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Personal intellectual potential in the e-culture conditions

Potencial intelectual del individuo en condiciones de e-cultura

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ABSTRACT:
The article analyzes factors of systemic effect exerted by the digital informational environment on the subject's cognitive sphere and his intellectual potential formation. Under modern conditions, mass online communication is noted to be the key factor determining changes in attention concentration, memory development, and intellectual activity pattern. The research is conducted within the frame of interdisciplinary information paradigm. In order to identify the correlation between Internet addiction, IT-activity and cognitive characteristics, psychological methods of the intelligence structure estimation are used.
Keywords: personal intellectual potential, e-culture, IT-activity, online communication, mosaic thinking

RESUMEN:
El artículo analiza factores de efecto sistémico ejercidos por el entorno informacional digital sobre la esfera cognitiva del sujeto y su formación de potencial intelectual. En las condiciones modernas, se considera que la comunicación masiva en línea es el factor clave que determina los cambios en la concentración de la atención, el desarrollo de la memoria y el patrón de actividad intelectual. La investigación se lleva a cabo dentro del marco del paradigma de información interdisciplinaria. Con el fin de identificar la correlación entre la adicción a Internet, la actividad de TI y las características cognitivas, se utilizan métodos psicológicos de estimación de la estructura de inteligencia.
Palabras clave: potencial intelectual personal, cultura electrónica, actividad de TI, comunicación en línea, pensamiento en mosaico

1. Introduction

Continuously updating intellectual technologies and virtual environments produce new forms of computer-mediated communication that affect the cognitive sphere of human life. The pace of change accelerates as the network culture develops in the information society, where mass online communication comes to the forefront. The digital technological environment programs new forms of interaction and personal expression, new roles and statuses of social institutions. Total formatting of human activities with "artificial intelligence" causes anxiety, leading in prospect to the post-human culture of a new species, e-Homo, which differs from Homo Sapiens in symbiosis with products of convergent technologies (Abhishek et al, 2013; Alekseev, 2014).

The research into the factors effecting intellectual potential of an e-culture consumer is motivated by the need for a deeper understanding of youth IT-activity pragmatics, standard forms of the Internet users' behavior and the negative effects of the multimedia environment on the thinking style (Brooks & Longstreet, 2015; Fox, & Moreland, 2015). The multimedia environment effect is manifested in the phenomenon of mosaic thinking, characterized by reflecting a whole set of any object properties without realizing their interrelations, and rapid switching of attention (Prensky, 2012; Rosen, 2007).

The purpose of our study is to analyze those systemic conditions potentially affecting the person and community due to the introduction of multimedia communication technologies into social practice. The article treats the cognitive sphere transformation of the interaction subject, resulting from the information environment pressure in the conditions of online communication. In this regard, the task is specified to generalization of empirical studies into correlation between the amount of IT-activity and the intellect characteristics. The empirical database is constituted by the materials of the questionnaire survey in a group of students.

1.1. Literature review

The question of the impact of digital environment factors on the personal cognitive sphere falls into the realm of media-psychology, which addresses the full spectrum of human experience in the field of media interaction, including intellectual, emotional and behavioral characteristics (Bruni, 2011; Giles, 2003; Oostendorp, 2003; Voiskunskiy, 2016; Iannella, 2017; Limba and Šidlauskas, 2018; Stepaniuk, 2018). The multimedia environment produces semantic fields layering which turns into the problem of a person's cognitive orientation in the information field of e-culture. Introduction of IT technologies into the educational process raises the issue of the multimedia impact on students' intellectual abilities.

The modern information environment that creates conditions for subjects' interaction is characteristic of hyper-personal online communication, which is the most effective in the format of non-verbal transmission of impressions and building of mental images (Walther, 2007). The dynamics of meanings translation is determined by the presence of the network media space with the topology determined by the symbolic matrix of values and attitudes. The information space of the network is associated with

the virtual world of digitized twins of subjects, things, compositions. The subject is included into the e-culture system as its functional element and object of influence. At the same time, an attractive form of message presentation plays a considerable role. In the literature, the concept of the infosphere role is presented in personal identification, modeled on the basis of general technological principles of building a multi-agent system (Dunn, 2013; Floridi, 2011; *Wooldridge, 2009*).

The sources discussing online communication modes in the digital network emphasize the leading role of the technological format of interaction: techniques of knowledge transfer, information extraction, representation, storage, processing. The pragmatics of the computer-mediated communication is widely represented in the book edited by Herring, Stein and Virtanen (2013), which includes an overview of interactive communication using text via the Internet, websites and other mixed mobile communication formats. Along with the practice characterizing the language used in the main interactive modes, the book highlights discourse as the basis for mediated interaction, narrative analysis of computer communication, and code switching as a factor of computer-mediated communication.

Programmable normativity of information interactions in the network correlates with the implicit skeleton structure of messages production, transmission and reception process. A person is considered as a digital analogue of the information transmitter. On the other hand, the scenario of interaction between users-visitors is determined by the fact of participation, entry into the communicative environment. Interaction is shown to be able to transform the conditions configuration insomuch that it will be necessary to change the programs and algorithms of action (Kozyrev, 2013: 110). Mass communication dynamics is considered as a process of subject interactions production through the Web2.0 technology and interactive websites wherein the content is created by the users themselves (Chernetz, 2010; Evseeva et al., 2017).

The Internet is perceived by the subject as an element where everything is generated spontaneously and the traditional limitations are removed. An impersonal media environment provokes new contexts and communicative situations. A person captured and immersed into the media becomes a media product himself, as Žižek (1998) notes. In terms of psychoanalysis, cyberspace is treated as the "transitional space" that expands the inner psychic world of a person and captures him so much, that his own self dissolves in the personality of the character of the game running on the screen. Cyberspace is perceived as a continuation of mind in the intermediate space between self and others open to all kinds of fantasies that can be projected onto this space (Alekseenko, 2000).

The possibility to surf the cyberspace relates to the issue of the possibility of freedom in the conditions of programmed reality in e-culture. Virtual interaction independence from physical and social constraints, its transience, multimodal nature of network communication, and comparative absence of behavioral standards create the conditions for individual action freedom (Lichy and Kachour, 2014; McQuail, 2005). The term "e-culture", which is established in official government documents, emphasizes that this form of subculture is not reducible to computer technologies (Alekseev, 2014: 36).

There is a fixed hierarchy of unreduced levels in the modern infosphere: physical, signal, linguistic, semantic, collective, and evolutionary. Whether information interaction occurs at the level upper than the signal one, the indication of information subjective significance is needed. Multimedia space appears to be a systemic factor in the interaction subject transformation, since information in the network influences a person rather as a target set than as a physical reason. The structure of interactions in e-culture is organized by an implicit meta-principle. The fact that information and knowledge, as a result of grasping the meaning, are not identical, explains the specific effect of digital network, that is information availability does not lead to wide broadcast of knowledge (Kozyrev, 2013: 120-121).

2. Methodology

The conceptual basis of this research is constituted by the settings of information and cognitive paradigms in the context of media psychology. Being an interdisciplinary area, media psychology combines the research positions of sociology, anthropology, cognitive psychology in the study of the influence exerted by the IT-activities and multimedia communication tools on human information perception in the conditions of developing technologies of virtual and augmented reality.

The methodological framework is provided by informational determinism, which assumes the code nature of interrelations in the dynamic system, enables to identify systemic factors of the media environment pressure (such as normativity, discourse, semantics) on the cognitive sphere of subjects, as well as to consider the topological aspect of interaction transformation. The subject cognitive orientation uncertainty occurs due to the presence of implicit knowledge, layering of the premises hidden in the context. In terms of dispersed background knowledge, information interactions stimulate cognitive processes through encoded information interpretation, whereunto the subject needs some initial knowledge.

Informational determinism to a significant extent determines the specifics of subjects' response, their IT-activities and interaction. In such a cognitive setting, subject interactions are regulated implicitly by the correlation of freedom and normativity principles. The technique of speech and visual impact on the audience in the media space triggers a subconscious mechanism of emotional response through the psycho-complex semantics (for example, fear, revenge, guilt, justice, erotic, patriotism, etc.). The latent indirect impact on the audience is realized in the media space through the agenda shaping (the most relevant topic, the line of thought) based on intuition, confidence in the media, adherence to an ideology or fashion. Along with the total coverage of the target audience, the media space influence, however, is characterized by the impact selectivity, which can be either cognitive, or behavioral, or emotional, and time-variant: short-term, long-term, intermittent, and cumulative. It is impossible to specify the nature of the impact and its effect in advance (Burgoon et al, 2016; Shelonaev, 2012: 69). In the process of reflection, the information recipient can extract something from the message more than was intended by the sender and the system itself.

3. Results

3.1. Internet addiction study

Interaction with the mass media online is a key factor that determines changes in the cognitive sphere, in particular for imagination, concentration, memory development, and intellectual activity characteristics. These changes are the most obvious in the situation of Internet addiction. The phenomenon of gravitation towards the Internet use was described back in 1995 in the context of psychological dependence. However, quantitative data on the percentage of the Internet-dependent users differ a lot. In 2018, a group of students of the St. Petersburg State Transport University was surveyed to identify the percentage of the Internet-dependent young people among university students. The sample included students aged 18-20 years, totaling 60 people, among them 11 girls and 49 boys. The study applied the Internet dependence scale from the "The Internet Behavior" questionnaire according to the methodology developed and tested at the Faculty of Psychology of Moscow State University (*Zychkina, 2004*). This scale includes 7 statements; the respondent should choose the answer that best suits his behavior on the Internet. Those who gain 6-7 points on this scale are considered as Internet-dependent in the strict sense. According to this

methodology, respondents with a score of 3 or more points are considered to be prone to Internet addiction. Respondents with zero points are not prone to Internet addiction. Internet addiction has been detected in 1.5% of the students surveyed, 6% of respondents demonstrated no tendency to Internet addiction. The results of the study are shown in Figure 1. According to these results, 91% of the students surveyed show a tendency to Internet addiction to varying degrees. Among them, 28% have a low rate of Internet addiction tendency (1 point), and 43% have a higher one (2 points).

Figure 1.
The study of Internet addiction among the students
at the St. Petersburg State Transport University
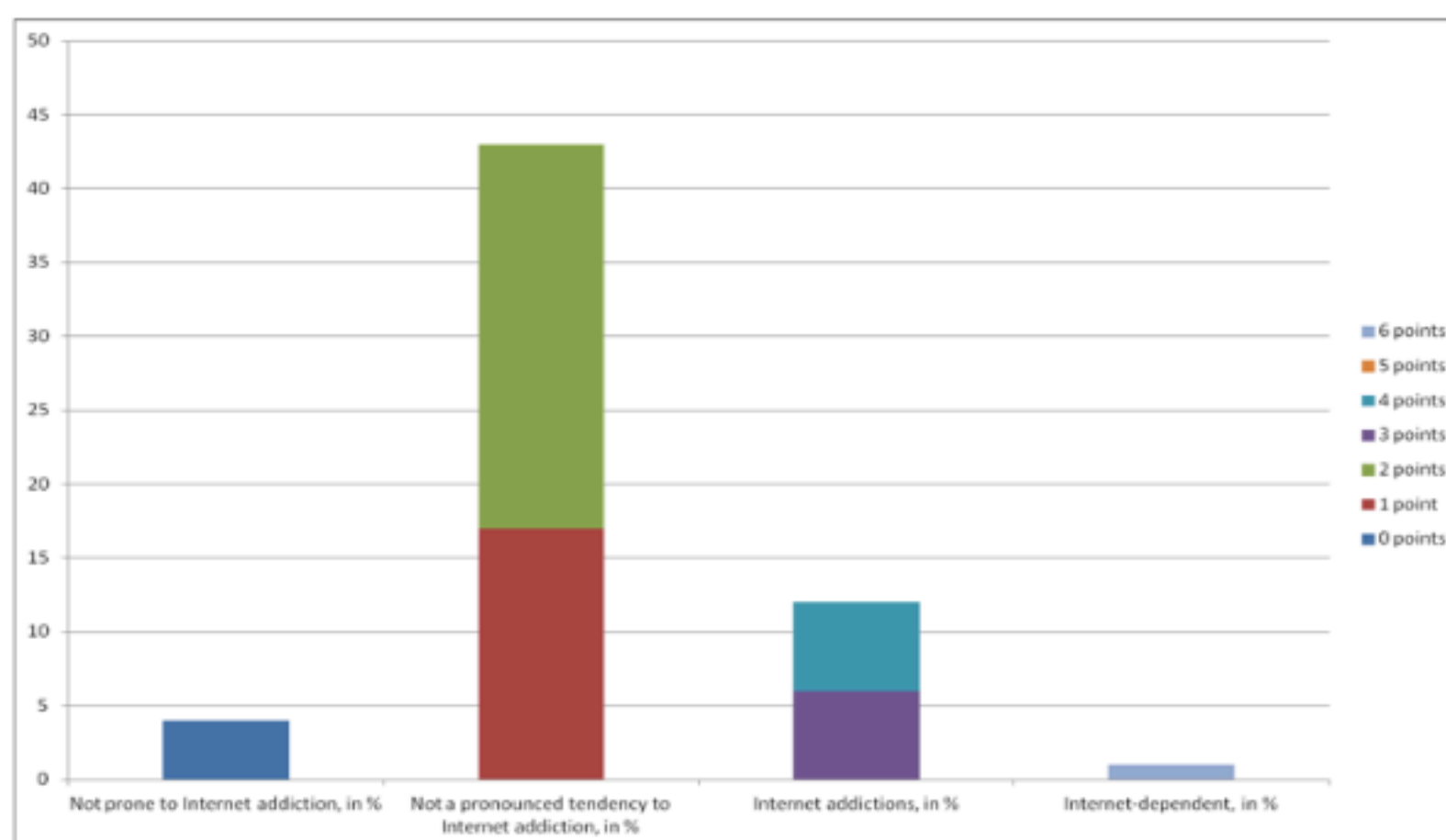
A low rate of Internet addiction among university students is probably connected with several factors. Firstly, learning takes time, so being on the web cannot be long enough to be testified as the dependence. The second factor is the availability of information flow from other sources (textbooks, lectures, consultations, conversations). Nevertheless, only 6% of all respondents demonstrated the absence of Internet addiction. *Belinskaya and Zychkina (2000)* identify two main reasons that contribute to the development of Internet addiction propensity. One of them is an increased sensitivity to social restrictions. The Internet, in its turn, provides a large field of opportunities to avoid social demands. The second reason is mostly connected with the emotional instability of young people, with the need for emotional support, which is difficult to obtain in a real social environment. The Internet addicts are characterized by the "anticipation" of addictive implementation, the problem of control, low criticism of their own state, violation of social adaptation in real life. Being a university student due to the presence of direct social interaction and information handling by traditional methods hinders Internet addiction development. In addition, the study of students' attitude toward online learning at the St. Petersburg Polytechnic University showed that, despite having a propensity for Internet addiction, most students negatively assess introduction of distance learning via the Internet instead of the traditional teaching methods.

3.2. Study of students' attitude to online learning at St.Petersburg Polytechnic University

Social base of the study included 50 first-year students of the SPbPU Humanitarian Institute (approximately 10% of general population). The personal distributed questionnaire was used as a method of research (Pankova et al., 2017: 106-113; Razinkina et al., 2018).

When being asked the question: "Would you like a range of disciplines to be taught remotely for full-time students?" Only 24% of the respondents gave positive answers. Most students (70%) gave a negative answer.

Regarding the online courses of specific disciplines, 60% of respondents did not like to study physical education in this form, 46% - economics, 26% - mathematics (the total sum exceeds 100%, because several answers could be chosen). The majority of the students surveyed inclined to the following evaluative judgements: "inadequate information input and acquirement", "there's no use learning to solve economic problems online", "inconvenient", "lots of technical problems", "separate site for each discipline", "poor organization of courses", "takes extra-curricular time", "a huge number of tests".

When being asked the question: "What advantages of online learning can you note?" - Most respondents chose the answer "no advantages" (22%). The students prefer communicating with the teachers personally.

When asked the question: "Which format is better?" - More than half of the respondents voted for the traditional education; 16% of the interviewed first-year students agreed, and the majority (57%) denied the assertion that "online learning forms students' skill of independent acquirement of educational material" (Pankova et al., 2017: 113, Figure 5).

3.3. Study of the St. Petersburg State Transport University students' Internet experience duration and intensity in correlation with the verbal intelligence level

Application of the psychological techniques in the study of respondents' information behavior in the digital environment allows detecting whether there is any correlation between individuals' media behavior and cognitive features. In this direction, a study was conducted of the Internet experience duration and its intensity in correlation with the verbal intelligence level, using data on the network activity of the young people who have got acquainted with the computer and mobile phone at the age of about 10 years. The sample consisted of students aged between 17-23 years, 71 people in total, including 38 girls and 33 boys (Berezovskaya and Shipunova, 2018).

To study the correlation between the IT-activity and verbal intelligence characteristics, the following methods were used: 1) questionnaire; 2) "Complex analogies" test (Mironova, 2006); 3) reading test (Yasyukova, 2013); 4) intellect structure test by R. Amthauer (IST), subtests No. 2 "Word exception" (on the intuitive component of conceptual thinking), No. 3 "Analogies" (on the logical component of conceptual thinking), No. 4 "Generalization" (on conceptual categorization) (Plotnikov, 2005); 5)

mathematical data processing package "IBM SPSS Statistics 21".

Correlation analysis has not shown an unambiguously negative impact of the IT-activity on the level of verbal intelligence. Data characterizing the ability to abstract and to correctly express one's thoughts, positively correlate with the level of activity in social networks. However, the students who more often use the computer to perform class assignments and to watch films have demonstrated a lower level of conceptual thinking.

4. Discussion

The research results demonstrate that the changes of the cognitive sphere mostly occur not at the level of addictive transformation (Loskutova, 2004). The factors transforming interaction in e-culture act like the code, provoking a mixture or inversion of meanings in the individual's head. Emerging thoughts, however, correlate with a certain direction of common intellectual fashion. Therefore, when talking about the factors of cognitive transformation of interaction subject in the computer-mediated communication, one must keep in mind the semantic limits of the internal freedom of thinking and understanding, indicated by common sense, scientific world view, and cultural stereotype of perception (Shipunova et al., 2017).

The authors believe that the understanding of the situation serves as a general principle, on which psychological parameters of the cognitive sphere transformation of the interaction subject operate in the conditions of e-culture. Technological possibilities of the interaction process formatting in e-culture allow modeling situations oriented on translating specific meanings that motivate the subject to certain cognitive and behavioral acts (for example, flash mob), or vice versa, block the semantic field, switching implicit barriers of understanding.

In the cognitive orientation (as a pledge of free action), the pragmatic factor of actuality of the mental image, the stereotype activating the contextual semantic links is extremely important. Message coding technically maintains the process of transferring high-volume information. But the message content is not directly related to the code; it is determined by some linguistic or intellectual norm. Explicit or implicit reference to the norm makes it possible to understand the transmitted signals, as well as to rely on them to be understood by other subjects, to get bearings in sign symbolism, to change meanings, to correlate them with the events in the past, present, and future.

The problem of the individual's intellectual potential formation in the conditions of dynamic increase of information environments and social networks becomes more urgent because of its correlation with emergence of new cognitive barriers, conditioned by the modern feature of mosaic thinking. Kaleidoscopic nature of information presentation in the network, particularly in the form of visual-semantic blocks and video blogs, is focused on emotional grasping and keeping attention at the current actual moment. All the accents in perception, understanding and evaluation are already preset and broadcasted in the completed form. Virtualization of the multimedia information environment heats the imagination, translates the uncertainty of the real world and real relationships, as semantic blocks are constantly changing. The technology of keeping attention in the mosaic mode relies on a vote of confidence in the media system. Thus, the need for critical thinking (Facione and Facione, 2013), which creates the cognitive potential of self-regulation in evaluating of judgment systems, becomes unnecessary.

In the description of mosaic thinking, the features typical of perception, memory, and attention than of intellect act predominantly. The cognitive sphere transformation in the online mosaic-mode of communication is correlated with fragmentary perception of information, a constant shift of attention due to the decrease in attention concentration. A more detailed specification of mosaic thinking should depict those changes in the cognitive sphere of modern human that deal with the logic of understanding as the main component of a successful intellectual action.

5. Conclusions

In the process of information perception, each person mentally builds models and scenarios of cultural and socio-political interpretation of current events using different norms and patterns with varying degrees of mindfulness. The wide use of computer technologies provides the digital generation representatives with a special type of mosaic thinking as a new way of cognitive practice, wherein multimedia trends constitute the basis of contextual expectations of forthcoming events and possible interpretations.

To identify the cognitive transformations of the users of digital information and communication technologies, and the specific psychological characteristics of a new type of thinking, it is necessary to reveal the interrelations between the features of individuals' media activity and the level of critical thinking development. In this case, psychological research methods should be focused not only on the characteristics of information perception at the level of images and verbal intelligence, but also on an empirical analysis of the formation or blocking of critical thinking skills that include more complex forms of mental activity such as interpretation, analysis, conclusion drawing, explanation, and self-regulation.

Kaleidoscopic style of online information presentation in the form of visual-semantic blocks is focused on keeping attention at the current time. All the accents in perception, understanding and evaluation are already preset and broadcasted in the completed form. Thus, the need for critical assessment of information is eliminated. The analysis of students' questionnaire survey data shows that there is no unambiguously negative correlation between media behavior and verbal intelligence. The analysis results afford talking about the need to specify those changes in the cognitive sphere of a modern human relating to the combination of characteristics of mosaic and critical thinking as the main component of successful intellectual action.

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