group 2	-.071	-.240*	-.190
Openness to everything new	Group 1	-.392**	-.084	-.111
	Group 2	-.171	.038	-.101

Note: \* - significance level  $p < .05$ ; \*\* – significance level  $p < .01$ . Group 1 – involved students, Group 2 – not involved.

Analysis of the results showed that the first group of respondents, in their manifestations of risk for the sake of success, does not associate success with new achievements, does not show perseverance, and is not focused on the future (Table 2). High school students involved in MMORPG show their potential abilities in the present time, in the process of gaming activities implementation. In the manifestations of creativity, they are not open to new things. It can be assumed that the specificity of gaming activity develops innovativeness, but does not focus on the implementation of potential opportunities in real life. For the participants of the game activity, the manifestations of success and



creativity are important here and now, and they are not ready to realize their potential in the future. It should be noted that the second group representatives also do not show persistence in risks for the sake of success. This tendency of passivity in the sample is probably due to a general reluctance to risk for success in the future.

Let us consider the characteristics of creativity and self-assessment of the individual's innovativeness, obtained as a result of correlation analysis of data.

**Table 04.** The results of correlation analysis by the "Creativity" method by N. Vishnyakova and "Scale of personality innovativeness self-assessment" (N. M. Lebedeva, A. N. Tatarko) in groups with different levels of involvement (n=120)

"Creativity" method scales	Groups	"Scale of personality innovativeness self-assessment" method scales		
		Creativity	Risk for the sake of success	Focus on the future
Curiosity	Group 1	.360*	.289*	-.043
	Group 2	-.037	.083	.149
Intuition	Group 1	-.132	-.06	-.234
	Group 2	-.154	-.123	-.309*

Note: \* - significance level  $p < .05$ ;  
 \*\* – significance level  $p < .01$

The analysis of the correlations between the scales of the two methods allowed to reveal positive and negative significant results on several scales. The first group representatives, in their manifestations of innovation and creativity, are quite inquisitive and willing to risk for the sake of success (Table 04), while the second group representatives are not focused on the future in their intuition manifestations.

The results of the study revealed the following characteristics in the groups of respondents:

1. The group of high school students involved in MMORPG demonstrates higher rates of independence and positivity;
2. Involvement in MMORPG does not affect the high school students' formation of such indicators as innovativeness, openness to the new, intuition, creative orientation;
3. Representatives of the group involved in MMORPG are characterized by a more developed ability for constructive leadership and a higher level of innovation than their peers not involved in the massive multiplayer online role-playing games.

4. Those involved in computer games are characterized by higher originality, imagination and creative thinking than their peers from the second group, not playing massive multiplayer online role-playing games;

5. High school students involved in MMORPG have higher rates of sense of humor than the students not involved in massive multiplayer online role-playing games.

## 7. Conclusion

The virtual world, absorbing human resources, challenges the modern man. Currently, it is important to use MMORPG stories and technology as resources for the development of personal potential of modern generations. The activity of the subject acts as one of the criteria and regulatory mechanisms by which the activity is carried out. Preconditions of innovative activity and real expression of the person's innovative potential are different types of activity, including the virtual one (Mikhailova, 2016). Therefore, modern teachers, psychologists and game developers need to work together to find new stories for the use of virtual space for the benefit of personal development.

The authors consider the personality potential as an integrative combination of inclinations, abilities, individual characteristics and personal qualities that provide the basis (foundations) for the implementation of human capabilities in various activities (Mikhailova, 2012, 2013). Therefore, while providing psychological and pedagogical support of personal potential formation and development, it is important to use the virtual world game scenarios for the formation and implementation of personal opportunities in the creative objective reality.

To solve these problems, we highlight several topical areas of psychological support for the personality development using MMORPG resources: 1) the introduction of virtual technologies into the practice of modern education, using the potential of MMORPG not as entertainment, but as a means of learning; 2) psycho-prophylaxis and psycho-hygiene of Internet addiction formation at the earliest stages of personality development; 3) the development of more realistic and creative game plots, strengthening the semantic moral value of the plot; 4) development of the practice of virtual and real group interaction in optimal combination; 5) implementation of jointly achieved results of active virtual activity in the creative environment of objective reality.

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