PsychNology Journal, 2004
Volume 2, Number 3, 259 - 281

Playing Online Games: Flow Experience

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ABSTRACT

Playing MUDs (Multi-User Dungeons, or Multi-User Dimensions), text-only online gaming environments, may initiate flow experience. Online survey research was administered within the population of Russian MUDs players, using the specially designed questionnaire with 3 blocks of questions: demography and experience in playing MUDs; flow experience; interactive patterns. Replies of respondents (N = 347) fit a six factor model: F1 (Flow experience); F2 (Achievement); F3 (Activity/Passivity); F4 (Interaction); F5 (Thoughfulness/Spontaneity); F6 (Cognition). To analyse the data, structural equation modeling was done. All the correlations between the factors are significant ($p < 0.05$). The set of dimensions describing flow experience while playing MUDs was selected. Since players experience flow while MUDding, it was proposed that flow is one of the sources of MUDs' long-time attractiveness for players.

Keywords: *play, online, flow, MUD, structural equation modeling.*

Received 7 July 2004; received in revised form 11 December 2004; accepted 16 December 2004.

1. Introduction

Online gaming is an essential component of the variety of virtual behaviors: children, adolescents and (mostly young) adults allocate long time periods to playing online. Players often enter club-like online communities and enjoy the mixture of competitive gaming and computer-mediated encounters. A well-known example is a steady online community of MUDders. Basically, MUDs (Multi-User Dungeon, or Multi-User Dimension) are text-only virtual environments, usually in a form of an adventure game; the latter is either original, or is based on fantasy books or movies. Non-adventurous social MUDs and graphic (i.e. not text-only) MUDs are less numerous and less popular, and thus will not be analyzed in the paper.

Important, MUDs are online role-play group games, often with hundreds of simultaneous players. The players' goals include the development to the maximal level of the certain character chosen by the player and representing him or her in all the situations taking place during the game. But this is not the only possible goal; popular

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enough goals are connected with interation patterns within the players' communities. Strong human ties and friendly relations are common within the communities of MUDders: competitive players use the advantage of intense communications (in the text-only mode) during playing sessions. Since their origin a quarter of century ago, the communities of MUDders have not once been investigated, though no exhaustive study has been done. Anyway, the focus of our research, i.e. flow experience while playing MUDs is far from being intensely studied; besides, the current research deals with the community of Russian players, and this group of MUDders has not been thoroughly investigated earlier.

2. Research of human behavior patterns on the MUDs

In the review of literature sources we limit ourselves to the discussion of major views and data expressed on behavior of MUD players, not video/computer gamers in general. Besides, special discussion is devoted to flow experienced in the process of using information and communication technologies (ICT), especially the Internet. This is due to the fact that flow experience is the main topic of this paper.

The earliest issues investigated in the field include disinhibition, friendly attitudes, and openness of MUDs players, as reviewed by Sempsey (1997). Some of these problems are still of of high importance; for example, effects of disinhibition have been recently discussed within the broader context of Web related behavior (Joinson, 2003).

An empirical typology of MUDders worked out by Bartle (1996) is another example of an important contribution to the field. His taxonomy is based on two crossing axes, namely "acting with" (i.e., interacting) vs. "acting on", and "emphasis on players" vs. "emphasis on the environment". Thus, the typology includes four basic types:

"achievers" (acting on / emphasis on environment),
"killers" (acting on / emphasis on players),
"socialisers" (acting with / emphasis on players), and
"explorers" (acting with / emphasis on environment).

Bartle states that these four types of players are equally important to keep the balance of interests within the MUD environment; any surplus or underrepresentation of this or that type of players might result in a total loss of interest toward the imbalanced environment. Thus, Bartle recommends to keep the subtle balance: otherwise, the former MUD will transform into a chatline full of socialisers; or into an

arcade game, if killers start to dominate the gamers' community; or into an online book enjoyable to explorers; or into a single-player game for achievers.

Investigating development of virtual friendship, Utz (2000) found that 76.6 % of respondents report they have had relations with fellow MUDders. Having collected diverse data (intensity of MUD use, online friendship, sociability, attitudes toward MUDding, use of paralanguage while the exchange of messages, degree of skepticism toward computer-mediated communication, various demographic data), and having done cluster analysis using three attitudinal scales (role-play, game, and skepticism), Utz (2000) was able to differentiate types of players. Her typology, like that of Bartle, consists of four types. These types include:

"Role-players" – those interested in playing roles;
"Gamers" – those interested in having adventures and playing games;
"Virtuals" – those interested either in online meetings with virtual partners and in chatting with them, or else in development of virtual environments; "virtuals" seem to be indifferent toward role playing;
"Sceptics" – those disinterested in most of the features of MUDs, playing less hard (in the amount of hours per week) and refusing to identify themselves with any group of MUDders.

In an unpublished diploma thesis (Psychology Department, Moscow State University) by Bekhtina (2002), supervised by the first author, four (again four!) basic types of MUDders' motivations have been described. These motivations are:

- motivation of curiosity, astonishment and interest, reported by 66% respondents;
- cognitive motivation, reported by 65% respondents;
- motivation of enjoying a different life style in virtual environments, reported by 64% respondents;
- recreational motivation, reported by 57% respondents.

Obviously, individual players reported partly overlapping types of motivations, and thus no strict typology of MUDders has been worked out. Nevertheless, it is easy to notice that the classification of basic types of motivation partly fits the typologies worked out by both Bartle (1996) and Utz (2000).

Turkle (1997) is known to carry out high-quality qualitative studies; most of her respondents are MUD players. In her research she touches cultural, metaphorical, interpersonal, and personal aspects of MUDding. Particularly, Turkle has thoroughly analyzed the specifics of establishing virtual relations, including friendship and romance, intimacy and deception; she described the means and ways, available to MUDders, to construct their identities, to present online personae and to develop their self-concepts. Special interest she pays to gender issues and gender swapping, i.e. to experiencing gender roles other than in the real life. For example, she describes a respondent whose roles, played simultaneously, were as different as (1) a courageous young man, (2) a timid young man, and (3) an attractive girl. Turkle states that in online environments the boundaries between one's real life and his/her virtual lives have been significantly eroded.

Salvay (2002) compares MUD related environments with a virtual space for psychodrama; both promote, he believes, personal and social growth. The effect is gained by changes in players' positions, roles, characters, ways of behavior and the related changes in feelings, affects and emotions. Again, we can borrow an example from Turkle (1997). She describes a young girl who had been tense with her mother: they misunderstood one another, hardly communicated and often quarreled. While playing MUD, the girl used to create two characters, one of which symbolized her mother, and the second herself. Playing several sessions involved interactions between the two. Finally, the girl developed an easier mode of real-life communication with her mother.

To avoid gender bias, it is reasonable to remind that Turkle also writes about a young man who managed to cope with his real-life father after he had created the MUD character symbolizing his own father. Thus, psychological experience gained while playing MUDs might help in solving personal problems, i.e. compensate possible lack or inadequacies of real-life social contacts. Turkle (1997) comes to a conclusion that virtual environments might be viewed as a sort of a psychotherapeutic tool.

In a theoretical work, Kwan Min Lee (2000) introduces a new context, that of the social learning theory. Particularly, Kwan Min Lee states that self-efficacy, i.e. self-realization of one's capabilities to deal with and to oppose to real-life problems, is a major psychological dimension inherent of MUD-related behavioral analysis. The researcher has worked out a theoretical model, according to which effects of the MUD experience might be measured, taken certain parameters of self-efficacy (Kwan Min Lee, 2000).

3. Flow in the ICT Environment

A promising approach has been undertaken by McKenna and Lee (1995). Their research is strongly based on the theory of flow experience, initiated by Csikszentmihalyi (1990; 2000). This theory – later called positive psychology – rests on an analysis of subjective positive experience: processes of pursuing a desired or a cherished result seem sometimes to be more pleasing and self-rewarding that the result itself, when and if it is gained. Csikszentmihalyi describes this experience as someone's "flowing from one moment to the next, in which he is in control of his actions, and in which there is a little distinction between self and environment, between stimulus and response, between past, present, and future" (Csikszentmihalyi, 2000, p. 34).

The researcher and his followers have found that flow might accompany almost every type of human behavior. Major characteristics of flow are: temporary loss of self-consciousness, and of sense of time, high concentration on the task and high level of control over it, objectives become clear and distinct, and actions merge awareness, experience brings full satisfaction and seems worth doing for its own sake (that means, motivated intrinsically), immediate feedback. What is especially important, the flow rests upon the precise matching between the available skills and the task challenges (Csikszentmihalyi, 1990; 2000).

The dimensions listed above make it tempting to find out whether the overwhelming devotion of MUDders to the processes of playing might be partly or fully explained in the terms of positive psychology. Indeed, human beings uusally feel satisfaction while MUDding, they often keep control over the tasks, the complexity of the tasks might be dynamically changed and task objectives might be quantified, feedback is close to immediate, the sense of time periods is most often altered, concentration and awareness are reportedly very high, motivation is certainly intrinsic. This problem area is really quite promising for doing research in the flow paradigm.

McKenna and Lee (1995) have shown that MUDding fits the flow model, and that social interaction while playing MUDs is inseparable from the flow experience. Not many further empirical evidences are available in the field. Korean researchers, too, have shown that flow experience and interaction patterns collaborate in forming long-term attachments to certain online games (Choi, Kim, 2004). We may also note that the highest level of involvement into MUDding is reported to take place at the moments when the gaming environment is not too simple but not too complex (Reinberg et al.,

2002). Decisions made in these environments tend to be optimal due to a balance between the players' skills and task challenges; according to Csikszentmihalyi's (1990) statement, such a balance is both effective and welcomed for experiencing flow.

To put MUDding and in general computer gaming aside for a while, we will review studies of flow experienced while carrying out diverse online activities. Hoffman, Novak and their collaborators have developed and validated a structural model of online flow experience (Novak, Hoffman, 1997; Novak et al., 2000; Novak et al., 2001). This universal approach is, however, rather hard to follow in practice due to its global context: the main method of collecting empirical data is putting questions to users of online services, and it is easy to notice that the potential respondents meet problems and get confused determining their skills and task challenges related to multi-purpose computer and Web related activities (Chen et al., 1999). Probably due to this reason, the most part of research projects in the field deal with specialized, and not universal types of online behavior. No new research is, however, done on flow experienced while playing MUDs.

It is worth to mention publications on flow experience inherent of human-computer interaction and computer-mediated communication (Finneran, Zhang, 2002; Ghani, Deshpande, 1994; Novak, Hoffman, 1997; Trevino, Webster, 1992), Web related activities, including – but not restricted with – Web navigation (Chen et al., 2000; Novak et al., 2001; Rettie, 2001; Skadberg, Kimmel, 2004), computer hacking (Beveren, 2001; Voiskounsky, Smyslova, 2003), and learning to use professional resources on the Web, or using these resources (Heidman, Sharafi, 2004; Pace, 2004). Researchers try to link ICT-related flow experience with theoretical paradigms which have been established earlier – for example, the engagement mode model and the activity theory (Heidman, Sharafi, 2004), with sociological findings of the reasons of illicit behavior (Voiskounsky, Smyslova, 2003), and with certain behavioral phenomena, for example, with symptoms of internet addiction (Chou, Ting, 2003; Tzanetakis, Vitouch, 2002). The latter seems to need a really profound justification, since flow is universally understood as an entirely positive joyful experience, while Internet addiction, like any psychological dependence, is a sort of a forced escape from personal problems.

Use of computers and the Web, usually purposeful and effective, is at the same time emotive. In the context of the ICT use, as in all the other contexts, the emotional states accompanying flow experience are usually called fun, playfulness, and enjoyment (Bryce, Higgins, 2000; Pace, 2004). It is well-known though that computers and the Internet might well bear negative affects as well. Interviewing information seekers on

the Web, Pace (2004) has worked out theoretical background for flow experience in Web environments. His respondents report such task challenges as “negotiating a vast, constantly changing, uncharted information space; selecting suitable key words for a search engine query; using the correct syntax for a search engine query; distinguishing relevant links from irrelevant links; scanning a page for relevant information; and understanding the content and non-linear structure of a Web site” (Pace, 2004, p. 345).

These task challenges refer to entirely cognitive applications of online sources and services. Other applications, too, refer to highly specialized ICT-related behaviors. Is the set of factors, or dimensions describing ICT-related flow experience universal, or is it task-specific? It is worth mentioning that the Csikszentmihalyi’s original dimensions of flow, introduced in his pioneer books and later used in hundreds of works, have been not once changed in different ways. Besides, to state flow it is important that most of dimensions, not necessarily every dimension is marked. “Though Csikszentmihalyi lists factors that contribute to flow, he does not intend them to serve as the exclusive factors of flow, but more as the most commonly exhibited ones” (Finneran, Zhang, 2002, p. 1048).

Taking into consideration all this, we are inclined to expect that there possibly are numerous sets of flow dimensions, or let us informally call them “flow dialects”, which are strongly dependent on task specificity, and probably on some other parameters. Flow patterns inherent of ICT related behaviors, too, differ a lot: flow experienced while online shopping might be described using a set of dimensions which only partly match the dimensions describing flow experienced while online gaming, or navigating the Web, etc. Rettie (2001) states that “while respondents recognized most of Csikszentmihalyi’s dimensions, the merging of action and awareness and loss of self-consciousness were not really relevant…” (Rettie, 2001, p. 111). Pace (2004), too, enumerates the dimensions of flow, as reported by respondents: “The joy of discovery, reduced awareness of irrelevant factors, a distorted sense of time, a merging of action and awareness, a sense of control, mental alertness, and telepresence” (Pace, 2004, p. 351).

We should state that Pace’s (2004) respondents, as well as those of Skadberg and Kimmel’s (2004), are far from naïve: they mention telepresence, and this concept is not universally known, though rapidly developing (Riva et al., 2003). Not to go into deeper details, it would be enough to note that in the ICT-related field there are indeed several subsets, or “dialects” of the flow dimensions. It is likely that these subsets differ, taken for example less competent vs. more competent respondents, or differing types of

activities. A thorough discussion of research dimensions and/or constructs used in the field may be found elsewhere (Chen et al., 1999; Finneran, Zhang, 2002; Novak, Hoffman, 1997).

To sum up, the methodology of flow experience is being investigated within the ICT area in an accelerating tempo. This methodology seems to be promising and fruitful indeed. To the best of our knowledge, there are only few studies of flow patterns within communities of MUD players; the most influential of them has been done by McKenna and Lee (1995). This work is among the earliest ones carried on within the flow paradigm; its results supported the view that MUDders experience flow, and that flow is positively related to the players' communicative patterns. Supposedly, these findings might provide a valid explanation of long (lasting over a quarter of century) popularity of MUDs among gamers. In a recent paper it is shown that flow is one of several constructs (along with personal and social communication patterns, and loyalty) explaining behavior of those who long-time play the same online games (Choi, Kim, 2004). No data is nevertheless available whether the findings gained by McKenna and Lee (1995) are true for modern communities of MUDders, and especially for non-English speaking communities.

4. Research Goals, Methodology and Procedure

According to the issues discussed in the previous Sections, the goals of the current research are the following.

First, we are going to determine factors influencing behavior patterns of MUD players. Supposedly, flow experience is just one of these factors.

Second, we are going to find out whether Russian MUDders experience flow. Though text-only MUDs have not changed too much, and though the current communities of devoted MUD players seem to resemble the earlier communities, it is time to update the data gained by McKenna and Lee (1995) ten years ago. Besides, there is no research data available on the communities of Russians playing MUDs, and playing/chatting in Russian language. Taking into consideration a delay in adopting new entertainment technologies – a certain lag time is needed to accept a new hand-held and/or online gadget, to make translations, to organize and advertise services and facilities, etc. – we might very informally suppose that the current level of development of communities of Russian MUDders is close to the ten-years-ago level of the MUD communities in the USA.

Third, in case the second goal is realized, we are going to select on empirical basis a set of dimensions – a sort of a "flow dialect" – describing a flow pattern typical for a MUD player. Supposedly, a subset of criteria is enough to characterize flow experienced while MUDding.

In order to achieve these goals, we have planned the research. The first point to note is the method of collecting empirical data which has been chosen.

The main way of getting data on flow experience is putting questions to the members of selected samples. Putting open-ended questions means interviewing respondents; most often the procedure includes retrospective reports about flow-like experiences within any type of respondents' behavior. When multiple choice questionnaires are used, there are two main approaches: (1) questioning refers to possible dimensions of flow-like experiences – reported retrospectively – within a certain type of behavior, in our case, within playing MUDs, or (2) the questionnaire is administered many a time at randomly selected moments in attempts to catch the moment when the respondent experiences flow and is able to reflect it (this is the Experience Sampling Method, worked out and intensely used by Csikszentmihalyi and his followers).

With online gaming, it is in principle possible to combine the two methods of administering a questionnaire, for example sending out questions (referring to the experience in playing MUDs) on a random-time basis, but exclusively at the moments when a respondent is connected with the distant game server. Nevertheless, we did not administer this sort of an online research, due to the two mail reasons. First, this type of research might be administered within a pre-defined sample of gamers. Carrying out the first study of Russian MUDders, we would prefer to increase the number of possible respondents, not to decrease it to a narrow enough sample. Second, one of our research goals says that we intend to investigate the (supposedly, numerous) factors influencing the behavior of the MUD players; thus, the questionnaire has to include questions on flow and also on issues which stand outside the flow experience. For these reasons, the Experience Sampling Method does not fit our research paradigm.

The next issue to note is the questionnaire. Since no surveying methodology to measure the behavior of MUD players has been available in Russian language, our aim has been to design the needed questionnaire. At the first step we have collected the questions used in earlier works (McKenna, Lee, 1995; Novak et al., 1997). We have also reflected over the measuring techniques that have been worked out and used in some of the papers mentioned in the previous Sections. We have thought for

example over a possible use of introducing questions on telepresence experience. We do not expect it is worth to ask respondents whether they feel immersed in any sort of augmented reality: questions on telepresence are supposedly relevant not for text-only games like MUDs, but for CAVE-type games which are intensely investigated nowadays (Schroeder, 2002). Besides, the concept of telepresence is entirely unknown in Russia both in theory and in practice.

Having collected the questions, we have chosen the non-identical ones, translated them into Russian and adapted, i.e. tested within a restricted sample of gamers to make sure that the questions can be easily and uniformly comprehended. This testing procedure resulted in some modifications of the questions; after that the questionnaire got the following structure. It includes three blocks of questions: a block on demography and experience in playing MUDs (8 questions), a block on flow experience (32 Likert-type questions) and a block on interaction patterns within the game (8 Likert-type questions). The latter block is similar to what has been used in the McKenna and Lee (1995) study.

The next issue to note is the methodology of handling the data. In our study we have used the traditional method of handling survey data, i.e. factor analysis. Thus, our research is entirely quantitative; no qualitative data has been collected and/or analyzed.

The final issue to note is the procedure. We have planned to carry out an online research, similar to what we have done earlier within the hackers' community (Voiskounsky, Smyslova, 2003). The online methodology of doing psychological research is rapidly progressing since the end of the previous century; this methodology has not once proved its validity (Hewson et al., 2003; Kraut et al., 2003; Reips, 2000). Thus, we have done the Web questionnaire to be filled out by the respondents, and placed it at one of the MUD-related Web sites (http://c7i.mud.ru/voting/public). To save the results, the administrator of the site organized an electronic table. The survey has been administered in Spring, 2003 and lasted about two months. During this time we have advertised the survey at various Web forums and at numerous game servers hosting MUDs.

5. Results and Discussion

Of 352 respondents five provided incomplete data and were excluded. We have checked that no identical replies are sent from the same e-address; no such cases happened. The replies of 347 respondents were handled using exploratory and

confirmatory factor analysis. In the current paper we are presenting the results of the exploratory factor analysis.

5.1. Demographic Analysis

But first we note some demographic data and data on game experience. The respondents represent neither the population of Russia, nor the population of the Web/Internet users in Russia, which includes plenty of non-gamers. What they do represent, is the community of Russian MUDders; no alternative data characterizing this community is available. To illustrate some directions in which the community of MUDders differs from the population of the Web/Internet users in Russia, we refer to the results of sociological studies published by the most advanced organization in Russia which holds all-Russia fieldwork surveys and fully publishes the results. This independent organization is called the Foundation “Public Opinion” (www.fom.ru), it carries on quarterly representative surveys (21,000 respondents) and uses the methodology compatible with that of the Nielsen//NetRatings – one of the leading companies in the area. The results gained by the Foundation “Public Opinion” are representative for the adult population of Russia; it does not work with respondents under 18.

Besides, we will use selective data on overall demographical statistics of the Russian population, as it is shown on the site www.fom.ru of the Foundation “Public Opinion”.

The results of our study say that an average MUD player turns out to be a male of 21, a Muscovite, a college/university student, his experience in playing MUDs is 3 years, and he plays 16 hours per a week. To compare it with the broader populations, we turn to the sociologic data gained by the Foundation “Public Opinion”, and referring to the same time period, i.e. Spring, 2003.

Our respondents are presumably males. Only 45% of Russians are males, and 55% females. Only 13% of Russian males are Web users (8% females). Of the Web users in Russia, 58% are males (the data refer to Spring, 2003).

Our average respondent is a Muscovite. As much as 16% of Web users in Russia are Muscovites; 33% Muscovites are using the Web. Generally, the Muscovites have long been the most influential part of the population of Russian Web users; this leading role is slowly coming to the end.

Our average respondent is 21; we can compare it with the age range of 18-24. Only 13% of Russians are within this age range, and 12% of Muscovites. Among the Web

users there are 28% of those who are over 17 but before 25. Not a surprise, at every country the Web audience is much younger than the population itself.

Our average respondent is a college/university student. To compare, we can use the data on the highest degree gained, since there is no reliable data on the proportion of college/university students among the Web users. The high school (and equal to that) degree have 19% of Russian Web users, all the others have higher degrees (for example, 31% have a college/University degree) – almost nobody has a less high degree, since the Foundation "Public Opinion" represents population of 18 and above, and the majority of young people graduate from the high school at the age of 17 or 18. To compare, we may note that statistics says 69% of Russian population have a high school (or equal to that) degree; many of them have higher degrees as well. In case the Foundation "Public Opinion" had got data concerning the use of the Web by high school students, the whole educational structure of the Web users in Russia might have changed, since rather a lot of high school students are hard users.

Finally, our average respondent plays MUDs 16 hours a week. No data for strict comparison are available. We can note that the daily Web audience (i.e., those who access the Web every day) is 28% of all the Web users, and only 3% of the Russian population; the weekly audience (those who access the Web at least once a week) is 55% of all the Web users, and 6% of the population of Russia.

To sum up, the average MUD player is close to a typical Russian Web user in three parameters: he is young, he is a male and he lives at Moscow. He is far from typical in some other important parameters; for example, he is online more often and for longer periods than the majority of the Web users in Russia.

5.2. Patterns of the MUD Players' Behavior: Factor Analysis

5.2.1. Factor Model

To work out and validate a factor model of the data, structural equations modeling has been done (Bentler, 1995). Using two traditional steps of statistical analysis, we have found latent factors at the first step (namely, exploratory factor analysis). At the next step we have confirmed the significance of the factor model using the confirmatory factor analysis which is much more powerful and puts less restrictions on the hypotheses about the empirical data.

Having done exploratory factor analysis, we received six major factors. To describe and discuss these factors we use the results of both exploratory and confirmatory analysis.

Factor 1, or F1, might be called **Flow**. It is positively connected with the experience in playing MUDs and with the average duration of time allocated to playing MUDs per a week, and includes the following parameters: inspiration and enthusiasm toward the play, specific absorption of attention on the game, loss of the sense of time, belief in full reality of the situations taking place in the game, feeling of pressure and mobilization, indifference to everything beyond the play, overuse of time allocated to the play sessions.

F2 might be called **Achievement.** It is positively connected with the time allocated to the game, and with the orientation on achieving success. The paramenters included in this factor are: orientation on successful results, reiterative replay of the same situations taking place in the game – frequently using the same role-play character, choice of familiar types of MUDs.

F3 might be called **Activity/Passivity.** It is positively connected with the experience in playing MUDs, and with the average duration of time allocated to playing MUDs per a week. For an active player it includes the following parameters: constant strict control over situations taking place in the game, and orientation towards being the leader when two or more players decide to play collaboratively. The opposite – the passive pole – is characterized by the opposite meanings of the same parameters.

F4 might be called **Interaction**. It includes parameters which are indifferent to success in MUDs: orientation towards communication with other players, high frequency in getting to know other MUDders and establishing close contacts with them, constant control over messages sent by fellow players, desire to be a member of collaborative teams of players, and loss of the sense of time while exchange of messages during the play.

F5 might be called **Thoughtfulness/Spontaneity.** It is positively connected with the experience in playing MUDs, with the average duration of time allocated to playing MUDs per a week, and with an orientation towards the achievement of success. This factor includes the choice of known from the previous experience (or the opposite – completely unknown) ways and routes of playing, reflections over the situations taking place in the game after the game sessions end (or the opposite- indifference to these situations), frequent – or the opposite, i.e. infrequent - attempts to play the same situation taking place in the game several times during different game sessions, constant control over messages sent by fellow players.

F6 might be called **Cognition.** It assumes that players find interest and feel pleasure while playing MUD, and they prefer to investigate the areas and situations of the MUDs environments which were unknown to them earlier.

To prove the model, we present the results of the confirmatory factor analysis. The results are the following: χ^2 = 430.889 and df (Degree of Freedom) = 338; CFI (Comparative Fit Index) = .959; RMSEA (Root Mean-Square Error of Approximation) = .028. A factor model is adequate when the meaning of χ^2 divided by df does not exceed 2.0, CFI > .9, and RMSEA < .05. In our case all of these conditions are valid. Thus, the six-factor model described in this Section fits the empirical data quite well.

We can state that the six-factor model describes fully the behavior of the MUDs players. It is necessary to note that the factor F1 (Flow Experience) is the most important (the first) factor. One of the results of the discussion in the above Section "Flow in the ICT Environment" is that flow has been recognized as a significant factor attracting visitors of numerous Web services. Taking into account the result gained in our research, i.e. that flow turns out to be an important factor in human behavior patterns within MUD environments, it is very prompting to make an attempt to conclude that flow experience should be essential to explain in a reasonable way the gamers' long-term fascination with the MUDs.

The full description of the results of research on the processes of playing MUDs includes five more factors, which have to be discussed. The factor model includes F2 (Achievement) – needless to say, the desire to acquire achievements while playing is crucial in almost any type of games people play. Bartle (1996) noted that "achievers" are very important for the prosperity of communities of MUDders. In the MUD environments an achievement means that the chosen character presenting the player is high-scored and gains a very high – up to the highest possible – level of a character's development. In a sense, MUDs are "infinite": no player is able either to "win", or to "lose" once and forever. Instead, after having achieved the highest level of a certain character, a player may choose a different character and keep playing. In fact, many players choose several characters – diverse or the same type – and use all of them simultaneously. Thus, their wish to acquire achievements might be called everlasting.

The factor model includes F4 (Interaction) – that means, communication is really important for MUDders. Moreover, many players enjoy the play because it helps them enhance their social contacts and gives access to computer-mediated patterns of interactions with close or distant fellow players. Ease of communication with other

players is one of the main attractions of the MUDS, and the current research fully supports this regularly reported view. Supposedly, interaction is a major goal for the players who would tend to refer to themselves as non-achievers; Bartle (1996) called them “socialisers”. The groups of socialisers are very special to be discussed within the MUD’s context, since not too many computer/video/online games provide interactive services; players’ fascination with MUDs takes origin – partly, of course – in the easy means to carry on communication with other players.

The factor model includes also F6 (Cognition). Based on this result we can state that MUDders believe the game environments are interesting, intricate and non-transparent, worth being investigated. As we can see, these environments initiate players’ curiosity. To investigate the environments while playing MUDs, the players use specialized computer-mediated means: whenever they have to make decisions in the situations which take place during the game and to give directions to their characters, MUDders may choose completely unknown or less known options and directions of movement. This interest includes also the choice of diverse characters to present the player within the gaming environment; since different characters have diverse patterns of behavior and specific lines of development, these patterns are too worth to be studied. Pursuing cognitive interests may possibly result in a failure, and this is not the most likely way to acquire achievements: indeed, following well-known directions might often be beneficial, compared to processes of seeking new ways. Not a surprise, most often groups of “explorers” and “achievers” do not match (Bartle, 1996). It is necessary to state though that cognitive actions and reasonable cognitive strategies are essential for gaining success in almost any type of activity.

The rest of the factors – F3 (Activity/Passivity) and F5 (Thoughtfulness/Spontaneity) – represent opposing personality traits, polar cognitive trends and supposedly, entirely different life-styles. One might also admit that these factors represent certain cognitive styles, for example, reflection or impulsiveness. It is more than reasonable that these two factors describe the behavior patterns of MUDders: active or passive, impulsive/spontaneous or thoughtful/reflective actions might easily enough be perceived in almost every gaming environment – not only in online role-play or computer/video gaming behaviors, but also in traditional board games and/or sports, including for example boxing, chess, basketball, preference, tennis, etc.

The two factors, F3 and F5 refer to styles of gaming in the MUD environments, unlike the other four factors, namely, F1 (Flow), F2 (Achievement), F4 (Interaction), and F6 (Cognition) which might refer to the MUDders’ goals, their conscious intentions or

unconscious drives, but evidently not to tactics and styles. Within the MUDs environment, we might call the two bipolar factors, F3 and F5, the style-factors, and the rest of the factors, namely F1, F2, F4, and F6 the goal-factors. Each of the style-factors might selectively correlate with each of the goal-factors, and the analysis of these correlations might enrich our knowledge of the ways the MUDders play their favorite online games.

5.2.2. Analysis of Between-Factors Correlations

We may expect that correlations between the factors are important for the further analysis. Within the process of confirmatory factor analysis we calculated the Pearson correlations between the six factors, and the Cronbach alpha. At the Table 1 the meanings of Cronbach alpha are placed on the diagonal and marked bold; the intercorrelations between the factors are placed in the lower triangle. All the correlations are positive and significant ($p < 0.05$).

	F1	F2	F3	F4	F5	F6
F1	**0.75**					
F2	.502	**0.65**				
F3	.282	.386	**0.59**			
F4	.357	.209	.346	**0.65**		
F5	.486	.387	.240	.166	**0.61**	
F6	.642	.423	.360	.435	.428	**0.59**

Table 1. Correlations between the factors, and the Cronbach alpha.

Considering the data presented in the diagonal of the Table 1, we can conclude that the Cronbach alpha meanings are significant at the level .05. The highest meaning has the Factor 1 "Flow experience" (.75); the Cronbach alphas for the rest of the factors are rather close, and the least meanings have the Factor 3 and the Factor 6 (both .59).

The interpretation of the data presented in the lower triangle at the Table 1 is the following. First we discuss the correlations between the factors, mainly between the F1 and the rest of the factors. This is due to the fact that the F1 (Flow Experience) is the most interesting in the context of this paper factor. After that we will briefly discuss the correlations between the goal-factors and the style-factors.

The correlation between the F1 (Flow) and the F2 (Achievement) is .502. We can note that flow experienced while playing MUDs is positively correlated with achievements. Thus, flow accompanies behavior oriented towards maximal development of the characters chosen by the gamers – often MUDders use the same

character during the successive playing sessions. The choice of familiar types of MUDs and of the well-known situations taking place within the game correlates, too, with flow experience. Thus, the general statement saying that flow experience depends on the matching of the task challenges and the available skills, seems to get a new empirical confirmation.

Correlation between the F1 and F3 (.282) testifies that players experience flow when they are sufficiently active (i.e., do not pursue passive strategies), but not too active, since the correlation is not too high. Long enough time periods allocated to MUDding weekly, player's strict control over the situations taking place within the game environments, orientation towards being the leader of temporary collaborative teams of MUDders – all this seem to match flow experience.

Correlation between the F1 and F4 (.357) assumes that patterns of interaction and flow are inalienable while MUDding. Computer-mediated dialogic communications are specific for MUD environments; players even admit they often lose the sense of time while communicating. This type of interaction seems to be effective in initiating flow experience. Correlation between the two factors is significant and positive, but at the same time not too high. We can conclude that MUDders, experiencing flow, are not heavy communicators, and vice versa, players who are fond of interaction with fellow players might experience flow, but are not destined to it. This finding supports the results gained by researchers earlier and discussed in the Section "Flow in the ICT Environment", i.e. the results evidencing that flow experience might emerge while computer-mediated communication sessions.

Correlation between the F1 and F5 (.486) means that flow might accompany mainly thoughtful behavior of gamers. Thus, flow is likely to occur when MUDders repeatedly play with the same characters and in the same situations, and allocate long enough time periods weekly to playing. We may conclude that players preferring familiar routes and ways and doing it on a regular basis might experience flow: this seems to be the main reason of their thoughtful and repeated actions in familiar situations while playing MUDs.

Correlation between the F1 and F6 (.642) is the highest in the first column in the Table 1. That means, flow experience is likely to occur when MUDders feel themselves interested and inquiring, when their cognitive motivation is initiated. This finding corresponds the data discussed in the Section "Flow in the ICT Environment", saying that flow is likely to be experienced while users seek information on the Web. Interesting, the F6 correlates highly enough with all the rest five factors; this is the only

factor which is somehow low (for example, less than .350) correlated with the other factors. We may conclude that every factor easily coordinates with F6; at the same time, cognition may accompany every type of behavior of MUDders.

The other correlations between the factors are either much less than the correlations of F6 (Cognition) with the rest of the factors (four correlations), or slightly greater than the minimal correlation for the F6 (two correlations: between F2 and F3, and between F2 and F5). We will not discuss these correlations, since the most interesting for us is the factor F1, and we have already discussed the correlations of F1 with all the other factors.

We are going now to discuss the correlations between the goal-factors and the style-factors. The discussion will be brief, since these correlations are not very special. Each of the two style-factors has one low correlation with the goal-factors: F5 and F4 (.166); F3 and F1 (.282). All the other correlations are higher (over .340). In other words, the correlation of the style-factor F5 (Thoughtfulness/Spontaneity) with the goal-factor F4 (Interaction) is low; the same with the correlation between the style-factor F3 (Activity/Passivity) and the goal-factor F1 (Flow). It is reasonable to note that the two style-factors are not tensely correlated: the correlation between F3 and F5 is only .240. Between the four goal-factors we might see only one low correlation: it is the correlation between the F2 (Achievement) and F4 (Interaction), the meaning is .209. It is worth to note once more that all the correlations are significant (α=.05).

5.3 Dimensions of Flow Experience

As we have discussed in the Section “Flow in the ICT Environment”, the dimensions describing flow patterns of typical Web shoppers, gamers, information seekers, chatters, and/or those interested in entertainments might slightly differ. Though there is no canonical set of dimensions, one cannot expect that the sets of dimensions characterizing diverse types of behavior differ too much; in the latter case there would not be good reasons to name the differing sets of dimensions the same name.

Anyway, we expect that the behavior of MUDders experiencing flow might be described using a certain subset of dimensions. These dimensions supposedly correspond to the points of the research questionnaire which refer to the F1 (Flow Experience).

At the positive pole of the F1 there are the following points: *loss of the sense of time; attention is directed solely on the game; inspiration is felt; nothing distracts from the game; playing sessions last longer than planned; real-life and within-game situations*

are mixed and the latter situations acquire the status of reality; strain and tension are constantly experienced; when interactions with other players take place, time flies very slow. At the negative pole of the F1 there is only one point: *MUD is a play, and nothing more than a play.* These are the points describing flow experience of the MUDders.

We can conclude that the dimensions which are likely to specify MUD-related flow experience include the set of universal points characteristic for flow in almost any sort of activity, and specific points characteristic for MUDding. The former dimensions include the points which refer to psychological conditions (tension, inspiration, concentration of attention, etc.) and to allocation of time (sessions are longer than planned, sense of time is lost). The latter dimensions refer to what is specific for games in general (playing behavior means more than simply a game, what occurs in the game become a reality) and for the MUDs as a special type of games (time is slow while computer-mediated interactions take place).

To sum up, we can conclude that the set of flow-related dimensions characterizing behavior of MUDs players consists of the three main subsets. The first is the subset of universal dimensions describing flow in any type of activity. Supposedly, this subset is in a way variable: certain dimensions might be omitted or added, depending on specific types of human activities. The second subset is specific for games, or – to be careful and not to over-generalize – for computer/video/online games. Supposedly, actual dimensions constituting this subset might be even more subject to possible substitutions, than the dimensions constituting the first subset. Substitutions would not, however, result in no dimensions in the subset at all: supposedly, dimensions referring to gaming need to be represented in the total set of dimensions. The third subset includes dimensions specifying flow experienced while playing MUDs, thus differing from flow-related behavior while playing other computer/video/online games. The third subset is the most task-specific, the most variable and depending on the actual type of a game.

6. Conclusions

The three main goals of this research are the following. First, it was planned to investigate the factors describing fully enough the behavior of MUD players. Second, it was planned to find out whether the players experience flow. And third, it was planned to learn the set of dimensions describing flow experienced while MUDding, possibly differing from sets of dimensions characterizing behaviors other than playing MUDs.

These three goals have been realized. We have found out and described the six-factor model of MUDders' behavior; the model fits the empirical data. Two types of factors have been selected: goal-factors and style-factors. We have described correlations between the factors; correlations are positive and significant.

The results clearly show that MUDders experience flow; flow is the first, the most important factor. This result confirms the previously published data, namely that of McKenna and Lee (1995).

The set of dimensions describing flow experienced while MUDding is found to consist of the three subsets: an universal subset (dimensions describing flow experience irrespectively of any particular type of activity), a gaming subset (describing flow experienced while playing computer/video/online games), and a MUDs-related subset of dimensions specifying flow experienced while MUDding, not playing the most of the other computer/video/online games.

MUDs have a long enough history and steady enough communities of players. We believe, this type of online games represents a promising model to be investigated using diverse psychological platforms, including of course the field of positive psychology. The research has been carried out within the Russian community of MUDders; we believe this community does not differ altogether from players speaking other languages than Russian, and thus the results described in the paper should be regarded not as ethno-specific, but as universal. This point, nevertheless, might be the subject of further investigations.

7. Acknowlegements

The work on this paper was supported by the Russian Foundation for Basic Research, project # 03-06-80165.

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