IT Activity of Youth in Multimedia Environment and Verbal Intelligence

Olga Dmitrievna shipunova & Irina Berezovskaya

Petersburg State Transport University Russia

ABSTRACT

The article discusses one of the topical problems of modern education, namely, how IT-activity of students influences their cognitive abilities. The most common types of IT-activity of modern students are communicating in social media, listening music and doing homework. In connection with rapid introduction of IT-technologies into educational process, the problem raises of the effect from IT devices usage on the development of student's personality in general and his intelligence in particular. The assumption on the lower level of verbal intelligence for active IT users served as the hypothesis of the study. Research held on a sample of technical college students aged 17-23 years revealed that the intensive use of IT-devices in learning process is negatively associated with indicators of verbal intelligence, whereas the communication in social media and computer games do not have a clearly negative impact.

Keywords: multimedia, IT-activity, cognitive ability, verbal intelligence, education.

Classification: FOR Code: 410303p

Language: English

London Journals Press

LJP Copyright ID: 118949
Print ISSN: 2515-5784
Online ISSN: 2515-5792

London Journal of Research in Humanities and Social Sciences

Volume 18 | Issue 1 | Compilation 1.0

IT Activity of Youth in Multimedia Environment and Verbal Intelligence

Olga Dmitrievna shipunova[α] & Irina Berezovskaya[σ]

I. ABSTRACT

The article discusses one of the topical problems of modern education, namely, how IT-activity of students influences their cognitive abilities. The most common types of IT-activity of modern students are communicating in social media, listening music and doing homework. In connection with rapid introduction of IT-technologies into educational process, the problem raises of the effect from IT devices usage on the development of student's personality in general and his intelligence in particular. The assumption on the lower level of verbal intelligence for active IT users served as the hypothesis of the study. Research held on a sample of technical college students aged 17-23 years revealed that the intensive use of IT-devices in learning process is negatively associated with indicators of verbal intelligence, whereas the communication in social media and computer games do not have a clearly negative impact.

Keywords: multimedia, IT-activity, cognitive ability, verbal intelligence, education.

Author α: St. Petersburg Polytechnic University of Peter the Great, peterburg University of railway.
σ : St. Petersburg Polytechnic University of Peter the Great, peterburg University of railway.

II. INTRODUCTION

The modern networking and techno-economic paradigm promotes rapid changes of the forms of social and educational practice. In terms of dynamic growth of information environments and social media, the problem of the individual's intellectual potential formation becomes increasingly pressing and associates with new cognitive barriers in education conditioned by the modern type of clip thinking [15. Berezovskaya I., Shipunova O. 2015]. It is also associated with the problem of adaptation in multimedia network environments. Modern education trends are dictated by the expansion of socio-technological environments which form a special kind of virtual reality and a special mentality. Socio-technical virtualization hypes imagination, translates the uncertain vision of the future, which is built in the minds of young people [16. Jasanoff S. 2015].

Modern information and communication technologies and global networks provide any inhabitant of the Earth with the access to information resources of human civilization, help to accumulate today's knowledge and spiritual values, significantly push the boundaries of application for cultural, scientific and technological innovations. For the modern young people, the Internet is an accessible and convenient research tool, as well as, to a greater extent, a space of free opportunity to achieve goals and meet diverse needs. Communicative, cognitive or play activity, along with the variety of ways of self-presentation favor the manifestation of the user's individual identity.

However, realizing all the advantages of network multimedia environment, one cannot deny that this environment is specific of not only new opportunities, but also new problems and risks. One of these problems is related to the human cognitive abilities transformation.

Literature review: In a number of studies after A.V. Belyayeva, M. Cole [7], A.E. Voiskounsky [8,9], J.D. Babayeva [6], O.N. Arestova [5], Y.M. Kuznetsova, N.V. Chudova [10], E.B. Morgunov

[12] D.A.Allport [1], V.Brenner [2], M.D. Fischer, Z. David [3], P. Kelly [4], long-term network activity is shown to may have resulted into various forms of user's psychological dependence. So, the question arises on the negative impact of IT activity on cognitive abilities. The negative consequences include low attention focusing, memory impairment, inability to understand linear text and hierarchical relationships. Qualitative change of sensory and perceptual standards of person's intranet activity creates conditions for spontaneous action motivation and unpredictable behavior of the Internet-active subject in real life. In this study, we set out to identify the impact from active use of digital devices (IT activity) on the verbal intelligence formation.

III. MATERIALS AND METHODS

Research hypothesis: the verbal intelligence level relates to the features of using IT-devices (IT-activity negatively affects the verbal intelligence level).

Research methods:

1. Author's questionnaire on base of a pilot survey results, which identified information sources used by students.
2. Test "Complex analogies" by E. A. Korobkova (ability to understand complex logical relationships and abstract connections) [14].
3. Reading test by L.A.Yasyukova (according to this author, about 70% of school leavers have got an imperfect skill of reading) [11].
4. Intelligence Structure Test of R. Amthauer (I-S-T 2000R, or IST), subtests No. 2 "Word Exception" (intuitive component of conceptual thinking), No. 3 "Analogies" (logical component of conceptual thinking), No. 4 "Generalization" (conceptual categorization) [13].
5. Software package for mathematical data processing IBM SPSS Statistics 21.

The sample consisted of technical college students aged between 17 and 23 years, 71 person overall, including 38 girls and 33 boys.

Young people born in 1993-1998 get acquainted with computer and mobile phone at the age of about 10 years. The average age of trying computer games is somewhat higher - 11.8 years. Girls-respondents differ in this parameter from boys (Mann — Whitney U-test, $p \leq 0.01$)[1]. They start playing later (if they do) and play less often (see Table 1). Also, girls watch TV more often ($p \leq 0,05$)[2].

[1] The non-parametric Mann-Whitney U-test estimates the reliability of differences in independent samples if the data in them are presented in the rank scale.

[2] In our study, we utilize the concepts of working and null hypotheses, which are indicated and interpreted as follows: H1 is a working hypothesis. This is the hypothesis about the significance of differences (interconnection, influence). Usually, research attempts to test this hypothesis. H0 is a null hypothesis. This hypothesis supposes that there are no differences (interrelations, influences). This hypothesis is sought to refute in the study. P is the probability to accept the null hypothesis (what is the probability that there are no differences?). Therefore, for most statistical methods, the lower is this value the more reliable is the statistical indicator. In psychology, there are three standard values of error probability: $P \leq 0.01$; the probability to assume the null hypothesis is less than 1%$P \leq 0.05$; the same probability is less than 5% (from 0.02 to 0.05). $P \leq 0.1$; the probability is less than 10% (from 0.06 to 0.1).In other words, the probability to make a wrong conclusion can be 1%, 5%, 10%. In psychology, sociology, etc., it is customary to use $p \leq 0,05$.

Table 1: Features of students' IT-activity

Characteristic	average	σ	min	max
Overall sample, n=71				
Start of using personal computer, age	10,3	2,88	3	16
Start of using mobile phone, age	10,5	2,45	6	16
Start of playing computer games, age	11,8	4,53	4	-
Watching TV programs, hours per week	7,06	12,84	0	70
Reading paper books, hours per week	3,75	4,18	0	20
Girls, n=38				
Start of using personal computer, age	10,7	3,07	3	15
Start of using mobile phone, age	10,3	2,36	6	14
Start of playing computer games, age	13,3	5,13	4	-
Watching TV programs, hours per week	9,2	15,18	0	70
Reading paper books, hours per week	4,8	4,8	0	20
Boys, n=33				
Start of using personal computer, age	9,94	2,65	4	16
Start of using mobile phone, age	10,7	2,57	6	16
Start of playing computer games, age	10,1	2,98	4	16
Watching TV programs, hours per week	4,6	9,08	0	50
Reading paper books, hours per week	2,6	2,81	0	10

The time costs for different activities have been categorized into five levels: I do not do this; I do less than 2 hours a week; 2-7 hours per week; 2-3 hours per day; 3-6 hours per day; more than 6 hours per day. The last three categories are conditionally called active users (2 or more hours per day). The distribution of time costs can be seen in Table 2. The most popular activity, performed by means of gadgets, is expectedly communicating in social media, a little less time is spent for listening music or audiobooks and fulfilling class assignments. 30.9% of respondents actively use the computer or tablet to view photos and videos, about a quarter do that for playing games, watching movies, searching for background information. The most unpopular occupations among students are blogging and online shopping.

Table 2: Respondents distribution on the time costs for various types of IT activity, %

Activity performed using digital devices	don't do this, %	Less than 2 h/week, %	2-7 h/ week, %	2-3 h/ day, %	3-6 h/ day, %	more than 6 h/ day, %	«Active users» (2 h/day and more), %
Communicating in social media /agents / forums	2,8	8,5	12,6	36,6	9,9	29,6	76,1
Listening music or audiobooks	0	9,9	26,7	26,8	19,7	16,9	63,4
Fulfilling class assignments	0	5,6	32,4	32,4	19,7	9,9	62,0
Playing	42,3	21,1	11,3	12,6	9,9	2,8	25,3
Blogging	94,4	2,8	1,4	0	1,4	0	1,4
Watching photos, videos	4,2	16,9	47,9	23,9	5,6	1,4	30,9
Watching feature films	5,6	29,6	42,3	19,7	2,8	0	22,5
Searching for background information	2,8	25,4	46,4	14,1	11,3	0	25,4

Reading professional and specialized literature	23,9	40,8	22,6	9,9	2,8	0	12,7
Self-education, tutorial web-sites	21,2	39,4	33,8	1,4	4,2	0	5,6
Reading sociopolitical news	18,3	35,2	31	15,5	0	0	15,5
Reading fiction books	19,7	29,6	29,6	15,5	4,2	1,4	21,1
Working, side gig in Internet	57,7	14,1	11,3	11,3	2,8	2,8	16,9
Online shopping	62	35,2	2,8	0	0	0	0
Creative activities (writing texts, drawing digital pictures, processing photos, making movies)	53,6	28,2	7	5,6	4,2	1,4	11,2

IV. RESULTS

The average indicators of students' verbal intelligence in the sample (Table 4) appear to be lower than the normative data for tests 2 and 3 given by E.E.Tunik for 17-year-old high school students, but they exceed mean value for people aged 16 years from some other sources (for example, data of S.G.Plotnikov). The girls successfully cope with the reading test, the boys proceed somewhat worse. The test of "Complex analogies" has become the most difficult for respondents its results are below normal.

Table 3: Indicators of verbal intelligence for boys and girls

	Girls		Boys		Level values
Research method	average	Σ	average	σ	
IST 2, points	12,6	1,34	13,4	1,90	-
IST 3, points	12,1	3,39	11,9	3,31	-
IST 4, points	19,7	4,36	16,8	3,58	-
Reading test (number of errors)	0,5	0,82	1,64	2,87	p≤0,05
Complex analogies (number of errors)	6,38	4,27	6,5	4,26	-

Table 4: Significant correlations of information activity features and verbal intelligence indicators (p≤0,05)

Information activity features	IST 2	IST 3	IST 4	Complex analogies (errors)	Reading test (errors)
Overall sample					
Start of using mobile phone, age	-0,339				
Communicating in social media			0,351		
Reading fiction via gadgets	0,341				
Fulfilling class assignments using IT-devices				0,319	
Watching feature films on computer				0,303	
Girls					
Start of using computer, age				0,465	
Boys					
Time spent for computer games		0,557			
Fulfilling class assignments using IT-devices					0,644

V. DISCUSSION

Thus, the correlation analysis has not revealed an unambiguously negative effect of intensive IT technologies use on verbal intelligence formation (Table 3). In overall sample, the scores on the "Word Exception" scale (IST subtest 2) are higher for those students who have started using mobile phone earlier, and who reads fiction more often via gadgets (we believe that the very fact of reading plays a leading role, not the use of electronic devices). Indicators on the scale "Generalization" characterizing the abstract ability and ability to express one's thoughts correctly (IST subtest 4), positively correlate with the level of activity in social media. Students who more often use the computer to fulfil class assignments and watch films, have demonstrated a lower level of conceptual thinking (the "Complex Analogies" test), the same pattern can be seen for boys. Apparently, study using computer often reduces to plagiarism or thoughtless downloading of texts. Girls in case of early acquaintance with mobile phone turn out to have a lower level of conceptual thinking. Unexpectedly, the boys-active gamers demonstrate higher mobility of thinking, ability to combine and to understand interrelations (IST subtest 3).

VI. CONCLUSION

In accordance with the idea expressed in the literature on the problem of IT-activity negative impact on cognitive abilities, the authors put forward a hypothesis about the negative impact of IT-activity on verbal intelligence. However, the research results did not confirm this hypothesis. Despite the fact that IT-activity has a negative impact on such cognitive abilities as attention focusing, memory, ability to understand linear text and hierarchical relationships, this influence does not extend to verbal intelligence. Nevertheless, the absence of unambiguously negative impact of IT activity on verbal intelligence should not lead to the closure of this issue, but points to its complexity and the need for new creative solutions in this field.

VII. ACKNOWLEDGMENTS

Авторы благодарят Елену Сергеевну Новикову за предоставленные материалы, помощь в проведении исследования среди студентов и обработке его результатов, а также Ирину Валентиновну Тарасову за большую помощь в подготовке английского текста статьи.

The authors are grateful to Elena Sergeevna Novikova for providing materials, assistance in carrying out the research among students and results processing, as well as to Irina Valentinovna Tarasova for her great help in preparing the English text of the article.

REFERENCES

1. Allport D. A. Attention ends performance // Cognitive Psychology: New Directions / G. Claxton (Ed.), L. Routledge and K. Paul, 1980: P. 112-153.
2. Brenner V. Psychology of computer use. XLVII. Parameters of Internet use, abuse, and addiction: the first 90 days of the Internet Usage Survey. Psychological Reports 1997; vol. 80: P. 879-882.
3. Fischer M. D., David Z. Visual anthropology in the digital mirror: Computer-assisted visual anthropology // http://lucy.ukc.ac.uk/dz/layers_nggwun.html
4. Kelly P. Human Identity Part 1: Who are you? // Metropolitan life/E-lecture from the university course about the net. 1997.
5. Arestova O.N., Babanin L.N., Voiskounsky A.E. Communication in computer networks: psychological determinants and consequences // Moscow University Psychology Bulletin 1996, vol.4: p.14-48. (In Russ.)
6. Babaeva J.D., Voiskounsky A.E. Psychological consequences of informatization // Psychological Journal 1998, vol.1: p.89-100. (In Russ.)
7. Belyayeva A.V., Cole M. Computer-mediated joint activities and the problem of mental development // Psychological Journal 1991, vol. 12, № 2: p. 145-152. (In Russ.)

8. Voiskounsky A.E. Internet as an environment of human activity // Proceedings of the 2 Russian Conference on ecological psychology, Moscow, April 12-14, 2000. Moscow – Samara 2001, p. 117-122. (In Russ.)
9. Voiskounsky A.E. Psychological studies of human activity in the Internet // Information Society 2005, vol.1: p. 36-41 (In Russ.)
10. Kuznetsova Y.M., Chudova N.V. Psychology of the Internet population. Moscow 2007. 222 p. (In Russ.)
11. Methodology for reading skill level estimation by Yasyukova L.A. http://met.emissia.org/offline/2013/met010_files/m18-sys.htm (accessed 12. 01.2016). (In Russ.)
12. Morgunov E.B. Human factors in computing systems. Moscow – Trivola Publ. 1994. 272 p. (In Russ.)
13. Plotnikov S.G. The experience of using intelligence structure test by R. Amthauer in studying abilities of the profession-oriented 10th class students // Siberian Teacher: The journal of research methods and methodological issues. Novosibirsk 2005, vol.5: p. 21-26. (In Russ.)
14. Collection of psychological tests. Part II / E.E. Mironova (Ed.). Minsk, Women's institute ENVILA Publ., 2006. 146 p.: p.41-42. (In Russ.)
15. Berezovskaya I., Shipunova O. Reverse side of Multimedia Pedagogics: Clip Thinking // Mediterranean Journal of Social Sciences MCSER Publishing, Rome-Italy, Vol.6 No.6 S1, *November 2015,* 277-280, Doi:10.5901/mjss.2015.v6n6s1p277
16. Jasanoff S. Dreamscapes of modernity: Sociotechnical imaginaries and the fabrication of power / Jasanoff S., Sang-Hyung Kim. - Chicago, London: University of Chicago Press, 2015.