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Socio-psychological Aspects of Informatization of Higher Education

Ekaterina Gnatik
Department of Ontology and Epistemology
RUDN University
Moscow, Russia
ekaterinagnatik@rambler.ru

***Abstract*—The article reviews the use of information technology in higher education. Since the impact of information technologies on humans is ambivalent in its nature, there are both advantages and some undesirable aspects pertaining to its significant but not sufficiently studied effect on mental functions of a person, his personality and development possibilities. It has been observed that an uncontrolled use of information technologies might have some negative consequences, which would block the individual developmental potential.**

Keywords—higher education; information technology; Internet users; technological transformation of mental functions

I. INTRODUCTION

The specificity of modern society development and fundamental changes in the world of science for the last two or three decades, the new opportunities and the new realities (virtualization of reality, nano- and biotechnological advances, etc.) – all this dictates the need to find new approaches in the education policy. Education system is the main indicator of the development of society and, at the same time, it is the catalyst of its development. It is education that creates prospects for human moral evolution. History of education is a long chain of continuous search for the answers to the questions "What to teach?", "Why teach?", "How to teach?" and "How to teach effectively?" Teaching objectives have been diverse in different times and supplemented in accordance with the prevailing social attitudes and world outlook. Therefore, educational means of training and personal development have been changing all the time.

Nowadays the established life styles and forms of human interaction are a subject of conversion. The main direction of progress is focused on the technologies for fulfillment and effective use of human potential (the so-called 'high-hume technologies'). The new ideas of substituting a biological development with a technological one, of integrating technology and human body, of full automation, etc. are rapidly gaining momentum. In other words, "we are witnessing a change in the cultural 'human code' and the formation of its new axiological and behavioral contours" [1]. In this regard, the major existential question is what is appropriate for the fulfillment considering everything essentially possible and technologically feasible from a scientific point of view? The answer will be the basis for circumstances, whether our radically changed sci- and techno- world will stay human and what values will prevail there.

Of course, education must strive to match the pace of society's change, to seek ways of designing new systematical links with different fields of activity. Therefore, it must be inherent in its nature. This implies the presence of interdisciplinary courses in university curricula that contain information on the up-to-date inventions, methods, technologies and the application of global information resources. A modern innovative training should develop an 'acting human', who will possess not only knowledge within his or her profession after graduation, but also a holistic system of scientific knowledge, research methodology, creative thinking, awareness of the consequences of one's different activities typical for technological civilization. In this respect, the integration of the natural and humanitarian sciences, cultural and professional training are gaining great importance.

II. AMBIVALENT NATURE OF INFORMATION TECHNOLOGY IMPACT

The information technologies became an integral part of modern life. They actively and freely penetrate into everyday life, different spheres of material production, science and culture. There is a process of development of a qualitatively different society – an informative one distinguished by information as the main engine of the civilization progress, high activity and huge amounts of information exchange. Expansion of personal computers, broadcast satellites, online channels and Internet have led to drastic transformation of the culture of the late 20th - early 21st centuries. Technologies allow people, who are in a "networked world", to overcome limits of traditional communications. Simultaneously some new types of social behavior of an individual are constructed – they are an alternative to the historically evolved relations in the real society.

The use of information technology in the learning process became a megatrend of contemporary education. Information and communication education technologies (training multimedia courses, simulators, webinars,

conference calls, etc.) significantly affect the quality of student training. During swift computerization of educational activities, some socio-psychological problems of the process began to appear.

Philosophers, psychologists, doctors, sociologists, ecologists and other experts started to pay more attention to the fact that the information technology impact on human is ambivalent. There are both advantages and some undesirable aspects associated with its significant and yet insufficiently studied effect on personal mental functions, on personality and development possibilities. It is evident today that an uncontrolled use of information technologies might have some negative consequences that may block any developmental potential [2]. It would be an unforgivable mistake not to consider this while building the IT-development concepts within the education system.

Among alleged negative impacts of the modern information technology use, as a rule, on the first place is the conceivable harm to health (e.g., after an ongoing and uncontrolled computer use, or caused by an addiction to computer games, etc.). This can be avoided quite easily with the aid of certain restrictions imposed by experts in the field of hygiene, psychology and pedagogy. However, a haphazard, pedagogically ungrounded use of modern information technology tools has become more common. In particular, there are problems of noncompliance with the didactic teaching principles, using tools just for the fact of usage, and the predominance of game components over educational ones. Thus, the use of software tools that are oriented to play activity often brings the entire student's work to some mindless execution of a primitive command set, to some automatic presses. Indeed, such activity is not conducive to the development of educational material and does not bring positive results either in individual growth of a student or in intensification of the learning process [3].

III. Technological Transformation of Mental Functions

The increasingly huge technological transformation of mental functions is of a greater concern. The experience of the previous decades has shown that Internet sources are shaping up a fundamentally new environment of mental processes' functioning and evolution. The data flow that constantly goes through a person excites a mind by its abundance, depriving people of the opportunity to respond to the situation adequately. It makes a person feel depressed and respond more sharply to external stimuli. From an expert point of view, the constant surfing through Internet for particular information and checking e-mails bring a negative impact on the Internet user's mental state [4]. In such a state the chances for an adequate reflection, including self-reflection, are decreasing and the ability to make informed decisions is being significantly reduced.

Another dangerous trend of the strong and often uncontrolled integration of 'facilitating' technologies is the steady substitution of intellectual human abilities with different technical innovations. It had been discovered during a special research that one of the first 'victims' of technological transformations was the ability to count, which has the close direct relationship with the level and style of thinking, with the abilities to abstract, to generalize, etc. Because of the spread of calculators and computers, there is a sharp decrease in the need in the 'independent' account. The gradual loss of calculating skills has been recorded (counting, folding and backwards multiplying, taking roots, exponentiation, etc.) [5]. The calculation is transforming into a motor skill, wherein only the recognition of numerals is left.

When switching to the keyboard, major modifications were subjected to a motor structure of writing. Researchers conclude, "From a psychological point of view, calligraphy is one of the examples of 'formal education', aiming not at the assimilation of specific knowledge, but at the development of cognitive skills and abilities. In this sense, the writing is quite a convenient didactic practice to train fine motor skills of hands and arbitrary regulation" [6]. In addition, the automatic spell checking and correction of grammar errors installed in modern text programs produce a neglect attitude to spelling and language rules [7].

Serious cognitive consequences are produced by the modification of reading procedure. Books' replacement by other devices of information transmission has brought fundamental changes in the structure of reading and readers' capabilities. The result is a significant qualitative transformation of oral speech. In particular, it has been discovered that the vocabulary of younger generation representatives decreased almost by half [8]. The negative impacts have been recorded in the sphere of grammar, which is directly related to the subtle aspects of mental activity that can be lost after its dysfunction.

IV. The "Google effect" and the Tendency of Mental Manipulation

The depletion of lexical experience is not the only problem of the fundamentally changing the IT environment. There is a growing tendency of replacing reading or listening by viewing images or videos. Their perception is much easier than of a long text that requires considerable focus, concentration, memory, etc. The formation of the so-called 'clip consciousness' is accompanied by injury to the brain and central nervous system. This process, which particularly affects children and youth, develops unnoticed and eventually leads, figuratively speaking, to a 'digital split' of the brain structures [9]. The reason is that a clip or a slogan, being bright, impressive images of a situation and the accompanying sentiments, due to their unusualness to evolutionary and historically developed algorithms of mental perception, are literally being 'imprinted' in one's brain. The need for systematic knowledge is replaced with a fragmented information, developing the reluctance to read, the inability to concentrate, to analyze, to generalize and to explore the world and inner self [10].

The replacement of traditional paper books with electronic ones also accelerate the technological transformation of mental functions. Experts are inclined to assume that the possibilities inherent in the gadgets disaccustom readers to think critically [11]. There is a

significant difference in memory work done by people who read more electronic texts and the adherents of paper book reading (‘the same old way’): the former retain more general information while reading, the latter – more narrow, specific. In general, e-books are more like ‘machines of information and communication’; they cannot provide us with a slow and thoughtful reading. In this regard, it is noted the falsity of the practice to convert textbooks for secondary schools and universities entirely into electronic form, since comprehension of texts with a large ‘intellectual load’ is difficult with such books [12].

The study of information technology users’ cognitive characteristics also concerns the phenomenon of ‘multitasking’. Active Internet users tend to show high scores in dealing with multiple tasks. However, experts note that a long-term simultaneous solution of many problems leads to the increased cerebral resources exhaustion due to the high ‘cost’, ‘energy capacity’ for task switching. Researches show that in this case "the depth of information processing is seriously undermined, the content is remembered worse, which may be critical for the educational environment" [13].

There are serious concerns about the constantly growing number of adherents of the position called by the contemporary psychiatry and psychology the ‘Google effect’. More and more young people arrive at the conclusion that they do not need the system of knowledge, which requires considerable intellectual efforts, time and money to gain and use. Instead, a brain function is being much better performed by Internet. Indeed, an active Internet user does not need to memorize tons of information, which can be taken immediately. However, such position is very dangerous for the cognitive abilities: "Using Internet resources for information can influence mind of a user, affecting his memory as a system for organization of information for future activities" [14]. Jean Baudrillard noted, "To trust your intelligence to a machine is to refuse any claim for knowledge" [15].

The above data indicates possible change in the structural organization of functional systems responsible for intellectual abilities of active Internet users (practically all young people up to 30 years). The consequences do not keep themselves waiting long. Thus, the President of the Russian National Research Centre "Kurchatov Institute" Mikhail Kovalchuk, while discussing the challenges of formation of young specialists, the necessity of training specialists to navigate interdisciplinary space of technoscience, noted, "The majority of today's youth is not ready to listen, speak or perceive, and this is due to their fascination with computers, Internet, pseudo awareness. It is a tragedy—people are controlled by a keystroke. Therefore, our task is to select those students with no such clustered mind, for whatever reason. Those, who retain the thinking skills" [16].

The scale of new knowledge significantly increases, Internet changes the nature of its perception fundamentally. This entails another serious problem. Information is usually ‘ready done’, i.e. it has been already carefully processed and formed. Experts note, "The sooner the process of involvement into the process of Network use takes place, the more a person learns to absorb the prepared estimates, judgments and conclusions. People are ‘ingesting’ processed (‘inanimate’) information that does not require any extra analysis or individual assessment" [17]. The flow of information falls onto people, stunning them, erasing by its spontaneity the boundaries between everything necessary and unnecessary, good and bad, moral and immoral. This poses a threat to the modern society—the new emerging identity can cause intellectual and spiritual degradation.

We cannot ignore the fact that today there are many techniques of manipulating people (social, humanitarian, scientific and technocratic). The meaningful impact on the consciousness and behavior of a modern man with the help of efficient technologies based on "the latest developments in the field of neurolinguistic programming, verbal-communicative skills of manipulation, provoking destructive energy, exploiting human vices and turning them into profitable industry is a reality" [18]. Thus, in the era of information and communication technologies the opportunities expands, on the one hand, the democratization of knowledge, while on the other hand, the effective manipulation of public opinion and behavior.

V. The Mission of Higher Education in the Context of an Informatization-Accelerated Society

In our opinion, the main gateway to the widespread distribution of various methods of human exposure, primarily through mass media, is the falling standard of education in society. However, this trend may yet be reversed. This will require a lot of effort, but it is worth doing. Mastering the scientific thinking will greatly contribute to the displacement of ‘clip consciousness’, imposed by mass culture, and to the formation of the consciousness able to draw a clear line between the rational and mystically irrational. Only a well-educated, harmoniously developed and a well-educated person is able of thinking independently, critically, relying on logical, empirically grounded claims and concepts.

The technological revolution in education is an objective process we are witnessing right now. The challenges of informatization of education are complex and varied. The information technologies in training have already contributed significant changes into the educational process and affected students’ results. The opinion, which is not so shocking nowadays, is that "the practice of lecturing on the record matches the situation of the middle of the last century. Today, the teacher only accompanies, advises and monitors the process, becomes a Tutor in the full sense, since any direct contact with a student becomes more and more virtual or remote" [19].

VI. Conclusion

Changes are inevitable, but their nature and impact are still not fully realized, and the advantages and disadvantages have been only outlined. Analysis of scientific researches on the problems of informatization of education indicates the

need for a thorough, comprehensive study of pedagogical expediency of software and computer systems usage.

In our opinion, in the course of active integration of information technologies for the purpose of intensification and improvement of the quality of educational process it is necessary not to forget the most important thing—no matter how tempting are the innovations, whatever unique capabilities they may possess, the priority of the Hippocratic principle "Do no harm" should remain. For this reason, it is necessary to conduct a psycho-pedagogical research on the peculiarities of the Informatization of education, as well as methods for the efficient and safe usage of media sources in education.

Undoubtedly, the education must be aimed at tomorrow. However, this aspiration should be based on careful examination of any possible undesirable consequences of the use of computer devices in the learning process, because they can be irreversible. This is a serious challenge to the pedagogical science and the education system as a whole.

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