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Influence of Modern Technologies on Human Cognition and Behaviour

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Abstract

In the modern era, technology is well developed and we are surrounded by most of such technologies. We are so used to of these technologies that even unknowingly these either directly or indirectly are influencing our thinking style, behavior pattern, feelings and our actions; in short, overall lifestyle. Virtual Reality (VR) is a stimulated three-dimensional environment created by computer processing and can be perceived through users' senses. Artificial Intelligence (AI) is a part of computer science which produces programs that simulates human intelligence. It is not an exaggeration that we are so much dependent on the technology today, which is furthermore increasing only. There is an urgent need to be mindful, and become aware to about this in order to restrict this dependency including the harmful effect of these technologies. The main purpose of the present research is to evaluate how much modern technologies including virtual reality and artificial intelligence influencing our cognition and behaviour including our thoughts, feelings and actions; and whether they are only helpful or do they have some adverse effects also. After thoroughly reviewing the literature related to the present study it can be concluded that VR and AI either directly or indirectly are influencing our cognition and behaviour including our thoughts, feelings and actions. Emotions and feelings are associated with AI for producing extraordinary results and intervening in important social roles. In virtual environment a person may think, feel and behave as if the event were real despite knowing that it is not.

Keywords: Technology; VR; AI; Thoughts; Behavior; Feelings; Actions

Abbreviations: VR: Virtual Reality; AI: Artificial Intelligence; VRET: Virtual Reality Exposure Therapy.

Introduction

Virtual Reality is a stimulated 3-dimensional environment created by computer processing and can be perceived through users' senses. Virtual reality is a new set of electronic technologies that find applications in various fields which may include education, training, urban planning, medicine, entertainment, research etc. Applications of VR may include entertainment such as video games, 3-D cinema, education, business etc. Immersive virtual environments may interrupt with our sensory system as we may feel to be in the virtual environment but we actually are not there. Virtual reality is also used in digital industry and enhance the visual effect of movies. The movies provide people many ways for interacting with VR technologies [1]. VR headsets are now used in such technologies which helps in generating more realistic image, sound or other such sensation which helps any person to feel as being present in the same virtual environment. Any individual using VR equipment may explore the artificial

world, move and interact with virtual feature and objects. In psychological studies, VR is providing less expensive tools to study and replicate any interaction in control environments [2]. VR may also be used as a therapeutic intervention form. Such as, virtual reality exposure therapy (VRET), an exposure therapy form which helps to treat anxiety disorder including PTSD and phobia [3,4]. VR programs are now also used in rehabilitation process and in many diseases. VE technique is now also used in certain therapies to treat certain conditions such as in treating phobias. Such as in acrophobia or fear of height. Virtual environment exposure may help in creating virtual conditions like elevator ride or bridge scenario. A study using VE in graded exposure therapy depicted that an experimental group exhibited a significant reduction in anxiety over an 8-weeks period, in comparison with control group [5]. VR provide visualization and interaction in virtual world which is very similar to the real world. Compared to traditional physical learning method, e-learning is much flexible leaning method which removes the barriers of time, distance and space [6]. A study conducted on 135 graduate students revealed that virtual reality would affect reflective thinking and indirectly enhance perceived learning effectiveness [7]. Thus, it can help in enhancing learning behavior in students. VR based e-learning systems helps to get instant feedback from educator and to maintain real-time communication which further improves perceived learning effectiveness. The perception of VR is achieved by wearing special VR goggles and other such equipment that allow the perception system to be immersed in a VR simulation. The level of computer simulation penetration in our senses is directly associated with our immersion in virtual world [8]. A study was conducted on 36 college students with mean age of 20.5 years and who were aware of virtual reality games to compare influence of playing versus watching violent VR games on arousal level, feeling of hostility, and aggressive thought in them. The results revealed that participants who played violent VR games showed more physiological arousal and aggressive thought as compared to those who just observed other participant playing the game [9]. A study was conducted on 48 participants with age range of 23-32 years in which virtual negotiation training system was introduced and used and to study the effectiveness of the system. Self-motivation related statements were integrated into virtual cognition. The results of the study shown that the system significantly increased people's negotiation knowledge and self-efficacy, also self-motivation statements further enhance self-efficacy [10]. VR offer new learning opportunities, especially for training people about body movements including providing physical therapies or practicing exercises. A study conducted on 41 adult participants demonstrated that people learn better with the help of VR than 2-D video-assisted learning environment as per self-reported measure whereas other experiment where a virtual mirror was added to the learning environment improve the ability to see oneself from new angles in real time, subjects learn better in VR according to objective measure of performance [11]. Pain distraction is one of the powerful applications of this process, because the body of an individual is experiencing pain in physical reality but at same time the individual feels him/herself in a virtual world, so perceive less pain. The experience of pain was found to be significantly reduced during physical therapy given for severe burn treatment, where the patient was allowed to experience a head-mounted display system delivered via virtual reality [12].

Artificial Intelligence (AI) is a part of computer science which produces programs that simulates human intelligence. AI can be defined as the simulation of human intelligence in machines which is programmed such that they can think same as human beings and copy their actions. The New Oxford Dictionary defines Artificial Intelligence as "The theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages." AI application includes advance web search engine, recommendation system, understanding speech, automatic driving vehicles, automatic decision-making so on. It has been programmed such that it can replicate the cognitive abilities of the human brain. According to Turkle [13] computer is an "evocative object that fascinates, disturbs equanimity, and precipitates thoughts". Now-a-days conscious interaction between an individual and computers have been started such as SIRI and Alexa. Emojis suggest us something else rather than what was in our mind. AI-based learning system enhances the emergence of creative AI along with improved search algorithms [14]. Such as robot-feet which helps a robot to learn about how to walk. Creativity research has become a small vibrant area in AI researches for decades. One of such achievement in this area is created by companies including Autodesk. Autodesk is also a pioneer AI-driven designing tool that empowers human designers to explore countless opportunities to discover new and innovative design. Autodesk also developed new generative design algorithm which expand creative possibilities for human designer [15]. The core idea is that media acts as "extensions" of our senses and allow us to restructure our perceptual and cognitive possibilities. So, a person's sensorium can be more generally, modulated by the presence of a tool, and the effect can involve different sensorial channels: vision, touch, and the whole phenomenal experience of the subject [16]. A study conducted on 266 participants examined individual qualitative description of personal encounters with any AIs exhibiting characteristics of mind. Extraordinary outcomes of AI amaze people; these outcomes are associated with

mind perception. Expected outcomes lead to satisfactory and happy emotional response whereas poor results may lead to disappointment [17,18]. The research also suggests that humans may experience emotions during interaction with minded AI. AIs and robots are generally considered to have moderate agentic mind but a weak experiential mind [19]. Thus, it can be said that when we evaluate the capabilities of AI and robots, there is a distinction between their abilities to perform tasks and their capacity for subjective experience. When AI engages in social interactions, individuals might react with specific emotions based on the situation [20]. AI invading individual space can usually elicit a range of reactions [21,22] individuals might be surprise, curious or frightened by such intrusions. AI has a profound impact on the development of many sectors of economy, education and overall quality of life of society as a whole [23]. According to Russell and Norwig, the term "artificial intelligence" is used "when a machine mimics the cognitive functions associated with other human minds, such as learning and problem-solving" [24]. It can be assumed that when any individual seek advice about how to behave or what decision to make, the action of AI can at least serve as a guide to them [25]. A study was conducted on 1500 participants with age range of 18-73, based on 2 experiments where subjects are asked to take urgent decision in any critical situation where they did not know which action was correct. First experiment was online in which half of the participants did not receive any kind of hint whereas rest were familiarized with AI decision and in second experiment which was in laboratory the participants could see how a robot AI would take the decision. Yet, AI every time took a complete absurd decision. The results stated that in first experiment first half sample took decision on their own justified way whereas out of the rest half more than 33 percent sample copy the decision of AI as it was. In the second experiment more than 85% copy the AI decision [26].

One should take care about own health and safety while using VR. Many symptoms can be seen by prolonged use of VR which may slow down the proliferation of technology. Many VR systems have warnings mentioned on them which may include seizure, development related issues etc. About 0.025% people experience such symptoms. Motion sickness, eyestrains, headache, restlessness are its common adverse effects. Due to its heavy weigh children are advised not to use VR headsets [27]. VR sickness or cybersickness occur when an individual is exposed to VE and experience motion sickness like symptoms [28]. Females and males both are found to be affected 77% and 33% respectively by headset-induced symptoms [29,30]. Data from eye tracking sensors, which are expected to become standard features in VR headsets, could indirectly reveal information about user's ethnicity, personality trait, fear, emotion, interest, skill, and physical and mental health conditions [31].

Conclusion

After thoroughly studying the research papers related to the present review it is concluded that modern technologies including VR and AI either directly or indirectly are influencing our cognition and behaviour which includes our thoughts, feelings and actions. Emotions and feelings are associated with AI for producing extraordinary results and is intervening in important social roles. In virtual environment, a person may think, feel and behave as if the event is real despite knowing that it is not. Users in a virtual environment can move an object through its virtual representation in the same virtual environment and feel as if they are touching the object with the tip of a tool or stick which they are holding in their hands. When this virtual scene collides against virtual objects, the user may feel it and it would be very convincing. Many researches have been conducted on the effects of haptic feedback. Researchers have examined the effect of haptics on the sense of being with others in a virtual environment [32-35]. VR and AI both influence reflective thinking and indirectly enhance perceived learning outcomes. There is no doubt in that both the technologies are very useful for the development and in our daily life. Our dependency on these technologies is being increased day by day. There is an immediate need of being mindful, and become aware to restrict the over usefulness and harmful effect of these technologies.

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