NATIONAL RESEARCH UNIVERSITY
HIGHER SCHOOL OF ECONOMICS

Mariia I. Okuneva, Dmitriy B. Potapov

CONSUMER BEHAVIOR IN ONLINE GAMES

BASIC RESEARCH PROGRAM

WORKING PAPERS

SERIES: MANAGEMENT
WP BRP 25/MAN/2014

Mariia I. Okuneva[1], *Dmitriy B. Potapov*[2]

CONSUMER BEHAVIOR IN ONLINE GAMES

The present paper focuses on the concepts of motivations and fun in online games. The ultimate goal of our research is to understand consumer behaviour toward an online games extending Yee's model of motivations (Yee, 2006). We investigate relationships between fun, motivations, continued intention to play and such characteristics of players as age and rank. Moreover, we examine if the relationships are different depending on user characteristics (experience, donation). Our calculations are based on statistical procedures (structural equation modeling) for players of one particular game "Tanki Online".

JEL Classification: A12

Keywords: MMOG, motivation, fun, flow state, SEM.

[1] National Research University Higher School of Economics - Perm. Group for Applied markets and Enterprises Studies. Research Assistant; E-mail: miokuneva2@gmail.com
[2] National Research University Higher School of Economics - Perm. HSE-Perm Deputy Director, Associate Professor. E-mail: dbpotapov@gmail.com

Introduction

Online games has become popular as an e-commerce application on the Internet. According to the report called "Online Game Market Forecasts", revenue from online games on both consoles and PC is estimated to reach $35 billion by 2018, up from $21 billion in 2012 (DFC, 2013). Widely used today per-item billing model makes game designers analyze player behavior as carefully as it is possible because they should ensure that players visit their site repeatedly and are intended to purchase different items. Even special term was introduced in the literature for analysis of player behaviour – games user research (GUR) (Drachen et al., 2013). While simple focus group feedback is necessary, it is no longer sufficient because investigation of users' experience, preferences, feeling of fun provides designers with deeper understanding of their consumers, helps to anticipate players' wants and needs, improve game process that consequently leads to higher financial results.

Several million people currently have accounts in massively multi-player online games. They can spend hours in virtual environments even becoming addicted. Why do people decide to play games? What does make them happy and satisfied? Do all people value the same things or motivations depend on characteristics of a user? These questions are rather difficult because asking players about that reveals a huge array of motivations crucial for both academicians and practitioners. The importance of articulating motivations for play that in theory should lead to feeling of fun is introduced in the papers of Nick Yee (Yee, 2006), Richard Bartle (Bartle, 1996) and Nicole Lazzaro (Lazzaro, 2004).

Moreover, our intention to understand what makes players happy is also explained by development of 'gamification' that stands for application of game-related mechanisms in non-gaming fields, such as sports, learning, news aggregation etc. Revelation of users' motivations to play games and insight into their feeling of fun can give assistance to creating better 'gamified' applications. Another reason for study of fun in online games is that programmers would like to create a metric that will automatically show how the player feels, whether implemented changes were successful or not (Yannakasis, 2012). Of course, it is possible to ask players about that, but it demands time, resources and is fixed after an experience was gained. That's why designers are so interested in good proxies for fun, but search for these variables starts from understanding of general things that are valuable for players and that can lead to satisfaction (if they don't – why does a user continue to play?), i.e. motivations.

It is obvious that quantitative data should be supported with qualitative one, as, for example, data about the number of deaths of a player acts only as a signal about his or her

feeling of fun and is difficult to interpret, even if historically it is the best predictor of player satisfaction. That is why user researchers at Microsoft ask players about what was fun for them after playtest session and how they can rate enjoyment (Drachen et al., 2013). At the same time, they collect data about users' progression and try to realize what is different between players who assess the feeling of fun as high or low. One of the cases is presented in Drachen's work – combination of quantitative data about the most frequent actions of users and self-reported qualitative data about feeling of fun revealed that those who rated their state as 'fun' or 'very fun' jumped onto rooftops more than other players. Further analysis showed that use of rooftops needed agility and was too difficult for many players. As a result, challenge was adapted to skills of players and the second stage of experiment showed greater satisfaction of users. We believe that this is a good explanation for practitioners why the concept of fun is so important and why we need to understand determinants of consumer enjoyment.

Furthermore, another topic that attracts researchers is associated with "tools" necessary for "fun production" (Castronova, 2013). Stochastic frontier analysis is proposed to determine "tools" (weapon used, ability to change settings etc.) that will differentiate players and result in different levels of fun. The only problem is that prior research of "fun" wasn't conducted that makes the author to concentrate on very narrow group of players who participate in guilds. Moreover, the proxy for fun (number of killed bosses) is not empirically proved that makes us hesitate about its accuracy. Again we want to highlight that the search for fun is needed by both researchers and practitioners.

The present paper focuses on the concepts of motivations and fun in online games. The ultimate goal of our research is to understand consumer behaviour toward an online games extending Yee's model of motivations (Yee, 2006). First, we examine the player's motivations according to different theories and explain why Yee's theory is preferable in our case. Second, we look at features of "flow state" that is used in this paper as proxy for fun. Third, we investigate relationships between fun, motivations, continued intention to play and such characteristics of players as age, rank, average payment amount, average play hours. It is important to pay attention of the reader to the fact that all relationships are based on both theoretical background and common sense. Finally, we examine if the relationships are different depending on user characteristics (experience, donation).

In order to gain the aim, the comprehensive literature review on motivations for play was conducted. In addition, the empirical analysis was carried out: we measure motivations, feeling of flow state, continued intention to play, users' characteristics and study the casual structure

between them. Our calculations are based on statistical procedures (structural equation modeling) for players of one particular game “Tanki Online”.

The paper is organised as follows: firstly, the introduction reveals the importance of the problem. Section 2 gives some theoretical background about motivations for play in online games as well as concepts of fun and flow state and their impact on player behaviour. Next, Section 3 introduces the research design describing the framework applied to our study. In Section 4 we present the predicted results of empirical investigation of the hypotheses formulated in our study and discuss limitations of the research.

Theoretical background

The present paper is focused on fun players get in online games. According to this aim, a comprehensive literature review was carried out for specification of the issues involved.

Three main concepts - motivations, flow state and fun - will be discussed in our work to understand why people enjoy playing games. Motivations are explained as reasons for play: players may be motivated to reach goals, escape from real problems or express themselves through game characters. It has been argued that treating gamers as a monolithic group is impossible because different people play games for very different reason (Yee, 2012). The bottom line is that motivation acts as a crucial part of next concept called flow state. Mihaly Csikszentmihalyi describes flow as a state of extreme focus of attention, when you are completely involved in the problem solving process and nothing can distract you from an activity (Csikszentmihalyi, 1990). Three conditions should be met for a flow state to exist: balance of challenge and skill; clear goals and feedback; uncertain outcome can be influenced by player’s actions (Csikszentmihalyi, 1990). The last of our concepts is fun that can be induced by flow state, while flow and fun are not the same. All the terms – engagement, deep involvement, player satisfaction, and entertainment – characterize fun (Murphy, 2011). It is easier to realize if the example is given - an office worker who fills out a lot of similar forms can reach flow state (his skills and challenge of the task are balanced, goals are clear, he feels time distortion etc.) but this process is hardly fun for him. At the same time, fun is quite a nebulous term as it is instinctively clear whether the game provides fun or not, but strict interpretation of fun is difficult to formulate. Still, this concept is important and often discussed as it is crucial to understand what makes people happy when they play games.

Several researchers have specifically looked at multiplayer games and investigated the concepts of flow, fun, motivations. Famous principles of intrinsic qualitative components of player satisfaction under psychological approach to fun in online games were developed by Thomas Malone (Malone, 1981) and involved three aspects, namely challenge, fantasy and

curiosity. “Uncertainty toward attaining a goal” is a definition of challenge given by Malone; curiosity refers to interest in what will occur next in the game; another motivational aspect of games has to do with the themes or fantasies which they embody or encourage.

The meaning of fun is also interesting for Nicole Lazzaro. Her fun clustering overlaps with Malone’s (Malone, 1981) and Csikszentmihalyi’s (Csikszentmihalyi , 1990) foundational concepts and is drawn from the research of game preferences as expressed by players (Lazzaro, 2004). Four types of fun were proposed by Lazzaro on basis of facial expressions of players and surveys on them – hard fun, easy fun, serious fun, people fun. Hard fun is associated with challenge, strategy, and problem solving. Easy fun describes the enjoyment players get from states of immersion, total absorption, curiosity. Some players perceive game as therapy and are excited about change in their internal feeling (such as relaxation) before and after a game that is referred to serious fun. Amusement from social experiences, interaction between people explains the concept of people fun. Moreover, it is important to highlight that production of statistically significant results was beyond the scope of Lazzaro’s work.

Raph Koster inspired by Lazzaro’s fun clustering developed his own “Theory of fun” (Koster, 2005). He asserts that “fun is really just another word for learning”, learning new and unpredictable patterns, therefore, is fun for us. We so like it because under normal circumstances learning totally unpredictable experience is too risky. Noise (patterns we do not understand) and boredom (too simple patterns) are opposite to fun in Koster’s view that is tightly correlated with flow theory where challenge and skill should correspond to each other. Meanwhile, author of the fun theory reminds that other sorts of things except for learning puzzles and mastering responses to situations also contribute to the overall experience.

There are many other classifications of fun that were proposed by researchers including eight kinds of fun (sensation, fantasy, narrative, challenge etc.) from the MDA framework, standing for Mechanics, Dynamics, and Aesthetics (Hunicke et al, 2004); three dimensions of fun presented in (Read, 2002), such as endurability (the desire to do again an activity that we perceived as fun), engagement (dimension of fun) and expectations (fun that is influenced by the prior expectations of players); and even framework of thirteen pleasures of play (Costello et al., 2007). However, these articles prove that it is impossible to take into account all components of fun and that we need to identify the main ones that will characterize the majority of players and that will be quantitatively assessed. For example, only analysis of data can reveal whether Fantasy and Narrative are separate constructs or they are just two different labels for the same kind of fun. Meanwhile, we would like to draw attention to the method Costello (Costello et al., 2007) used to measure engagement (that is synonym to fun in our opinion): the author scored

video footage with regard to positive (smiles, laughing etc.) and negative (signs of boredom, negative vocalization) instantiations. This method is more objective but can't be used for big groups of users.

Another concept associated with fun is player types. Various types were proposed but the only one model we would like to discuss is Bartle's Player Types because it gained widespread interest and is historically important. Four types of players are included in the initial Bartle's model (Bartle, 1996): Socializers, Achievers, Killers and Explorers. Socializers are interested in interaction with other players; Achievers try to "win" the game and become powerful; Killers do their best to ruin an experience of others; Explorers enjoy a virtual world. In spite of the fact that the model was later developed into a model of 8 Player Types (Bartle, 2003), it still has some limitations discussed in Yee's article (Yee, 2006). First of all, several components associated with one Type can not be related. As it is proved in Yee's research, role-playing and socialization that fall under Socializer Type in Bartle's model are in fact two independent motivations. Secondly, Player Types can overlap with each other (players often like socializing and achieving their goals simultaneously) that is not taken into account in Bartle's theory and instead Types lie on opposite corners of the model. Thirdly, the model can not be used on a practical basis unless it is validated with empirical data. The main idea of Yee's critiques is that either Player Types or player motivations can not be simply brainstormed, on the contrary, they must be tested. In addition to this, there are obvious parallels between player types and kinds of fun: Achievers are those who prefer hard fun of Lazzaro or Challenge fun of Hunicke, Socializers favour People fun or Fellowship fun etc. It seems that the same things are just differently.

All the presented theories of fun or player type explain what leads to player satisfaction, enjoyment or fun, but none of them tells us about how to measure fun and what it is. Different theories analyze enjoyment as a general concept that is applicable to sports, media, games etc. because feeling of fun is universal irrespective of age, gender or social class (Csikszentmihalyi, 1990) but things that make people happy vary according to circumstances. Attitude theory defines fun as positive or negative feelings about the target behaviour, evaluation of a certain entity with some degree of favor or disfavor (Nabi et al., 2004). Transportation theory is concentrated on absorption of player in a game (Green et al., 2004), on his or her attention and imagery. Parasocial interaction concept describes the state when players talk to their characters, discuss character's life, feel like they are connected to 'avatars' (Nabi et al., 2004). Nevertheless, flow theory, we started to discuss in the beginning, synthesizes all the aspects of previous ones and describes elements of universal enjoyment. State of flow is possible if

following conditions hold: task can be completed, a player is concentrated, goals are clear, immediate feedback is available, a player feels that everything is under control, he is involved in the process and doesn't have a sense of time (Csikszentmihalyi, 1990). At the same time, we should remind you that the concept of fun is broader than flow theory and we can use flow as proxy for fun.

The question that is important for us – what does make players happy in an online game? The answer can be found in motivation theories. According to Nick Yee (Yee, 2006), MMORPGS (multiple massive online role-playing games) are so popular because they can attract people with very different motivations for playing. While articulation of these motivations can be quite complicated, it lets us differentiate players (people of different age, gender can have different reasons to play) and link motivations to in-game characteristics of users (average play hours, whether the player is a guild leader or not etc.) and that is more important to fun or flow state in practice. The main problem of all proposed player and motivation taxonomies (Bartle's Player Types, Lazzaro's four kinds of fun etc.), is that most of them were not developed using statistical methods and, consequently, are not equipped for quantitative assessment. Due to factor analytic examination and restructuring of Bartle's Player Types, Yee's model of motivations stands out against a background of other taxonomies of Types or motivations. Ten motivations that Yee's paper (Yee, 2006) revealed (advancement, mechanics, competition, socializing, relationship, teamwork, discovery, role-playing, customization, escapism) fall into three higher-level categories, such as achievement, social, and immersion motivations (Yee, 2012). Our research effort will base on this existing model of motivations grounded in online gaming. Meanwhile, the ultimate goal of our research is not just to determine what is of high value for players, namely ability to socialize, achieve or discover a virtual world, but also understand how these motivations (why do people play?) are linked to their satisfaction, or fun (these terms can be used interchangeably).

This issue has been discussed in several studies: human-computer, or personal interaction (interaction that exists between the user and the system) and social interaction (user-to-user interaction) may be important factors leading to flow state (it is also called optimal experience) (Lee, 2010; Choi, 2004). The positive aspect of these works is that both were empirically approved. However, personal interaction is too general to tell us something about player's preferences. Statistically significant relationships were also revealed between perceived usefulness (that was simplified to achievements) and attitude towards online games (another concept of fun), perceived critical mass (social aspect) and attitude (Yoon, 2013). Furthemore,

Sweetser also highlights the importance of social interaction to reach flow state (Sweetser et al., 2005).

Study of R. Ryan (Ryan, 2006) is of high interest for us because he hypothesizes that player enjoyment is a function of such motivations as autonomy - "a sense of volition or willingness when doing a task" (Deci & Ryan, 2000), competence (wish to enhance experience, overcome difficulties, to be optimally challenged) and relatedness (ability to interact with other players, build relations with them). At the same time, in order to compare an impact of proposed regular game players' motives with Yee's three factor measure of motivations (Yee, 2012) on enjoyment, Ryan also included achievement, social and immersion factors measured with the help of Yee's methodology in the function. While Ryan revealed that game enjoyment was significantly related to autonomy, competence and relatedness, we, in our opinion, can not rely on his results because such constructs as Yee's social motivation and relatedness were strongly correlated (r=0.66) as well as competence and autonomy (r=0.45) that leads to the problem of multicollinearity not discussed in Ryan's article.

In spite of the fact, that the majority of works presented above do not provide statistically significant results, our conceptual model will be based on the discussed theories and those empirical results that already exist.

Research Model and Hypothesis

The conceptual model for the present study is shown in Figure 1. At the bottom three motivations for play in online games are presented: (i) achievement; (ii) social interactions; (iii) immersion. These are linked to flow state that acts as proxy for fun and continued intention to play games. According to many studies (Choi, 2004; Lee, 2010), flow state is linked to continued intention to play (it is also called behaviour loyalty, future play, usage etc.).

Motivations

The motivations that constitute a part of our model are adopted from Yee's paper (Yee, 2012). He used factor analysis twice to reveal ten motivations at the first stage and three kinds of overarching, non-exclusive motivations for play at the second one – achievement, social component, immersion. *Achievement* is associated with three subcomponents, namely advancement (wish to progress as fast as possible to become powerful), competition (the desire to win in competitions, cope with challenging tasks) and mechanics (looking for ways to optimize character performance, interest in all the details of rules). People with *social* motivation are interested in socializing (chatting with others), relationship (desire to make friends, build meaningful relations), teamwork (completing tasks in groups). *Immersion* as motivation includes

discovery (desire to find hidden things), role-playing (creating a story for the character), customization (changing the appearance of the character) and escapism (using the virtual world as the place where you can forget about real problems). Yee's survey demonstrates how differently players value games and supports these results by statistical analysis.

Flow state and motivations

We suggest that people play games because they are intrinsically satisfying and provide players with fun (Koster, 2005; Bartle, 2003). R. Ryan in his paper (Ryan, 2006) investigated the relationship between enjoyment and three kinds of motivations – competence, autonomy and relatedness. At the same time, he asserts that Yee's social, achievement and immersion motivations do not statistically influence enjoyment. However, it seems that model of Ryan suffers from multiocollinearity problem because such constructs as Yee's social motivation and relatedness were strongly correlated as well as competence and autonomy. Moreover, the relationship between social interaction and flow state was empirically tested in many works (Griffiths et al., 2004; Choi, 2004); escape motivation (the component of immersion) has an impact on engagement (that is close to flow state), according to D. Koo (Koo et al., 2007). We do not know studies about relationship between achievement and fun since achievement was not regarded as motivation in prior empirical research. Nevertheless, we assume that they are strongly positively related, because if something is of high value for a player and no one makes him play games the user should derive enjoyment from the game.

Hypothesis H1: Achievement has a positive effect on flow state.

Hypothesis H2: Social motivation has a positive effect on flow state.

Hypothesis H3: Immersion has a positive effect on flow state.

Continued intention and motivation

Yung-Shen Yen in his paper (Yen, 2011) claims that perceived value from information, social and hedonic aspects positively influence continued usage intention. While this research was carried out with respect to social networking sites, we suppose that indicated relationship is relevant to online games too. Perceived value in our mind is tightly correlated with motivations that also refer to crucial for users things. Therefore, this study brings forth three next hypothesis:

Hypothesis H4: Achievement has a positive effect on continued intention.

Hypothesis H5: Social motivation has a positive effect on continued intention.

Hypothesis H6: Immersion has a positive effect on continued intention.

Flow state and continued intention

The more a player is satisfied with the game, the greater his desire to continue playing. The relationship between customer usage and attitudinal measure is discussed in several prior

studies (Davis, 1989; Moon and Kim, 2001; Hsu and Lu, 2004). Y. Yen (Yen, 2011) also approves that final user satisfaction positively influence continued user intention. Therefore, in this research, positive relationship between flow state and continued intention may be found.

Hypothesis H7: Flow state has a positive effect on continued intention.

Age and rank of the player

We do not have theoretical background about an impact of age or rank of the player neither on flow state nor on continued intention to play.

Many online games have signs of player's success. The more the user kills, or completes other tasks, the higher his rank in the game. Relationship between rank and flow or rank and continued intention depends on ability of game designers to capture their consumers. If a new level and a new rank are unique and even more fascinating than the previous ones, the player will have a desire to continue playing and will derive enjoyment from a game.

We do not know whether age influences flow state and continued intention to play but would like to control this possible effect. Therefore, this study brings forth seven next hypothesis:

Hypothesis H8: Rank of the player has a positive effect on continued intention.

Hypothesis H9: Rank of the player has a positive effect on flow state.

Hypothesis H10: Age has an impact on continued intention.

Hypothesis H11: Age has an impact on continued flow state.

Group effects by experience, donation

In order to explain why it is crucial to take into account different groups of people we should remember about Bartle's theory (Bartle, 2003): novices are very aggressive and try to kill everyone; then having tired of fighting, they explore the world; gathered knowledge helps them to "win the game"; the last stage is characterized by absorption in the world, socializing and engaging with the game. This may indicate that players with different experience will be interested in different things. Nevertheless, as immersion motivation is deeper than just desire to explore, we suppose that newcomers like achievements, then they start socializing and interacting with others, the most experienced ones will value immersion in the game.

While we do not know whether those who pay money in the game (donators) differ from users who prefer to play free of charge, this issue is very important for game designers interested in commercial success of the game.

Hypothesis H12: Newcomers like achievements, then they start socializing and interacting with others, the most experienced ones will value immersion in the game.

Hypothesis H13: Donators differ from users who prefer to play free of charge.

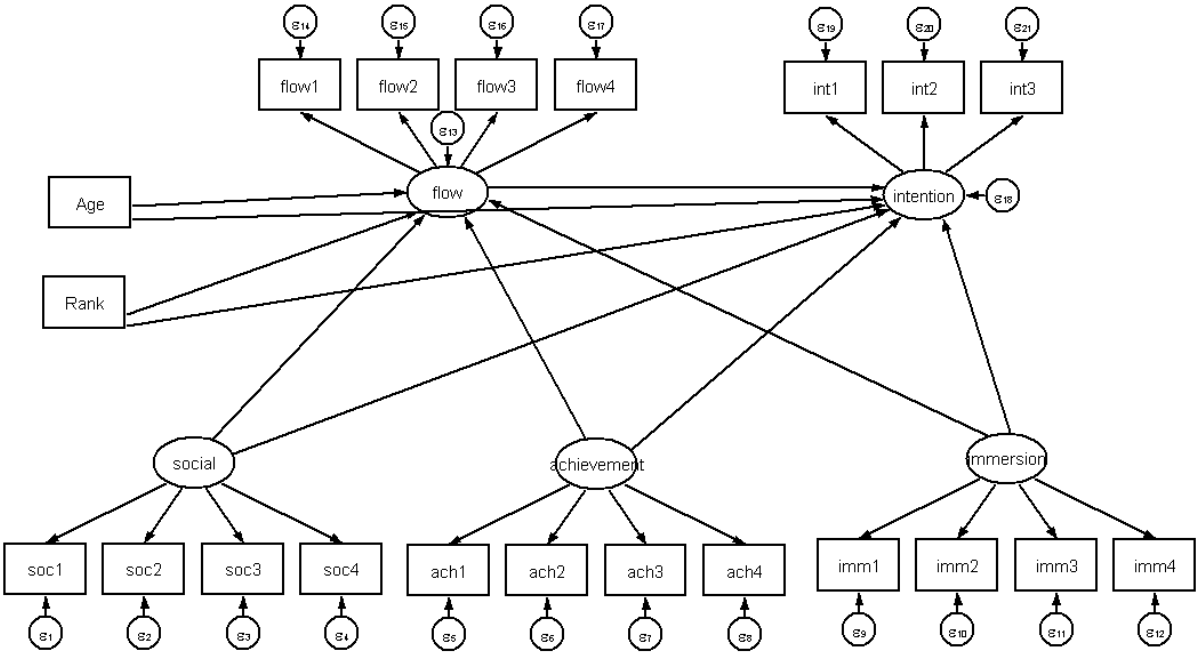

Figure 1. Hypothesized research model

Methodology

We developed a structured questionnaire (Appendix) to be answered by online game users for an empirical investigation of the influential factors on proxy for fun (flow state) and to verify the whole model. Questionnaire items were adopted from previous works (Yee, 2012; Lee, 2010) and modified for the context of particular game "Tanki Online". Each item associated with motivations in the questionnaire was measured using a 7-point Likert scale with 1 (not at all important) and 7 (extremely important), while items for flow state construct were measured in the same way with the only difference that 1 was equal to 'strongly disagree' and 7 – 'strongly agree'. Players were asked about age, frequency of playing games (days a week and hours a day) and their rank in the game. The present study acts as a pilot test to verify that the questionnaire items are appropriate for the survey in terms of its structure and language and that revealed relationships are consistent with theoretical background. Preliminary validity of the questions was examined by online game experts who found that items are highly associated with corresponding constructs. From our final questionnaire involving 289 respondents, we tested and analyzed our research model and hypotheses. Demographic profiles gathered from survey are shown in Table 1 and include information about age, experience, gender and rank of the respondents, the number of hours a day and days a week they play, how much users paid in last

30 days. Everyone who filled in the questionnaire on the game's forum got a reward of 2000 crystals (in-game currency).

Table 1. Descriptive Statistics of Respondent Characteristics ($n = 289$)

Measure	Min; Max	Mean	St. Dev.	Items	Frequency	Percentage, %
Age	Min – 8 Max – 69	24.94	12.36	8-15 16-20 21-25 26-30 >30	86 42 31 46 84	29,8 14,5 10,7 15,9 29,1
Experience (month)	Min – 1 Max – 62	18.27	15.74	<=12 (1 year) <=24 (2 years) <=36 (3 years) >36 (3 years)	135 50 62 42	46,7 17,3 21,5 14,5
Gender	-	-	-	Male Female	220 69	76,1 23,9
Hours a day	Min – 0.1 Max – 18	3.94	2.92	<=1 2-3 4-5 >5	49 109 68 63	17,0 37,7 23,5 21,8
Days a week	Min – 1 Max – 7	5.25	1.98	1-2 3-4 5-6 7	40 46 78 125	13,8 15,9 27,0 43,3
Payment in last thirty days	Min – 0 Max – 24303	283.16	1570.79	0 1-50 51-100 101-1000 >1000	206 13 16 39 15	71,3 4,5 5,5 13,5 5,2
Rank	-	-	-	Recruit Private – Sergeant-Major Warrant Officer1 – Warrant Officer5 Third Lieutenant – Colonel Brigadier – Commander Generalissimo	28 74 37 49 48 53	9,7 25,6 12,8 17 16,6 18,3

Results

We used the value of Cronbach's alpha to identify the internal consistency reliability of our questionnaire items. Cronbach's alpha for each construct was observed to be greater than .60 (Table 2) that is the benchmark proposed by Nunnally (Nunnally & Bernstein, 1978).

Table 2. Reliability checks for constructs

Constructs	Items	Cronbach's α
Achievement	4	0.633
Social	4	0.658
Immersion	4	0.628
Flow state	4	0.822
Continued intention	3	0.779

To assess the research model, we performed structural equation modeling for variables with Stata 12. All observed variables contribute to the identification of the latent variable at $p<0.001$. It means that the questionnaire items are appropriate for the survey in terms of its structure and language. As shown in Table 3, chi-square testing as indicated by chi-square fitness is rejected. This preliminary goodness of fit statistics suggests that the measurement model is worse than saturated model, but we do not want to add relationships that are not supported by theory and to improve the model artificially. Moreover, as the chi-square statistics is not always the best indicator of model fit, a range of additional fit indices is reported in Table 3. While RMSEA (root mean squared error of approximation) is a bit higher than 0.1, coefficient of determination is relatively high (0.995) and standardized root mean squared residual (0.181) is low enough. Thus, it is concluded that goodness of fit indices is wholly satisfactory to suggest that the measurement model fits the collected data.

Table 3. Fit Indices of the Research Model

CMIN/p	CMIN/df	RMSEA	SRMR	CD
0.000	4.84	0.115	0.179	0.994

CMIN/*p* = chi-square fitness; CMIN/*df* = chi-square/degree of freedom; RMSEA = root mean square error of approximation; SRMR= standardized root mean squared residual; CD= coefficient of determination

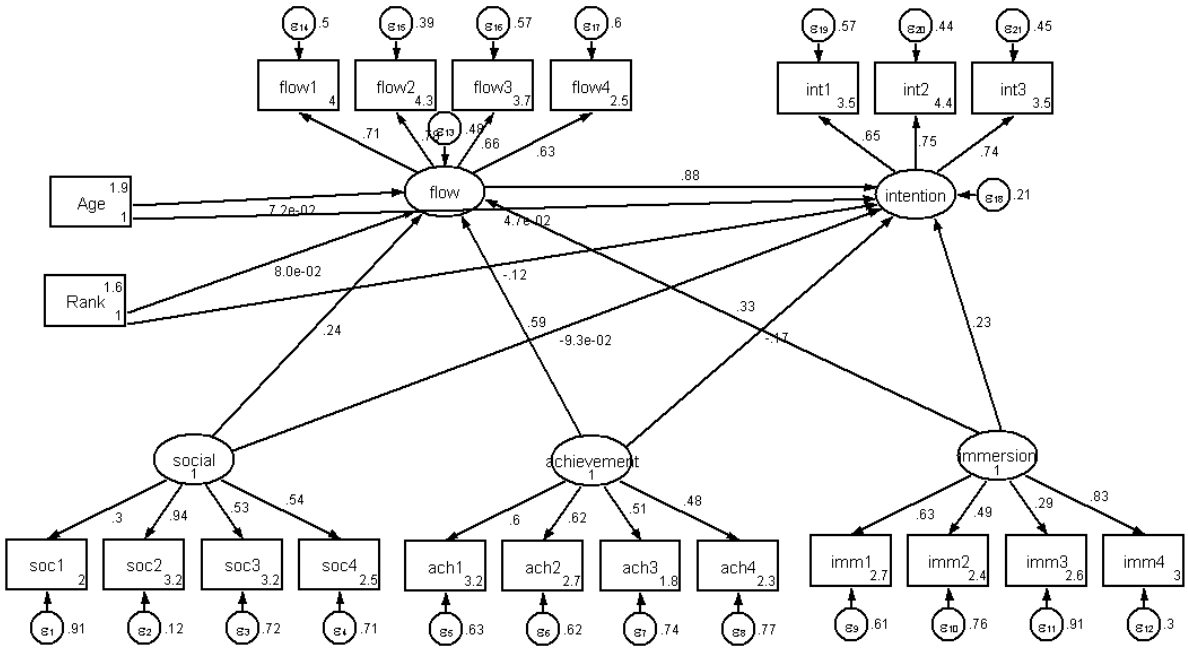

Figure 2. Results of structural modeling analysis.

As shown in Table 4 six of the eleven hypothesized paths were significant. The results showed that achievement, immersion and social motivations positively affect flow state that is consistent with theory. The most important motivation for players is achievement (β=0. 572) that in our opinion is associated with the type of the game, it is followed by social motivation (β=0.372), the third one is immersion (β=0.280). At the same time, only immersion directly influences continued intention to play games, achievement and social motivations have an impact on continued intention through intermediary – flow state. For game designers it means that in order to make users continue playing online games, they should create new content that players will explore, pay attention to guides, video blog, appearance of characters. The relationship between flow and continued intention is relatively strong and positive (β=0. 919). It approves the fact that the happier a player the higher his intention to continue playing. The relationship between rank of the player and his intention to continue playing is significant but has an opposite direction with respect to our prediction: the higher the rank of the player the less his desire to continue playing. This discovery may be associated with lack of new content and immersion correspondingly at higher levels of the game and motivates us to carry out another research about the level where players often become bored.

Table 4. Summary of the Estimated Path Coefficients

Path	Estimate	p-value	Hypothesis testing
Achievement→flow	0.572***	0.000	Supported
Social→flow	0.372***	0.009	Supported
Immersion→flow	0.280***	0.000	Supported
Achievement→CI	-0.168	0.178	Not supported
Social→CI	-0.153	0.210	Not supported
Immersion→CI	0.204**	0.007	Supported
flow→CI	0.919***	0.000	Supported
Rank→CI	-0.012**	0.042	Supported (opposite direction)
Rank →flow	0.007	0.209	Not supported
Age→CI	0.004	0.383	Not supported
Age→flow	0.005	0.219	Not supported

flow = flow state; CI = continued intention to play the game; ***p<0.01; **p<0.05; *p<0.1.

Next table (Table 5) presents results in a more detailed way: direct, indirect and total effects are counted. Total effects for relationships between motivations and continued intention to play are significant only for achievement and immersion, while indirect effects are significant for all the motivations and direct effect is significant only for immersion. Immersion has the highest value of total effect that again approves its importance. The relationship between achievement and continued intention is a bit weaker and based on the intermediary – flow state: the more the player likes achievements the happier he is that in its turn leads to higher wish to continue playing.

Moreover, in spite of the fact that rank directly and negatively influences continued intention to play, total effect for rank is insignificant. Although indirect and direct effects for Age→CI relationship are insignificant, the total one is significant and positive – the older the player the more he wants to continue playing. The reason for that can be higher income of older players that allows them to spend more money on the game; the latter often makes game more satisfying and keeps players in the game.

Furthermore, we are interested in relationships between flow state and payment amount as well as flow state and number of hours a day a user spends on a game. In a multiple regression using the number of hours a day as a dependent variable, and flow state as the independent variable, the resulting model had an R^2 of 6,9% (1).

$$Hours_{day} = \alpha + \beta * flow + \varepsilon, \quad (1)$$

where $Hours_{day}$ is number of hours a day a user spends on a game, $flow$ is a flow state.

Table 5. Total effects.

	Indirect effect	Direct effect	Total effect
Achievement→CI	0.526***	-0.168	0.358***
Social→CI	0.342**	-0.153	0.189
Immersion→CI	0.257***	0.205***	0.462***
flow→CI	-	0.919***	0.919***
Rank→CI	0.007	-0.012**	-0.005
Age→CI	0.005	0.004	0.009*

flow = flow state; CI = continued intention to play the game; ***p<0.01; **p<0.05; *p<0.1.

The β-coefficient of the independent variable was 0.932 (significant at p<0.01). It means that an increase in flow state by 1 point on average leads to an increase in number of hours a day a player spends on game by 0.932 hours. That is why it is so important to understand what is flow state in the game and how it can be improved.

Logit model for determinants of a player's wish to pay money for a game where X is the measure of flow state revealed that flow state significantly (p=0.002) and positively ($\beta = 0.539$) influences the desire to become a donator.

$$P\{donat = 1\} = \frac{1}{1+\exp\{-X'\beta\}}, \quad (2)$$

where X is the measure of flow state.

Previous results are relevant to an average player but we suppose that there is a difference in influential factors on users' satisfaction depending on their characteristics, namely experience and donation. Structural equation modeling for different groups helps us to investigate this effect. First of all, respondents were divided into two groups – players whose experience is 1 year and less and the experienced ones (>1 year). As CMIN/df fit index for the restricted model is lower (2,99) than for the original one, it is reasonable to investigate two groups. Bartle's theory about different stages players go through is supported by our findings – while less experienced players derive satisfaction from achievement (β=0.736), those who have more than 12 month of experience to greater extent value immersion (β=1.331), though achievement (β=0.518) and socializing (β=0.397) also contribute to their flow state (Table 6). As it was suggested, the greater players' feeling of flow the higher their wish to continue playing. This

effect is more significant for experienced players (β=1.206) who are more loyal to the game. Bartle's theory again is supported by the positive relationship between rank and flow state (β=0.035) for inexperienced players who like achieve and reach new levels. Moreover, we revealed small effect for older experienced players – they feel a bit greater flow state than younger users. Opportunity costs of older players are higher that may lead to the effect that only those who really enjoy the game are ready to bear these costs.

The path Immersion→Continued Intention is significant for inexperienced players, while the immersion motivation doesn't lead to happiness of these people. For practitioners it means that still they should pay attention to all the motivations of users because even if the motivation doesn't directly lead to absorption of players it can make them stay in the game. Experienced players still value achievement but lose desire to continue playing that highlights necessity of different approaches to different players. It is crucial to provide those who play for a long time with new content, support their social and immersion motivations.

Table 6. Summary of the Estimated Path Coefficients for groups

Path	Experience		Donation	
	<=12 month (n=127)	>12 month (n=162)	Payment=0 (n=206)	Payment>0 (n=83)
Achievement→flow	0.736***	0.518***	0.543***	0.396**
Social→flow	0.366	0.397**	0.357**	0.389
Immersion→flow	0.174	1.331***	0.247**	0.381***
Achievement→CI	0.213	-0.377**	-0.181	-0.057
Social→CI	-0.319	-0.084	-0.148	-0.151
Immersion→CI	0.311***	0.037	0.221**	0.052
flow→CI	0.615***	1.206***	0.893***	1.116***
Rank→CI	-0.018	-0.005	-0.013**	0.007
Rank →flow	0.035***	-0.006	0.007	-0.013
Age→CI	0.008	-0.008	0.006	-0.016
Age→flow	-0.0002	0.014**	0.004	0.019*
p-comparison	p=0.0001		p=0.000	

flow = flow state; CI = continued intention to play the game; p-comparison (LR test); ***p<0.01; **p<0.05; *p<0.1.

The second characteristic that we used to divide players into groups was donation: donators are referred to players who pay money (Table 6). These groups are interesting for designers who want to understand how to make users pay. CMIN/df fit index for the restricted model is also lower (3,02) than for the original one, that is why it is reasonable to investigate two groups. We have found that those who prefer to play games free of charge value all three

motivations – achievement (β=0.543), socializing (β=0.357) and immersion (β=0.247), while donators are mostly satisfied with achievement (β=0.396) and immersion (β=0.381). Again we would like to pay attention to immersion that is very important for experienced players and donators. Continued intention of donators is tightly related to flow state that in its turn is determined by age (positive but small effect).

The majority of players do not pay for the game – 206 people of 289 in our sample. As the number of observations on donators' group is very limited all the results should be interpreted with cautious. Continued intention of player that do not pay money depends on immersion motivation (positive relationship), flow state (this positive relationship is always supported by data) and rank (the game becomes more challenging with next level and some people prefer to quit).

All in all, we found out that fun in online games is really associated with three components – achievement, socializing and immersion. At the same time different people at different stages of the game value various things.

Conclusion

Our research revealed that players get satisfaction from different dimensions of the game, such as achievement, socializing and immersion that corresponds to Yee's theory. While the results for all respondents tell us that achievement influences flow state in the highest degree and is followed by motivations to socialize and be immersed in the game, the same analysis for people with different experience proves Bartle's theory – players go through different stages in the game. Less experienced players (<1 year) derive satisfaction from achievements; those who have more than 12 month of experience to greater extent value immersion, though achievement and socializing also contribute to their flow state. The division of the sample into two groups depending on whether they pay money for play or not led to results that those who prefer to play games free of charge value all three motivations – achievement, socializing and immersion, while donators are mostly satisfied with achievement and immersion. All this means that different players should be approached in different manner – experienced players and donators are to be provided with new content (new maps, weapon, levels, events etc.), continuous development, news, blogs and other things that foster desire to discover, customize the character, escape or play the role. Newcomers want to feel power, progress and try to optimize their character to win – designers can help them to reach this state. Socializing is important for everyone and perceived as an obligatory part of massive online games. Only if all the

components are presented in the game, many players will be satisfied and that will lead to their desire to continue playing.

However, the results of this pilot research are intermediary and should be analyzed with cautious because structural equation modeling needs large sample for studying. At the same time, we reached the main goal – it is clear that questions measure the latent constructs and are appropriate for the survey in terms of its structure and language.

In future it would be interesting to find in-game variables that in the best manner will describe flow state of players with different motivations and understand how tools (such as weapon, maps etc.) influence fun in the game. Moreover, we found out negative relationship between continued intention to play games and rank of the player that can be associated with some difficulties in a particular level. If the results will be the same for larger sample, it would be reasonable to find the level when the higher rank makes players less satisfied and ready to continue playing. Furthermore, the data about players' rank, age, gender and other characteristics in next research will be provided with the company and consequently will be more objective.

In our mind, the results of such a study can be generalized only in the context of the same online games' genre because players of other games can be completely different. Another limitation of this research is a biased sample (average age – 24 years). The survey was conducted using web-based forms and employed a nonrandom convenience sampling. Gathering a large sample with the help of main website of the game can solve this problem.

References

1. Bartle R. (1996) Hearts, clubs, diamonds, spades: players who suit MUDs. // The Journal of Virtual Environments.
2. Bartle R. (2003) Designing Virtual Worlds. // New Riders.
3. Castronova E., Ross T., Knowles I. (2013) Designer, Analyst, Tinker: How Game Analytics Will Contribute to Science. // Chapter 29. // El-Nasr M., Drachen A., Canossa A. (2013) Game Analytics. Maximizing the Value of Player Data. Springer-Verlag London.
4. Choi D., Kim J. (2004) Why people continue to play online games: in search of critical design factors to increase customer loyalty to online contents. // Cyberpsychology & Behavior: The Impact Of The Internet, Multimedia And Virtual Reality On Behavior And Society. // Volume 7. Issue 1. – p. 11-24.
5. Costello B., Edmonds E. (2007) A Study in Play, Pleasure and Experience Design. // In Designing Pleasurable Products and Interfaces conference. DPPI'07. ACM Press. – pp.76-91.
6. Csikszentmihalyi M. (1990) Flow: The Psychology of Optimal Experience. Harper Perennial, New York.
7. Davis F.D. (1989) Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. // MIS Quarterly. Vol. 13. Issue 3. – p. 319-340.
8. DFC. (2013) Intelligence. Retrieved from http://www.dfcint.com/wp/?p=353
9. Drachen A., Canossa A., El-Nasr, Rau J., Sorensen M. (2013) Gameplay Metrics in Game User Research: Examples from the Trenches. // Chapter 14. // El-Nasr M., Drachen A., Canossa A. (2013) Game Analytics. Maximizing the Value of Player Data. Springer-Verlag London.
10. Green M., Brock T., Kaufman G. (2004) Understanding media enjoyment: The role of transportation into narrative worlds. Communication Theory. Vol. 14. Issue 4. – p. 311-327.
11. Griffiths Mark D., Davies Mark N.O., and Chappell Darren (2004) Online Computer Gaming: a Comparison of Adolescent and Adult Gamers. // Journal of Adolescence. Vol. 27. p. 87-96.
12. Hsu Chin-Lung, Lu His-Peng (2004) Why Do People Play On-line Games? An Extended TAM with Social Influences and Flow Experience. // Information & Management. Vol. 41. – p. 835-868.

13. Hunicke R., LeBlanc M., Zubek R. (2004) MDA: A formal approach to game design and game research. // In Proceedings of the challenges in game AI workshop, 19th national conference on artificial intelligence. AAAI'04. San Jose: AAAI Press.
14. Koo Dong-Mo, Lee Soo-Hyung, Chang Heung-Seub (2007) Experiential Motives for Playing Online Games. // Journal of Convergence Information Technology. Volume 2 Number 2.
15. Koster R. (2005) A Theory of Fun for Game Design. // Paraglyph Press.
16. Lazarro, N. (2004) Why We Play Games: Four Keys to More Emotion Without Story. // GDC.
17. Lee Ming-Chi. (2010) What Drives People to Continue to Play Onine Games? An Extension of Technology Model and Theory of Planned Behaviour. // International Journal Of Human-Computer Interaction. Volume 26. Issue 6. – p. 601-620.
18. Malone T. W. (1981) What makes computer games fun? // Byte. Vol. 6. – pp. 258–277.
19. Moon J., Kim Y. (2001) Extending the TAM for a World-Wide-Web Context. // Information & Management. Vol. 38. Issue 4. – p. 217-230.
20. Murphy C., Cheroff D., Guerro M., Moffitt K. (2011) Creating flow, motivation and fun in learning games. // Chapter 5. // The Design of Learning Games. Springer-Verlag.
21. Nabi R., Krcmar M. (2004) Conceptualising media enjoyment as attitude: implications for mass media effects research. // Communication Theory. Vol. 4. Issue 14. – p. 288-310.
22. Nunnally J., Bernstein, I. *(*1978*).* Psychometric theory. New York*:* McGraw-Hill.
23. Read J., MacFarlane S., and Cassey C. (2002) Endurability, engagement and expectations. // In Proceedings of International Conference for Interaction Design and Children.
24. Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. // American Psychologist. Vol. 55. – p. 68–78.
25. Ryan R. M., Rigby C. S., and Przybylski A. (2006) The motivational pull of video games: A self-determination theory approach. // Motivation and Emotion. Vol. 30. No. 4. – pp. 344–360.
26. Sweetser P., Wyeth P. (2005) GameFlow: A Model for Evaluating Player Enjoyment in Games. // ACM Computers in Entertainment. Vol. 3, No. 3.
27. Yannakakis, G. (2012). Game AI revisited. In Proceedings of ACM computing frontiers conference.

28. Yee N. (2006). Motivations for Play in Online Games. // CyberPsychology and Behavior. Vol. 9. – p. 772-775.
29. Yee N., Ducheneaut N., Nelson, L. (2012). Online Gaming Motivations Scale: Development and Validation. // Proceedings of CHI 2012. – p. 2803-2806.
30. Yen Yung-Shen. (2011) The Impact of Perceived Value on Continued usage Intention in Social Networking Sites. // 2nd International Conference on Networking and Information Technology IPCSIT. Vol.17. IACSIT Press, Singapore.
31. Yoon G., Duff B., Ryu S. (2013) Gamers just want to have fun? Toward an understanding of the online game acceptance. // Journal Of Applied Social Psychology. Volume: 43 Issue: 9. – p. 1814-1826.

Appendix

Questionnaire

1. Nickname
2. Gender
3. User's age
4. The average hours of game playing per day
5. The average number of days of game playing per week
6. The average playing period for "Tanki Online"
7. How much money (ruble) did you pay for the game in the last 30 days?
8. Users' rank in the game

How important are the following things to you in the game?

Achievement

9. Becoming powerful
10. Competing with other players
11. Taking part in competitions
12. Catching "gold boxes"

Social

13. Chatting with other players (in a chat room, forum)
14. Playing with friends
15. Playing team deathmatch mode
16. Communicating with people from many different countries and cities

Immersion

17. Learning all the details of the game. For example, reading the guides and watching the video blog.
18. Exploring new maps
19. Watching how the game develops
20. Escaping from real world

Do you intend to …

21. recommend the game to your friends/colleagues?
22. keep playing «Tanki Online»?
23. continue playing «Tanki Online» as much as possible in the future?

How much do you agree with the statements?

24. I feel time passes quickly while playing "Tanki Online".
25. I feel curious while playing "Tanki Online".

26. While playing “Tanki Online”, I was entirely absorbed.
27. The game makes me happier.
28. Are you going to participate in future surveys?

Authors:

1. Mariia Okuneva, National Research University Higher School of Economics - Perm. Group for Applied markets and Enterprises Studies. Research Assistant; E-mail: miokuneva2@gmail.com

2. Dmitriy Potapov, National Research University Higher School of Economics - Perm. Deputy Director, Associate Professor. E-mail: dbpotapov@hse.ru