Investigation of virtual reality concept based on system analysis of conceptual series

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Abstract. The paper covers approaches to the definition of virtual reality from the point of view of the humanitarian sciences and technology. Each approach analyzing problems of concept perception of methods interpreted by representatives of philosophy, psychology and sociology is singled out. Terminological analysis of the basic concepts is carried out and their refinement is constructed in the process of comparing the concepts of virtuality and virtual reality. Using the analysis of selected sources, a number of singularity characteristics of the given concept are singled out and its definition is specified. Results consist in combining the interpretation of all approaches to determine the concept of virtual reality. Due to the use of a comprehensive approach to the definition of the investigated concept, which allows us to consider the object of research as a set of elements that are subject to study with the help of a corresponding set of methods, one can conclude that the concept under study is complex and multifaceted. The authors noted that virtual reality technologies have a flexible concept depending on the field of application.

1. Introduction

Virtual reality is a rapidly developing technology that promises to change radically the lives of contemporaries, artificially stimulating their feelings, working on a mind that becomes receptive and accepts a different version of reality. Virtual reality (VR) “can send one to the altitude of the flight of an aircraft, teleport one to another continent”, make anybody a participant in a videoconferencing due to the effect of immersion. Already now there is an opportunity for communication within new worlds, each of which can be real or artificially created. At present, VR generates realistic images, sounds and other sensations to replace a real environment, or to create non-realistic settings. A user can access VR through visual, auditory and haptic sensomotor channels [1].

The emergence of new information and communication technologies (ICT) affects the modernization of the entire structure of social production, which entails a change in the forms and nature of human labor in various areas of its activities. One considers it important to note that the development of engineering and technology has led to the creation of a virtual environment.
Therefore, it is important to understand what the phenomenon of virtuality is and what the approaches of different authors to these definitions are.

This paper investigates affordances of use of VR technologies, actualizes the problem of theoretical and methodological consideration of the key concepts of virtual reality.

2. Main Section

A characteristic feature of the first quarter of the XXI century is the growing influence of information and communication technologies on the development of society. At the same time, the developing technologies of virtual reality exert the most powerful influence on the human being and the objective world surrounding it. The study of the concept of virtual reality deals with representatives of both humanitarinian and natural and technical sciences. For example, a virtual approach is already used in history, geography. J. Lanier in the 80s of the twentieth century associated the expression “virtual reality” with the idea of cyberspace, with the user's conviction that by replacing the natural sensory information produced by the computer, he (the user) is actually in another place [2]. Most domestic and foreign scientists [3, 4, 5] consider the concept of virtual reality as a technically constructed environment, the formation and management of elements similar to material or imaginary, based on their three-dimensional graphical representation, simulation of their object properties, effects, properties and independent presence in space. In addition, the creation of hardware that uses computer technology, while influencing virtual elements, is perceived by man in a manner similar to ordinary reality.

However, despite the wide use of the term virtual reality, the understanding of the object of research is far from unambiguous. Many researchers point out rightly that the very term virtual reality is a strange combination. In scientific research on the history of philosophy [4], there was a removal of the terms "virtus" (translated from the latin language - energy, force, imaginary). Interesting variants of generalizations of various interpretations of the virtual reality concept definition, its nature, structure and function, prospects for the development were proposed by domestic scientists (Rozin V M, Kovalevskaya E V, Babenko V A, Solopov P E, Borschikov S A, etc.).

The main approaches to interpreting virtual reality and its varieties (computer virtual reality, "altered states" of consciousness, "ordinary" psyche) are considered in the works of foreign (Kroner A, Weistein M) and Russian (Korsuntsev I G, Afanasyeva V V, Voronov A I) scientists. Geddy K, Haybs B uses this concept as a synonym for illusory and abnormal [6]. Grimak L P regards computer virtual reality as a hallucination [7]. Belyaev V P characterizes virtual reality as a reality that acts as a result of fantasy, imagination or the logical construction of the visible world [8]. A number of similar concepts are found in the works of Gavrilo D and Olegov S. Virtual reality is understood as a conditioned and insufficient reality (Kovalevskaya E V, Orekhov S I, Lobanov S D, Korsuntsev I G, Prilukova E K, etc.) since "the emergence of virtual reality is due to interaction: a) technical reality; b) human activity; c) "social-psychic reality", so the emerged reality is a reality "put as representative" [9].

The variety of interpretations, aspects, methods of research that exist today can in many ways be explained by the increasing awareness of the researchers of the extraordinary complexity and complexity of virtual reality.

Philosophy gives the most general interpretation of any concept; the philosophical interpretation of the concept of "virtual" goes back to the works of the French philosopher. The interrelation and interdependence of the socio-technological and ontological aspects of Baudrillard J are evidenced by the idea of reality as virtual and endowed with technological features: informativity, computability, operationality, etc. [8].

In his works, Baudrillard J addresses the present cultural situation and offers a vision of reality through the prism of the presence of the phenomenon of simulation in it. According to this thinker, the postmodern era is the time of total simulation. Simulation in the interpretation of Baudrillard J means the acquisition of signs, images, symbols of self-sufficient reality. Baudrillard J believes that today the
development of human civilization is moving towards the establishment of a world of simulations that literally spread to all spheres of social life [5].

Summarizing the consideration of the concept of virtual reality Baudrillard J, it is worth noting that the basic for the reconstruction of this phenomenon in his concept is the theory of simulacra. A simulacrum is the image of an absent reality, an empty form, a sign behind which no reality stands. This concept was invented and for the first time used not by Baudrillard J. Even for Plato, the simulacrum designated a "copy of copies". At the turn of postmodernism, this term was introduced by Bataille J and later interpreted by Deleuze J, Klossowski P, etc. However, it was precisely in Baudrillard's philosophy where its most vivid embodiment was found. According to Baudrillard J, an infinite reproduction of objects leads ultimately to the growth of their audiovisual images that define the space of hyperreality.

The reality evaporates, perishes in hyperrealism from one reproduction to another, from one copy to another. As a result of such celebration of the signifier, the world turns into a sign, virtual reality. The virtual reality of Baudrillard J is perfect in terms of consistency, absolutely homogenized and operational. Consideration of virtuality, filled with nostalgia for the reality, inevitably leads Baudrillard J to the question of finding guarantors for the existence of culture, its authenticity, which in many ways remains open. On the other hand, it is widely accepted that the opposite of virtual is a material for other realities, such as probability [5]. In sociology, the "ontological ambiguity of virtuality" is noted, which reflects its symbolic-imaginary and instrumental nature [8].

The potential impact of VR on the individual and society as a whole is emphasized by American philosopher Cline S, who predicts the possibility of developing methods using VR to influence human behavior, interpersonal communication and cognition [5]. In [11] seven different VR concepts have been singled out and described: imitation, interaction, artificiality, immersion, telepresence, total immersion and network communication. As one spends more time in virtual space, in the author's opinion, gradual "migration to virtual space" can occur, which will lead to significant changes in the person himself, as well as in the economy, worldview and culture [11].

In this context, and taking into account the psychosocial storm triggered by numerous powerful technological, demographic, ecological, cultural and other changes, it is necessary to intensify interdisciplinary scientific research on the potential negative social consequences of developing technologies, including virtual reality [9].

In this regard, it seems appropriate to consider the interpretation of the concepts of "virtuality" and "virtual reality" in psychology. Analysis of scientific research in psychology has shown that these concepts are considered in two main aspects: the study of the phenomenon of altered states of consciousness and with respect to immersive modeling, which assumes a relatively high likelihood of VR. Studies in the first direction are far from the context of this article, while in scientific papers on the second direction virtual reality is treated as an interactive immersion environment based on three-dimensional real-time graphic images generated by a computer" [3]. In this case immersion (the effect of presence) is achieved by the combined impact of technological and psychological factors. It should be noted that in the treatment of VR, the emphasis is shifted towards the visual part or visual illusion, although the phenomenon of virtual reality is much broader and includes, in addition to visual perception, also auditory (audio/auditory illusions) and tactile, i.e. Virtually all modalities are involved in VR. As noted above, everything is determined only by the implemented technical and technological capabilities.

In pedagogical studies, one can find different approaches to the interpretation of the concept of virtuality, but with reference to modern trends in the development of VR, the most interesting is the socio-centrist model of virtualization [4], in the context of which virtualization means "any substitution of reality by its simulation (image) reality: immateriality of impact, conditionality of parameters, ephemerality. Virtual reality is nothing but the space of simulacra, which, in contrast to actual reality, expressing integrity, stability and completeness, is the source of diversity and multeity [3].
Within the framework of the technological approach, in the interpretations of the concepts virtuality and virtual reality, the accents shift towards the description of four technological components [13]: effectors (input and output devices), a reality simulator (computer and sensory synthesis equipment), application (software) and geometry (information in the application that describes the physical attributes of objects). The technologies involved in each of these components will develop rapidly over the next twenty years, initiating the development of VR research in various scientific fields, both natural sciences and the humanities.

3. Results
As it has been already noted above, VR has the possibility of mass psychosocial impact, which has actualized the research in which VR is the object and subject of studies devoted to cognitive, experimental and social psychology, psychology of communication, clinical psychology. In pedagogical psychology, a special place is occupied by researching the possibilities of using VR in general and vocational education. At the same time, virtual reality has the resources to change human society, which initiates large-scale interdisciplinary research on the possible consequences of this powerful, transformative technology. This research allows us to conclude that the concept of "virtual reality", which was studied in the course of studying scientific literature, is complex and multifaceted.

4. Conclusion
There is a vast field of thinking about virtuality. Philosophy and cultural studies have yet to reveal how closely and deeply ideas about virtuality are intertwined with today's processes. Obviously, these processes reflect the growing tendency to person’s perception of reality as a multi-dimensional reality. Undoubtedly, all these kinds of reality are very close to the features of virtual reality, if not directly belong to it. In a sense, people are already approaching the emergence of a "virtualistic worldview" and a person is focused on virtuality, oriented at all levels of one’s activity, beginning with the bodily. In the field of computer technology and mass culture, instantly discrete, flashing and changing blocks, the human device, is completely rebuilt and configured for virtuality and enters a special virtual mode. And the consequences of this have not yet been fully appreciated.

Analysis of approaches in different areas of knowledge, starting from the philosophical approach, has shown that at the moment the interpretation of the concept of virtual reality is ambiguous; there are many definitions of this concept given in the field of application and the direction of research. An exact definition of the concept of virtuality cannot come from any of the approaches, but all together they give a complete picture of the description of the concepts of "virtuality" and "virtual reality".

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