



Impact of Games on People: A Comprehensive Review

Hoshang Kolivand^{1,2,3}, Shiva Asadianfam⁴(✉), and Daniel Wrotkowski¹

¹ Faculty of Engineering and Technology, School of Computer Science and Mathematics,
Liverpool John Moores University (LJMU), Liverpool L3 3AF, UK

h.kolivand@ljmu.ac.uk

² School of Computing and Digital Technologies, Staffordshire University, Stoke-on-Trent, UK

³ Bharath Institute of Higher Education and Research, Chennai, India

⁴ Department of Computer Engineering, Qom Branch, Islamic Azad University, Qom, Iran

sh_asadianfam_stu@qom-iaau.ac.ir

Abstract. It is clear from the beginning that video games are no cure for anything, like books and movies, they are often used in an antisocial way. Games clearly are a way of seeing reality differently through a person's eyes, and mostly nowadays, the games commonly come with violence and sometimes with abusive themes. Critics say that the things people learn from playing video games are not often the things that they expect. However, even the crudest critics agree with the ways we learn something from video games. Above the multibillion-dollar industry, higher than a fascinating toy for both children and adults or more than a passage to computer proficiency, the video game is highly profitable in ways that let people engage in a new world. It allows the player to think, speak, and act in a new way. Unquestionably, players come to possess roles that are unapproachable to them. This paper presents a comprehensive review of games and the impact of video games on them. Also, we will point out the qualities of Virtual Reality and its history. We will also point out the importance of development, which gives birth to new technology.

Keywords: Digital games · Games & Simulation · Integrated learning systems · Video games

1 Introduction

In the past, the form of digital games has initially been brimmed with a variety of different experiments and changes based on each new electronic creation. For example, a valve, silicon circuits, and televisions. This change has helped the researchers in many ways by seeking ways of improving the value of entertainment we could get from the new technology. Nowadays, the mass of older games can still be playable through purchasing the games on online auctions or through retro gaming companies or from using modern technology, which allows people to use the internet to play games on emulation software [1]. The way of defining the first computer games is somewhat

debatable, with claims pointing at the explanations and the chronological way of looking at it. In 1952, Alexander Douglas created a version of naught and crosses, which was playable on EDSAC, a first stored-program computer that ran a regular computing service [2]. In 1972, the world's first console was invented, Magnavox Odyssey, which sold over 100,000 units in a year. The console came in with a controller and a see-through screen overlay [1].

Video games allow the player to think, speak, and act in a new way. Unquestionably, players come to possess roles that are unapproachable to them [3]. These upper-class virtual worlds are indeed what make video games a powerful way of learning. However, in video games, learning is no longer a way of encountering words and symbols which are separated from the thing's person may learn from these words and symbols or what they are referred. The inverse square law of gravitational excitement is no longer a thing that is possible to be understood from an equation. As a substitute, students can advance their virtual experience by walking in a smaller world than Earth [3]. A style of games like mud-type games, online gaming is not a new concept. Online gaming usually was discarded until now in ways it allows people to play on their personal computers since consoles were not online compatible. However, when Sega Dreamcast was created, all of the popular consoles include such an option, but the percentage of games is not very high. Online gaming is appealing to games, and console developers are far higher than one offline game as online gaming generates monthly income from monthly subscriptions. The reason for this is the future of widespread mass public gaming [1]. In modern days, most of the players are lone teenagers who are seated in front of the computer, playing, which can cause a social phenomenon. An example can be a massively multiplayer online game, in which millions of gamers play at the same time with their reasoning for participation in virtual worlds with their political views and cultures [3]. This paper presents a comprehensive review of games and the impact of video games on them.

This paper is structured as follows. In Sect. 2, the background information required for a better understanding of video games presented in this paper is discussed. In Sect. 3, the related studies on the impact of video games on people are described in detail. Finally, the general conclusion of this paper is explained in Sect. 4.

2 Background

Nowadays, video games are to be said that they started with simple graphics such as Pong, Donkey Kong, Battle Zone, or Centipede. Pong was invented in 1972, which was a relatively basic game that was relative to Ping-Pong, but Pac-Man, which was invented in 1980, showed a significant step forward for its graphical design. It started with it being an average arcade game that leaped through popularity and then was created onto a hugely successful home version. Pac-Man was the most popular video game in America for several years. The console that the gamers used was commonly the ones to generate a sharp video image onto the screen with characters and loud sound effects. Pac-Man, the arcade version, had an 84-circuit chip integrated into the central logical board that backs in the days was one of the reliable devices. The first home console was an all right but less powerful and for most of the gamers not satisfying, but Atari, which created the games, combined a special microprocessor dotting to generate an improved video display and sounds [4].

Over the past 30 years, games have become one of the factors of the modern world. Games have become part of the lives of many people and are prevalent not just in the United States but all over the world. Games are very recognized and have a significant impact on people. There are around two billion players in the world [5], which means every 4th person in the world is a player, and the game is one of the most successful things in our world [6]. In the United States alone, computers and consoles in 2001 were very successful because their earnings exceeded \$ 6.35 billion, and in the world arena, about \$ 19 billion (IDSA 2002). When a foreign company such as Sony released the first Sony PlayStation in the United States in less than 24 h, it earned 150 million dollars, while taking advantage of any competitor at the time in the United States. Since then, this console has become part of one of four homes in the United States, forming a group of 25 million Americans who use the services of Sony [7]. When games began to gain in importance, and the scale at which they began to spread, people began to pay more and more attention to how games, console, and the computer are affecting people, and in particular, the largest sector of people using games: children. So, games become part of the lives of many people, especially children, which suggests that educators still have doubts about whether this is good or bad and what changes it can bring to their student's life. Some educators began to doubt the games and began to fear that the games could increase aggression or violence. Also, it can change the way in how children behave in contact with other children and even isolate themselves from the rest [8]. On the other hand, other educators see games as a huge success. How games motivate them with the help of a vast digital environment; they want to research how motivational components of popular video games might be integrated into the instructional design [9].

3 Related Studies on the Impact of Video Games on People

3.1 Games and People

The results of one study shows that using games, television or the Internet for several hours a day has a significant impact on children during their adolescence stage [10]. One of the factors of this process is the younger age of the person who begins to use technology. For this reason, even teachers pay attention to how games and the media have an impact on children [11]. Games are so present in the lives of many children, with 97% of these kids in the United States alone spending at least an hour playing games. A large number of psychologists researched the effects of playing games had adverse effects such as depression, violence or addiction. Although games have adverse effects, more research is still needed to understand better how games affect the human mind. Games are changing all the time and how a person perceives these games also change [12, 13].

3.1.1 Impact of Games on Children

Recently, there have also been studies that aim to find the benefits of using games correctly. Because there are games that do not contain much violence but are aimed at developing skills such as concentration, cognitive, building emotions, and learning about social aspects, combining various positive and developmental aspects, including

social and medial aspects, can result in improved psychosocial benefits [12]. In research [14] conducted in the field of psychology, the result showed that playing games relate to factors such as coordination and spatial skills as well as visual scanning and hearing improvement. However, studies with children have shown that games that contain violence increase aggression and affect children's behavior [14]. Playing games that contain various physical exercises has effects such as increased heart rate and metabolism, tendonitis, and seizures. Playing games can cause aggressive behavior. So far, there is no direct connection between the game and functioning in school and psychopathology [11]. Although games with harmful aspects are full of adverse effects, they are games that are full of good things and are very important and useful as a learning tool. Most studies, however, are still not fully defined in this matter because there are still not many long-term studies, and many studies give different results [11].

3.1.2 Violence in Games

The potential impact that games which include violence may spread violence and aggression among young people is a topic among scientists, researchers, and the majority of society for many years. Currently, finding the leading cause is difficult because everyone has their opinion on this matter, and it is difficult to know one main reason. So, scholars have debated on this issue all the time. Some scholars have found that the impact of games that contain violence and aggression began to show up and bring to the more significant part of society [15, 16]. Other scientists have found that the adverse effects of these games have little effect on young people and can only affect individuals depending on the circumstances and susceptibility to violence [17–19]. Other scholars argue that the impact of games on behavior and susceptibility to aggression in young people is zero, or the methods they use are not good enough to determine or draw any conclusions due to methodological difficulties or problems [20–22]. Some researchers have stated through their research that playing games cause more and more violent feelings and thoughts, measured by inventory [23–25]. Others studied children how they would play with other children after they had previously played games with violence, as demonstrated by the increase in aggressive play [26]. Other studies on similar situations have shown a more aggressive behavior of only girls [27]. Other researchers have shown increased aggression in children who played with violence than in children who did not play them, and no effects in children who watched television [28]. Recent studies have shown that there are no changes in children who play games with violence [29]. In 1997 there was a shooting in West Paducah, in which a student shot other students, which ended fatally for three students and several victims [30]. Two years later, two other students made the most significant school shooting in the United States at Columbine High School near Denver, Colorado, in the suburbs of Littleton [31]. In addition to the tremendous amount of brutality, violence, and blood, there was another thing that connected these two tragic events. These are video games that have become part of young people from the 70s of the 20th century, which began with the appearance of the first video game [32].

From the psychologists' research on the perpetrators and the circumstances of these two shootings, they were connected by a tremendous desire to play games and in particular, shooters. First of all, it is visible in the other situation where the perpetrators had obsessions for these games in which only shooting and murdering opponents was.

Furthermore, the worst part was the fact that one of the perpetrators adapted this game to a similar scenario of this tragedy that happened [33]. The pattern of results obtained suggests that playing violent games may have an immediate effect on state hostility, but not on state anxiety. Concerning the psychophysiological effects, after many scientific and research studies, it can be concluded that playing games may be hostile to public opinion but does not introduce social anxiety. In contrast, the influence of games on the mind or body is still not entirely clear. Research shows that there are no immediate effects or changes in behavior, but, according to research, games have a more significant impact on women than on men [34]. Studies of people who are already aggressive or playing games like this may have softening effects. However, studies have shown the opposite effect, and playing games with violence may have different effects depending on the aggressiveness of the person, which is consistent with research conducted by the media [35]. That is why what the media say may not be accurate because how the game affects a person is composed of several factors and circumstances. Therefore, people who are more susceptible to games should not play this type of game [36].

3.1.3 Negative Impact of Extended Play In-Game

Technology is the thing that drives our world and the people who use it in everyday life. The development of technical aspects, such as the internet and computers, has promoted the stage of life. In the sector of education and business and, above all, health and entertainment. So, like any great thing or innovation attracts many people, which makes people more and more addicted over time. Well, apart from good self-feelings, electronics devices such as computer or console have several adverse effects [37]:

- **Radiation**
Most monitors have a cathode ray tube (CRT), which causes radiation, this lamp emits X-rays. X-rays are very harmful to health. Insomnia, migraine, and cancer, and tumors may be one of the symptoms. Just placing the laptop on a lap or stomach can lead to male infertility, or such radiation can also cause skin irritation [38].
- **Stress**
Another sign of prolong using a computer for too long is that the user is more likely to experience stress. Stress may be influenced by many factors, such as poor working conditions, poor health, and pressure at work. This condition can lead to constant headaches, fatigue, and low concentration. In the worst case, a susceptible person can lead to depression or mental disorders [37].
- **Obesity**
People who use a computer or console usually use them a few hours a day, sitting all the time comfortably. There are around 2 billion people in the world who are overweight or obese. Such people are less physically active, which, when combined with unhealthy food, gives a terrible mix for health. Children, in particular, are at risk because children and teenagers are the greater society of players. Symptoms occur through obesity, which leads to diabetes and in the worst case, to heart disease [39].
- **Headache**
As well as any prolonged use of a different type of electrical device can cause migraines as well as headaches. According to research, many things cause a headache, such as

weak or dim lighting, various patterns, or image on the computer. Besides, bad posture can also contribute to headaches [37].

- **Vision Problems**

Using the monitor or television for too long is harmful to the eyes. According to research, the long-term use of visual cognition with the electronic screens of a computer, telephone, or tablet leads to computer vision syndrome. The employee who uses the computer spends around 7 h in front of the computer [40].

- **Muscle Problems**

The most common way to use a computer is to sit on a chair in front of a desk. Spend most of the time, look at the monitor that is on the desk. According to research, more extended periods of sitting, whether, on a chair or a couch before the console, the muscles start to be fatigue and sore. There is also numbness in the arms, back, chest, and feet. Furthermore, all this is caused by poor posture when sitting at the computer or the couch for several hours [41].

3.1.4 Phenomena of Popular Games

Throughout the years, the generation of games become more successful, but at the same time, the category they contain is more realistic and gruesome. Brand new video games which are based on CD-ROM type of technology, people often use this technology to create music or for uploading a computer software is changing into a film in which we practically expect of a video game. This type of game is a big step forward that is far beyond the use of simple graphics likes Space Invaders. Space Invaders was so famous for estimated years of 15 to 20 years ago, or small animated cartoon figures created in the Nintendo System that have surpassed the video game market in recent years [42].

A delight phenomenon created by the adventure impacted video games with terms of social, psychological and educational significance, is also regarded by the size of the video game industry. The new evolution of video game character technology and video games influence the storytelling made huge improvement. More and more people start to recognize games, not just games but something where people can experience something new [37]. Most Americans well know the existence of games. Periodically, articles are published about new games in the newspaper or New York Times, was it consistently carries a feature on new games every Thursday on its “Circuits” section. Time and Newsweek magazines also contain articles about the industry and various games, many magazines are fond of video games, and hundreds if not thousands of Internet sites are devoted to video games. Video Game companies created their internet sites where users can find a variety of different information about the specific game. The main component of the video game is interactivity, which can create image-less fiction records, which might be thought of as an original art form version of video games without the use of animated characters. The progression of games covers from relatively coding “bang-em-up” wrestling games to innovation science fiction and adventure games to a postmodern progressive novel [37].

3.1.5 Content of Games Made for Teenagers

These days, children are mainly exposed to violence in video games, the use of blood and sexual themes with gambling, and media remains the source of public health concern. Even so, the content in games played by the older children and adults has not been evaluated or compared with the rating of information assigned to a consumer by the Entertainment Software Rating Board (ESRB). ESRB stands for Entertainment Software Rating Board. This type of board creates, in turn, a rating system that delivers viable purchases of video games (including parents) with approximate age based on the game category, which includes violence, sexual images, and the use of bad/swear words among the players. The ESRB trusts that these guidelines could be used in a way the parents can downsize the child's time play on video games that contains unfit content [43].

The examination of all content descriptors which were trusted to the 396 T-rated video game titles displayed 373 (94%) in the usage of violence, 102 (26%) for blood, 60 (15%) for sexual images and themes, 57 (14%) for swearing, 26 (7%) for the usage of suggestive humour, 6 (2%) for drugs, and none for gambling. We played a random sample of 81 games in which we were able to find that 79 (98%) of players are involved in violence for a moderate of 36% games played. 73 (90%) required a player to injure a character, 56 (69%) required the player to kill, 34 (42%) demonstrated blood, 22 (27%) demonstrated sexual themes, 22 (27%) contained swearing, 12 (15%) showed usage of substances, and 1 (1%) involved gambling [43]. Games were more likely to illustrate the females by making them incompletely nude or were engaged in sexual behaviors other than males. Fifty-one observations were done in which we identified the content that could authorize a content descriptor of 39 video games (48%) that ESRB was not entrusted into the content descriptor. We were also able to find that the ESRB tasked out seven content descriptors for seven games (9%) that were not observed in what content was indicated within the 1 h of the game being played. The content that was examined suggested that the significant amount of the content used in T-rated games will surprise the teenage player and their parents in the presence of the content being used without ESRB content descriptors. Parents and physicians need to be cautious of popular T-rated games that are mostly like to be a root of exposure to a broad range of fantastic content [43].

3.2 Virtual Reality

Virtual reality, also known as VR, is a type of technology that grants permission for a user to interact with a computer-based environment simulation that can be a real-world or an imaginary world. They range from being able to create a game or having a little walk around the virtual universe to being able to stroll around our own dream house also to be able to experience a walk-in alien planet [44].

Virtual reality is a different way in which we can use computers; it rules out the separation between the user and machine, being able to provide more first-hand and unlearned interaction with information [45]. Virtual reality is used everywhere. Users will not be able to imagine life without using Virtual Reality technology. In this paper, we will point out the qualities of Virtual Reality and its history. We will also point out the importance of development, which gives birth to new technology. Nowadays, we use

mail for communication if the person is not sitting next to the user but, by the usage of technology, distance is not a matter. This type of technology contributes to an enormous scope to allow the user to explore the 3D world and users' imagination. It has several applications, from entertainment to product developments. It is still in the development stage with a large scale of users creating their customizable applications and setups to meet their expectations [44].

3.2.1 Use of Virtual Reality in Education

Educating the present and the future generation of children from America to live in an informatics society is included as a critical issue. It is recognized to provide life-long education for people and to support a flexible workplace. Virtual Reality technology is globally proposed as a significant technological advance that can give support for such education. There are many ways in which Virtual Reality is expected to advance learning. One unique capability is the ability to authorize students to visualize mental concepts, to see the events at atomic or planetary scales, and to be able to attend environments. Also, to be able to interact with a variety of events at the time, distance, or safety factors that make it unavailable. These types of activities reinforced by this capability advance the present educational thinking that allows students to better master, retain, and generalize the new knowledge by being actively involved in constructing that knowledge in a learning-by-doing situation [46]. The potential in the usage of Virtual reality to be able to support education is globally recognized. Several programs are designed to be introduced to a significant number of students and teachers. To allow technology has been authenticated. A large number of academic schools have constructed a research program to examine the key issues, and some of the public schools are learning the technology. It is proved to be seen practical use an estimated number of 20 or more public schools and colleges and many more to have been used in evaluations or research efforts. The large scale of educational uses of Virtual Reality technology was able to involve students to use pre-developed Virtual Reality applications in which the students one by one visit the virtual world to be able to learn some of the basic concepts or for example to be able to construct an understanding of different periods in history. Time by time, students may be required to construct their virtual world to lead the research of understanding and display of their grasp of non-scientific or scientific material [46].

Virtual reality was first used to help disabled children, but it has additionally expanded to the field of education. The technology was firstly used for on how to learn to use a wheelchair and driving among the children with sensory-motor disorders, which showed significant results. The success showed supported the search for further usages of Virtual Reality, which eventually led to a new application in science educations. The improvements have since helped the students to learn scientific phenomena and manage experiments in the field of chemistry, physics, and biology [47]. The capabilities of VR technology allow the students to observe the effects of changing physical laws, to see the events of atomic or planetary scale, to be able to picture the abstract concept and to be able to visit environments and interact with them as demonstrated above. Other benefits contain the ability to acknowledge good practices such as demonstrate numeral representations and placing at least more or fewer instructions under the learner's control [46].

3.2.2 Virtual Reality and Games

New technology opens up new possibilities. In this case, it is the same with games. Virtual reality technology can be accessed using the VR set. Thanks to this concept, many new projects have been opened. Game designing uses these technologies but not all games are used for entertainment purposes. Some games are designed to help people, for example, with their phobias. New moods are used, new concepts are created, and new types of games appear on the shelves of stores [48]. In the beginning, several game concepts were created. Players have increasingly started playing games using VR. This enabled better and more powerful games to be created. Then experimentation began and more and more various genres of games in VR began to appear. Based on research, scientists have come to the point that playing games generate a variety of ideas in a participative and targeted manner [3].

Virtual reality games are starting to appear more and more. These types of games can slowly begin to displace normal games, just as they did with classic games. Thanks to the fast development of games, better and better ways and solutions appear to facilitate the creation of games. In recent years, VR games have been thought to be seen as larger than normal games [12]. VR games allow personal interaction in the virtual world. With the help of scanners, the real traffic is moved to the virtual world, which means that a person can experience to some extent how it would be there. This is a very interesting concept because it is only the beginning of this technology and is still being improved to more effectively reach the virtual world. In addition, this technology can be used for many good purposes such as mental therapy [49].

3.3 Mental Health

3.3.1 Importance of Good Mental Health

Mental health is a personal matter and individual for every human being, especially the state in which the mind is. Factors such as society, the environment, or culture can affect how the mind is shaped and may have positive or adverse effects. However, ultimately, only the owner of this mind can influence the state of his or her mind [50]. Normal behavior or standard mental health is challenging because it depends on the place, culture, time, and social group. Namely, a different state or nationality has a different standard than the one in which the person lives. Mental health is of value for many people. Taking all these facts into account makes this harder to ascertain the correct standard of healthy mental state or mental illness. During consideration, if a person is sick or healthy mentally, it is required to a distinction between attributes and actions is required. Considering long-term behavior, whether a person is more or less healthy depends on that person's persistent attributes. However, through actions, it is also possible to state the psychological state in one short, direct situation [50].

The positive state of mental health considers the combination of being fully functional and subjective well-being. Positive mental health gives positive feelings and proper function in society. The positive state can be considered in two separate philosophical terms: the hedonic perspective, which talks about the importance of honesty and friendliness, and the eudemonic perspective that determines behavior and thinking that the person feels fulfillment and commitment [49]. A state in which a person is entirely

mentally healthy is a state in which the person's thinking is positive. Positive thinking is essential for people, families, and society. When a person is satisfied, his or her productivity and involvement in society increases. People who have weak mental health increase spending on mental support and their contribution to society is getting worse. All these negatives impacts may contribute to the economic problem, which results in a low quality of life and severe problems. Mental health is critical in society, and the mental problem is not only burdening of one but all the people closest to this person and society are affected [51].

3.3.2 Work of Game with the Human Mind

Nowadays, games are so popular that millions of adults play them and above all, millions of young people. In the states in 2015, around 40% of people play for at least a few hours a day. Games have gained popularity because they can enormously drag people into their world. They use better and better patents and technologies that sometimes a person feels as if they were already inside the game. Furthermore, each new game adds something new and different from other games. Studies have shown that high-quality games increase concentration, help in learning, and change behavior [52, 53].

The human mind is a very complicated place, and because games are generally available, many people use them, mainly children. Games have begun to gain popularity ever since they also began to teach people many things. Most of the games have a message that is to be given to the user. The games can be used for good or evil purposes. However, players spend a considerable amount of time in a given game. Players begin to identify with the character or with what is happening in a particular game. The more addictive the game, the easier it is to start memorizing and learning those things that happen in a given game. Furthermore, after some time, the player starts learning more and more. Eventually, it begins to affect the behavior or perception of the person [54]. Games are now available all over the world and can be used for a variety of purposes, but some games can be made for better purposes such as education and health care. To create a game that could be more attention to the term as mental health in three steps: the first to increase the reach to all people even to those who have not previously used them. Secondly, increase the number of visitors through the development of educational games and, thirdly, the use of mechanics in the field of therapeutics and educational functions [52].

3.3.3 VR and Mental Health

Over the past decade, plenty of virtual reality (VR) applications has been created to help people who have mental health problems and also understand and evaluate these problems. Sophisticated applications allow users to be physically fully immersed and experience many things in a virtual environment. This experience happens because the user is, in a certain sense, excluded from the real world to the virtual world through image and sound stimuli from the application. Modern devices such as gloves for data transfer allow a user to feel with the user's fingers what is happening in the simulation. So, a person can experience with the help of the three senses touch, hearing, and sight what is happening in the virtual world. These simulations allow the user to experience

in a very detailed way what is done in virtual reality, and it has a significant influence on the mind of a person [55]. Many applications Virtual reality is created for mental therapy to treat all kinds of phobias. For example, some phobias can be cured, such as fear of height, arachnophobia, or cockroaches. Other uses of virtual reality are used to treat post-traumatic stress disorder or test anxiety disorder. Some applications are used to help in rehabilitation and help cognitive assessment of people who have schizophrenia, dementia, or brain injuries or stroke. The greatest success is noted in the fight against phobias. Even though treatment in this way is easy and cheaper, under certain conditions, there is also a risk that the phobia may get worse or harm treatment. On the other hand, thanks to the fact that this treatment can cure phobias that can be expensive and dangerous under normal conditions, e.g., in the case of flying phobia. Additionally, the patient feels safe and is not directly exposed to his fear, and confidentiality is maintained because everything usually happens in the therapist's office [55].

Virtual reality, like any entertainment, can addictive interaction in a world where it attracts players with beautiful visual effects, well-composed sounds, and other sensory stimuli. All effects are made in such worlds is to engage players more, and this kind of interaction can have a therapeutic effect on the user. On the other hand, research into the use of VR in medications has also been successful, but the number of participants is not insignificant in such tests. Research is still needed within this period to determine the usefulness of virtual reality clearly. However, promising results of the intervention in virtual reality have been revived in the treatment of Post-Traumatic Stress Disorder (PTSD) in virtual Iraq. VR games are popular, so probably more research in this direction will be conducted [52].

3.4 Alternatives Ways to Video Games

3.4.1 Children and Their Time

Today, children spend more time at home than ever before, because many electronics are now readily available, which means that all kinds of entertainment at home are available. This situation makes children more vulnerable than adults to the harmful effects of this type of environment. According to research, children are spending more time at home all over the world. Most of these children are at the age of 5 to 12 years [56]. In the last decade, all sorts of new technologies have been created that have entertainment goals. Such devices are television, consoles, telephone, and portable consoles. Nowadays, children are overwhelmed by screen entertainment. Research carried out in 2004–2007 results from average child spend about 6 h a day before the screen, which is a more or less equal time that children spend at school [57]. The problem that children spend a significant amount of time in front of computers or consoles is, in most cases, that both parents work, and there is no time to raise a child. Lack of time to meet with children is one of the reasons why children fall in front of computers. Another case is after a hard day, the parent has no strength and is not thinking about what his child is doing. In the last case, the parent is not caring about what the child is doing. The lack of any interest in what the children do with their time is irresponsible from the parents' side. This kind of situation leads to where game raises these children [58].

3.4.2 Reducing the Time that Children Spend with Video Games

The first step to change usually is to change his habits. It is best to start slowly. At first, the parent should reduce the time that a child spends playing games. It is best to start by moving the computer and the console from the child's room, this will make the child spend 40 min less a day playing. Parents should go with their children. The study shows that children who travel with their parents spend 30 min less playing each day. Besides, to prevent a child from playing the wrong game, a parent should check what the game contains, as it may contain inappropriate content for a young person [59]. Creating a schedule by the parent and child how much time a child spent playing games and how much time the child will be able to play next week. To convince the child more, a parent should do some challenges, such as spending less time in front of the screen than last week. To encourage children, more parents can also use the time with games as a reward for doing homework. Parents should not use games as a moment of peace, on the contrary, parents, and children should spend more time, e.g., cooking together a complicated recipe in this way, encourage the child to try other things. The most important thing for a parent is to be patient and not give in [59]. There few alternatives to video games and television:

Outdoor: Playing outside is very important for a young person because it allows him to develop in many ways. The cultivation of sports or games that require the whole mass of movement is an excellent chance for a child to be able to develop the body but also to have a great time. The child also has a chance to meet new people and connect with other children. A child can make new friends and spend time with them. By exploring, the child learns and develops his mind. All this happens in the open air. It is an excellent way for a child to grow in the right way [60].

Indoor: When a child cannot go outside due to bad weather or late hours, there are still things better than sitting in front of a computer. Cooking with parents brings much fun and teaches children how to cook various recipes. Spending time playing board games or card games develops the mind of a young man and teaches a child to make different decisions and, above all, develops imagination. Painting and creative creation of various things by a child develop his talents and also develops imagination. Reading books with parents or telling different stories is also a great way to spend time together and develop a child's mind [59].

3.5 Devices and Software

3.5.1 VR Set

When on the market, there was inexpensive virtual reality equipment that allows research into which the researcher can conduct observations of naturally moving objects. One known such system is HTC Vive, which includes goggles which serve as a display from a computer and besides tracking systems in a designated room. It is all at a reasonable price if the sophisticated tracking precision and sufficient accuracy allow this device to be used for many tests [61]. Figure 1 represents HTC VIVE set. This set contains HTC goggles, two pads and adapters. Adapters track the movement of goggles and pads and

send information to the computer. Goggles and pads allow interaction with a virtual environment. The operation of virtual graphics consists of the integration of images from graphics sounds from the program and other sensory data such as a plugin with gloves in real-time into one virtual world. The best thing is that the user can feel most things when interacting with a given object. The image from the virtual world is transmitted by the head-mounted display set (HMD).



Fig. 1. Picture of all components from HTC Vive Set [62]

This type of goggles which look like helmet usually contains two small screens built-in. The newer type of this type of goggles has built-in headphones. Everything the user does is tracked and sent to a computer that will adapt everything to the user's actions. Minimum system and hardware requirements are, for example, a Pentium IV computer with a minimum 2 GHz circuit power, 40 GB memory as well as sound and audio functions [55].

3.5.2 Unity

Unity is a game engine, and it was developed in Denmark by Unity Technologies. This engine integrates a custom rendering engine with the NVidia PhysX physics engine and Mono. Mono is open-source, and it is an implementation of Microsoft's .NET libraries. The Unity engine works with complete documentation with examples for its entire API. This complete documentation is the most significant advantage. It allows for increased productivity when compared to other engines such as Source or Unreal, which functionality only provides partial documentation for non-subscribing customers. There is plenty of online developer in the community, which can often help or provide assistance for new developers. The Unity Technologies developers also are very willing to add new concepts and features to Unity at a user's request, which will never happen in case of using a big developer's engine such as Unreal. Several of the features existing as a result of requests from different developers of the SARGE [63]. Figure 2 represents a graphical user interface of Unity during the curation of 3D project. On the left side objects, on the right-side properties of a specific object, on the bottom list of the object that can be added. In the middle is windows which show the 3D project.

In the field of physics properties, objects can be several factors that can be used to determine bounciness, springiness, mass, also features such as detection of a collision. The psychic is simulated by NVidia's PhysX engine, which is used by many games that are made for AAA purposes. Rendering properties include even features such as shader



Fig. 2. Unity example of unity project [64]

and texture that affect the appearance of the visible objects. The built-in rendering software uses a simplified shader language designed with DirectX9 or OpenGL 2.0 software, depending on the target device. Unlike other gaming links such as Unreal or Source to create the game, the cost per license alone would cost \$ 300,000, while Unity provides free access only for brushes over \$ 100,000, a user must buy the license [63].

3.5.3 C# Programming Language

C # is easy-to-use, object-oriented, one of the new languages, and values security, such a programming language is C#. This programming language combines the excellent performance of application programming with C++ and C output. This language was designed by a team of developers and was the ultimate technical reference to the C # language [65].

4 Conclusion

Since the creation of games, a lot has changed in the appearance and message of the original series of games. New technologies implemented in games attract more and more people. It often happens that violence is the main factor in these games. Especially that many people can learn something useful from games or just the opposite. Games are for people, and everyone likes some games, whether it is classic computer games. The more games there are, the more games there will be players. Everyone can find something for themselves and conclude the games. With more and more players, games have become part of the modern world. Thanks to the successes in the new markets, games are of increasing importance—most on the American market. With the spread of games, people pay more and more attention to what games bring to their lives. Most games are used for entertainment purposes. Some people use them for education. There are also people who only want to make as much money as possible from them. Young people most like games. It allows them to learn new things, increase their perceptiveness and draw conclusions. They are increasing physical fitness if games contain factors such as physical movement. Games allow the player to expand his or her imagination and take dull moments away. Games have many advantages, but they also have disadvantages.

Many popular games contain mainly violence. Violence is already part of the games. Although violence is part of the games, it is still unclear what effects it can have. It is known, however, that depending on the individual factors of this type of game can be harmful. Games of violence can affect human behavior in society, especially in children. Other cases may affect aggressive behavior or aggravation of negative feelings. The debate on the effects of this type of game has been conducted for a long time. Much research has been carried out, and many applications have been released. Most say that this game has psychological and social effects, especially for children. Games are entertainment and a break away from reality. This makes the player spend more and more time playing games. This can lead to adverse psychological and physical effects, for example, radiation, stress, obesity, headache, vision problems and muscle problems. In addition to games, another technology that is rapidly evolving is virtual reality. Let it create something new in virtual reality. One limit in virtual reality is imagination. This new technology is expanding massively, mainly for developmental purposes and for the treatment of various phobias. Cat games are created for virtual reality, and they are often needed to use a set of goggles and a mouse pad that allows the player to interact in the game on a similar basis as in reality. This allows for a completely new gaming experience, but also new threats. Mental health is an essential part of every human being. On mental health has many internal and external associates that can affect his condition. It is vital to keep it in good condition as it may have adverse effects. Games that emanate bad aspects can, over time, significantly affect human behavior. It can also affect human behavior in society. They are more vulnerable to young people and people in stressful situations. Youth is a significant period for many people. Because during this period a young person can get to know the world, shape his views on various topics and meet many people. It is hard to do when young people spend all their time in front of the screen. Gaming absorbs them to spend most of the day playing games. When the world outside offers many new experiences. Especially parents should know about how important this period is for their children and how their games may have an impact on their children. So, people should be able to spend time without electronic devices and with their family at home or outside.

References

1. Rutter, J., Bryce, J.: *Understanding Digital Games*. Sage, London (2006)
2. Bryce, J., Rutter, J.: Gender dynamics and the social and spatial organization of computer gaming. *Leis. Stud.* **22**(1), 1–15 (2003)
3. Shaffer, D.W., et al.: Video games and the future of learning. *Phi Delta Kappan* **87**(2), 105–111 (2005)
4. Berger, A.A.: *Video Games: A Popular Culture Phenomenon*. Transaction Publishers, New Brunswick (2017)
5. Santos, I.K.d., et al.: Active video games for improving mental health and physical fitness—an alternative for children and adolescents during social isolation: an overview. *Int. J. Environ. Res. Public Health* **18**(4), 1641 (2021)
6. Mayer, R.E.: Computer games in education. *Annu. Rev. Psychol.* **70**, 531–549 (2019)
7. Nagasaka, K.: Sony QRIO. In: Goswami, A., Vadakkepat, P. (eds.) *Humanoid Robotics: A Reference*, pp. 187–200. Springer, Dordrecht (2019). https://doi.org/10.1007/978-94-007-6046-2_16

8. Bègue, L., et al.: Video games exposure and sexism in a representative sample of adolescents. *Front. Psychol.* **8**, 466 (2017)
9. Rodán, A., et al.: Boys and girls gain in spatial, but not in mathematical ability after mental rotation training in primary education. *Learn. Individ. Differ.* **70**, 1–11 (2019)
10. Jenkins, R.: Children spend twice as long looking at screens than playing outside, study finds (2018)
11. Emes, C.E.: Is Mr Pac Man eating our children? A review of the effect of video games on children. *Can. J. Psychiatry* **42**(4), 409–414 (1997)
12. Granic, I., Lobel, A., Engels, R.: The benefits of playing video games. *Am. Psychol. Assoc.* **69**(1), 66–78 (2013)
13. Mohammed, M., Al-Sharify, T., Kolivand, H.: Real-time cloth simulation on virtual human character using enhanced position based dynamic framework technique. *Baghdad Sci. J.* **17**(4), 1294 (2020)
14. Chuang, T.-Y., Chen, W.-F.: Effect of computer-based video games on children: an experimental study. In: 2007 First IEEE International Workshop on Digital Game and Intelligent Toy Enhanced Learning (DIGITEL 2007). IEEE (2007)
15. Anderson, C.A., et al.: Longitudinal effects of violent video games on aggression in Japan and the United States. *Pediatrics* **122**(5), e1067–e1072 (2008)
16. Anderson, C.A.: An update on the effects of playing violent video games. *J. Adolesc.* **27**(1), 113–122 (2004)
17. Giumetti, G.W., Markey, P.M.: Violent video games and anger as predictors of aggression. *J. Res. Pers.* **41**(6), 1234–1243 (2007)
18. Kirsh, S.J.: Seeing the world through Mortal Kombat-colored glasses: violent video games and the development of a short-term hostile attribution bias. *Childhood* **5**(2), 177–184 (1998)
19. Markey, P.M., Scherer, K.: An examination of psychoticism and motion capture controls as moderators of the effects of violent video games. *Comput. Hum. Behav.* **25**(2), 407–411 (2009)
20. Durkin, K., Barber, B.: Not so doomed: Computer game play and positive adolescent development. *J. Appl. Dev. Psychol.* **23**(4), 373–392 (2002)
21. Olson, C.K.: Media violence research and youth violence data: Why do they conflict? *Acad. Psychiatry* **28**(2), 144–150 (2004)
22. Savage, J., Yancey, C.: The effects of media violence exposure on criminal aggression: a meta-analysis. *Crim. Justice Behav.* **35**(6), 772–791 (2008)
23. Anderson, C.A., Ford, C.M.: Affect of the game player: short-term effects of highly and mildly aggressive video games. *Pers. Soc. Psychol. Bull.* **12**(4), 390–402 (1986)
24. Calvert, S.L., Tan, S.-L.: Impact of virtual reality on young adults' physiological arousal and aggressive thoughts: Interaction versus observation. *J. Appl. Dev. Psychol.* **15**(1), 125–139 (1994)
25. Graybill, D., Kirsch, J.R., Esselman, E.D.: Effects of playing violent versus nonviolent video games on the aggressive ideation of aggressive and nonaggressive children. *Child Study J.* **15**(3), 199–205 (1985)
26. Schutte, N.S., et al.: Effects of playing videogames on children's aggressive and other behaviors. *J. Appl. Soc. Psychol.* **18**(5), 454–460 (1988)
27. Cooper, J., Mackie, D.: Video games and aggression in children. *J. Appl. Soc. Psychol.* **16**(8), 726–744 (1986)
28. Silvern, S.B., Williamson, P.A.: The effects of video game play on young children's aggression, fantasy, and prosocial behavior. *J. Appl. Dev. Psychol.* **8**(4), 453–462 (1987)
29. Graybill, D., et al.: Effects of playing versus observing violent versus nonviolent video games on children's aggression. *Psychol. J. Hum. Behav.* **24**(3), 1–8 (1987)
30. Braun, S., Pasternak, J.: Student Opens Fire on Prayer Group, Kills 3. *Los Angeles Time, California* (1997)

31. Brooke, J.: Terror in Littleton: The Overview; 2 Students in Colorado School Said to Gun Down as Many as 23 and Kill Themselves in a Siege, vol. 21. *New York Times* (1999)
32. Calvert, C.: Violence, video games, and a voice of reason: judge Posner to the defense of kids' culture and the first amendment. *San Diego L. Rev.* **39**, 1 (2002)
33. Moser, R.S., Frantz, C.E.: *Shocking Violence: Youth Perpetrators and Victims - A Multidisciplinary Perspective*. Charles Thomas Publisher (2000)
34. Anderson, C.A., Bushman, B.J.: Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: a meta-analytic review of the scientific literature. *Psychol. Sci.* **12**(5), 353–359 (2001)
35. Bushman, B.J.: Moderating role of trait aggressiveness in the effects of violent media on aggression. *J. Pers. Soc. Psychol.* **69**(5), 950 (1995)
36. Arriaga, P., et al.: Violent computer games and their effects on state hostility and physiological arousal. *Aggressive Behav. Official J. Int. Soc. Res. Aggression* **32**(2), 146–158 (2006)
37. Berry, B.: 7 worst common health problems caused by computer use (2017)
38. Carbonari, K., et al.: Increased micronucleated cell frequency related to exposure to radiation emitted by computer cathode ray tube video display monitors. *Genet. Mol. Biol.* **28**(3), 469–474 (2005)
39. Deitel, M.: Overweight and obesity worldwide now estimated to involve 1.7 billion people. *Obesity Surg.* **13**(3), 329 (2003)
40. Rosenfield, M.: Computer vision syndrome: a review of ocular causes and potential treatments. *Ophthalmic Physiol. Opt.* **31**(5), 502–515 (2011)
41. Seghers, J., Jochem, A., Spaepen, A.: Posture, muscle activity and muscle fatigue in prolonged VDT work at different screen height settings. *Ergonomics* **46**(7), 714–730 (2003)
42. Provenzo, E.F., Jr.: *Video Kids: Making Sense of Nintendo*. Harvard University Press, Cambridge (1991)
43. Shaker, N., Togelius, J., Nelson, M.J.: *Procedural Content Generation in Games*. Springer, Cham (2016). <https://doi.org/10.1007/978-3-319-42716-4>
44. Mandal, S.: Brief introduction of virtual reality & its challenges. *Int. J. Sci. Eng. Res.* **4**(4), 304–309 (2013)
45. Bricken, M., Byrne, C.M.: Summer students in virtual reality: a pilot study on educational applications of virtual reality technology. In: *Virtual Reality*, pp. 199–217. Elsevier (1993)
46. Youngblut, C.: *Educational Uses of Virtual Reality Technology (No. IDA-D-2128)*. Institute for Defense Analyses. Alexandria, VA (1998)
47. Inman, D.P., Loge, K., Leavens, J.: VR education and rehabilitation. *Commun. ACM* **40**(8), 53–59 (1997)
48. Rendon, A.A., et al.: The effect of virtual reality gaming on dynamic balance in older adults. *Age Ageing* **41**(4), 549–552 (2012)
49. Huppert, F.A.: *Positive mental health in individuals and populations* (2005)
50. Jahoda, M.: *Current concepts of positive mental health* (1958)
51. Rohrer, J.E., Pierce, J.R., Jr., Blackburn, C.: Lifestyle and mental health. *Prev. Med.* **40**(4), 438–443 (2005)
52. Fleming, T.M., et al.: Serious games and gamification for mental health: current status and promising directions. *Front. Psych.* **7**, 215 (2017)
53. Read, J.L., Shortell, S.M.: Interactive games to promote behavior change in prevention and treatment. *JAMA* **305**(16), 1704–1705 (2011)
54. Fudenberg, D., et al.: *The Theory of Learning in Games*, vol. 2. MIT Press (1998)
55. Gregg, L., Tarrier, N.: Virtual reality in mental health. *Soc. Psychiatry Psychiatr. Epidemiol.* **42**(5), 343–354 (2007)
56. Silvers, A., et al.: How children spend their time: a sample survey for use in exposure and risk assessments. *Risk Anal.* **14**(6), 931–944 (1994)

57. Rideout, V.: *Parents, Children & Media: A Kaiser Family Foundation Survey*. Henry J. Kaiser Family Foundation, Oakland (2007)
58. Hayes, C.D., Kamerman, S.B.: *Children of Working Parents: Experiences and Outcomes*. ERIC (1983)
59. Kris, A.: *Alternatives to TV and Video Games for Your Elementary School Child*. The Parent Institute (2004)
60. Rivkin, M.S.: *The Great Outdoors: Restoring Children's Right to Play Outside*. ERIC (1995)
61. Niehorster, D.C., Li, L., Lappe, M.: The accuracy and precision of position and orientation tracking in the HTC vive virtual reality system for scientific research. *i-Perception* **8**(3), 2041669517708205 (2011)
62. HTC Corporation Website (2011). https://www.vive.com/uk/product/vive-pro-full-kit/?gclid=CjwKCAjw7P1BRA2EiwAXoPWA2AsKNJcZPEeSsWcxlKxT9PZegzKEMoxWxmuQyMrxQAThHS7lQRThoCHDEQAvD_BwE
63. Craighead, J., Burke, J., Murphy, R.: Using the unity game engine to develop Sarge: a case study. In: *Proceedings of the 2008 Simulation Workshop at the International Conference on Intelligent Robots and Systems (IROS 2008)* (2008)
64. Unity website (2020). <https://unity3d.com/unity/beta/2019.3>
65. Hejlsberg, A., Wiltamuth, S., Golde, P.: *C# Language Specification*. Addison-Wesley Longman Publishing Co., Inc. Boston (2003)