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Faculty of Electrical Engineering  
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## TECHNOLOGY AND SOCIETY - ONLINE ADDICTIONS

TECHNIKA A SPOLEČNOST - ONLINE ZÁVISLOSTI

### BACHELOR'S THESIS

BAKALÁŘSKÁ PRÁCE

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### **POKYNY PRO VYPRACOVÁNÍ:**

Popište současný stav poznatků týkajících se závislosti na komunikačních technologiích - vytvoření závislosti, různé druhy těchto závislostí, negativní dopady na život jednotlivců a společnosti. Pojednejte o případných možnostech řešení těchto problémů.

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## Abstrakt

Cílem práce je popsat problémy závislosti na internetu. Tato otázka je nejnaléhavější na světě, protože skutečnost, že dnešní svět si bez internetu nelze představit. S jeho popularizací však existuje stále více problémů s uživateli, které je třeba řešit. Neznamená to vzdát se internetu, ale spíše zkrátit nekontrolovanou dobu používání. V této práci autor studuje problematiku závislosti na internetu a hledá řešení problémů, které jsou nutné v éře internetu. Každá osoba je povinna tuto problematiku prostudovat, aby se zabránilo problémům se závislostí, jejichž aspekty budou popsány v této práci.

Samotná práce je rozdělena do 3 částí: úvod, hlavní článek a závěr.

Úvod vysvětluje globální posuny v komunikační technologii a jejich negativní a pozitivní účinky.

V první části je online závislost zvažována ze dvou stran: z pohledu vlivu závislosti na společnost a sociální chování, jakož i z biologického hlediska; účinek závislosti na lidském mozku. Autor zvažuje určité typy závislosti na internetu a způsoby, jak se s nimi vypořádat.

Závěrem autor shrnuje tezi o příčinách a následcích vztahů závislých na internetu.

## Klíčova slova

online závislost, sociální sítě, komunikační technologie, online hry, kybernetická sexuální závislost.

## Abstract

This work aims to study the problems of online addiction. This issue is the most acute in the world, due to the fact that today's world can not be imagined without the Internet. However, with its popularization, there are more and more problems with users, which require to be addressed. It does not imply renouncing the Internet, but rather reducing uncontrolled usage time. In this thesis, the author studies the issue of online addiction, and look for a solution to the problems that are necessary in the era of the Internet. Each person is obliged to study this issue in order to avoid problems with addiction, aspects of which will be described in this thesis.

The work itself is divided into 3 parts: introduction, main article, and conclusion.

The introduction explains the global shifts in communications technology and their negative and positive effects.

In the main part, online addiction is considered from two sides: from the perspective of the influence of addiction on society and social behavior, as well as from a biological point of view; the effect of dependence on the human brain. The author considers certain types of online addiction and ways to cope with them.

In conclusion, the author summarizes the thesis of cause and effect relationships of online addicted people.

## Keywords

online addiction, social networks, communication technology, online games, cyber-sexual addiction.

## Bibliographic citation

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# Prohlášení

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V Brně dne.....

.....

Timur Sarbassov

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Děkuji vedoucímu bakalářské práce PhDr. Milanu Smutnému, Ph.D. za účinnou metodickou, pedagogickou a odbornou pomoc, a další cenné rady při zpracování mé bakalářské práce.

V Brně dne.....

.....

Timur Sarbassov

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## List of abbreviations

MUD - multi-user dungeon

CSA - cyber-sexual addiction

RPE - reward prediction error

ADHD - attention-deficit/hyperactivity disorder

OCD - obsessive-compulsive disorder

SNS - social network sites

MMORPG - massively-multiplayer online role-playing game

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## 1.INTRODUCTION

Since the creation of a personal computer, various mobile devices and the Internet, mankind has made a huge leap on a global scale. The World Wide Web has become an integral part of a progressive society. The amount of information exchanged between people has significantly grown. News distribution has become instant from anywhere in the world. Therefore, any news uploaded to the network is discussed by all possible segments of the population in a few moments. On the one hand, all of that certainly facilitated the development of mankind. On the other hand, it is worth taking into account that it has a negative impact. There is no such historically important invention as the Internet that has been so criticized. Disadvantages of the Internet and its harmful effect on modern society are evident: from parents dissatisfied with their children that they spend a lot of time on social media and playing online games, to politicians, who consider the Internet as a weapon, which can be used against them, and try to limit the Internet in their countries. There is a lot of opponents of the Internet in almost all segments of society. The author will attempt to refute these arguments in the thesis. It will contain examples from a wide range of human activities. Also, the development of the Internet in Third World countries, where it is just developing and has not reached the Euro-American level, will be mentioned.

In this section will be discussed and highlighted the main topics of the thesis.

The author divided the thesis into two parts, both of them are the main components of the description of this issue. The first part describes the problem of online addiction from the perspective of society, the second part - medicine and science. Also, opinions of various segments of the world's population will be mentioned. People should probably blame only themselves for “problems caused by the Internet”. The author considers the Internet and technology as the most important inventions of mankind since the discovery of electricity. Blaming the Internet and the development of technology for people’s vices is tantamount to blaming a gun or assault rifle for murders.

In general, Internet addiction is not a problem on a global scale. There is a sufficient number of various therapy types, due to which such a problem can be

excluded from people's lives. First of all, as already mentioned, this is a question of responsibility for each person's mental health. Today the life without the Internet would be practically impossible, and the problems associated with its use are a trifle, compared to what privileges the Internet provides. However, every day the problem of online addiction is becoming increasingly important, in particular for the younger generation. The main mistake is the lack of awareness of this problem and people's ignorance of the possible consequences. Information literacy is the key to solving the problem of mental disorders associated with the use of the Internet. Humanity should study this issue, and perform prophylaxis in order to avoid problems with addiction. This is exactly what will be considered in this thesis.

# Part 1

## 2. Online games - 21st century plague or breakthrough entertainment.

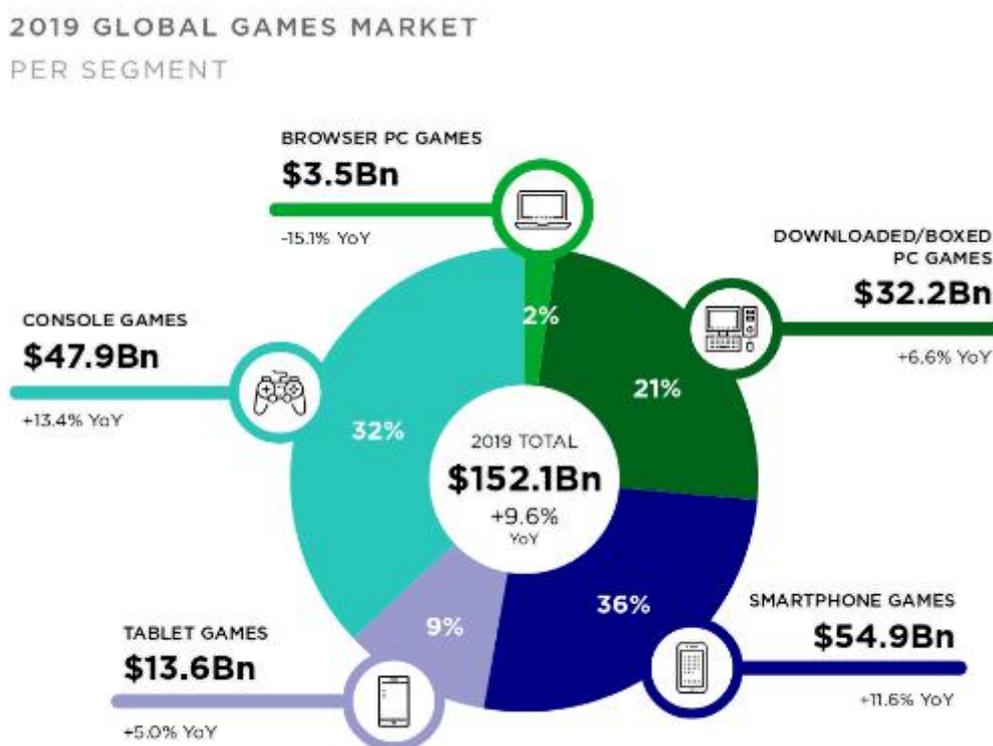
To these days, several ways of spending leisure time for youth have been invented. Online games occupy a special place among the types of entertainment. The popularity of online games has significantly grown with the improvement of Internet speed and advanced graphics. Today, the quantity of online game users is equivalent to the population of some countries.

For example, 10 to 25 million users play daily in the online gaming platform STEAM (Steam,2020).

In 1975, programmer Will Crowther created a text game called Colossal Cave Adventure on a PDP-10 computer from DEC. This game became the founder of the adventure game genre. In such games, the player assumes the role of a hero, the plot of an interactive story progresses as you explore the world and solve the riddles. In 1976, the game was expanded by Don Woods. In the summer of 1977, a group of students at MIT (Massachusetts Institute of Technology), inspired by game Adventure, developed a game called ZORK on a PDP-10 computer. ZORK instantly became popular in ARPANET - the forerunner of the modern Internet. In 1978, a DEC programmer ported the ZORK game to the FORTRAN programming language and called it DUNGEON. In 1978, a student at the University of Essex, Roy Trabshaw began working on a multi-player adventure game in the MACRO-10 assembly language on a DEC PDP-10 computer. He named the game he created in honor of DUNGEON - MUD (multi-user Dungeon). Clones of these games were created all over the world and gained great popularity. Such games became so popular that they were called Multi undergrad destroyer. The reason for this was that many students were so keen on the game that they completely forgot about classes. Even then, at the beginnings of the online games industry, they were mercilessly criticized. There was a reason for it (The Russian MUD Connector,2009).

Recently the online game industry has become one of the most profitable in the business environment due to the huge number of its users. In 2019, the total revenue of interactive entertainment and online games amounted to \$ 120 billion, which is an absolute record in this area. Analysts also predict the continued growth of the video game market (Cyber Sports,2020).

Based on the foregoing, the question arises about the impact of online games on people. In this paper, online games and their methods of affecting children and people in general will be explored.



*Figure 1 : 2019 global games market per segment*

On the one hand, online games help people to develop quick thinking, reaction, broaden their mind and expand their worldview. On the other hand, a huge amount of their negative impacts exists. In this case, the reality is replaced with online games and cyberspace in it. This is especially acute when a person experiences problems in relationships and is completely immersed in the world of online games, where he/she is the master of the situation. In this world his/her sense of victory raises self-esteem, which forms a way of life, where the only goal is the pleasure received from the game. This is a real online addiction. In other words, it is an excessive passion for games for the sake of leaving reality. Games in which a person plays the role of a certain character are especially dangerous. In this case, there is a fundamental problem for all online addicted people - the decay of the personality into “real person” and “virtual character”. That is why this issue is so hotly debated. Parents and psychologists are raising the alarm, because this is basically a problem for the younger generation. They are more and more immersed in the virtual world in search of entertainment.

The main factor in the development of online addiction is the lack of real conversation. For that reason, developers are increasingly implementing online chats into their games for communication between players which leads to the socialization of people. For instance, MMORPG (massively-multiplayer online role-playing game) provides communication between users through typed chat and animated gestures and expressions (Yee, n.d.). Several studies (Net Addiction,2014) were conducted to identify the problem and its solution. In accordance with them, the scientists proposed the following solutions:

- The formation of a value attitude to the conditions of reality as a result and consequence of the social experience of the individual
- Use of potential influence of youth public associations
- Implementation of preventive programs for youth

There are several ways to solve that problem, as well as various forms of hypnosis. It is necessary to solve the problem with the help of psychotherapy aimed at improving family relationships and eliminating

phobia of communication with society. It should be noted that the most effective way to solve addiction is to prevent it. Parents are recommended to spend more time with their children and to interest them in active games and physical exercises. It is strictly forbidden to play before going to bed, and the rest of the time the time spent playing the games should be controlled , as well as stipulate the time the child plays computer games. It is required to discuss games with the child, choose educational ones. All the methods above will help to avoid the development of gambling addiction in children.

Alternatively, online gaming addiction can be considered from the side of game development companies. The largest ones are EA Sports, Valve Corporation, Blizzard, Rockstar Games, and Ubisoft. These companies release hundreds of games and updates to old games every year to keep players interested in their products. One of the most popular online games in the world is DOTA 2. Its developer, Valve Corporation, according to Statista, had about \$ 406 million of net profit in 2017 (Statista, n.d.).

### 3.Social networks - a breakthrough in communications

Our modern life is such that only a few have no profile in at least one of the social networks. Twitter, Facebook, V Kontakte, Instagram, and many other means of communication flooded our world. It also has both positive and negative traits.

This list can be continued indefinitely, but social networks also have a huge disadvantage - the problem of dependence on them.

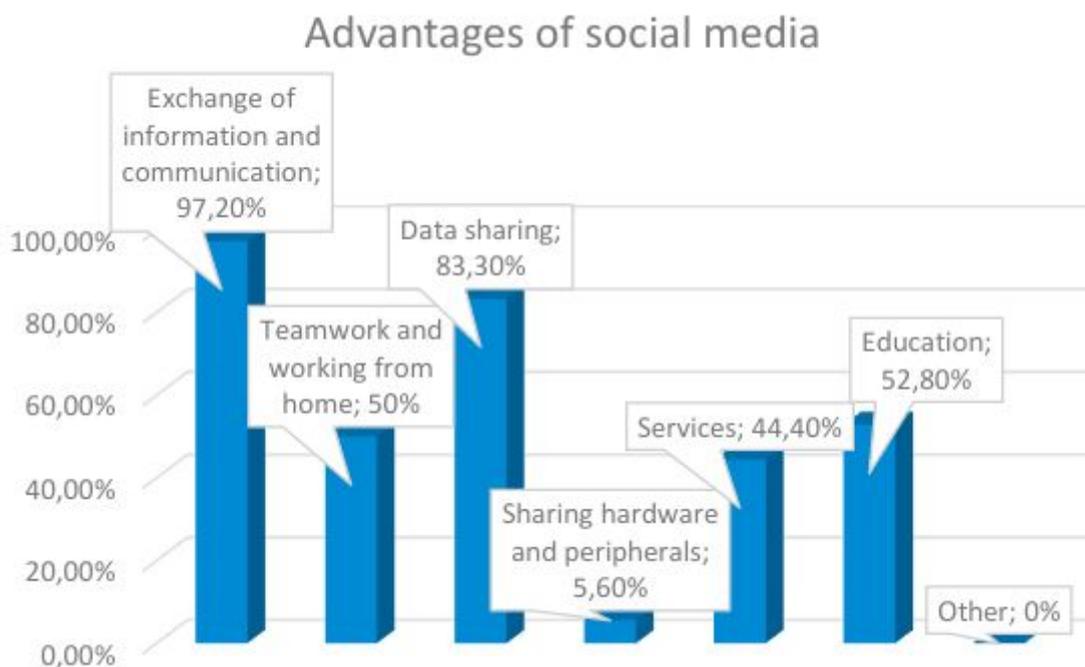


Figure 2. Advantages of social media

According to the results of data surveyed from 275 respondents from European Union, the most important benefit of the Internet is exchange of information and communication. The second biggest advantage is the sharing of data (Drahošová et al., 2017).

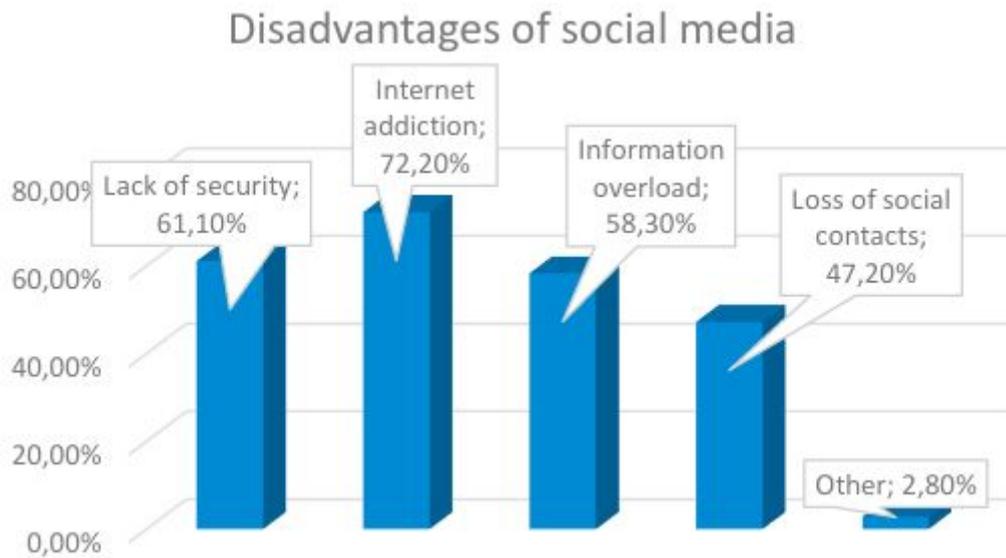


Figure 3. Disadvantages of social media

Main disadvantages of the Internet are lack of security (61.1%), information overload (58.3%) and loss of social contacts (47.2%). The biggest disadvantage is Internet addiction. This claim 72.2% of respondents from the EU countries. (Drahošová et al., 2017)

Every day, social network developers do everything possible to improve the functionality of their network so that people spend there as much time as possible. Some people use them not only as a way to exchange information and a source of obtaining the necessary information, but also wander meaninglessly on social networks, discussing all kinds of news in the comments and talking about nothing. Real-life communication is pretty complicated for many people. Overcoming social fears sometimes seems impossible. That is why people choose an easier way to communicate - communication on social networks. Sometimes they are not registered under their name, because it enables them to write any other name or nickname and even add a picture from the Internet or photo of another person. Therefore, it allows us to write anything, including insulting others, without having to be accountable for it.

People who suffer from social anxiety, have a very small circle of friends and low self-esteem, and are prone to addiction to social networks. Spying on someone else's life is much easier than building his/her own one. In the risk group are again children and adolescents.

Dependence on social networks is not officially classified as a mental disorder, but is similar in the minds of people to the already known psychopathologies. It is noteworthy that people who are addicted to social media are also at risk of developing other mental disorders.

Scientists from all over the world are carefully studying the problems of dependence on social networks. Nevertheless, there is no scientific justification for the relationship of dependence on social networks with mental disorders. In most cases, it depends on the particular person and the used resources. Research by Andreassen et al. (2016) reported positive correlations between symptoms of such psychiatric disorders as attention-deficit/hyperactivity disorder (ADHD), obsessive-compulsive disorder (OCD) and social network sites (SNS) addiction.

### 3.1 The history of social networks and the development of dependence on them.

The first more or less popular social network at the beginning of the twentieth century was MySpace. Facebook was invented in 2004 and currently has more than two billion active users (Statista, 2020). Using social networks, people think that in this way they get closer to other people, but in reality exists a completely different picture. Big groups of people mostly gather in parks or in entertainment places and do not communicate with each other, but look at the screens of gadgets and are immersed in the virtual world.

According to Meshi et al. (2019), recent neuroimaging work demonstrate that areas of the brain that are activated when people receive a response to their posts on the Internet are similar as by drug consumption. According to Duhigg (2012), each habit passes through three phases: a sign that activates the habit, habitual action and receiving a reward.

This is called a habit loop. People who are accustomed to spend a long time in the virtual world, form a series of habits associated with the habit loop and continue automatically flip popular posts. Facebook, Instagram, Twitter and other media have a reward system, which is a kind of response to posts on social networks. So, a person who published the post is habitually waiting for such responses like repost or retweet. Thus, he/she falls into the loop of a habit that

he/she cannot eliminate. Moreover, most of the media-dependent people do not recognize the problem and do not see anything wrong with that. The formation of this habit is preceded by many mental problems of the person himself. From self-absorption and social phobia, to family squabbles and difficult adaptation in society. Speed and accessibility are the main factors in the development of dependence on social networks. At the level of instincts, a person seeks easy ways for society to approve his personality. However, over a long period of time, this adversely affects the personality as a whole. Based on the foregoing, the conclusion is that the human brain gets used to this form of communication and information, and it develops attention deficit hyperactivity syndrome. This is an effect generated by a unique way of obtaining information, where one single interface of a social network includes several functions: communication, listening to music, discussing news, etc. This is bad for his thinking. It becomes quite difficult to focus on one thing, such as reading books. The brain is tempted to jump from one to another without completeness. His attention constantly goes aside. Absent-mindedness, laziness, and other human vices increase, which is why problems arise in real life (Duhigg, 2012).

There is no common consensus on solution of this issue. In major cases, the solution depends on every single person and individual for everyone in reliance on its paradigms and live persuasions, which in turn repels behavior and development in a person's childhood. Bill Gates and Steve Jobs, people who changed the course of human history and made a huge contribution to the development of communication technologies, had forbidden their children to surf on the social networks for a long time and carefully watched their screen time. Honestly, this fact must force the parents to guess about the accuracy of the children's accomplishment correctness.

Despite on foregoing, the author does not see anything dangerous about social networks. Also author does not consider it as an absolute evil the whole world needs to fight against. There is nothing wrong with being able to make new friends and chat with them online. Moreover, this is almost the only way to communicate with close people who are at a distance. It is a very powerful argument on the side of social networks. However, as in any other thing, every single man or woman must know the measure and approach this wisely.

## 4. Cyber-sexual addiction

Cyber-sexual addiction is a form of online addiction where an irresistible craving for visiting pornographic sites and discussion sexual issues in chat rooms and forums is forming (Wikiwand, n.d.).

According to Healthy Place (2016), every fifth Internet user suffers from this form of addiction.

According to Healthy Place (2016), warning signs of cybersexual addiction are:

1. Routinely spending significant amounts of time in chat rooms and private messaging with the sole purpose of finding cybersex.
2. Feeling preoccupied with using the Internet to find online sexual partners.
3. Frequently using anonymous communication to engage in sexual fantasies not typically carried out in real-life.
4. Anticipating your next online session with the expectation that you will find sexual arousal or gratification.
5. Finding that you frequently move from cybersex to phone sex (or even real-life meetings).
6. Hiding your online interactions from your significant other.
7. Feeling guilt or shame from your online use.
8. Accidentally being aroused by cybersex at first, and now find that you actively seek it out when you log on-line.
9. Masturbating while on-line while engaged in erotic chat.
10. Less investment with your real-life sexual partner only to prefer cybersex as a primary form of sexual gratification (Healthy Place, 2016).

One of the important factors that make people cyber-dependent is the ability to attend group chats on this topic anonymously.

This gives an advantage to people, because in this way the risk of being caught by a wife or husband is reduced. Anonymity and privacy are the first prerequisites for the emergence of great cybersex addiction. Scientists also found that this form of addiction affects the human brain so much that it goes over to a form of addiction that is close to physical.

This problem is probably the result of illiteracy and lack of education of the older generation in the field of IT and communication technologies. All this

has led to the fact that the problem of online addiction among the younger generation is most acute. If we recall the basic principles of various types of addiction to alcohol, cigarettes and drugs even before the advent of the computer and the Internet and its globalization, we can say that they are similar to the types of online, i.e. addiction that we are considering. As in the case of alcohol, cigarettes and drugs - this is primarily a problem of raising children from a young age. The solution to this problem is its prevention. Parents should be aware of the consequences of such omissions and should be closely involved in raising their children. It is necessary to devote more time to children, to struggle with their social phobia and isolation since childhood. To contribute to the development of their interest in sports, popular culture, music, and other activities in order to fill their inner world, attracting more and more types of addictions. With the development of cyberspace and its widespread accessibility, it is almost impossible to hide any information from children and adolescents. Therefore, it is no longer worth fighting with the fact that sooner or later they will learn about all this. Today it is necessary to struggle with their desire and craving for all that. The problem must be solved radically, and not fight its symptoms.

## Part 2

### 5. Dependency definition

In order to understand in detail the issue of Internet addiction, it is required to discover what addiction is and what types of addiction exist.

Parekh (2017) states that addiction is a brain disease, a complex condition of a person, which manifests itself in the obsessive use of psychoactive substances, or classes of psychoactive substances, despite their detrimental effect on humans. The use of psychoactive substances such as alcohol and drugs is becoming such a huge problem that addicted people pay more attention to them than to vital matters. Thus, addicted people cannot stop using psychoactive substances, even when they are harmful.

People with addiction have distorted thinking, norms of behavior and body functions. The detrimental effect on the neural connections of the brain makes addicted people experience an irresistible craving for psychoactive substances. According to Parekh (2017), brain imaging studies show changes in areas of the brain responsible for judgment, decision making, learning, memory, and behavior control. Taking psychoactive drugs causes intoxication - intense pleasure, a state of excitement or calmness and increased senses. The required dosage of the consumed substance increases each time, as the body's tolerance to psychoactive drugs is caused (Parekh,2017).

The term “dependence” was introduced by the World Health Organization in 1964 to replace the terms “addiction” and “habituation”.

Further, the criteria in the presence of which it is possible to diagnose dependence in humans will be considered.

According to World Health Organization (n.d.), to determine the diagnosis of dependence, three or more of the following manifestations must occur for at least one month:

- A strong desire or sense of compulsion to take the substance;
- Impaired capacity to control substance-taking behavior in terms of its onset, termination, or levels of use, as evidenced by the substance being often taken in larger amounts or over a longer period than intended, or by a persistent desire or unsuccessful efforts to reduce or control substance use;
- A physiological withdrawal state when substance use is reduced or ceased, as evidenced by the characteristic withdrawal syndrome for the substance, or by use of the same (or closely related) substance to relieve or avoid withdrawal symptoms;
- Evidence of tolerance to the effects of the substance, such that there is a need for significantly increased amounts of the substance to achieve intoxication or the desired effect, or a markedly diminished effect with continued use of the same amount of the substance;
- Preoccupation with substance use, as manifested by important alternative pleasures or interests being given up or reduced because of substance use; or a great deal of time being spent in activities necessary to obtain, take or recover from the effects of the substance;
- Persistent substance use despite clear evidence of harmful consequences as evidenced by continued use when the individual is aware, or may be expected to be aware, of the nature and extent of harm (World Health Organization, n.d.).

Addiction is divided into two types: chemical and behavioral (Alavi et al.,2012).

Chemical and behavioral addiction have a series of common concomitant symptoms, which suggests that both types of addiction have common causes. Both types of addiction have the same effect on the brain. Both substance abuse and behavioral addiction target the brain's reward system and evoke a sense of pleasure.

Even though most people are familiar with chemical addiction, in recent years, especially during the development of information technology, people have developed behavioral addiction. Behavioral addiction - or, as it is called, process

addiction - is a form of addiction in which a person becomes dependent on pleasant feelings caused by certain types of behavior. A person can be diagnosed with behavioral addiction, with the loss of control over his/her behavior, despite the negative consequences in work or even relationships.

As stated in an American Addiction Centers Resource (n.d.), researchers have identified some general behaviors that can result in addiction. The pathological features of some of them, as well as methods of prevention and treatment, are examined in detail in this paper:

1. Gambling
2. Video games
3. Pornography and masturbation
4. Cell phone and social media

## 6. Gambling

In accordance with Russian Association of Psychiatrists(n.d.), pathological gambling is gambling addiction. Gambling means betting on money or any tangible goods for an event with a doubtful outcome having the intention of making a profit. The main feature of gambling is that its outcome depends almost entirely on the will of chance, rather than on the skill of the player.

Gambling can be a good pastime if people rarely participate in it. People with a gambling addiction are called pathological gamblers. They often deny the existence of a problem, despite large financial or social problems due to gambling (American Addiction Centers Resource,n.d.).

Russian Association of Psychiatrists(n.d.) state that gambling is manifested by the following symptoms:

1. Constant enthusiasm, increasing the amount of time spent in the game
2. Directing the entire range of person's interests to the game
3. Loss of control, inability to stop the game even after big wins/losses
4. Abstinence (after the end of the game)
5. The desire to increase risk
6. Irresistible craving for participation in the game

Frequently playing people show typical thinking mistakes. They are able at the psychological level to find excuses for their actions and increasingly return to the game. The longer they play, the more it seems to them that money solves all problems, including problems of emotions and relationships with people. They are unsure of themselves and consider success as a result of winning, ephemerally imagine the possibility of making amends by a successful game. Also, most pathological gamblers have large debts, but still can not stop playing; they have a clear idea that gaming debts can be repaid only by continuing to play, in other words, "won back".

The operation of gambling establishments is restricted all over the world, except “special zones”. In this regard, online casinos and sweepstakes are gaining more and more popularity (Russian Association of Psychiatrists,n.d.).

As reported by American Psychiatric Association (2018), pathological gamblers may experience periods in which the symptoms of gambling disappear, and in general, the picture seems to them problem-free. The prerequisites for gambling disorder tends to appear in families, but environmental factors also have an important role. Men, in most cases, tend to start at a younger age, and women are more likely to begin later in life. It is also worth highlighting that problem players are very prone to suicide. A serious attitude to any thoughts and talk about suicide is mandatory, otherwise such thoughts lead to fatal outcomes.

Pathological gambling in DSM-5 (Diagnostic and Statistical Manual of Mental Disorders. 5th edition - is the product of more than 10 years of effort by hundreds of international experts in all aspects of mental health) was the first behavioral, addictive, non-substance use disorder.

Despite this classification, scientists disagree on the issue of classifying gambling as pathological. Some of them are in favor and some are against ( American Psychiatric Association, 2013).

Both gambling addiction and substance abuse have common features of the clinical picture, including general neurobiological mechanisms that underlie the functioning of the brain and cognitive functions in these disorders. Gambling and substance use have the same mechanism for activating the reward system, which differs from the mechanism of diminished motivation disorders. With such disorders, negative reinforcement of the reward system is activated: a person experiences a feeling of relief and pleasure as a result of a certain action. On the contrary, addiction to chemicals and gambling involves positive reinforcement, at least in the early stages of the disease, when people report a “kick” or “flow” state. Only at later stages compulsive features and negative reinforcement in the reward system begin to prevail. In addition, the severity of factors associated with problematic behavior is a central element that combines gambling with disorders associated with the use of psychoactive substances. In both cases, the expectation of reward is disproportionate to the type of reward. According to Mann et al. (2016), “evidence suggests that individuals with gambling or substance use disorders exhibit a hypo - responsive reward circuitry”. This confirms the view that dopaminergic dysfunction is a common

feature of both addiction types, although the need for further research seems warranted (Mann et al., 2016).

With the rapid development of the Internet and communication technologies, an increasing number of people are at risk of being addicted to gambling, because access to it due to technology has become almost instantaneous from anywhere in the world where is the Internet access.

Modern studies show that from 0.2 to 5.3 percent of the population of developed countries are involved in gambling (Grall-Bronnec et al.,2010). According to the largest epidemiological study, the prevalence of gambling in the United States is 0.42% of the population (Petry et al., 2005). In the developed countries of Southeast Asia (Hong Kong, Singapore, Macau), these figures are higher: the number of pathological gamblers is 1.8 - 2.5% of the population (Shek et al.,2012). In Korea, this number is 0.8-3% of the population (Park et al., 2010).

Based on international experience, gambling therapy can conditionally be divided into non-pharmacological therapy and pharmacotherapy. Psychotherapy is a type of non-pharmacological therapy that is mainly used, most often it is cognitive-behavioral therapy, as well as 12-step programs implemented in the “Anonymous Players” groups. Sometimes these methods are used in combination. From pharmacotherapy for gambling, at the moment, the effectiveness of three groups of drugs has been proven: antidepressants, opioid receptor antagonists and normotimics (Egorov, n.d.).

## 7.Video Games

“Video games addiction (pathological gaming) is manifested in the loss of control over game behavior, where the priority of the game prevails over others and does not stop with the appearance of problems in various fields. Pathological gaming is characterized by a model of constant or periodic gaming behavior using computer games or video games that takes place online or offline.”(Russian Association of Psychiatrists,n.d.)

It happened, but the spread of the Internet and video games has led to the spread of dependence on them. Most at risk are men under 30, as well as shy teenagers and children.

Psychologists have found that addiction to video games is very similar to gambling addiction in key areas. According to Young, addiction to video games is clinical impulse control disorder. As in the case of gambling, people with pathological gaming have difficulty controlling the impulse to play. Until the present, all the factors that encourage people to become addicted to video games are not clear, but of course, this has its psychological factor. People dependent on this use of video games in order to temporarily break out of our reality. For example, a person who is subjected to some kind of harassment at work, tends to immerse himself/herself into the world of video games, where he/she can better control the surrounding factors (American Addiction Centers Resource, n.d.).

Further the issue of pathological gaming in comparison with other types of addiction will be examined in more detailed way.

Video game addiction is described in the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-5). This guide is used by psychiatrists to detect various mental disorders. There is currently insufficient evidence to suggest that addiction to video games is a unique mental disorder. However, in the DSM-5 section, which described the recommended conditions for further research, Internet gaming disorders were recognized along with caffeine use disorders. But it's still worth noting that DSM-5 (2013) includes all types of chemical dependencies, including dependence on alcohol, tobacco, stimulants, marijuana, and opioids. In this case, pathological gambling is the only behavioral addiction included in the DSM-5. According to DSM-5

(2013), games should cause a significant deterioration in various areas of human life. The proposed condition is limited to games and does not include problems with the general use of the Internet, online gambling or social networks and smartphones.

Parekh (2018) states that the main symptoms of internet gaming disorder include:

- Preoccupation with gaming
- Withdrawal symptoms when gaming is taken away or not possible (sadness, anxiety, irritability)
- Tolerance, the need to spend more time gaming to satisfy the urge
- Inability to reduce playing, unsuccessful attempts to quit gaming
- Giving up other activities, loss of interest in previously enjoyed activities due to gaming
- Continuing to play the game despite problems
- Deceiving family members or others about the amount of time spent on gaming
- The use of gaming to relieve negative moods, such as guilt or hopelessness
- Risk, having jeopardized or lost a job or relationship due to gaming (Parekh, 2018).

In accordance with the above criteria, a diagnosis of addiction to video games requires the constant manifestation of at least five or more of these symptoms for 12 months, including both games on the Internet and any other electronic device, but serious problems with addiction mostly arise in people playing on the internet.

Neurological studies have shown similarities in changes in the brain between video gaming and addictive substances.

In 2017, the World Health Organization announced that in the upcoming edition of the International Classification of Diseases (ICD-11), gaming disorder will be defined as a mental disorder. According to preliminary data from World Health Organization (2018), the ICD-11 will enter into force on January 1, 2022. In South Korea and China, for example, to these days, addiction to video games has already been recognized as a mental disorder and treatment programs have been introduced for people with such disorder.

Some scholars even believe that addiction to video games is a symptom of pre-existing mental disorders such as depression, but not as disorder (Ferguson,2017).

A systematic review of all gambling addiction studies using neuroimaging methods showed that addiction to video games appears similar to other addictions, including addictions associated with psychoactive substances, at the molecular, neurocircuitry and behavioral levels. From a molecular point of view, the game leads to the release of dopamine. It has also been suggested that in small samples, addiction to games is associated with a reward deficit that results in decreased dopaminergic transporters in the brain. To restore biochemical balance, people whose reward systems are inadequate are looking for substances and actions that lead to the release of dopamine. Over time, a person becomes accustomed to the hedonic feelings caused by Internet games, and causes withdrawal, tolerance and abstinence symptoms. Thus, addiction to video games is initiated and maintained.

With regard to the nervous system, areas of the brain associated with addictions are often used by playing video games, and therefore the impact of addiction on brain areas such as the orbitofrontal cortex and cingulate gyrus is high, which can lead to significant changes in neural connections and brain structure.

In terms of behavior, frequent involvement in video games leads to problems with behavioral inhibition, executive functioning, attention, and general cognitive functioning. There are also positive aspects: the player improves the integration of perceived information into the brain and the coordination of hands and eyes.

Summarizing all of the above, it would be suitable to conclude this topic with the words of Zastrow (2017): "Adding video gaming to the list of recognized behavioral addictions could help millions in need. It could also pathologize normal behavior and create a new stigma."

## 8.Pornography

Almost all pornography is legal and easily accessible, which makes it possible for a person's pornography use to get out of control. Pornography affects the pleasure centers of the brain, just like alcohol and drugs, and can become addictive.

Certain areas of the brain do not distinguish images from reality. Therefore, during watching a pornographic video, a kind of "complete immersion" effect happens. Our brain reacts to it and the body becomes sexually aroused. Masturbation and orgasm lead to the unleashing of dopamine, serotonin, oxytocin, and testosterone, which leads to relaxation of the whole body and provides positive reinforcement for viewing porn. Addiction to pornography happens gradually. Increases the frequency of watching. Suddenly comes the understanding that a person has become addicted to porn, but he/she believes that it is not possible to stop. The addicted person has obsessive thoughts about pornography, which interfere with him/her in everyday life and even in relationships. A person's desire to watch porn in stressful situations is also one of the signs of porn addiction.

It is also worth considering that frequent watching of pornography also causes tolerance. "Soft" porn becomes insufficient to satisfy needs. As a result, prohibited or taboo materials can be required to become aroused. Some people addicted to porn consider watching it and masturbation a more enjoyable affair than sex itself, since here they have no boundaries for a perverted fantasy and they will not encounter criticism. They may stop associating sex with love, affection and romantic relationships (American Addiction Centers Resource,n.d.).

Due to the Internet and its high speed, pornography has become easily accessible for almost everyone who has access to the World Wide Web. With the development of technology, the porn industry has significantly changed. It became completely different in form and began to improve the "presence effect". With the advent of VR, a person while watching porn as an observer turns into the main character. It can have a very negative effect on people's relationships and can provoke harmful behavior.

The main issue in this topic is the relationship between watching pornography and violence. People have been trying to find the answer to this question for decades. Kutchinsky(1970) was trying to find out how the legalization of porn in Denmark, Sweden and Germany affected the number of sexual crimes. He found no increase in violent crimes. Moreover, some types of violence, such as child molestation or rape, have declined (BBC,2017).

A review of more than 80 research papers in 2009 concluded that there was no connection between violence and pornography.

Malamuth et al. (2000) researched the connection between porn and violence. Over 300 men participated in it. He concluded that the act of criminal violence is committed by people who are already aggressive on the basis of sex. In an interview with BBC Radio 4, he said that he doesn't consider pornography as the cause of sexual violence. "Watching porn can be compared with alcohol consumption: it is not dangerous in its essence, but it can become for those, who are already burdened with other risk factors."(BBC,2017)

A sufficient number of methods have been developed to dispose of this kind of addiction. However, according to an American Addiction Centers Resource (n.d.), the inpatient treatment method is superior to all outpatient treatments.

Its main difference is that during inpatient treatment, the patient is placed in a hospital facility.

The treatment program for addiction to pornography helps to eliminate destructive thoughts and harmful behavior associated with watching porn and improves socially significant relationships that have been damaged due to an addiction.

## 9. Social Media

Addiction to social networks is nowadays the most progressive, especially among young people and the teenage generation. As has been repeatedly noted, this development is associated with the rapid development of communication technologies and the Internet.

Addiction to social networks is a behavioral addiction in which excessive preoccupation with social networks is caused by an uncontrolled desire to enter social networks and actively use them, as well as an uncontrolled waste of time that damages important areas of life (Hilliard, 2020).

When Chamath Palihapitiya, former Vice President of User Growth at Facebook, was responding to a question about his involvement in exploiting consumer behavior, he admitted to an audience of Stanford students that he felt tremendous guilt. He explained that the short-term, dopamine-driven feedback loops that they have created destroy the working principles of society. He also noted that Facebook, Snapchat and Instagram use the same neural circuitry as slot machines and cocaine, so that people are kept using their products (Haynes,2018).

About 73% of people claim to experience a sense of anxiety when they lose their smartphone and feel relieved by finding it. People are so attached to their devices that they feel phantom vibration of the phone in their pocket when this vibration is not present 5(Haynes,2018).

In its essence, the smartphone is not addictive, but the hyper-social environment it provides is a real cause of attachment to this device. A key factor in the success of mankind as a species is the social structures. In real life, the social structure, in which a person thrives counts an average of 150 people. This can not be compared with 2 billion potential connections on the Internet, where our smartphones provide access. To these days, it is undeniable that social networks and online media have made our life order of magnitude easier. However, the price we pay for this is becoming ever more tangible. Numerous studies show the connection between the frequent use of smartphones and increased levels of anxiety and depression, poor sleep quality and increased risk of injury or death in a car accident (Haynes,2018).

Dopamine is a chemical produced by our brains that is fundamental in motivating behavior. It is produced when we eat delicious food, have sex, or as a result of successful social communication. This is a kind of reward system for successful behavior that encourages us to return to it again.

The human brain includes the 4 main pathways for the release of dopamine, or connections between different parts of the brain called neurotransmitters. Mesocortical, mesolimbic and nigrostriatal pathways are considered as our “reward pathways”. They are responsible for the release of dopamine in certain parts of the brain, which forms their activity. The fourth pathway, the tuberoinfundibular pathway, is responsible for regulating the release of prolactin, the hormone necessary for milk production (Haynes,2018).

As Haynes (2018) stated, despite the different anatomical organization of these pathways, all three are activated by expecting or experiencing rewarding events. In particular, they strengthen the connection between the various behavioral forms and the subsequent reward. Each time a certain type of behavior leads to such rewards, these connections become stronger due to a process called long-term potentiation. This process strengthens the frequently used connections between brain neurons by increasing the intensity at which they respond to certain stimuli.

Even though such neural connections and stimuli are not as strong as when using cocaine, they also lead to the release of dopamine, which enhances any previous behavior.

According to Haynes (2018), cognitive neuroscientists have found that the positive recognition of our peers, messages from loved ones, emoticons - activate the same dopaminergic reward system. Smartphones have provided us with an unlimited range of social incentives, both positive and negative. A text message, like on Instagram, or a notification on Facebook can be a positive incentive for dopamine release.

Due to the free access to social networks, their owners look for ways of making profit through advertising. Such a system perfectly works and affects all users. This has led to the fact that those who make the best use of their product to exploit the functions of brain reward systems will earn the most. “Research in reward learning and addiction have recently focused on the functions of our dopamine neurons, called reward prediction error (RPE) encoding. These

prediction errors serve as dopamine feedback signals in our brain.”(Haynes,2018) This neurological feature casino owners have used to their advantage for a long time. During the game, when the roulette wheel is spinning, the person is in a state of anticipation. In between pressing the lever and waiting for the result, dopamine reward systems are activated, which creates a pleasant feeling from the game process. But with the accumulation of negative results, the loss of dopamine leads people to stop playing. Thus, our brain is constantly involved in balancing positive and negative outcomes.

As in slot machines, many social media applications have a reward template optimized for our maximum participation in the process of using the application. It is easily noticeable that people check their phones at the slightest signs of boredom, completely out of habit. Programmers have been working for years to obtain such results.

As stated by Haynes (2008), the longer person has been a Facebook user, the more the site expands its criteria for notifications. After the start of using Facebook, notification center revolves around the initial set of connections that a person establishes, creating an important link between notification and social rewards. With the increase in the amount of time spent on Facebook and interactions with various groups, events or artists, notification center will also become more active. Expecting to be rewarded, people open the Facebook app repeatedly. Considering the low cost of checking the phone, there is a strong stimulus to check in at any time.

Other examples, however, emphasize more conscious efforts to monopolize the population’s time. Further Instagram implementation of a variable-ratio reward schedule will be considered. Instagram notification algorithms will sometimes hide “likes” in photos, so that person can be notified later in large quantities. Therefore, making a post on Instagram, it is possible to become disappointed with a smaller amount of feedback than was expected only to obtain it in large quantities later. Dopamine centers were prepared by these primary negative consequences in order to react strongly to the sudden influx of social assessment. Such use of a variable reward schedule takes advantage of our constant desire for social approval based on dopamine and optimizes the balance of negative and positive feedback signals, which gradually turns us into familiar users. In order to take advantage of people’s constant desire for social approval based on dopamine, used variable reward schedule optimizes the

balance of negative and positive feedback signals, thereby transforming people into habitual users (Haynes,2008).

According to Forbes (2018), Salesforce CEO Mark Benioff compared social media to cigarettes. At the World Economic Forum in Davos, Switzerland, he stated that companies such as Facebook should be regulated in the same way as the cigarette industry, because consumer safety is violated for the financial benefit of the company.

Such serious comparison can be justified by the arguments mentioned above.

Griffiths (2018) offers some options for solving and preventing the problem of addiction to social networks. In particular, the professor offers ordinary users of social networks, in order to avoid problems with addiction, to engage in “digital detox strategies,” which simply reduce the amount of time spent on social networks. These are fairly simple steps, which include disabling sound notifications and avoiding checking smartphone every 30 minutes or an hour.

According to Mark Griffiths (2018), measures should also be implemented at the government level. Specifically, minimizing and prohibiting the use of mobile devices. For example, in many countries, bans on the use of mobile devices while driving have already been adopted. Many schools prohibit the use of mobile phones during class. It is worth noting one of the most interesting ideas - discounts at some restaurants if visitors refrain from using their phones while eating.

These strategies of positive reinforcement may well be a step forward in an attempt to reduce the time spent on checking smartphones in social networks (Griffiths,2018).

The next step, proposed by Griffiths (2018), is certainly disadvantageous for social network operators, but it is already actively used in the online gambling industry. It is about using behavioral data of such social network operators in order to identify excessive users and provide strategies to limit time spent on their products.

For a small number of individuals, who are addicted to social networks, treatment is warranted. However, the goal of treating this type of addiction should be the controlled use of social networks, and not a complete cessation,

since it is impossible to stop anyone from using their smartphones (Griffiths,2018).

Griffiths (2018) states that the most successful treatment for Internet addiction is cognitive behavioral therapy. This is conversational therapy that can help people change their behavior and their way of thinking.

## Conclusion

Based on the foregoing, a simple conclusion can be drawn. The Internet and technology are not responsible for developing addictions, but people, who are initially prone to addictions. Population finds more and more new ways to satisfy and fulfill their vital needs, which they cannot satisfy in real life. The problem of online addiction must be treated in terms of psychotherapy. Simple communication can not assist in coping with such issue. Technological progress is an integral part of modern life and, similar to evolution, is irreversible. Due to technological progress person's life has become much easier. The archaic form of thinking has remained deep in the past. A new era has come and it is time for people to admit the responsibility for their lives and such problems, as addictions. Each person and each parent in particular should be aware of what is happening in his/her life. There is no universal method for solving this issue, each child is an individual, with a unique set of psychological qualities.

On the other hand, it is worth considering that online addiction adversely affects the human brain, disrupting its neural connections. Numerous studies in this area suggest that it is impossible to completely eliminate online addiction in the modern world. However, it is necessary to reduce the time spent on the Internet.

It is worth noting that behavioral dependence has similar symptoms with dependence on psychoactive substances, and this fact is depressing for the whole humanity. However, following the methods of prevention and therapy described in this thesis will help to cope with the problems of Internet addiction. Researches are still ongoing on these issues. To these days, there is no single, clearly express an opinion in the scientific community regarding all aspects and types of online addiction. Such situation suggests that this issue remains open and requires more attention and research.

Another point that requires consideration is that some types of addiction, such as addiction to social networks, cannot be completely eradicated from life. Because social networks are the foundation of modern society, they have a lot of positive qualities. The problem does not lie in the use of social

networks, but the uncontrolled and excessive being online. It develops mental abnormalities that have been described in the thesis. In the comparison of this addiction with gambling (gambling addiction), for gambling, it is not enough to limit the time of use, but is also required the complete termination of gambling from life.

This thesis is the result of research by scientists from psychiatric associations in different countries, as well as my personal observations. Many of the problems reflected in the thesis are present for the whole population.

## Extended abstract in Czech Language

Vědecký a technologický pokrok je neustále v pohybu. Každý den jde svět kupředu mílovými kroky. Technologický vývoj samozřejmě lidem usnadňuje život a pomáhá jim ve všech jeho oblastech. Moderní svět si nelze představit bez technologií a internetu. Internet se stal nedílnou součástí našeho světa. Veškerá práce největších světových společností má základnu na internetu (Google, Amazon, Yahoo). Dva nejbohatší lidé na planetě, jejichž bohatství přesahuje 100 miliard dolarů (Bill Gates a Jeff Bezos), díky technologiím přišli ke štěstí. Jejich produkty i produkty jiných společností výrazně snížily množství času stráveného v různých oborech. Dělají život mnohem pohodlnějším, což je jistě velký pokrok pro lidstvo.

Tento pokrok však doprovází obrovské množství problémů, s nimiž se lidé setkávají při používání technologií a internetu. Téměř polovina světové populace má přístup k internetu. Ve vyspělých zemích jsou to prakticky všichni. Počet uživatelů sociálních sítí, lidí hrajících online hry a dalších uživatelů na internetu roste obrovským tempem. Facebook má asi dvě miliardy aktivních uživatelů, počet lidí hrajících videohry na platformě STEAM je od 10 do 25 milionů. Z toho plyne jen jedno: neuvěřitelné množství lidí používá internet a technologie každý den.

Tato skutečnost přispívá k výskytu duševních poruch, jako je například závislost na internetu. Lidstvo, zejména mladší část populace, je v současné době velmi závislé na internetu. Mohou trávit hodiny surfováním po internetu, brouzdáním po sociálních sítích a hraním her, a ztrácejí tak svůj drahocenný čas. Z lékařského hlediska se tímto způsobem vyvíjí návykové chování, které je z pohledu vědců duševní poruchou. Vzhledem k četným studiím jsou některé typy závislosti na internetu klasifikovány jako specifické duševní choroby. Mají společné příznaky se závislostí na alkoholu, drogách a nikotinu.

Ve své práci jsem k této problematice přistupoval z různých hledisek. Svou práci jsem rozdělil na dvě části. V první části hovořím o obecném postavení vlivu online závislosti na společnost a jejích důsledcích a ve druhé části o patologických vlastnostech závislosti z pohledu medicíny a vědy. Ve své práci se spoléhám na spolehlivé zdroje, různé studie vědců i knihy, které jsem uvedl v seznamu použité literatury.

Přestože se názory vědců na tuto problematiku velmi liší, snažil jsem se nahlížet na tento problém objektivně a z neutrálního hlediska.

Prostudoval jsem velké množství výzkumných prací na toto téma a také informace dostupné na internetu na stránkách psychiatrických sdružení v různých zemích, včetně stránek Světové zdravotnické organizace. Podrobněji jsem tento problém studoval z lékařského hlediska, zejména tedy vliv závislosti na internetu na lidský mozek a vliv online závislosti na formy sociálního chování. Dále jsem studoval příčiny výskytu a způsoby léčby a prevence závislosti na internetu.

Jak bylo uvedeno výše, první část pojednává o obecných aspektech online závislosti, jejích typech a dopadu na člověka a jeho sociální chování. První část práce je rozdělena do několika kapitol, které samostatně popisují jednotlivé typy závislostí, včetně závislosti na sociálních sítích, online hrách či pornografii. V první řadě je věnována pozornost historii vzniku těchto oblastí. Krok za krokem je popsána chronologie vývoje závislosti na internetu, současnost i potenciální budoucí vývoj.

Dále je věnována pozornost výzkumům v určitých oblastech závislosti, které poskytují ucelenější obraz sociálního chování lidí závislých na internetu. V každé kapitole popisují faktory, které předcházejí vzniku závislosti, symptomy závislosti, jakož i výsledek, k němuž různé formy závislosti vedou. Důležitou součástí mé práce je popis subjektů, které profitují z toho, že lidé tráví stále více času na internetu. Kapitály těchto společností jsou miliardy dolarů. Podle vědců tyto společnosti provádějí stále více výzkumů, aby udržely svého uživatele za obrazovkou více času, což může nepříznivě ovlivnit člověka. Nejškodlivější účinek na lidské sociální chování je podrobně rozebrán v první části mé práce. I přes všechny tyto negativní aspekty se práce také nepřímo zabývá pozitivním dopadem internetu.

Byly předloženy argumenty, že je mnohem snazší zabránit tomuto onemocnění, než se vypořádat s jeho důsledky. Každý rodič se musí naučit metodám prevence takových duševních poruch u svých dětí. Neznalost a nevědomost rodičů o této otázce vede ke smutným důsledkům.

V této práci se také zdůvodňuje to, že internet není odpovědný za problém závislosti na internetu, ale zodpovědní jsou samotní lidé a důsledky jejich destruktivního chování. Vývoj takových duševních poruch je v neposlední řadě

ovlivněn společností, ve které člověk vyrůstá a je vychován. Ve většině případů vyústí toxické chování v mezilidských vztazích v to, že se člověk vrhne do online světa, kde se cítí mnohem pohodlněji a kde je neuvěřitelně obtížné ho dostat ven.

Shrnutím všeho, co je popsáno v první části mé práce, lze říci, že sociální jáma, do které se člověk vrhne v důsledku nekontrolovaného a častého používání internetu, je důsledkem jeho výchovy a prostředí, ve kterém se nachází. Tato práce se nevztahuje na celou populaci, ale, bohužel, přesto na její většinu.

Za zmínku také stojí, že sami lidé jsou odpovědní za rozvoj duševních poruch, nebo v případě dospívajících, jejich rodiče, a v žádném případě ne lidé, kteří pracují na vývoji technologií a internetu.

Ve druhé části práce se věnuji problému závislosti na internetu z hlediska vědy a medicíny. Vystávají zde otázky týkající se dopadu online závislosti na lidský mozek.

Byly uvedeny základní definice pojmu závislost, její forma a kritéria. Existují dva typy závislosti: chemická a behaviorální. Chemická závislost je závislost na užívání psychoaktivních látek, jako jsou alkohol, drogy a nikotin. Druhým typem závislosti je behaviorální závislost, na kterou se ve své práci zaměřuji podrobněji.

Vlivy závislosti na mozkovou činnost, myšlení a tělesné funkce jsou dále popsány. Podrobněji je popsáno téma destrukce nervových spojení u závislých osob, která vytváří neodolatelnou touhu po určité formě chování nebo po požití psychoaktivních látek.

Ve druhé části jsou dále popsána kritéria, na základě kterých je u osoby diagnostikována závislost.

Druhou část jsem rozdělil do čtyř samostatných kapitol, z nichž každá popisuje klinický obraz vývoje čtyř typů závislosti na chování, konkrétně: závislost na sociálních médiích; hazard - závislost na hazardu (V první části práce tento typ závislosti chybí, protože je více individuální a souvisí s užší sférou vlivu); gaming - závislost na videohrách; cybersexová závislost na pornografii.

Práce také pojednává o umístění různých typů závislosti na internetu do Mezinárodní klasifikace nemocí. Přes četné spory jsou některé typy online závislostí zařazeny do seznamu duševních chorob.

Patologické hráčství - závislost na hazardu. Tato kapitola odpovídá na otázku závislosti lidí na hazardních hrách, její důsledky a způsoby jejího řešení. Vlády některých zemí dokonce zakázaly na svých územích provozování kasin (výjimkou jsou „zvláštní herní zóny“, kde jsou kasina povolena). S příchodem a rozvojem internetu se však objevilo obrovské množství online kasin a různých možností online sázení, což problém hazardu zhoršilo. Nyní k vytvoření závislosti na hazardu stačí, aby měl člověk přístup k internetu.

Herní porucha - závislost lidí na videohrách. Tato kapitola pojednává o problému herní poruchy jako o způsobu chování, při kterém člověk ztratí kontrolu nad hracím časem, navzdory tomu, jaký má tato skutečnost škodlivý účinek na hráčův život. Stejně jako v předchozí kapitole je problematika herní poruchy analyzována z pohledu různých vědců. V této části jsou také uvedeny četné studie a příklady. Jsou zde také zvažovány příznaky, na základě kterých lze tento typ závislosti diagnostikovat.

Další dvě kapitoly se zabývají otázkou závislosti na sociálních sítích a pornografii. Jsou zde prezentovány stejné studie a teze jako v předchozích kapitolách, pouze s ohledem na danou konkrétní oblast.

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