

# IMPACT OF DIGITAL TECHNOLOGIES ON PEOPLE HEALTH AND MEANS TO AVOID INFORMATION FATIGUE

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**Abstract.** *Internet become as basic component of daily routine. Although the Internet has many positive aspects, most people spend too much time on their smart devices spending less time playing outdoors. A decrease in physical activity not only sets up information fatigue, which leads to increase in diseases of the nervous and heart systems. Many of scientific articles deal only with the features of information fatigue and its consequences for human health, however research articles that analyze tools that can protect against information fatigue have not been found. Only commercial companies advertise their software, which help monitor what users are doing on their computer. Novelty of the article is that it explores how information technology affects young people lives and analyses software that can help control working time with these smart devices also.*

**Keywords:** *diseases, information fatigue, monitoring working time, smart devices.*

## Introduction

21st century is the century of information technology and Internet. The technologies are neither good nor bad. Modern technologies bring new opportunities, facilitate learning and communication, and broaden horizons. However, the online world also carries certain threats: unwanted and even life-threatening contacts on various dating sites, videos and games with traumatic and violent content, bullying, unconscious translation of virtual space into reality. Various types of information contribute to the dissemination of thoughts, emotions, feelings, and thus influence decisions and actions. It is especially painful when the technology affects children who are not yet able to think critically and defend themselves. Technology had to make life easier and bring people closer, however it seems they distract people. Most people are dependent on their digital devices and need a constant connection to the internet. Everyone

spends too much time on their smart devices. The digital information fatigue affects relationships and health.

Information technology and online social networking led to a dramatic increase in the amount of information (Rodriguez, Gummadi, & Schoelkopf, 2014). Many modern people are now suffering from a dangerous state of information overload as the ability to obtain more information than is useful. American scientist B. Gross first became interested in the scientifically negative effects of information overload on the brain (Gross, 1964). He introduced the term "*information overload*". Later scientists (Dean & Webb, 2011) emphasize that brains have limited information processing ability, so it is best suited to focus on one task at a time. When humanity switch between tasks, especially complex ones, they become dramatically less efficient.

In 1996 researcher D. Lewis suggested a new phenomenon – "*information fatigue syndrome*" definable as fatigue and stress resulting from the need to encounter large quantity of information (Lewis, 1996). The researcher explained effects of the syndrome on health. Such effects may include paralysis of analytical ability, permanent search for information, increased anxiety and fear, and reduced confidence in decision-making. (Thomas, 1998; WordSpy, 2019.12.10). The mentioned syndrome goes by many names as information overload, information explosion, data smog, info pollution, the communication tsunami and so on (Kabachinski, 2004).

Many of the scientific articles deal only with the features of information fatigue and its consequences for human health, however research articles that analyze the tools that can protect against digital fatigue have not been found. Only commercial companies advertise their software, which help monitor what users are doing on their computer.

The *aim* of this article is not only to describe how information technology influences people's lives, but also to suggest the tools that can monitor working time with smart technologies. This article generalizes experience of teaching of information technology to the students at Kaunas University of Technology. The course teaches information and communication technology, their advantages, and potential threats.

*Research tasks:*

- Overview the main technologies that allow to protect from harmful information on the Internet.
- Generalize experience of teaching of information technology to the students of Kaunas University of Technology.

*Research methods.* Research methods include analysis of scientific publications and the generalized experience gained from students' projects, analyzing benefits and potential threats of the communication technologies.

The article is structured in the following way. First section introduces the main means that allow to avoid the digital information fatigue. Second section generalize experience of teaching of information technology.

### **Literature review on tools that allow to protect from harmful information**

Scientific articles that analyze the tools that can protect against digital fatigue have not been found. Only commercial companies advertise their software, which help monitor what users are doing on their computer. Many of the companies offer filtering or blocking content on websites. It is one of the possible ways to protect young people from inappropriate and harmful information on the Internet. Some applications integrate web filters or support the ability to block specific website URL; others have tools such as screenshots, social media blocking or use special algorithms to detect and block inappropriate online content.

Windows manufacturers integrated “Windows 10 parental controls” functionality (Jones, 2019) designed to safeguard children from inappropriate online content. Parents can create a separate account for their children and easily monitor their activities.

There are also preventive measures developed by other manufacturers. For example, “K9 Web Protection” and “True vine” (TrueVine, 2019.12.03) programs can help protect children from accessing harmful online. The website blocking programs are compatible with Windows, Android, and iOS. “K9 Web Protection” blocks web pages and can even block search engines (Softonic, 2019.12.10). The application features the specially designed child protection filter against web proxy tampering. There are tools for time limits sets and real-time access to websites also. “True vine” services block dangerous content.

The “Rescue Time” software can be installed on a PC and is also compatible with a smartphone or tablet (RescureTime, 2019). The application tracks time spent in social networks, captures which programs is used, allows to enter timeout limits. Built-in alerts provide overview of the day activity.

Other software “Qustodio” (Qustodio, 2019.11.07) lets to control how much time kids spend online. The software records and provides detailed information about how long children are on specific websites or the words they look for in search engines. It informs also if kids have tried to go to a blocked website. This software works on Windows, Mac OS X, Android, iOS, and Kindle. The program has 29 categories of filters to block access to websites via a mobile phone. Access restrictions can be time-based or depended on the content of the website. The software allows to control the screen time, capture contents of emails with the keywords entered by parents. The program generates a daily overview and a detailed summary of child's online activity.

“Net Nanny” (Nanny, 2019.11.14) is a website blocking software compatible with “Mac”, “Windows”, “iOS” and “Android” devices. This software integrates 18 categories of filters that allow quickly restrict access to unwanted websites. The program blocks swearwords to prevent children from reading. It also prevents typing words that are inappropriate in the search box. The program informs parents via email in the form of a report that children have tried to enter inappropriate words into the search engine and had been blocked. The program supports time control of children's Internet access, as well as configuration of multiple children's Internet access profiles.

Sending the message to parents is as important as reading activity reports. Software “McAfee” (McAfee, 2019.11.14), sends a text message as soon as the kids try to access banned site. Applications such as “Spy Agent” (SpyAgent, 2019.11.04) or “Norton Family” (Norton, 2019.11.04.) monitor social media activity and block online bullying also. Application “Barracuda Web Blocker” blocks malware or rogue bidding additionally (Barracuda, 2019.11.20). Other application “Surfer” sends email notifications when children enter specially selected words into search engines (Safesurfer, 2019.11.27). Some of them take screenshots while your child is online so parents can physically see what they saw on computer screen.

Software “InterGuard” provides high quality software for blocking websites, whitelisting URLs, categorizing content, tracking web search, getting traffic bandwidth (Uzialko, 2019). One of the best features of this software is that it cannot be detected. This means that device users do not realize that the software is running in the background. This enables parents easily monitor their children's online activities. The software also provides graphical reports.

Website blocker “Aobo Website Blocker” is different from other common online content blockers. This software has a content filtering algorithm that can block websites independently (Softonic, 2019.11.20). There is no need to manually block adult games or any other inappropriate website. The software currently supports these platforms: Windows and Mac OS.

Another tool is “Block Site” (BlockSite, 2019.11.20) created using Wireless Intrusion Prevention System technology (Cisco, 2018.02.18). This tool improves web browser by extending its functionality. The tool can be added to “Google Chrome” or “Mozilla Firefox” web browsers with built-in advanced features. They can block websites or filter words from search engines or web pages. It is also possible to set a specific time interval during which the web browser operates.

Social networks as Instagram and Facebook provide new tools to help people manage time on social networks (Infocenter, 2018.08.01). They allow to set daily time limits and the ability to temporarily disable instant messaging.

### Study: how social networks affects young people life

This part summarizes a study of teaching of information technology to the students of Kaunas University of Technology. The study finds out what technologies young people use; how much time they spend on the Internet; for what purposes they use the Internet; if they know about information technology that can control time on the Internet.

At the beginning of the school year, students (questioned 250 students from 18 to 20 years old) were asked what information technology they use to communicate with friends and relatives. The answers showed that students communicate through Facebook, Skype, Messenger, Viber, Instagram, Snapchat and WhatsApp (Figure 1). Most students referred to Facebook, Instagram and Viber or Messenger.

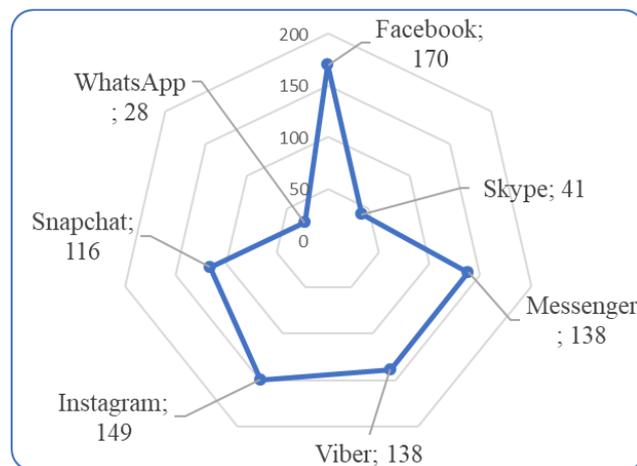


Figure 1 Survey on the usage of communication software

All semester, in the information technology course, students worked on projects that explored the impact of the technologies on their lives. They analyzed various communication software. Project groups created questionnaires to interview their friends and acquaintances.

Authors of this article divided the projects questionnaires data into two groups to find out how social networks affects people life: if young people are dependent on their digital devices and is need a constant connection to the Internet. The aim was to find out whether this dependence could lead to digital information fatigue.

The first group consisted the data that analyzed how social networks affects people life. The aim of the first study was to find out how much time young people spend in social networks. The following questions were therefore under consideration: how many times a day they look at social networks; what they do

on the Internet; when they access social networks; if they check social networks before going to bed; could they consider themselves addicted to social networks and so on.

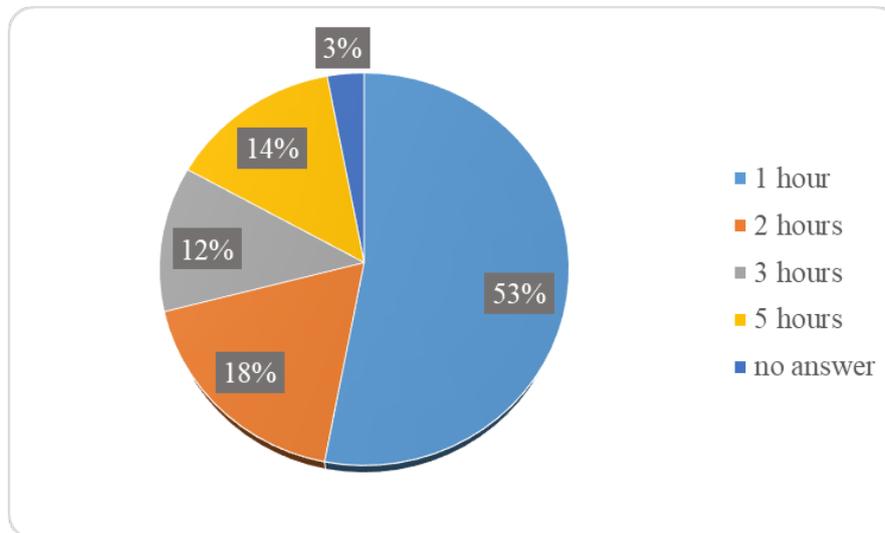


Figure 2 Survey “How often people use social networks per day”

About half of the respondents (questioned 119 people from 15 to 20 years old) said that they use social networks for 3 hours and more per day (Figure 2). Some of them use the Internet for more than 5 hours a day. More than a third of participants responded that they visit social networks more than 10 times a day. Students activities on the Internet are searching for information, playing games; communicating with people; spending time on social networks, doing projects; filling documents; buying things on Internet; chatting with friends; studying; spending free time; watching films and so on. People access social media during free time, while eating, at school/work time or any spare moment. Two-thirds of the participants check social media before going to bed. Only about half of the respondents admitted that they are addicted from social networks.

In the second study authors explored data on usage digital devices: when young people use their digital devices; if the respondents track their time spent on smartphones; do they know applications that track time spent on digital devices and have they tried them. Respondents (questioned 37 people from 15 to 20 years old) answered (Figure 5) that they often use their smartphones in a lecture, in working hours, while waiting in the queue, while driving or eating, before going to bed, after waking up and so on.

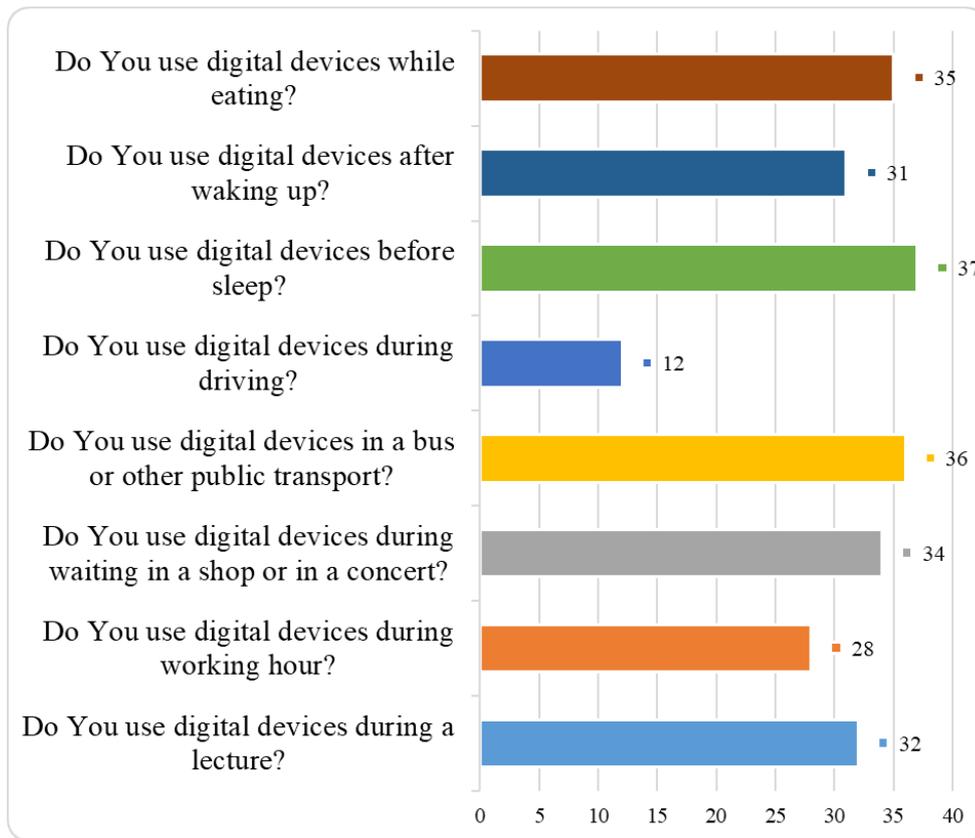


Figure 3 When young people use their digital devices

However, almost half respondents answered that they do not track their time spent on smartphones and only one-fifth respondents use applications to track time spent on smart devices (Figure 5 ).

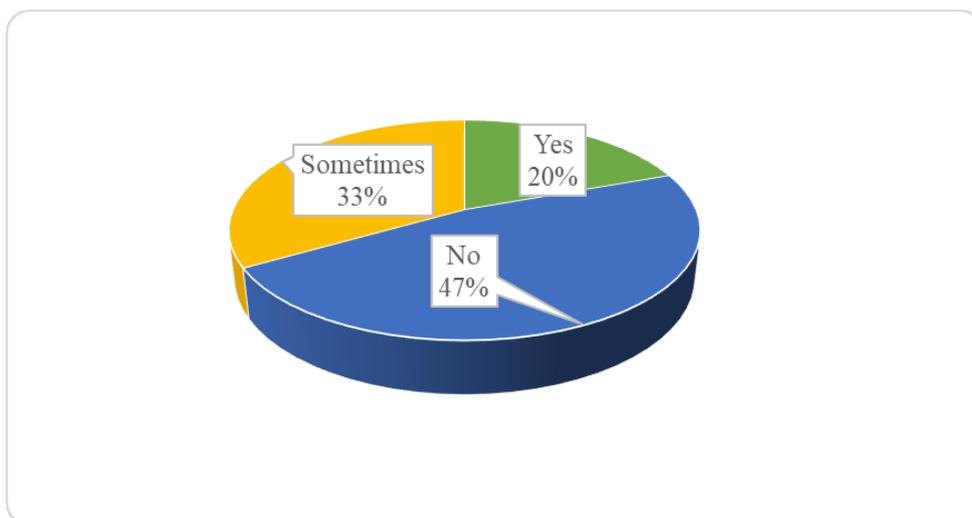
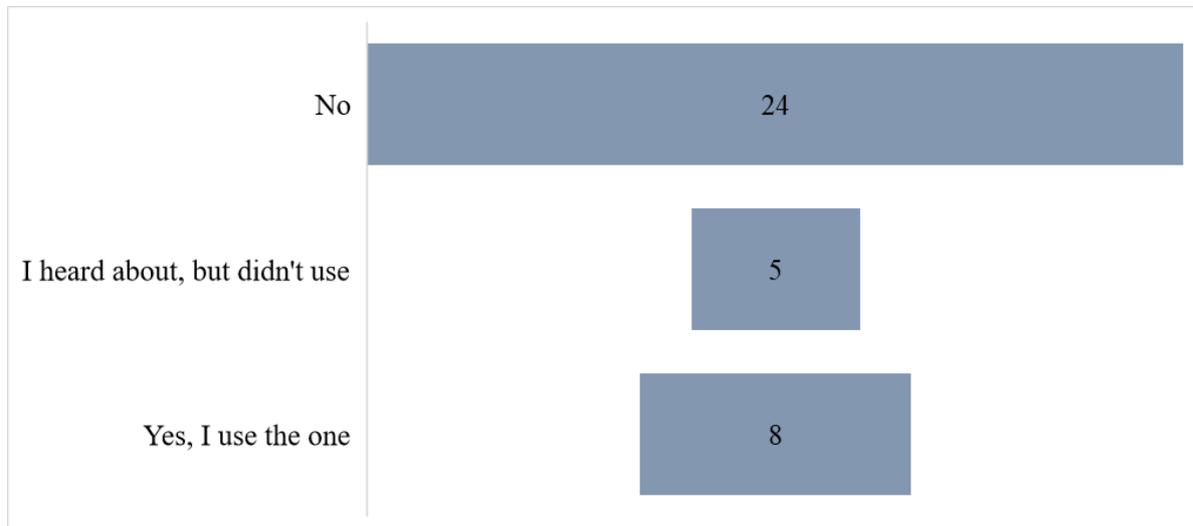


Figure 4 If respondents track their time spent on smartphones

Only few respondents said that they use applications to track time spent on their smart devices (Figure 5). They named tools such as: Instagram tool, iPhone screen time function and Apples screen time clock.



*Figure 5 If respondents know applications that track time spent on digital devices and if they have tried them?*

The research showed that young people spend quite a lot of time in the social digital space. Almost half respondents answered that they are dependent on their digital devices and need a constant connection to the internet. The searching for various types of information may contribute to the dissemination of thoughts, emotions, feelings, and thus influence decisions and actions. This can cause information fatigue. Almost half respondents do not track their time spent on smart devices and do not know any software that could help them. In the first chapter mentioned tools could help the people manage time while setting daily time limits and the temporarily disabling instant messaging.

## Conclusions

Summarized study of teaching of information technology showed that young people communicate through Facebook, Skype, Messenger, Viber, Instagram, Snapchat and WhatsApp. They spend time on their smartphones searching for information, playing games; communicating with people; spending time on social media, doing projects; filling documents; buying things on Internet; chatting with friends; studying; spending free time; watching films and so on. Young people use social networks for three hours and more per day. They use their smart devices in a lecture, in working hours, while waiting in the queue, while driving, before going to bed, after waking up, while eating. This gives us an insight, that any of

them assign their free time cautiously. The searching for various types of information may contribute to the dissemination of thoughts, emotions, feelings, and thus influence decisions and actions. This can cause information fatigue. Most of respondents answered that they do not track their time spent on smart devices and do not know any software that could help them.

It is important to mention that information technology companies treated tools for filtering or blocking content on websites to protect young people from inappropriate and harmful information on the Internet. Some applications integrated web filters or support the ability to block specific website URL; others provide tools such as screenshots, social media blocking or use special algorithms to detect and block inappropriate online content. Not only technology companies, but also social networks applications, such as Instagram and Facebook, encourage people to track their time on social media. The mentioned tools could help the people manage time while setting daily time limits and the temporarily disabling instant messaging.

### **Summary**

Internet become as basic component of daily routine. Although the Internet has many positive aspects, most people spend too much time on their digital devices.

Article's study explores how information technology affects people's lives and suggest technologies that can help control working time with smart devices.

Generalized study of teaching of information technology showed that young people communicate through social media. They spend time on their smartphones searching for information, playing games, communicating with friends, spending time on social media, doing projects; filling documents; buying things on Internet; chatting with friends; studying or watching films and so on. Young people use social networks for three hours and more per day. They use their smartphones in a lecture, in working hours, while waiting in the queue, while driving, before going to bed, after waking up, when eating. This gives us an insight, that any of them assign their free time cautiously. The searching for various types of information may contribute to the dissemination of thoughts, emotions, feelings, and thus influence decisions and actions. This can cause information fatigue. Most of respondents do not track their time spent on smart devices and do not know any apps that could help them.

It is important to mention that information technology companies treated tools for filtering or blocking content on websites to protect young people from inappropriate and harmful information on the Internet. Some applications integrated web filters to support the ability to block specific website URL. Others have tools such as screenshots, social media blocking or use special algorithms to detect and block inappropriate online content. Not only technology companies, but also social media developers, such as Instagram and Facebook, encourage people to track their time on social media. The mentioned tools could help the people manage time while setting daily time limits and the temporarily disabling instant messaging.

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