

СОФИЙСКИ УНИВЕРСИТЕТ „СВ. КЛИМЕНТ ОХРИДСКИ“
SOFIA UNIVERSITY “ST. KLIMENT OHRIDSKI”

БЛАГОПОЛУЧИЕ В ДИГИТАЛНИЯ СВЯТ

WELFARE In the Digital World

УНИВЕРСИТЕТСКО ИЗДАТЕЛСТВО „СВ. КЛИМЕНТ ОХРИДСКИ“
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Автори / Authors

- © Оля Харизанова, професор, доктор на философските науки, 2017 /
Olya Harizanova, Professor, Doctor of Philosophical Sciences (Dr Habil)
- © Иванка Мавродиева, професор, доктор на философските науки, 2017 /
Ivanka Mavrodieva, Professor, Doctor of Philosophical Sciences (Dr Habil)
- © Стамена Кавръкова-Георгиева, докторант, 2017 /
Stamena Kavrakova-Georgieva, PhD Student
- © Никола Николов, докторант, 2017 /
Nikola Nikolov, PhD Student

Научен редактор / Scientific editor

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FOREWORD

The current publication contains results from the implementation of a project aimed at developing a methodology for measuring information-dependent well-being. What are the reasons for the authors' interest?

The Challenges

Today, the well-being of individuals, especially those ones who are directly connected to (integrated into) an Information Society and the Internet of Things (IoT), should be highly dependent on information, information technologies, communication technologies and the accompanying "invisible" processes of satisfying needs, impacts, maintaining "interest" in already created virtual worlds. This claim may be rooted in the undeniable fact that today's information and communication technologies (ICTs) strongly influence people's personal lives and professional realization. For example, a lot of professions are already ICT-dependent. This dependence will grow exponentially until active individuals get fully immersed virtual environments / systems / worlds. The key to a person's successful socialization and successful realization will be the expert handling of virtual instruments. The lack of such literacy will be equal to digital dependence and digital slavery. It can be assumed that the level of knowledge and skills to use virtual instruments will turn into a factor that will greatly influence the equality / inequality between people.

In a world where information is already a key resource for development, users form virtual communities and display a purposeful use of ICT, specific knowledge, skills, behaviors and practices, with a variety of self-expression and self-awareness. New sets of rules have been formulated to prescribe specific behaviors in virtual environments with their inherent experiences and aspirations. And yet... People accept and actively use the benefits of communication technologies and social networks. At the same time, they do not know them as virtual environments / means of control, analysis of behavioral attitudes to induce actions (real or virtual). These users are entirely subject to "invisible" forces imposing certain behaviors on a particular occasion.

It is an indisputable fact that during the last decade of the previous century, an assistant, perceived by many as an "intelligent assistant", "sneaked" in many working processes as well as in households. At the end of the 20th century, computers and automated systems invaded "everything" to such an extent that it has changed the role of man in the globally connected world. Indeed, in the late 1980s it became clear that the near future would bring new opportunities, but would also impose unknown limitations and inequalities. They were called digital and subsequently linked to free access to technology, quality of electronic content, trust in and security on networks and information processes, technological neutrality, etc. Subsequently, the ubiquitous spread of high technologies over the 15 years that followed, mobile communication, Internet connectivity and high-speed digital delivery systems revolutionized economies, politics, cultures and outlined the so-called Information Society.

As early as 1999, Kevin Ashton introduced the notion of the Internet of Things. It rapidly gained in popularity because it reflects advances in information and communication technology and refers to the need for a network connecting objects from the physical world to the Internet. Gradually, its scope extends to the integration of RFID chips¹

¹ RFID (*Radio-Frequency IDentification*) is a technology based on a communication standard for transmitting data and information through radio waves. RFID is implemented through radio frequency communication between an identifier (card, keychain, sticker, etc.) and a reader.

into a variety of inventories or into different objects and then to the technological processes associated with remote data transmission through different sensor devices and the connection of these devices to each other. It can be said that the transition from “internet to computers - to the Internet of things - to the Internet for everything” was launched at the end of the 20th century. Today, “Internet for Everything” is a universal name for device-to-network connectivity, which can be managed from anywhere in the world via the Internet and which forms an ecosystem of devices, software and services. This “connected world”, however, has made us aware of the need to achieve efficient control over vast arrays of data coming from a number of virtualized processes in different spheres of socio-economic practices. The volume of data is growing exponentially every day, and new units of information have been introduced, as well as new models termed Big Data. It has become clear that the humans are already dependent on the unbridled cyber development.

A particular emphasis on the above is that, when computers were introduced, those who wanted to use them were forced to get acquainted with machines and acquire computer literacy (knowledge and skills to use a device and software). Later, with the emergence of computer networks and their subsequent connection to the Global Network, the necessary knowledge and skills were multiplied - users had to learn how to use network resources, to acquire information literacy to streamline information flows. Today, in order to be successful in interacting with the connected world, we now need an information culture - knowledge of both computer systems and cyberspace, of information resources, of rules for behavior in virtual environments, of tools for managing them².

It has already become clear that in the next few years, the tendency for interconnection between devices, between technologies, between “things”, between artificial and natural systems, between man and the parallel worlds created by humans will be strengthened. In that future, the key to human success will be the mastery of information culture, while its absence will mean a guarantee of digital slavery.

If the above is true, then prosperity in the digital world must be heavily dependent on information, on information technologies, and on the accompanying “invisible” processes which support the flow of information.

The project

The project is funded by the Scientific Research Fund of Sofia University “St. Kliment Ohridski” (Contract № 80-10-89/20.04.2017). Its topic is “Methodology for Measuring Information-Based Well-Being (Part 1: Piloting an Empirical Data Collection Tool)”. It is the first step in the development and regular application of research tools to the phenomena, processes and problems of the digital and post-digital world.

The up-to-date nature of the subject of well-being in the digital world is indisputable given society’s dependence of on information (trustworthy, untrustworthy) and the massive use of information technologies for different purposes: individual development, group development, business development, awareness or informing audiences, disinformation of audiences, advertising, marketing, control, etc.

² In relation to this, see: **Internet** of Things (IoT):What it is and why it matters. In: *SAS* [online]. [Viewed 16.02.2016]. Available from: http://www.sas.com/en_us/insights/big-data/internet-of-things.html; **Internet** of Everything. [online]. [Viewed 17.02.2016]. Available from: <http://ioassessment.cisco.com/>; **Bajarin**, Tim. The Next Big Thing for Tech: The Internet of Everything. In: *Time* [online]. January 13, 2014. [Viewed 17.02.2016]. Available from: <http://time.com/539/the-next-big-thing-for-tech-the-internet-of-everything/> among others

In connection with the above, there are both myths and facts refuting them. For example, it is widely reported that today, in the world of ICTs, man controls his activity as an Internet consumer. The truth is that, with the spread of the so-called new technologies, a number of processes are already directly dependent on ICTs - new professions have emerged, some have changed their nature and others have disappeared. The next wave of technology has imposed new sources of information and knowledge, tools for communication, tools to perform various tasks. These changes cover both demand for and finding employment, and the prestige of different jobs, friendly circles, living conditions. And if, until recently, there was reason to claim that individuals choose instruments, it is instruments that are now targeting individuals. The creator has proved to be dependent on his creation. It is the same regarding the claims that the Internet is free and practically unregulated, and that the information on it is distributed indefinitely, and everyone can share whatever they want the way they want to do so. The truth is that in the world of networks, technologies are being implemented that control “free” users at different levels. The example of Deep Packet Inspection, a technology that allows reading e-mail in prior to recipients getting it, is evidence of the above. This became known in the first half of December 2012, during a conference of the International Telecommunication Union (ITU)³.

Let us also specify what is meant by well-being (still ...). In general terms, welfare is seen as a degree / level of life of a person or a group of people. It is often identified with prosperity or quality of life. Since 2010–2012, well-being has also been regarded as a new economic paradigm (see 65th Session of the UN General Assembly, July 19, 2012). In a broad sense, prosperity is a multilateral construct - a correlation between cultural, psychological, physical, economic and spiritual factors. Different branches of science deal with several variants: physical well-being, psychological well-being, economic well-being, social well-being, etc.

Three terms are used in English: *wellness*, *welfare* и *prosperity*. The meanings attributed to the term *wellness* are pleasure, satisfaction, and they are related to the satisfaction of the needs of the body and / or the mind, as well as good health or luck, with such synonyms as *comfort*, *happiness*, *prosperity*, *welfare*, *advantage*, *benefit*, *ease*, *good*. The online version of Merriam-Webster states that *well-being* is a noun and refers to a state of happiness, health and prosperity. The term *welfare* is described in a narrower, more specialized, meaning in the online version of Cambridge Dictionary and is connected to financial parameters, money, companies' welfare, less unemployment in a country, etc. The term *prosperity* most often covers financial gains, economic development of a state or a company, personal success and career development. In Russian, *well-being* means: (1) calm and secure (secured) life, success and prosperity; (2) a normal life with no undesirable phenomena, pointing to material well-being on a personal level, and on an economic one - full prosperity. *Welfare*, *prosperity*, *flourishing* (mostly economic), *well-being*, *happiness*, *luck*, *chance*, *contentment*, *sweet life*, *prosperity*, *wealth*, etc. are the synonyms of *wellness*.

³ In relation to this, see: **Recommendation ITU-T Y.2771**: Framework for deep packet inspection. In: *International Telecommunication Union ITU* [online]. Approved in 2014-07-18. [Viewed 28.06.2016]. Available from: <https://www.itu.int/rec/T-REC-Y.2771-201407-I>;

Recommendation ITU-T H.248.86: Gateway control protocol: ITU-T H.248 support for deep packet inspection. In: *International Telecommunication Union ITU* [online]. Approved in 2014-01-13. [Viewed 28.06.2016]. Available from: <https://www.itu.int/rec/T-REC-H.248.86/en> among others

The project is based on the interpretation of the term “well-being” in philosophy, namely as referring to an individual’s the manifestation in real life based on desires, goals, needs and many other variables, but within the dimensions of the information society. It is these initial limitations which frame our examination whether it is true that well-being is directly related to an individual’s adaptation to the surrounding environment and in direct dependence on his/her ability to meet his/her aspirations and needs.

A key question for the project is what the relationship between prosperity and an individual’s perspective is – in an environment which is highly dependent on technologies and their development, on mass virtualization of activities / processes and on the enhanced role of virtual reality.

The project aims to support the development of a methodology for regular survey of information-dependent well-being (IDW) with the development of a research methodology for collecting primary data from target groups. Given the specificity of the problem as well as the variety of manifestations of IDW, the methodology should provide sufficient arguments for: the scope of the phenomenon, the toolkit for the selection of respondents among ICT users (sampling), the approach to developing questionnaires for each group of respondents, the tools for analysing and evaluating the dependence on or independence from the impact of information in modern conditions, well-defended conclusions about IDW dependence on ICTs in the information society, parameters for measuring the relationship of “IDW – the professional and / or social realization of the individual”.

The team

Olya Harizanova is the project team leader. She is a professor of data-mining systems and a Doctor of Sciences at Sofia University “St. Kliment Ohridski”. The topic of the social interpretation of modern information and communication technologies has been an emphasis in her research activity for over twenty years. Over the past 15 years, she has been involved in 34 projects (11 as manager, 23 as key expert, expert or participant). She is the author of 87 publications (including 8 monographs and 9 as a co-author).

Ivanka Mavrodieva-Georgieva is Professor and Doctor of Sciences at Sofia University “St. Kliment Ohridski”. She teaches public speech, business communication, PR and academic writing. She graduated Bulgarian Philology at Sofia University “St. Kliment Ohridski” and holds a Master’s Degree in Public Relations at the same university. She is the Editor-in-chief of the electronic research journal “Rhetoric and Communications” (<http://rhetoric.bg/>, <http://journal.rhetoric.bg/>) and of the Online Rhetoric Guide (<http://www.online.rhetoric.bg/>). She is also a member of the editorial board of the “Foreign Language Education” journal and of the US-China Foreign Language, David Publishing Company (<http://www.davidpublisher.com>). She is a member of the executive board of the Rhetoric Society of Europe (<http://eusorhet.eu/>) – for the second term. She is the author of 12 books and 120 articles in Bulgarian and foreign journals and collections of international conferences in areas such as PR, political rhetoric, business communication, academic writing, argumentation, Internet communication and monographs.

Stamena Kavrakova-Georgieva is a Bachelor of “Library and Information Studies” and a Master in “Electronic Content Management”. She is a full-time PhD student at the Department of Library and Information Studies and Cultural Policy (Sofia University “St. Kliment Ohridski”, Faculty of Philosophy). She was accepted in 2015 and currently works on a dissertation about the “Application of holographic memory in information

repositories of the future” (professional field 3.5 Public Communications and Information Sciences, Information and Search Systems).

Nikola Nikolov is a Bachelor of Philosophy at Sofia University “St. Kliment Ohridski” and holds a Master’s degree in four master programs: “Philosophy of Consciousness and Language” (Sofia University), “Psychology” (Veliko Tarnovo University), “Business Economics” (UNWE) and “Information Technologies and Financial Engineering” (UNIBIT). He is a full-time PhD student at the Department of Library and Information Studies and Cultural Policy (St. Kliment Ohridski University of Sofia, Faculty of Philosophy). He was accepted in 2017 and is working on a thesis entitled “Brain implants as information-serving distributors” (Professional field 3.5 Public Communications and Information Sciences, Information and Search Systems). He has published “An Ontological Analysis of Intelligence”, *Philosophy research journal*, 3, 2010, pp. 80-85.

The book “Wellbeing in the Digital World” includes works on the topic of the project by each member of the team.

Olya Harizanova is the author of the first part, entitled “Well-being in a GIGA-World”. It is provoked by man’s increasing dependence on software systems (both in one’s career and personal life). In this respect, a brief overview of the current trends and pace of technological development in the ICT sphere, user integration into them and emerging user problems is outlined. The working hypothesis of the chapter is that with the development of ICTs and the inclusion of more and more people in their use, human well-being becomes more and more dependent on artificial systems, especially for the so-called onliners. In a short-term respect, the expectation is of users’ complete “immersion” in virtual systems and the formation of a highly controlled post-digital world.

Stamena Kavrakova-Georgieva is the author of the second part, which is on “Digital (il)literacy and well-being”. The chapter seeks to identify and describe the relationship between digital literacy and personal well-being. The results of a survey conducted among 135 students from the Faculty of Philosophy at Sofia University “St. Kliment Ohridski” serve as the basis of the current research. An emphasis has been put on some aspects of digital literacy and their impact on achieving well-being. Some measures are proposed to address the problems associated with the high level of digital illiteracy among young people.

Ivanka Mavrodieva-Georgieva is the author of the third chapter, entitled “Students and Social Networks: From Acceptance in Virtual Groups to Self-Establishment in Virtual Communities”. The emphasis is on social networks, mainly on Facebook, LinkedIn, Twitter, Instagram, in the process of training Bulgarian students in a university environment. It seeks to address the extent to which access to online social networks contributes to the well-being of young people (in particular information well-being) and how access to social networks influences students’ self-evaluation of their well-being and career development.

Nikola Nikolov is the author of the fourth part, entitled “Brain Implant Influence on Personal Identity and Free Will”. The purpose of this work is to present variations in the understanding of personal identity and free will. They are seen as being influenced by modern technological discoveries (mostly ICTs) through brain implants. The aim is to outline the extent to which brain implants are dangerous or on the contrary – helpful in promoting an individual’s autonomy and freedom.

WELFARE IN GIGAWORLD

Olya Harizanova

Abstract

In recent years, with the development of information and communication technologies, people have faced a number of challenges. Some of them affect individuals in a personal respect, others – in a professional one. For example, Job Tiger (a leading human resource company with a career website for job vacancies in Bulgaria) underlined that “the future belongs to combined majors and multifunctional specialists, which in turn will create new opportunities in all sectors”¹. At the same time, at the beginning of 2017, human resource experts noted in a series of publications that 80% of jobs would be changed or entirely new ones will appear in the coming years.

Truth is that today the world is divided into two parts. On the one hand, people are welcoming the achievements of technological development and on the other, there are those who believe that this development is a threat. There are threats indeed because in some sectors, machines will undoubtedly be displacing people or because computers will be better able to write programming codes faster and more correctly than highly paid IT² specialists. Apparently, alongside traditional software platforms (e-business, office or entertainment), new technologies, new software environments, new opportunities called “smart” are growing. Let’s take the development of 3D virtual reality technology, as well as the growth of Internet infrastructure. These achievements have created new online societies – multimedia communities. They exist and act in real-time, and their members can also engage in exploring different virtual “worlds” (computer-simulated and computer-based environments). Take, for example, the Virtual World Web (a network of three-dimensional environments hyperlinked to each other in the same way as websites on the WWW). New 3D browsers are emerging to help discover and immerse into a network of interconnected virtual communities. Under these conditions, the individual, the so-called user, exists in parallel worlds – real/physical and virtual / technologically simulated / digital.

In relation to the increasing dependence of man on software systems (both in professional realization and in private life), this article provides a brief overview of the directions and pace of the technological development in the areas of ICT³, the inclusion of users to them and the emerging issues for those same users. The working hypothesis of the research is that with the development of ICT and the inclusion of more and more people in their use, human welfare becomes more and more dependent on artificial systems, especially when it comes to the so-called onliners.

Key words: welfare, ICT, dependence.

¹ *New jobs require a new type of education*. В: *JobTiger: HR компания и кариерен сайт* [онлайн]. [Viewed 06.10.2017]. Available from: <http://www.jobtiger.bg/statia/novite-profesii-iziskvat-nov-tip-obrazovanie-220-2>. The article notes that, according to a survey on the US market, more than two million new technology positions are expected to be opened by 2018. The highest growth is expected to be in the field of network administration, communications, and web developers. Other positions that are expected to grow significantly are security of information technology and data, online security and risk management. For a successful career of such nature, education in the field of computer technology as well as experience and knowledge in the field of data security and systems will be of the utmost importance.

² IT – information technologies.

³ ICT – information and communication technologies.

The web of parallel worlds

Everyday news about technological innovations no longer surprises anyone. For example, only in the first ten days of October 2017, intriguing titles can be found on Bulgarian websites (Table 1).

Table 1. Some news related to technology since the beginning of 2017

<p>https://technews.bg/ (06.10.2017)</p>	<p>http://inews.bg/ (06.10.2017)</p>	<p>https://www.digital.bg/novini/ (06.10.2017)</p>
<ul style="list-style-type: none"> • Robots take over Industries • Europeans are waiting for a robot and electric vehicle boom • Oracle announced a revolution in databases • 27% of consumers are victims of cyber attacks 	<ul style="list-style-type: none"> • Big Brother is watching us through social networks • BG websites dig cryptocurrency from users' computers • Twitter doubles the volume of messages • Teachers will acquire digital literacy from home • A scientist: Within 30 years we will stop aging, later – eternal life • The EU provides € 120 million for free Wi-Fi in member states 	<ul style="list-style-type: none"> • We will now be able to log on Facebook by use of a Face detection software • Google Pixel Buds Audio Headphones can translate text in different languages in a real-time mode • What is Mixed Reality Technology • What is the difference between added reality and virtual reality • Microsoft has revealed future plans for Windows Mixed Reality

Apparently, some of the titles emphasize the “capture of the world” by robots. Others address the modern dimensions of so-called Big Data and their impact on man / society. The third group concerns the issues of security or consumer protection of technological products. Let us take, for example, the news from Digital.bg (“Microsoft has revealed future plans for Windows Mixed Reality technology”) and focus on the three popular forms of artificially created “reality”, based on a number of ICT: virtual reality (VR), Added / Expanded Reality (AR), and Mixed / Holographic Reality (MR). There is still controversy over how best to define the three “realities”, but in any case, there are already products available on the market for wide use (Table 2).

Table 2. Main differences between VR, AD, MR

<p>Virtual reality (VR)</p> <p>A simulated / unreal world created through computer systems and audio-video equipment. Creates an artificial specific and separate world that does not exist in real / physically. It is in this world that consumers are immersed.</p> <p>There is no feedback / tactile connection (a user does not feel the objects touched). As a result, some users experience dizziness or nausea, and immediate disconnection between the human user and the VR system is required. Companies are already working on the problem, but there is still no significant progress.</p> <p><i>Examples:</i> As early as 1995, Nintendo created Virtual Boy; Oculus Rift, HTC Vive, Samsung Galaxy Gear VR, PlayStation VR, Google Cardboard, Discovery VR.</p>
<p>Added reality (AR)</p> <p>Computer-generated content additional to real-world items. Combination of a real environment and computer-generated objects – sound, video, graphics, etc. that can not react to each other (they are not one whole) without connecting tools.</p> <p><i>Examples:</i> the Google Translate feature that allows translation / transformation of text from one language to another by directing the device's camera to the corresponding text; a virtual tour guide showing facts about relevant objects (monuments, other sights ...).</p>

Mixed reality (MR)

Also seen as hybrid reality (HR). This is synthetic content added to the real world. Synthetic content and content in the real world are able to react with each other in a real-time mode. A term describing the interaction between the real and the virtual environment – merging real and virtual worlds to create new environments and visualizations where physical and digital objects coexist and interact in real time.

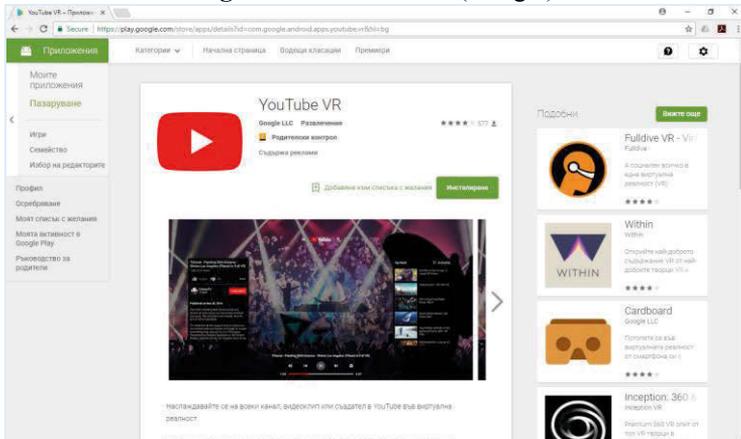
Unlike AR, MR virtual objects / aspects interact with physical space and physical objects.

Examples: Microsoft HoloLens holographic glasses that have a built-in chip to represent a holographic image of real objects; on October 17, 2017 Microsoft (Microsoft Game Studios) will present Halo: Recruit; in October 2017, sales of a new generation of MR devices of leading manufacturers are expected to start; NASA and Microsoft are working on the Sidekick project, which develops holographic glasses for astronauts / cosmonauts to receive virtual Earth help.

One such product is offered by the Google corporation – YouTube VR (Fig. 1). Google has announced the following about it: “Use YouTube in an entirely new way. Sign in to YouTube and explore the site in a **3D VR-environment**. Surf and watch all YouTube videos – from 360-degree 3D videos to standard rectangular clips. (...) Merge with the sound and picture”⁴.

Another such product is Microsoft HoloLens (Fig. 2), which, according to the corporation, is a mixed reality uniting “people, places and objects of the ... physical and digital world. This mixed environment becomes ... a canvas where you can create and enjoy a wide range of experiences. Control your view ... (i.e. a 360-degree panorama)”⁵. In essence, this is a hologram system. According to Microsoft, “holograms improve the real world. Interaction with holograms in a mixed reality ... allows you to visualize and work with ... digital content as part of ... the real world. Holograms react to the world around you ... and allow you to interact with content and information in ... the most natural way”⁶.

Figure 1. YouTube VR (Google)

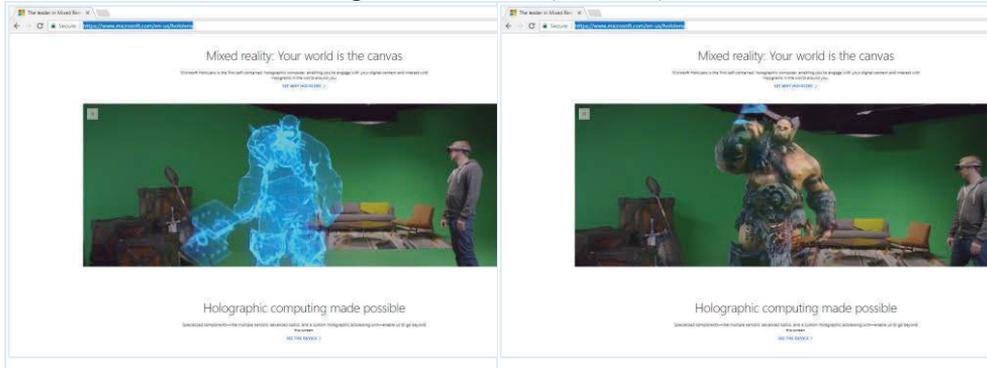


Source: Google Play (October 2017).

⁴ **YouTube VR** [software]. In: *Google Play* [online]. Updated 15 March 2018. Available from: <https://play.google.com/store/apps/details?id=com.google.android.apps.youtube.vr&hl=bg>

⁵ **Microsoft HoloLens**. In: *Microsoft* [online]. [Viewed 06.10.2017]. Available from: <https://www.microsoft.com/en-us/hololens>

⁶ *Ibid.*

Figure 2. HoloLens (Microsoft)

Source: Microsoft (October 2017).

It is possible to list other examples of products that provide VR, AR or MR, but the above mentioned are enough to outline the current development of ICT. It can be expected that the symbiosis between real and virtual will soon dominate in the form of surrounding / advanced / added. The question is whether a person will be able to choose or be “engulfed” in simulated realities, whether he/she will be able to distinguish between the real from the virtual, including to protect him or herself from undesirable effects. The most popular social network with more than two billion users – Facebook is significant in this respect ⁷. Here are a few facts.

- In mid-June 2015, the Belgian government has filed an indictment against Facebook regarding suspected misuse of personal data for both its users and those who do not have a social networking account at all. A study commissioned by the Belgian Personal Data Protection Commission showed that Facebook also monitors people who do not have and have never registered in the social network. It turned out that it is enough just to visit a website where the blue buttons “like” and “share” are present, even without clicking on them. This is the first lawsuit in Europe, where a state-run law enforcement agency has filed a lawsuit against Facebook.

- In March 2016, German authorities also launched an investigation into Facebook for abuse of market position. The local anti-monopoly commission has started an inspection in connection with a contract for the use of personal data that each user consciously or unconsciously signs. Authorities say that Facebook abuses its users’ personal information by giving it to their advertisers. The latter, on the other hand, execute targeted advertising aimed to users of the social network. The investigation has to establish whether users are well-informed how their personal data is being used and what data is exactly collected about them by Facebook.

- In May 2017, the French Data Protection Service imposed a fine of EUR 150,000 on Facebook because the social network administration failed to protect its users’ data from advertisers. The social network is accused of collecting data on

⁷ We will not comment on how many of the Facebook users’ profiles are real and how many are not. In recent months, however, it has become clear (including from many media publications) that there have been numerous cases of false profiles, and that in itself raises a series of questions that require an analysis of its own.

which sites are being viewed by users without warning the latter about it. Similar investigations are currently being carried out in Spain and the Netherlands.

▪ At the beginning of October 2017, information related to Facebook and Google was published in various popular electronic media. It is explained how the two corporations collect and store important information based on how the platforms are being used by users and the “footprints” they leave. “Internet search engines and social networks know about you more than your own mother. Check out what personal information Google knows about you. Jeff Hamerbacher, one of Facebook’s programmers, has explained that the best brains of his generation are only thinking of luring people into Facebook ads and has called it a tragedy. If you are still wondering how is it that insistant life insurance offers appear in your browser once you have started practicing a risky sport, or special services have started to show interest in you after you have Googled radioactive substances, you are obviously not familiar with the availability of some features, ...”⁸.

Despite the problems with the official authorities in different countries, according to the French press, Facebook has seen a 79% increase in revenue in the third quarter of 2017⁹. The generated profit was \$ 4.7 billion (compared to 2.6 billion for the same period in 2016). This trend also holds true for other world-known corporations in the ICT industry.

Another established fact is that today’s development of ICT (including the Internet as an infrastructure) seeks to disseminate mobile broadband services, which well exceed that of fixed broadband services. Mobile broadband prices for the past three years have fallen by an average of 50%. Factors related to accessibility, cost and connection speed have attracted approximately half of the world’s population to online applications.

In relation to the-above outlined trend of symbiosis between real and virtual, as well as the development of hardware ecosystems, a new term – **GigaWorld**¹⁰ – is now popular as of the summer of 2017. Its introduction is attributed to the 30-year existence of the Internet and the distinct formation of a new era in its development. In a book entitled “Unlocking GigaWorld Innovation. GigaApps in a GigaWorld” it is stated that “The Third Industrial Revolution leverages the development of electronics, information technology and automated production. There is a fourth industrial revolution of cyber-based systems based on a wave of technological innovations that fundamentally alters the nature of digital applications. It redefines the interactions between people, machines and the environment; also redefines the way

⁸ “**Shocking**: Facebook and Google know more about you than your own mother”. In: *Blitz.bg* [online]. 05 Oct 2017, 8:36. [Viewed 05.10.2017]. Available from: https://www.blitz.bg/lyubopitno/nauka-i-tekhnologii/shokirashcho-feysbuk-i-gugl-znyat-poveche-za-vas-otkolkotorodnata-vi-mayka_news548490.html. The same at: <http://www.celokupnabulgaria.eu/?p=18485>

⁹ **80% ръст** в приходите на фейсбук за последното тримесечие. In: *24chasa.bg* [online] 02.11.2017 08:50. [Viewed 02.11.2017]. Available from: <https://www.24chasa.bg/novini/article/6527754>

¹⁰ GigaWorld defines a new Internet cycle with additional requirements for the web. See: **Pankert, Gregory, Alves, Ignacio Garcia, Berjaoui**, Bassel. *Unlocking GigaWorld Innovation. GigaApps in a GigaWorld* [online]. August 2017. PDF 1.2 MB. [Viewed 12.10.2017]. Available from: <https://www.libertyglobal.com/pdf/publications/ADL-Report-Unlocking-GigaWorld-Innovation.pdf>

we live and work”¹¹. The report states that we are at the beginning of a cycle (Table 3), where innovation, investment and monetization work simultaneously to impose innovative applications on the market. In this new cycle, ICT networks are a major factor in the fourth industrial revolution and the expansion of the potential of Gi-gaApplications through GigaNetworks. In turn, GigaWorld appears among complex convergence ecosystems. GigaWorld offers solutions to improve quality of life, mo-bility, economic development, information sharing and decision-making”¹².

Table 3. After 30 years of the internet, a new internet cycle is emerging: The GigaWorld

	<i>1st Internet Cycle (1990 – 2005)</i>	<i>2nd Internet Cycle (2005 – Now)</i>	<i>3rd Internet Cycle (Start- ing Now)</i>
Killer Application	Data Transfer E-mail Web browsing	Uni- & Multicast/ on-demand Video	Augmented Discovery Virtual Telepresence Automated Living
Main Network Requirement	Asynchronous data transfer	1-way “near” real-time Ubiquitous	Critical real-time 2-way transmission (latency, security, packet loss, ...)
Monetization – Investment – Pricing	Coverage capex Access & volume-based	Capacity capex Bandwidth & volume-based	Latency & Security capex Bandwidth and QoE/QoS
“Governing Internet Laws”	Capacity capex Bandwidth & volume-based	Bandwidth driven	Quality of Experience driven
Public Policy – Consumer – Operators	Everyone connected Promotion competition	Best Effort high-speed access Infrastructure-based vs service-based competition	Resilience, security and privacy GigaWorld investment

Source: Arthur D. Little Analysis, Figure A, p. 10.¹³

The efforts of businesses aimed at the development of various economic sectors on the one hand and those of regulators on the other hand have facilitated the transformation from an industrial to the so-called information society. They have contributed to a smooth transition in a number of sectors of material economy to a network-based economy (online services economy). Today, however, a new transition is already emerging – the so-called data economy. It is thus significant that in early 2017, the European Commission (EC) adopted and announced the “Building a European data-based economy” Communication¹⁴. This is accompanied by a working document proposing policy and legal solutions aimed at boosting the EU-based economy within the framework of the digital single market strategy. The reason for this decision is related to significant finding, more precisely: “With the economy and society embracing data-driven change, increasing amounts of data are generated

¹¹ Ibid, p. 7.

¹² Ibid.

¹³ Ibid.

¹⁴ **Building** a European data-driven economy. In: *EUR-Lex*. [online]. [Viewed 29.10.2017]. Available from: http://eur-lex.europa.eu/content/news/building_EU_data_economy.html?locale=bg

by machines or processes based on emerging technologies such as the Internet of Things", Factories of the future and autonomous interconnected systems. Connectivity itself changes the way data can be accessed: more and more data accessed by physical connections can now be accessed remotely. The huge variety of sources and types of data, as well as the rich potential to apply the knowledge of these data in many areas, including the development of public policies, are just starting to develop. To take advantage of these opportunities, both public and private data market players need access to large and diverse data sets. Consequently, access and transmission issues with regard to the data generated by these machines and processes are central to the emergence of a data economy and require careful assessment¹⁵.

The EC document "Building a European data-driven economy" outlines the following:

- A global trend of making data a key resource for economic growth, job creation and social progress is outlined;
- Data analysis facilitates the optimization of processes and solutions, innovation and anticipation of future events;
- The collection, processing, analysis and use of data entails enormous potential for different areas – from health, environment, food safety, climate and resource efficiency to energy, smart transport systems and smart cities;
- The value of the European data-driven economy has been estimated to amount to EUR 257 billion in 2014 which represents 1,85% from the GDP of the EU¹⁶. This value grew to reach EUR 272 billion in 2015 or 1,87% from the GDP of the EU (annual growth of 5,6%). (The same estimate predicts that if the necessary policy conditions and the legal framework for the data-based economy are created in time, its value will increase to EUR 643 billion by 2020, i.e. it will reach 3,17% from the total GDP of the EU¹⁷);
- The "data-driven economy"¹⁸ is characterized by an ecosystem of various market participants (e.g. manufacturers, researchers and infrastructure providers) who cooperate to ensure the availability and usability of the data;
- Market participants can derive value from data by creating a variety of applications of great potential for improving everyday life (e.g. traffic management, optimization of yields and remote health care);
- New technologies such as the Internet of Things (IoT) or robotics, which give rise to complex interdependencies both between hardware and software products and between interconnected devices are already a fact;

¹⁵ Ibid.

¹⁶ **IDC**. *European Data Market study: SMART 2013/0063: Finale Report*. [online]. Published February 2016. PDF 5,2 MB. Available from: https://www.key4biz.it/wp-content/uploads/2018/04/SMART20130063_Final-Final-Report_030417_2.pdf

¹⁷ **Building** a European data-driven economy. In: *European Commission* [online]. Available from: <http://eur-lex.europa.eu/legal-content/BG/TXT/HTML/?uri=CELEX:52017DC0009&from=EN#footnote2>

¹⁸ Data-driven economy measures the overall impact of the data market – i.e. the market where digital data is traded as products or services obtained from raw data – on the economy as a whole. This includes generating, collecting, storing, processing, distributing, analyzing, producing, providing and using data, which is possible thanks to digital technologies (IDC. European Data Market study: SMART 2013/0063: Finale Report...).

– However, new problems associated with autonomous machines whose unexpected and unforeseen behavior could cause harm to people and property are likely to appear;

– The described phenomena may create legal uncertainty as regards the implementation of the existing liability and safety legal framework.

The above is directly related to “machine-machine” type of communication (M2M). In fact, over the past few years, we have been witnessing a *M2M revolution* promises of countless opportunities in an interconnected world of at least 50 billion “smart / intelligent” machines (**according to EU’s expectations – as of the end of 2020**). They lie at the basis of the so-called Internet of Things – smart grids and technologies for building automated networks of devices and products to increase efficiency. The Internet, in its now familiar form, also paves the way to connectivity and communication between different devices without human intervention. Phones, laptops, printers, cameras, monitors, and vehicles are just part of the different “smart” already connected devices.

Users

At the beginning of 2016, Facebook released data from its own survey, according to which the number of people in the world who had access to the Internet at that time had reached 3.2 billion by the end of 2015. However, according to the same study, another 4,1 billion had not yet been able to use the Web.

Another dominating company, Google, also publicized a survey of its own but in 2017. It was carried out among users from 63 countries (in Bulgaria it was done in the period of 01.04.2017–30.06.2017). The survey results were published in October 2017¹⁹. According to it, 80% of the surveyed users use the Internet for personal purposes with the age groups of 25–34 and 35–44 being the most active. (The share of Bulgarians for this indicator is 70%). Eighty-three percent of users use the Internet to find information, 80% – to get entertained, 60% – to solve specific tasks, 28% – upload content, 30% – publish solutions to problems to help other online users.

On the basis of the results from the above study, it is concluded that a new type of user is already active on the market (online user, called *onliner*²⁰) It is also indicated that device ecosystems are changing (a continuing increase in the use of mobile devices, which has a strong influence on people-to-people interaction and digital world interaction). According to the “Connected Consumer Survey 2017” (Google), to the contemporary user Internet is:

- An entertaining destination;
- A digital instrument used on a daily basis;
- First and foremost an instrument for searching for information.

One more thing – onliners are often older than it has been thought and many of them use the Internet several times a day.

¹⁹ **Connected Consumer Survey 2017**. In: *Think with Google* [online]. Survey research. October 2017. [Viewed 02.11.2017]. Available from: <https://www.thinkwithgoogle.com/intl/en-145/perspectives/local-articles/connected-consumer-survey-2017/>. See also: **Consumer Barometer with Google** [online]. [Viewed 02.11.2017]. Available from: <https://www.consumerbarometer.com/en/>

²⁰ The term is already included in Oxford Dictionaries and means individuals who are active online (Internet users). See the definition at: <https://en.oxforddictionaries.com/definition/onliner>

Indeed, is there ground to identify a new type of active user – onliner? Without doubt. According to the International Telecommunication Union (ITU), in November 2014, more than 3 billion people worldwide were using the Internet, with a year-on-year increase of 6,6%²¹. However, at the end of 2016, 3,9 billion people (53% of the world's population) have not used the Internet²²:

- 1/3 of the population in North and South America and the CIS was offline;
- 75% of people in Africa have not used the Internet;
- 58,1% of people in Asia and the Pacific region were offline;
- 58,4% of people in Arab countries did not use the Internet;
- 21% of Europeans were offline.

According to published preliminary data from the same source, by the middle of 2017²³:

- The share of young people aged 15-24 who use the Internet (71%) is significantly higher than that of the total number Internet users (48%);
- In 104 countries, more than 80% of the young population is online (young people are at the lead of today's information society);
- In developed countries, 94% of young people (15 to 24-years-old) use the Internet; compared to 67% in developing countries and only 30% in the least developed;
- Out of the 830 million young people online, 320 million (39%) are from China and India;
- Almost 9 out of 10 young people who do not use the Internet are from Africa, Asia and the Pacific.

According to data from another source – Internet Live Stats²⁴, as of 20.10.2017 (10.00 o'clock) more than 3,7 billion people of the world population has been granted Internet access²⁵. By way of comparison: in 1995, consumers were only 1%; the number of Internet users in the period 1999–2013 increased tenfold; the first billion consumers were reached in 2005, the second billion – in 2010, and the third – in 2014.

Apparently, regardless of the source, the data show *two significant problems*:

- a) a rapid increase in the number of Internet users on whom different impact strategies can be applied – currently around 47% of the world's population;
- b) a significant digital divide between people with and without access to the Internet – currently around 53% of the world's population has no such access.

What is the situation in Bulgaria?

According to data from the National Statistics Institute of Bulgaria for 2016:

²¹ In this case, it is essential to note that these are real Internet users, not people who have access to the Web.

²² **International** Telecommunication Union. *ICT Facts and Figures 2016* [online]. PDF 4,5 Mb. [Viewed 12.10.2017]. Available from: <http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2016.pdf>

²³ **International** Telecommunication Union. *ICT Facts and Figures 2017* [online]. PDF 3,9 Mb. [Viewed 12.10.2017] Available from: <http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2017.pdf>

²⁴ **Internet Live Stat** [online]. [Viewed 12.10.2017]. Available from: www.internetlivestats.com

²⁵ This source accepts an internet user as one who can access the Internet at home through any device and connection type; it does not measure the actual use of services across the global network.

- 63,5% of the households and 91,3% of the enterprises in Bulgaria have access to the Internet;
- 33,1% of the population have never used the Internet (34,7% in 2015, 37,1% in 2014);
- 58,1% of the population use the Internet regularly (54,6% in 2015, 53,7% in 2014).

The following groups of population are more active in terms of using the Internet regularly:

- Students (95,3% in 2016 against 94,9% in 2015);
- Persons aged 16–24 (87,2% in 2016 compared to 84,1% in 2015), followed by representatives of the age group of 25 to 34 years-old (82,5% in 2016 against 82 % in 2015) and the 35-to-44 age group (74,9% in 2016 against 69,2% in 2015);
- Employed (74,9% against 71,8% in 2015).

These data demonstrate that it is typical of our country that there is a large number of persons with access to the Internet, as well as an increasing share of regular users, i.e. on the whole, Bulgarians are among the 47% who are active in the Web. The typical profile of the Bulgarian internet user (regularly using the Internet) is: young, aged 16 to 34, student or employed, in other words, falls within what the ITU has established about youth activity on the Internet as a whole. Moreover, according to ITU data for 2016, Bulgaria ranks 10th in the world on the Internet of Things (M2M for 100 users with mobile subscriptions). By this indicator, our country is ahead of Estonia, Slovakia, Italy, Spain, Luxembourg, Germany, Korea among others²⁶. In other words, businesses on the territory of Bulgaria are trying to apply M2M technologies relatively quickly and they obviously succeed, while Bulgarian consumers quickly take advantage of such business proposals.

The above would be the reason to conclude that our country is among ICT developed countries and is actively involved in the use and distribution of the latest network technologies. On the other hand, it is the reason for a worrying conclusion – consumer susceptibility to any impact due to a low level of knowledge and skills in using ICT.

To what extent are Bulgarian users digitally literate? In the category of “E-skills of the population between 16 and 74 years” for 2016 the following data are highlighted:

- Word-processing skills – 25,7%;
- Spreadsheet skills – 14,1%;
- Image, video, and audio processing skills – 8,9%;
- Skills in transferring data from a computer to another device – 36,3%;
- Skills in creating computer presentations – 14,0%;
- Skills in installing software applications – 14,4%;
- Skills in changing/checking configuration parameters of software applications – 7,3%;
- Knowledge of and skills in creating computer programs – 1,0%.

Of course, it may be questioned whether the above-mentioned skills included in the methodology of the National Statistics Institute adequately reflect the current dimensions of complete and reliable ICT inclusion of users. This question will not

²⁶ **International** Telecommunication Union. *ICT Facts and Figures 2016...*

dimensions of complete and reliable ICT inclusion of users. This question will not be discussed here. However, the low shares even according to these indices indicate a prevailing uncritical use of applications and services accompanied by a lack of basic knowledge. According to data from the same source, the dominant share of users of the respective technologies is characterized by:

- *communication* – email (71,1%); phone calls or video chat via webcam using apps such as Viber, Skype, FaceTime (79,9%); social networking – creating a profile, posting messages or other activities on Facebook, Twitter and other social media (75,4%); viewing video content from video sharing services, such as YouTube, Vbox7 (36,7%);

- *access to information* – reading online newspapers, news, magazines (68,0%); finding information about goods or services (64,5%);

- *entertainment* – listening to music online (for example, web radio, streaming music) (40,0%); playing or downloading games (32,2%); watching TV online (live or recorded by broadcasters) (22,9%), etc.;

- *creation* – uploading created own content (text, photos, music, video, software, etc.) to a web site for sharing (35,1%); creating a website or blog (5,4%);

- *other online services* – travel and accommodation services (21,2%); sales of goods or services through auctions such as eBay, Auction, OLX, bazar.bg (10,6%); for ordering / purchasing personal goods or services over the past 12 months (16,6%, mainly clothing and sports goods – 77,2%); Internet banking (7,4%); using payment instruments (eg ePay, PayPal) to pay for goods / services (4,2%).

Based on the above data, it can be summarized that out of all users, for example, content users uploading their own content (35%) dominate, while those who support their own site are only 5%, those accessing online news sources / newspapers / magazines are 68%, but online shoppers are many times fewer (11–17%) and even fewer are users of online banking (7%). The most widespread services according to user activity are e-mail and phone / video calls, as well as maintenance of a social net-working account.

Similar data were obtained from an own study²⁷ administered among 135 students of the Faculty of Philosophy at Sofia University “St. Kliment Ohridski” in April-May 2017. They correspond to the dominant profile of Internet users in Bulgaria: students, youngsters, aged 19 to 38 (over 20 to 23 years of age), mostly without work experience (50,4%) or having up to 1 year of service (23,7%).

Among the surveyed students, 40% rarely use a computer, and another 23,7% have never used one, but 65,9% very often use a laptop (another 13,3% use a laptop often). 34,1% of the surveyed students have never used a tablet never used while 79,3% of them use a smartphone very often (another 11,9% use a smartphone often).

The respondents store their information mainly on a data stick (very often – 54,1%, often – 26,7). However, the values for using remote drives (cloud technologies) are extremely low – 31,9% have never done it, 22,2% have rarely done it,

²⁷ The publishing of the book “*Well-being in the Digital World*” as well as the development of the research presented in it was implemented with the financial support of the Scientific Research Fund at Sofia University “St. Kliment Ohridski” under contract № 80-10-89/20.04.2017, project theme: “Methodologies for measuring information-dependent well-being (Part 1: Piloting empirical data gathering tools)”.

20,0% do it sometimes. Moreover, 40,7% of respondents state that they are not interested in information about other file storage options, while 31,1% do it partly.

In general, cloud services seem to be of no interest to the respondents. This conclusion is based on the claim that they have never used such (19,3%), 23,0% use them rarely, and 28,9% – sometimes. However, the comparison of these results with the data on the mass use of smartphones is a reason to conclude that among the respondents, the ones unfamiliar with these technologies prevail even at the user level. In particular, Android devices are the preferred ones, which in turn means mandatory cloud services, but students may not recognize them as such. In other words, the results obtained confirm the existence of a problem with the literacy of active users and hence the quality of their use, their security and the full benefit of these technologies (Cloud Computing).

The revealed preferred information resources also highlight certain questions. Generally available resources (online but without quality assurance) collect the highest share of positive responses – 70,4% of respondents use such resources, compared to paid resources – only 13,3% use paid online resources. Students often use online videos and movies (very often – 55,9%, often – 28,9%). They often use e-books and e-texts (very often – 45,9% and often – 29,6%). However, social networks score the highest rate of positive responses – 96,3% say they are members of at least one. The percentage of those who post on social networks very often is 34,1% (of those who do it often – 26,7%). Email and popular platforms for communication with colleagues (Skype, Viber) are used very often by 75,6% (often – by another 14,1%). However, only 4,4% have their own blog. In addition, only 9,6% use electronic diaries very often (often – another 10,4%). At the same time, 88,9% note that ICT influences their activities and practices (“definitely yes” – 42,2%). According to the respondents, ICT boost good performance in their profession (81,5%), support the creation of new contacts (72,6%), increase personal well-being (65,2%) and increase the chances of achieving the set goals in life (55,6%). In other words, ICT is considered to be necessary, useful and even essential to the realization, and on the other hand (in real life practice) is the use on a primitive level.

On the whole, the aggregate image of the student respondent is:

- Young, still studying;
- A member of a social network, often posting information about himself or herself in it;

Actively communicating over internet-based platforms;

Mainly using a smartphone and / or a laptop;

Using free and publicly available internet resources;

Not familiar with cloud services;

Aware that new ICTs directly affect both professional realization and personal well-being, but rarely paying attention to their development and showing no interest in the novelties in this field.

The problems

During the previous cycles of Internet development, companies’ attention was still focused on their own investments, while customizing user interaction was not of particular importance. At that time the world was familiar with and had at its disposal mainly traditional media and means of communication. What has happened in recent years? A change. A change that has highlighted the effectiveness and the

quality of business-customer/user interaction or state institutions – citizens / businesses – state institutions. Now the focus is on personalization. It is based on strategic concepts aimed at unique and creative digital solutions focused on the user (now online – flexible but also sustainable in his/her online behavior).

Those already included in the World Wide Web that are part of the generation and dissemination of information online or any other form of electronic exchange that continuously use communication systems (explicitly or implicitly) are part of the so-called quality assurance processes / systems of Quality of Experience (QoE).

Quality of Experience is officially presented as a newly emerging multidisciplinary and applied scientific field. It is based on achievements in the spheres of social psychology, cognitive science, economics and engineering science. It is aimed at understanding the general requirements for a person's quality of life and his/her satisfaction as a consumer of goods and services. Essentially, QoE is a plan of all human subjective and objective quality needs and experiences arising from interaction with technology and with business organizations in a particular context²⁸.

Although it mainly covers subjective parameters, QoE generally serves to identify and measure the opinions and needs of users / customers of a service. The goal is to achieve controlled measurement, helping operators to identify service and resource errors, as well as needs for improvement and further development²⁹.

Quality of Experience is directly related to another concept – Quality of Service (QoS). It covers the measurement and description of a service performance (for example, access to a telephone or computer network or cloud computing service), and in particular the performance observed by users on a network. The quality of service includes: the maximum bandwidth achieved on a given network; other elements of network performance, such as latency, error rate and performance time; controlling and managing network resources by setting priorities for specific data types (video, audio, files) on the network. Quantitative measurement of service quality often addresses several aspects of the network service, such as package loss, data rate, bandwidth, transmission delay, availability, etc. Until recently, QoS was exclusively used for network traffic generated for on-demand video, IPTV, VoIP, streaming media, video conferencing and online games. QoS technologies used in an e-business or a telephone network typically help optimize network traffic management to improve the experience of network users.

However, in recent times, with the growing economy of online services and the inclusion of more economic sectors in it, QoS technologies are applied by various organizations to improve service delivery and enhance consumer interest (banking, tourism, etc.). In this respect, it is important to underline that in recent years ITU experts have seen the Internet as a global interconnection between information systems through several different networks. Every network, any system on the Internet, is considered to have an impact not only on the quality of its own services but also on the quality of services of other networks and systems because it influences the perception of the Internet as a whole by its users. Furthermore, according to experts, the term “quality” requires a new understanding, as the traditional control over the

²⁸ **Toward** total quality of experience: A QoE model in a communication ecosystem. Abstract. In: *IEEE Communications Magazine* [online]. Vol. 50, Issue 4, 05 April 2012 doi:10.1109/MCOM.2012.6178834. Available from: <http://ieeexplore.ieee.org/document/6178834/?reload=true>

²⁹ *Ibid.*

basic parameters of the individual elements of the networks and services is neither sufficient nor effective. In order to respond to the current situation, it is necessary to define several layers of “subjective quality” and then to construct quantitative features to describe these layers. Attention is also paid to issues of security and stability as aspects of quality – they are subject to careful consideration because of their importance for people regardless of their place in the demand-supply chain.

It can be said that there is an interesting transition:

- *From* productivity measurement to user experience management. The huge investment in network maintenance and upgrading and the development / provision of services through them now require another opportunity to increase the efficiency of internal processes and improve / optimize their management;

- *From* the application of traditional measurements for network performance goes to the implementation of operations focused on the interrelationship between the business itself and the client / user perspective;

- The focus is shifted *to* a service measurement in terms of network reliability with regard to the end result, measured by user quality (QoE).

As can be seen, the priority is to measure and control the ultimate goal and experience of the customer when using an online service. This new approach requires focusing on the client’s perspective, and service performance measured not only on the basis of a set of core system and network elements (for example, how well some components work), but also based on customer perceptions. In addition, it is necessary to track QoE for individual clients instead of wider customer segments³⁰. Ultimately, customer experience management is achieved through:

- Accessibility and ease of use (basic prerequisite, maximizing QoE);

- Reaction efficiency (offering multiple channels for access to services, simplifying the process of obtaining support and information, multi-channel strategy for homogenizing work experience);

- Operational efficiency (reducing the number of escalations, i.e. upset or dissatisfied cases to be solved in the back office, and the ability to fix problems in the front office, use of innovative knowledge management tools in real time integration of client-side tools and agents to access multiple systems);

- Response effectiveness (providing real-time information, anticipating customer needs, linking customer agent performance with customer satisfaction)³¹.

Today, based on products and services over the Internet, customer service and satisfaction of consumer expectations is highly differentiated across multiple segments. However, QoE management can be limited to: *monitoring*, *controlling*, and *forecasting*. They relate to all levels of service at all points of contact with the customer (a client’s route). By adding specific business goals, competition to markets, the race to attract customers / users, it may happen that in some cases one is taken care in order to be retained as a client as long as possible, but in others – is under threat of unfair business practices. At the same time, customers’ / users’ expectations and requirements are increasing and will continue to increase, at least due to

³⁰ See more: **Basile**, Vincenzo, **Spera**, Daniele. Maximizing Quality of Experience: A Company-Wide Customer Experience Management Approach. In: *Arthur D Little* [online]. Telecom and Media Viewpoint. Copyright © Arthur D. Little 2013. PDF 389 KB. [Viewed 18.10.2017]. Available from: http://www.adlittle.it/sites/default/files/viewpoints/TIME_2013_Improving_CEx_in_Operations.pdf

³¹ *Ibid.*

the accumulation of experience on their part. The same holds true for those who spend more time in the digital world than in reality.

Businesses have long been aware that the Internet is already users' "best partner" (to connect with others, to watch and to live together, to post and to demonstrate their own self, etc.). Businesses have long been aware of the fact that maintaining such a consumer attitude, such consumer experience, should not be destroyed. Because otherwise many business interests would be disturbed, it would damage the image and authority of the companies concerned, especially their profits. Quality (of experience and services) is therefore essential for both suppliers and consumers³².

Institutions have also focused their policies on setting up conditions and regulations for developing ultra-high-speed broadband and next generation access (NGA). For example, in the *Digital Agenda for Europe*³³ (DAE) seven interdependent priority pillars are identified: 1. A new digital single market to deliver the benefits of the digital era; 2. Improving standardization and interoperability in the ICT field; 3. Increasing trust and security on the Internet; 4. Increasing Europeans' access to fast and ultra-fast internet; 5. Stimulating advanced research and development activities in the field of ICT; 6. Providing skills in handling digital technologies and accessible online services for all Europeans; 7. Exploiting the potential of ICT for the benefit of society. This program is supplemented by next one – The Digital Single Market³⁴. The digital single market is seen as a sector that covers digital marketing, e-commerce and telecommunications. On their part, they are defined as a borderless space that facilitates people's lives in which citizens and businesses can trade, bring innovation and interact legally, safely, securely and at an affordable price. European Commission studies show that this will contribute € 415 billion a year to the European economy and create hundreds of thousands of new jobs. By May 2015, the European Commission has implemented 35 actions in relation to its Digital Single Market Strategy. The focus is now on updating EU telecom rules to boost investment in high-speed and quality networks (crucial to the full deployment of the digital economy and society). The specific achievements can be followed on the Digital Agenda Implementation website³⁵, where EU Member States share the progress made on each of the 23 planned actions (as part of the DAE pillars):

- Digital Single Market (2 actions)
- Interoperability and standards (2 actions)
- Trust and security (4 actions)
- Very fast internet (4 actions)
- Research and innovation (2 actions)
- Improving e-skills (3 actions)

³² According to NBC data (February, 2015) users who do not experience problems with quality watch 50% more videos.

³³ **Digital** Agenda for Europe. In: *European Union* [online]. Digital economy & society, 2014. PDF 565 MB. [Viewed 01.11.2017]. Available from: <https://europa.eu/european-union/topics/digital-economy-society> en

³⁴ **The EU and the Digital Single Market**. In: *European Union* [online]. EU Bookshop. PDF 2017. 2,83 MB. [Viewed 01.11.2017] Available from: <https://publications.europa.eu/en/publication-detail/-/publication/8084b7f3-6777-11e7-b2f2-01aa75ed71a1/language-en/format-HTML>. See also: **Digital** Single Market strategy: Mid-term review. In: *EUR-Lex* [online]. [Viewed 01.11.2017]. Available from: http://eur-lex.europa.eu/content/news/digital_market.html?locale=en

³⁵ **Digital** Agenda Implementation. In: *European Commission* [online]. [Viewed 01.11.2017]. Available from: <http://daeimplementation.eu/>

– ICTs for societal challenges (6 actions)

The main idea is “to facilitate investment in new, very fast, open and competitive Internet networks that will be the arteries of the future economy and a key prerequisite for the widespread use of ICT-based e-services for citizens, businesses and governments”³⁶. This is so because ICT is perceived as “one of the main drivers for building a competitive knowledge-based and innovation-based economy. A quarter of the GDP growth in the EU is generated in the ICT sector, and ICT investment and innovation are the main factor in boosting productivity in the EU. Creating the conditions for ubiquitous access to ICTs and their widespread use are essential prerequisites for the development of an innovative and inclusive information society providing a high quality of life for citizens”³⁷.

A critical analysis of EU initiatives and other countries around the world suggest, however, that there are three emerging trends:

- a) product multiplication from which people can benefit;
- b) stimulating people / citizens (through policies or business initiatives) to become more active in the digital environment (becoming active onliners);
- c) multiplying the risks of using digital environments.

Will the individual / citizen / consumer / client be able to preserve at least part of the so-called personal space, to take advantage of the proposed independence without crossing the borders “freedom and freedom of choice”? Maybe.

Discussion

Modern ICT development and network infrastructure clearly indicate that it is essential for the user to be sufficiently aware of the opportunities and risks of using relevant applications, whether it is access / dissemination of information, access / dissemination of communication services or entertainment. This is directly related to a person’s well-being³⁸, as far as achieving goals and success often depends on knowledge and skills applied adequately to a situation. This is particularly true for ICT-intensive environments and their visible or invisible influence on both the consumer and the situation.

The dynamic change in terms of work and personal fulfillment, as well as the opportunities for entertainment, gives grounds to address the issue of the dependence of human well-being on computer-based systems / digital systems. It also justifies the question of whether people are willing to take maximum advantage of technological advantages and to protect themselves from their disadvantages. This is especially true for active onliners like most young people.

Is a successful realization of personal and professional users (especially young people) in a constantly changing world which is becoming increasingly dependent on new ICTs possible then? Is it possible for them to be successfully implemented in GIGAWorld, which will undoubtedly be a fact and will be substantially present on the labor market of the current youth? Time will reveal this, however, what is now certain is the following: the majority of them, will be facing a difficult career

³⁶ **Strategic** policy framework for ICT. In: *Ministry of Economy* [online]. [Viewed 01.11.2017].

Available from: <https://www.mi.government.bg/files/useruploads/files/innovations/materialict.pdf>

³⁷ *Ibid.*, p. 1.

³⁸ The term in question proposed here is *welfare*. For its definition, see: **welfare**. In: *Oxford Dictionaries* [online]. Available from: <https://en.oxforddictionaries.com/definition/welfare>; **welfare**. In: *Learner's Dictionary* [online]. Available from: <http://www.learnersdictionary.com/definition/welfare>

path, especially with regard to positions that already require ICT knowledge and skills at a higher level than social media, internet telephony or watching videos. At this stage, most young people are still unable to take maximum advantage of technology plus sides and to protect themselves from their downsides. If the forthcoming stronger dynamics in periodic renewal of professions or at least the requirements for them is added to the above, most (especially current students) will experience a dramatic break between the desirable and the plausible, between the expected future and real life.

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DIGITAL (IL) LITERACY AND WELFARE

Stamena Kavrakova-Georgieva

Abstract

The purpose of this article is to uncover and describe the connection between digital literacy and personal welfare. The foundations of the research lays on results, gathered by a questionnaire among 135 students from Faculty of Philosophy at Sofia University. Different aspects of digital literacy are taken into consideration as well as their influence on achieving well-being. Some measures for dealing with problems, connected with the growing level of illiteracy among young people are suggested.

Key words: digital literacy, digital illiteracy, welfare, information, tuition, ICT, Internet.

The term “digital literacy” was introduced by Paul Glistler in his book “Digital literacy” in 1997, but it was widely used in the 1990s¹, and there are many different concepts of its meaning.

In 2011, the American Library Association’s working group responsible for the problems of digital literacy, formulated the following definition: “Digital Literacy is the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills”².

According to them, a digitally literate person should:

- possess the variety of skills – technical and cognitive – required to find, understand, evaluate, create, and communicate digital information in a wide variety of formats;
- be able to use diverse technologies appropriately and effectively to retrieve information, interpret results, and judge the quality of that information;
- understand the relationship between technology, life-long learning, personal privacy, and stewardship of information;
- use these skills to actively participate in civic society and contribute to a vibrant, informed, and engaged community.

The working group of the Society of College, National and University Libraries (SCONUL) responsible for digital literacy in the UK creates a model of information literacy based on seven groups of skills that a person has to possess to be considered literate. They are called „The Seven Pillars of Information Literacy”³:

¹ **Bawden**, David. Origins and Concepts of Digital Literacy. In: *Digital Literacies: Concepts, policies and practices*, 2008, chapter 1, pp. 17–32, ISBN: 9781433101694.

² **Viser**, Marijke. Digital literacy definition [online]. 14 September 2012 07:48 [Viewed 22.06.2017]. Available from: <http://connect.ala.org/node/181197>

³ **The SCONUL** Seven Pillars of Information Literacy: Core Model For Higher Education. In: *SCONUL* [online]. PDF 2,7 MB. April 2011, pp. 1–14. [Viewed 22.06.2017]. doi: 10.1108/00907320610716486. Available from: <https://www.sconul.ac.uk/sites/default/files/documents/coremodel.pdf>

– Being aware of the need for new information – a person realizes that there is always something else to learn, develops his/her own learning habits and is aware that knowledge opens up new opportunities. He/she is aware when he/she does not have enough information and possesses the necessary skills to look for additional materials on a given issue.

– Creating a strategy – a person is familiar with the different types of available information and the ways it can be obtained. He/she can use various methods to search and identify the data that would be of the greatest benefit.

– Search planning – there are more than one search techniques, as well as ways of using controlled dictionaries and keywords. The user can select on their own the most appropriate strategy to reach the desired information.

– Collecting information – this is the understanding of how information is organized, how it can be accessed, used and quoted, what the risks of using data from an unverified source are. This includes the necessary skills to use secondary information or metadata.

– Evaluating the results – this is the awareness of the need to verify information and question its credibility. A person should also possess the skills to look at the new data in the right context and to compare it with previous results. Critical reading, identifying basic ideas, and sifting information, are also very important.

– Organizing the newly received information – there is knowledge of the different methods and tools for indexing and referencing the sources for easier access to information without violating the intellectual property of the authors.

– Applying the acquired knowledge – a person has to be able to synthesize the newly acquired data, to add it to previously obtained results, and to create new information on this basis. He/she has to be aware of the purpose of doing this and, in relation to this, to be able to choose a suitable way of presenting the new knowledge.

– This model can also be fully applied to digital literacy. The main difference is that being digitally literate means to be able to use not only written information, but also pictures, videos, audio recordings, programming codes. One must be familiar not only with the methods of finding, processing and storing information, but also with different software tools to make these processes easier and faster.

Relation between digital literacy and welfare

According to the online interpretative dictionary⁴ welfare means “a calm, happy life in material security”. This definition allows for deriving a lot of conditions for achieving welfare – professional development and success, good health, life satisfaction, reaching a certain standard of living, a certain purchasing potential, personal happiness, and a whole array of similar things.

The impact of ICTs on these personal welfare factors is something to speculate on. The relationship between them is showed in the data of a survey conducted among 135 students at the Faculty of Philosophy at Sofia University – 51,1% of the respondents consider that their personal welfare is somewhat directly dependent on ICT, and another 23,3 % report a stronger relationship between the two of them.

⁴ **Welfare.** In: *Dictionary of the words in the Bulgarian language* [online]. [Viewed 20.06.2017]. Available at: <http://rechnik.info/благополучие> (in Bulgarian – Благополучие / Blagopoluchie).

More than two-thirds of the people in these two groups (78.7%) would contribute to the spread of ICTs because they think it increases their personal welfare.

Here are some examples of how ICTs would influence different conditions for achieving welfare:

– Professional development – ICTs gives access to multiple sources of diverse information, facilitating the acquisition of new knowledge and skills. There are different training platforms on the Internet that allow their users to gain further qualification, which would contribute to their professional development. On the other hand, social networks such as LinkedIn facilitate the process of finding a new job, contacting potential partners, and introducing oneself to the global business community.

– Good health – although the frequent use of ICTs leads to some health problems which are usually related to a person's posture⁵, an Internet connection can also lead to certain benefits with regard to one's health. The availability of online registers of different healthcare facilities and their addresses facilitates access and helps people navigate easily. Another service that saves time and reduces the risk of potential mistakes in the transmission of information is the availability of consumer portals of hospitals, pharmacies and laboratories. A person can receive and forward to their doctor laboratory results, information on health status, prescriptions. Another opportunity is the availability of health forums where doctors respond to patients' questions. Although the benefits of these are controversial, a person can get additional information about issues of interest to him/her concerning the necessary prevention of various illnesses.

– Satisfaction with the environment – a large number of institutions are creating their own web portals in which a person can get information regardless the time and place. The creation of an e-government allows citizens to perform all activities related to submitting and issuing documents, completing declarations, issuing reports, etc. at a convenient time. On the other hand, it is easier to report irregularities and to disagree. Anyone can report a problem and/or find ways to solve it. In Denmark there is a term "welfare technologies" that illustrates precisely this aspect of the new technologies⁶.

– Purchasing potential – this factor is directly related to one's professional development. ICTs help people to increase their qualifications, which in the most common case goes hand in hand with a wage growth and material security. In addition, information on the use of funds and ways of managing them can be found on the Internet. Another aspect of the purchasing potential is the availability of a wide range of products and services to be purchased. New technologies help create a global market where everyone can buy everything, no matter where they are.

– Living standard – this factor is directly linked to the previous one. A person has access to a variety of products and services to help build and maintain the stand-

⁵ Umeh, K., Mackay, M., Mulhearn, C. Information and Communication Technology, Well-Being, and Ethnicity. In: *Cyberpsychology, Behavior, and Social Networking* [online]. 2016, pp. 1–7. [Viewed 06.07.2017]. doi: 10.1089/cyber.2015.0328

⁶ *Welfare technologies and ICT* [online]. 21 May 2015. [Viewed 06.07.2017]. Available from: <https://www.digst.dk/ServiceMenu/English/Policy-and-Strategy/Welfare-Technology-and-ICT>

ard of living he/she desires. With the increase in finance, the possibility of purchasing better quality goods also increases. Another aspect of the living standard is the creation and maintenance of an image for the global society. Everyone can build the desired image and “shape” the opinion of others through social networks. In addition, these networks allow a person to connect with others sharing their values and interests. This facilitates the creation and maintenance of contacts, as well organizing them in different circles.

– Personal happiness – this is, perhaps, the most essential condition for welfare. It is very subjective and immeasurable, but it is largely dependent on the above-mentioned factors. Hence, it is indirectly related to ICTs and their use.

Is it enough for a person to dispose of ICTs in order to achieve welfare and what is its link with digital literacy? The notion of material security implies access to technology, which is the basic condition for the existence of a digitally literate personality. However, this access does not mean anything in itself. A set of knowledge and skills to use available ICTs is needed to achieve certain goals.

Do people consider themselves to possess welfare?

According to the results of the same survey, 46,2% of all students appreciate their personal welfare as “rather high” and 35,4% – as “somewhat high”. This is understandable considering the profile of the average respondent – he/she is 21, a student in one of the biggest faculties at the Sofia University “St. Kliment Ohridski”, with a work experience of about a year, in possession of at least one ICT-based device. He/she is materially secured, still studying, but seeking a professional development at the same time. There is no reason for the respondents not to consider themselves possessing welfare.

Do they define themselves as literate?

Considering the previous data, the question of how young people determine their digital literacy, is rather interesting. On the question whether they are properly trained to use ICTs in their own work, 44,7% of the respondents say they do not feel sufficiently qualified, even when it comes to meeting their own needs. All respondents are students who have two of the main prerequisites for welfare – access to education and technologies, but this is not enough for a person to be considered literate. The most important prerequisite for digital literacy is the ability to handle information using the appropriate tools.

At the same time, almost all respondents (90,9%) are convinced that ICTs directly affect their everyday activities. Paradoxically, although more than half of the respondents point out that their personal welfare is directly dependent on ICTs, almost the same number of people say that they have rather insufficient training to implement ICTs in meeting their own needs. Only 25% of those who have reported a high degree of welfare believe that they are somewhat prepared to use ICTs to the necessary quality, 46,6% think they are not well prepared and the other 23,3% say that they do not have the proper preparation at all.

A more in-depth analysis shows that, out of all students who think their personal welfare is rather high and somewhat related to the use of ICTs, 53% consider them-

selves insufficiently competent in handling information technologies. This contradicts all previous replies and statements. The question of the impact of ICTs on the respondents' practice is particularly counterbalanced. In total, 90.9% of the respondents believe that ICTs have a great impact on what they are doing. In their view, new technologies help people learn and consolidate knowledge, develop practical skills, contribute to the accumulation of work experience in a dynamic environment and stimulate interest in science and arts.

This can be used as evidence of a lack of ability to retrieve, evaluate, and process information – in this case, the questions in the questionnaire. The surveyed students cannot understand the questions themselves and the links between them which leads to contradictory and even mutually exclusive answers.

Where am I in comparison with others or do others know more than I do?

What is the opinion of the respondents about others? Out of the surveyed students, 47,7% say that others have rather low training in the use of ICTs, and 35,6% believe that others are somewhat qualified for its use. The percentage of people whose acquaintances and friends can handle ICTs freely is only 3,8%. Considering that an important part of the prerequisites for digital literacy is the participation in a committed and informed community, the question of whether there is such digital literacy among Faculty of Philosophy students consequently arises.

According to collected data, respondents consider that others have the same or slightly lower level of digital literacy. Only people who think they have no preparation for applying ICTs assess their friends and acquaintances higher. Different environments are thus formed – of the knowledgeable, of the somewhat knowing, of the unknowing. These environments do not interact with each other. Although they are all students in similar majors within the same faculty, they do not exchange knowledge and skills. Instead, everyone moves within their environment, communicating with people who are close to their abilities.

In the age of ICTs, a person has the opportunity to be a member not only of his/her local community but to participate in a global society. The Internet allows people to connect with each other in real time, no matter where they are. Global markets are created. They provide people with the opportunity to work for companies in foreign countries without even leaving their own home or taking advantage of goods and services at the other end of the world. Obviously, the inability to handle new technologies would limit one's life experience to an individual's physical location.

Mass ignorance creates a prerequisite for a digital divide⁷. The lack of skills to work with new technologies isolates an individual from the global society. The global trend is to digitize everything – e-books, newspapers and magazines are published, one meets new people on dating sites and communicates using social networking. Digital illiteracy creates a barrier between the individual and all the opportunities provided by ICTs. Even if it does not directly affect a person's life, it will certainly result in lost benefits and deprivation.

⁷ Петков, Стойко. *Дигиталната изолация и новата медийна грамотност* [онлайн]. Ноември 2008. [Прегледан на 25.07.2017]. Достъпно от: <https://masscomm.nbu.bg/download/masovi-komunikacii/konferencii/2008/stoyko-petkov-esen-2008.pdf>

Does digital literacy prevent people from or assist them in being successful?

Although there is a direct link between prosperity and digital literacy, most participants in this study think it is turned upside down. Among the students from the Faculty of Philosophy at Sofia University the following phenomenon is observed – the lower the awareness of ICTs is, the higher degree of prosperity they have reached. This is a paradox that deserves to be investigated in research of its own. The reason can be hidden in the scientific field of the faculty. The specialties are humanitarian, which puts technologies in the background. Even if students are not aware of how to handle ICTs, they can complete their education without experiencing too much difficulty in so doing.

Albert Einstein once said that the more a person learns, the more aware he becomes of his ignorance⁸. Maybe this is the answer to the described contradiction. People rely on the fact that once they have ICT-based devices and use them on a daily basis, they know how to work with them. Knowledge of the basic functions as well as the lack of a stimulus to develop skills can lead to a sense of possessing sufficient knowledge, which leads to the unwillingness to further develop it.

Another factor is the availability of many paid services in the ICT field. Information brokers, agencies, traditional and electronic libraries help people find the necessary information without a lot of efforts. Copying centers and computer stores more and more often offer word-processing and layout services, editing video files and images, installing and uninstalling software or operating systems and device diagnostics. The user does not need to know how to do this – it can all be achieved by paying the corresponding sum. Gradually, the ability to tackle the problems decreases until it finally disappears.

The result is an inverse relationship between digital literacy and welfare. The more materially secured a person is, the less he/she is able to gain new knowledge or skills to deal with a specific problem.

Relation to the used devices

The answer to the question of why the relationship between welfare and digital literacy are inversely proportional may be hidden in the ICT-based devices they use. The most popular device is the smartphone, then come the laptop, the tablet, and the desktop computer. The trend is geared to working with easily portable technologies which give access to information instantaneously, regardless of the location. The computer clubs era is coming to an end. Globally, in the world there are currently just over 20 billion⁹ “smart” devices connected to the Internet. This number is expected to grow to 75 billion in the next eight years, which is nearly 10 times the population of the earth today!

Since obviously the majority of students have fast and easy access to ICTs, what does the problem of using them stem from? Perhaps the answer is their comfort of use. Nowadays, the Internet is full of information, and search engines help users

⁸ **Albert** Einstein: Quotes. In: *Goodreads* [online]. [Viewed 26.07.2017]. Available from: <https://www.goodreads.com/quotes/620163-the-more-i-learn-the-more-i-realize-how-much>

⁹ **Internet** of Things (IoT) connected devices installed base worldwide from 2015 to 2025 (in billions). In: *Statista* [online]: The Statistics Portal. [Viewed 26.06.2017]. Available from: <https://www.statista.com/statistics/471264/iot-number-of-connected-devices-worldwide/>

obtain what they need. There is no need for anyone to try to remember or record – everything that is needed is limited to the device in your pocket or purse. In evidence of this is the fact that the name of one of the most popular web search engines – Google – was recognized as an official verb describing the search for information on the Internet by the Oxford Dictionary in 2006¹⁰.

With such seamless access to any facts, the user begins to lose the ability to extract information and operate with it. In everyday life, people often forget to think critically, to check what they are reading and to evaluate it. A proof of that is the fake news issue. Fake news could not be spread if people were to refer to what they read before taking it for granted and forwarding it further.

Ability to store information

Besides the ability to search and find large amounts of information, the user has a way to record and store it. Storage devices give a person the opportunity to record everything he/she finds important. He/she does not have to erase data to save new ones. This statement sounds good, but another reason for digital illiteracy is hidden behind it – the lack of necessity to evaluate available information. What is of priority is the easy access and not its usefulness.

The modern user is an “information Plyushkin”¹¹ who stores everything that has ever attracted his/her attention – electronic books, emails, music, films, work-related data. The content of most of these files may even fall short of the definition of information – “Data that is accurate and timely, specific and organized for a purpose, presented within a context that gives it meaning and relevance, and can lead to an increase in understanding and decrease in uncertainty.

Information is valuable because it can affect behavior, a decision, or an outcome... A piece of information is considered valueless if, after receiving it, things remain unchanged.”¹²

The survey results confirm that consumer focus is on quick access and convenience. The respondents ranked storage devices as follows:

1. USB storage device – a preferred device for 97% of the participants. 54,1% indicate that it is the main means of recording data for them. Perhaps the reason is because they are small, compact, with high information density and high speed of recording and reading. They can be easily transferred and stored without risk to the files stored on them. However, they are not suitable for long-term storage of frequently used information as they have a limited number of readings. This, as well as the frequent neglect of the fact that they are devices that require preparation when being shutdown, leads to a large number of irretrievably lost files.

¹⁰ **Bylund**, Anders. To Google or Not to Google: According to the OED, you can now Google away to your heart's content. In: *The Motley Fool* [online]. Jul 5, 2006 at 12:00AM [Viewed 26.06.2017]. Available from: <https://www.fool.com/investing/dividends-income/2006/07/05/to-google-or-not-to-google.aspx>

¹¹ **Lucifer** [Atanasov, Stanislav]. Information Hobo ... B: *Lucifer's sandbox* [online] 7 July 2011 [Viewed 16.07.2017]. Available from: <https://www.anavaro.com/blog/informational-hobo/>

¹² **Information**: definition. In: *BD: Business dictionary* [online]. [Viewed 16.07.2017]. Available from: <http://www.businessdictionary.com/definition/information.html>

2. Cloud Disc – 67,9% of the respondents say they use cloud storage to store their information. This gives them the ability to access their files from multiple devices at any time. Another major advantage is the ability to share data with other users via a hyperlink, without having to send mail, use social networks or file transfer programs. There are currently many companies that offer people to use their server space against a free registration. In this way, a person can store their information using several free clouds or, in case of having a large array of files, he/she can pay and store everything on a single cloud.

3. Portable hard drive – a little more than half of the participants – 57,3% – store their information on portable hard drives. They also have a high density of information, high speed of recording and reading, but are larger in size than USB storage devices. In addition, their moving parts lead to a risk of mechanical damage that could also damage the recorded information. This, coupled with their larger physical dimensions, makes them inconvenient to carry, which explains their lower popularity compared to USB storage devices. However, they are a more reliable option to store information, because the connection between them and the computer is achieved by means of a cable rather than by direct contact, which reduces the risk of connection failure.

4. Compact Disc (CD) – almost the same number of the participants (54,9%) use CDs. They can store fewer digital data compared to other media, and are physically more unstable. However, as their name suggests, they are compact in size and are cheaper, which explains their popularity.

5. DVD – 48,9% of the respondents say they keep their information on DVDs. From a consumer point of view, the difference between CDs and DVDs is the ability to store more information, the need for a DVD burner and the slightly higher price. However, the percentages representing preference for these two storage media are surprisingly high, given that more and more devices are incompatible with them.

The Cloud Technologies Paradox

79,4% of the respondents say they use cloud technologies, with one-third of them using them often or very often and mainly for storing files. At the same time, 17,8% of the students who use their smartphones often say, they never use cloud services, and 25,7% do so rarely. This speaks of ignorance and misunderstanding of the technologies used, for the simple reason that smartphones, tablets, and now more often than not – laptops and desktops – are linked to one or more “clouds” through a link embedded in their operating system. The applications that are used on these devices are of three basic types – native, web and hybrid.

Native applications¹³ are written for a particular operating system; they require downloading and storing data and can only be used on the device on which they are installed, but they can also use its software and hardware. Web applications¹⁴ are the opposite – they are based on cloud technologies that allow being accessed from different devices and do not require storing data on the user memory. They are not

¹³ **Rouse**, Margaret. Native app. In: *TechTarget* [online]. February 2013. [Viewed 30.06.2017] Available from: <http://searchsoftwarequality.techtarget.com/definition/native-application-native-app>

¹⁴ **Christensson**, Per. Web Application Definition. In: *TechTerms* [online] 17 February 2014 [Viewed 30.06.2017]. Available from: https://techterms.com/definition/web_application

dependent on the operating system of the user, therefore they do not require installation but are used through a browser.

Hybrid applications¹⁵ manage to combine the functionalities of the two previous types, although they seem incompatible. They are installed on a device, similarly to native applications, but the data they are running on are recorded on a “cloud” and can be accessed from anywhere. They use the hardware and software of the device on which they are installed, which saves memory space. The examples of hybrid applications are everywhere – banking, budget management, shopping lists, photo galleries, email, calendar, but most of all social networking applications.

Taking into account that 97% of the respondents say they are members of at least one social network, we can conclude that users use their phone applications mainly to access those networks. This only highlights the next paradox – 82,1% of the respondents use a smartphone, but only 7,9% of them say they use cloud services very often, and 18,8% use them often. This is yet another piece of evidence that the possession and frequent use of ICT-based devices does not guarantee understanding and properly using them.

At first glance, this does not seem significant – how often do people think or care about how a program works? In fact, this is very important because it suggests the user’s overall attitude towards ICTs. One of the prerequisites for a person to be defined as digitally literate is being able to use a variety of technologies in an optimal way, which is impossible if they are not familiar with the functionalities of those technologies and their accompanying software. It is not enough for a person to use a program, it is important that he/she can use it effectively.

There are many app stores on the Internet. Googleplay alone offers about 2,8 million different programs¹⁶. In order for the user to be able to choose a tool to deal with a specific problem, he/she needs to know the principles and requirements to do this – whether a permanent Internet connection, presence of a certain amount of memory, presence of RAM, etc., are necessary. This would save him from confusing situations such as using a web-based presentation on a forum where there is no Internet connection.

Knowledge of memory storing devices

Three of the respondents gave answers different from those outlined in the questionnaire and only one of them (who represents 0,7% of all respondents) is related to the survey – this respondent says he sometimes stores information on a non-portable hard drive. Considering that each of the devices listed in the first questions has its internal memory in the form of a non-portable drive, this is a digital literacy problem.

Another proof in this respect is related to the contradictions between the used ICTs and storage devices. The percentage of people who record data on USB storage devices that use computers and laptops is understandably high. Surprisingly, it remains high even when it comes to devices that are not generally equipped to work

¹⁵ **Rouse**, Margaret. Hybrid application (hybrid app). In: *TechTarget* [online] July 2011 [Viewed 30.06.2017]. Available from: <http://searchsoftwarequality.techtarget.com/definition/hybrid-application-hybrid-app>

¹⁶ **Number** of apps Available in leading app stores as of March 2017. In: *Statista* [online.] March 2017 [Viewed 30.06.2017]. Available from: <https://www.statista.com/statistics/276623/number-of-apps-Available-in-leading-app-stores/>

with standard USB sticks like tablets and smartphones. Surprisingly, tablet and/or smartphone owners also mention portable hard drives, CDs and DVDs as storage media, at the expense of cloud drives, which are the most logical choice of device. The same paradox is observed when it comes to computers and laptops – they are the only ones that can physically have a disk drive, but CDs and DVDs are among the last users' choices.

Another fact that highlights the lack of digital literacy is that only 33,5% of the respondents are familiar with storage methods other than the most popular ones. Only 2,2% of the surveyed students are aware of the novelties in this area. Consumers do not know how to store their information in the most optimal way. Perhaps, the most worrying fact is that 15,7% of the respondents say that they “do not understand what it is about”. Only a few basic memory storage devices are listed in the questionnaire, which means that the respondents either do not understand the question or have no idea of ICTs that exist outside their immediate reach.

Contrary to expectations, students of Library and Information Studies are among the most uninterested in the field – half of them are not aware of the different storage options and 10% think that these options are irrelevant. Their colleagues from the areas of “Culture”, “Psychology”, “Sociology” and “Sociology – Labour Markets and Human Resource Development” are at the other extreme – more than half of the respondents say that they are familiar with the different ways of storing information or are interested in the novelties in the field.

Are young people digitally literate

Everything outlined above leads to the conclusion that most of the respondents are digitally illiterate. The respondents have access to ICTs and any new developments in this area, yet they cannot or do not want to learn to use them in a quality manner. Unfortunately, they can be considered a representative sample of the digital illiteracy in the country – nearly 40% of the young people in the country are functionally illiterate – i.e. they can read and write but they are unable to retrieve and use information¹⁷.

At school there are subjects such as “Informatics” and “Information Technologies”, which aim to give pupils basic knowledge about using computers and similar devices. Unfortunately, the teaching material often does not meet the needs and abilities of the students. These are also among the disciplines studied over the lowest number of teaching hours, in addition, in 2013 a draft law was prepared, according to which such subjects should be taken out of the curriculum for general comprehensive schools and high schools¹⁸. Although the law was not passed the knowledge acquired during these classes is generally basic.

Of course, there are many different digital literacy forms of training, but most of them are organized by private institutions and are paid for. This automatically divides the young people whose parents can afford to spend time and money sending

¹⁷ **Господинов**, Иван. Дигитална грамотност. In: *Teacher.bg* [онлайн]: Мрежа на учителите новатори. 20.06.2016 г. [Прегледан на 30.06.2017 г.] Достъпно от: <http://www.teacher.bg/Article/Details/66143>

¹⁸ **Стоянова**, Стела. „Махат информатиката от часовете в училище? : Проектозакон притесни учителите и ИТ сектора“. В: *Dnes.bg* [онлайн] 13 декември 2013. [Прегледан на 29.08.2017] Достъпно от: <http://www.dnes.bg/obshtestvo/2013/12/13/mahat-informatikata-ot-chasovete-v-uchilishte.209454>

them to a similar course from those who cannot. As a result, even if students have their own smartphone or have access to a computer, they cannot use it for anything other than playing games or “hanging out” on social networks.

Everyday access to such technologies creates inaccurate judgment and self-esteem of human abilities. Once created, they can hardly be challenged and overturned which leads to unwillingness to develop further. Even when students go to university, they think that once they have reached this point without specific knowledge, there is no point to develop it further. This creates prerequisites for inability to handle ICTs at an early age which remain constant for life.

What has to be done

In order to avoid the creation of a digital barrier and to improve quality of life, a strategy to combat digital illiteracy has to be adopted. Since ICTs represent a field that is changing within days, it is necessary to focus on trainings that cover every stage of a person’s life to achieve the goal. Young people should be encouraged to develop their skills in this area. This can be done by highlighting the benefits of being digitally literate – the various opportunities digital literacy provides, the way it affects one’s quality of life and personal welfare.

A good strategy would also be related to intervention on part of the business world. Being clear about what kind of ICT skills are being appreciated, as well as the opportunities for development and realization they give, would encourage young people to develop them while they are at school and university. In this way, students will not only acquire new knowledge on the subject but will also see the direct results of being trained further.

Another way to combat digital illiteracy and reduce its levels is to stimulate interest in those who possess their own device or have access to one but do not use it for its intended purpose. This can happen by creating more widely accessible training courses that focus mainly on dealing with specific tasks. Such initiatives would have an even greater effect if they target adolescents. The creation of entertaining tutorials for different types of programs, even in the form of games, would attract children’s interest and could create a thirst for new knowledge to shape a person’s overall attitude towards ICTs.

Conclusion

Although the link between digital literacy and personal welfare cannot be demonstrated, the interconnection between these two cannot be denied. Nowadays there is almost no aspect of human life unaffected by new technologies. Digital literacy or the lack of it affect education, professional development, and even personal life. There is a global society in which the links between people are based on ICTs. It is no longer just about having a certain device, but about its proper use.

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STUDENTS AND SOCIAL NETWORKS: FROM ACCEPTANCE IN VIRTUAL GROUPS TO SELF-ESTABLISHMENT IN VIRTUAL COMMUNITIES

Ivanka Mavrodieva

Abstract

The paper presents the results of research into the role of social networks, mostly of Facebook, LinkedIn, Twitter, and Instagram, in the process of teaching Bulgarian students in a university setting. A survey and quantitative research methods have been used in this study of 135 students from the Faculty of Philosophy at Sofia University “St. Kliment Ohridski”. This part of the study focuses on the extent to which access to online social networks contributes to their well-being as a whole and, in particular, to their information welfare, and to analysing to what extent access to these social networks influences students’ self-esteem and their career development. The three formulated hypotheses have been proven to a large extent.

Key words: social networks, Facebook, LinkedIn, Twitter, Instagram, welfare, information welfare.

Relevance of the studied problem and research

The paper cannot be considered exhaustive, however, there is growing interest in analysing social networks in the context of university education and training, and there is reason to talk about the wider spread of these studies in different sub-areas.

Nicole Ellison, Charles Steinfield and Cliff Lampe research social networking opportunities, and Facebook, in particular, in relation to optimising the learning process, to what the benefits of online “friends” are and whether there are any benefits to social capital, a term which the authors use to refer to assessing a person’s ability to remain connected with the members of the once-inhabited community we refer to as “sustained social capital”¹.

This issue is also explored by Sebastian Valenzuela, Namsu Park and Kerk Kee, whose research includes wider perspectives, such as looking for answers to questions about whether students enjoy themselves or experience trust by using Facebook during their training period at the University of Texas, USA; while also studying the problem of social capital. The authors come to the following conclusions which are by no means unambiguous in terms of students, well-being and Facebook, especially considering that this is one of the most popular websites in the USA. In terms of attitudes and behaviour that raise the social capital of individuals, the authors conclude that there is a positive relationship between the intensity of Facebook use and the satisfaction with student life, social trust, civic participation and political participation are also observed. At the same time, the authors conclude that Facebook also has negative effects on young people, including that this social network

¹ Ellison, Nicole, Steinfield, Charles, Lampe, Cliff. The Benefits of Facebook “Friends:” Social Capital and College Students’ Use of Online Social Network Sites. In: *Journal of Computer-Mediated Communication*, 2007, Vol. 12, Issue 4, pp. 1143–1168.

does not offer the most effective solution to young people's need for being engaged citizens and being active in democracy and processes in society².

Another group of researchers places an emphasis on student training, intercultural differences, optimisation of the process of student preparation, etc. In the context of globalisation, student mobility and the intercultural differences among students, as well as a degree of internationalisation in training for some specialties, the question of how social networks are used in these conditions stands out. The results of such a study are presented by a group of researchers at a US university. The survey covers 195 foreign students, and the following conclusions are made regarding online and offline social capital and adaptation to the new university environment: Students maintain links with friends from home through Facebook, there is the so-called horizontal collectivism; as Facebook performs the so-called mediation function, and also allows the consequences of using it on personality, cultural differences, social capital, and the adaptation of students studying outside their home country³.

There is growing interest on part of universities from different countries in studying social networks with regard to students and their education, and in particular e-learning, for instance the team of scientists (Radovan Madlenak, Lucia Madleňáková, Eva Kianichková) from the University of Žilina (Žilinská univerzita), Prague, the Czech Republic has conducted such a study and published its results⁴.

Some surveys are conducted at individual universities, and results from analyses of how social networking is used to teach individual subjects. For example, Abdullah Al-Bahrani and Pavel Darshank examine how the three social networks Twitter, Instagram and Facebook can be used in studying economics⁵. Metin Yaman and Çetin Yaman of Gazi University in Turkey explore the potential of social networks in relation to the training of sports teachers⁶.

Analysts look at topics related to student attitudes and overall state of mind, including depression, investigating the reasons behind these with regard to using social networks, particularly Facebook, as well to how students overcome envy and popularity⁷.

² **Valenzuela**, Sebastián, **Park**, Namsu, **Kee**, Kerk. Is There Social Capital in a Social Network Site?: Facebook Use and College Student's life Satisfaction, Trust, and Participation1. In: *Journal of Computer-Mediated Communication*, 2009, Vol. 14, Issue 4, pp. 875–901.

³ **Lin**, Jih-Hsuan, **Peng**, Wei, **Kim**, Mijung, **Kim**, Sung Yeun, **Larose**, Robert. Social Networking and Adjustments among International Students. In: *New Media & Society*, 2015, Vol. 14, Issue 3, pp. 421–440.

⁴ **Madleňák**, Radovan, **Madleňáková**, Lucia, **Kianičková**, Eva. Designing a Social Network to Support E-learning Activities at the Department of Communications, University of Žilina. In: *Procedia – Social and Behavioral Sciences*, 2015, Vol. 176, pp. 103–110.

⁵ **Al-Bahrani**, Abdullah, **Darshak**, Pavel. Incorporating Twitter, Instagram, and Facebook in Economics Classrooms. In: *Journal of Economic Education*, 2015, Vol. 46, Issue 1, pp. 56.

⁶ **Yaman**, Metin, **Yaman**, Çetin. The Use of Social Network Sites by Prospective Physical Education and Sports Teachers (Gazi University Sample). In: *Turkish Online Journal of Educational Technology*, 2014, Vol. 13, Issue 1, pp. 223–231.

⁷ **Tandoc**, Edson, **Ferrucci**, Patrick, **Duffy**, Margaret. Facebook Use, Envy, and Depression among College Students: Is Facebooking Depressing?, In: *Computers in Human Behavior*, 2015, Vol. 43, pp. 139–146.

Abdullah Al-Bahrani and Pavel Darshkak have also reached certain conclusions: social networks have the greatest impact in the fields of informatics and technology; social networks are actively used by students to share knowledge; the popularity of Facebook Messenger options with students is growing, and their role and even their contribution to education should be taken into account, and it is imperative to do theoretical research and more academic research on how teachers can use them more effectively⁸.

Some researchers focus on how Facebook affects student relationships and how learning is organised⁹.

Researchers also deal with the relationship between social networking and welfare. According to Nicole Ellison, Charles Steinfield and Cliff Lampe "... the use of Facebook could interact with measures of psychological well-being, which implies that it can contribute to providing greater benefits to consumers who have low self-esteem and low life satisfaction"¹⁰.

In summary, students are particularly actively using Facebook and it is a popular research subject. There is no unequivocal attitude towards this one as well as other social networks.

In Bulgaria no such research has been implemented so far, there have been basic research on the semantic web¹¹, social networks, applications and training for students and adults¹², Facebook¹³, LinkedIn¹⁴.

It is clear from the review that a study in the direction presented in the project has not been performed and that it is imperative to examine the relationship between social networks and welfare in several contexts: personal life, career development and university education.

⁸ **Al-Bahrani**, Abdullah, **Darshak**, Pavel. Incorporating Twitter, Instagram, and Facebook in Economics Classrooms, *Journal of Economic Education*, 2015, Vol. 46, Issue 1, pp. 56.

⁹ **Cheung**, Christy, **Chiu**, Pui-Yee, **Lee**, Matthew. Online Social Networks: {Why} do Students Use Facebook? In: *Computers in Human Behavior*, 2011, Vol. 27, Issue 4, pp. 1337–1343.

¹⁰ **Ellison**, Nicole, **Steinfield**, Charles, **Lampe**, Cliff. The Benefits of Facebook "friends": Social Capital and College Students' Use of Online Social Network Sites. In: *Journal of Computer-Mediated Communication*, 2007, Vol. 12, Issue 4, pp. 1143–1168.

¹¹ **Миланова**, Милена. Библиографски данни в семантичния учеб. В: *Годишник на Софийския университет „Св. Климент Охридски“*, Философски факултет, Книга „Библиотечно-информационни науки“, 7, 2015, 201–2014.

¹² **Mavrodieva**, Ivanka, **Tsvetkova**, Nikolina. Manifestations of the Pedagogical Communication in applying LbD4All through Web 2.0. В: *Реторика и комуникации* [онлайн]. Октомври 2015. [Прегледан на 10.08.2017]. Достъпно от: <https://rhetoric.bg/?s=Manifestations+of+the+Pedagogical+Communication&searchsubmit>

¹³ **Добрева**, Десислава. Facebook комуникацията в етичен аспект, изразена чрез вербални и визуални реторически аргументи В: *Реторика и комуникации* [онлайн]. бр. 20, ноември 2015, [Прегледан на 10.08.2017]. Достъпно от: <http://rhetoric.bg/реторика-и-комуникации-брой-20-ноем>

¹⁴ **Стоячкова**, Десислава. Проявления на виртуалната реторика в LinkedIn. В: *Реторика и комуникации* [онлайн]. Бр. 25, ноември 2016, [Прегледан на 10.08.2017]. Достъпно от: <http://rhetoric.bg/сп-реторика-и-комуникации-бр-25>

This issue is pressing which is also evident in the fact that more and more students in Bulgaria, at Sofia University and in particular at the Faculty of Philosophy use social networks and it is necessary to study their attitudes.

Main parameters of the study

The object of the study is students' attitude to, experience in and use of social networks. The subject of the study is the causes, factors, relationships and changes in student behavior when using social networks in terms of their welfare in the context of providing and sharing information online.

The aim is to determine how social networks are used by students, by means of what devices and whether access to and participation in these social networks contributes to students' welfare while at the same time an attempt has been made to define these in the current paper in the context of the research outlined below.

The research objectives are theoretical and methodological. The social networks explored in the project and the term "welfare" are presented theoretically and part of the existing scientific knowledge is updated with the awareness that there is strong dynamics in this area so it is the current state which is taken into account. On a methodological level, the questionnaire covers 26 questions, the methodology being at a pilot level with a view to more in-depth and large-scale future surveys, and in particular, the questions concerning social networking are also used for piloting purposes, which is why they have been developed in general terms and no details have been outlined.

The hypotheses we formulate are three:

Hypothesis 1: Students have a relatively well-developed digital competence, they develop skills to use electronic resources primarily as users, relying on easy access to their training and exams.

Hypothesis 2: Students have a positive attitude towards the use of social networks, at the same time they use them with varying intensity, and they do not always realise their benefits in terms of career development and welfare.

Hypothesis 3: Most students prefer to be admitted to virtual groups and receive ratings and recognition from their members, however, it is few of them who appreciate self-establishment through affiliation and active participation in virtual communities and online collaboration.

A brief survey of research into social networking

The review is based on social networking publications and more specifically the following four – Facebook, LinkedIn, Twitter, Instagram – are explored more extensively in the project. In the paper, the functions and role of the social networks used by students are analysed in terms of welfare as well.

The interest in studying social networks and social media from the point of view of different sciences began immediately after their emergence. Some of the reasons why there is such keen research interest are quite diverse, on the one hand, the impact of social networks on society, on the life and behavior of people from different groups; on the other hand, their orientation towards business has been established; from a third point of view, their dynamic development and the competition between the social networks themselves are considered. As early as 2000, before Facebook

and LinkedIn appeared in 2003, Linton Freeman explored visualisation in social networks¹⁵, while Bill Howard studied the features of online social networks in general and presented his analysis results in 2008¹⁶. Zizi Papacharissi focused on identifying the specifics of what he called virtual geography on the basis of a comparative analysis between the following social networks – Facebook, LinkedIn and AsmallWorld – and published results in 2009, reaching the following conclusions. Each of the three social networks seeks and achieves a specific style in self-presentation in public and public-private spaces; there is socio-cultural identification and different content organisation. Facebook is characterised by a publicly open structure, freer norms of behavior, and an abundance of tools that members use in online communication to present themselves. LinkedIn and ASmallWorld create tighter spaces that match the spirit of each of the two networks and offer few opportunities for spontaneous interaction and informal networking¹⁷.

Research continues in the second decade of the 21st century in different directions, one of them being the study of leadership and online social networks¹⁸; analysing how the use of social networks and the messages posted lead to the growth of these networks, and whether online relationships influence creating and maintaining emotionally close relationships with members of the offline network¹⁹; what the role of these networks and specifically Instagram is in relation to constructing branding and branding strategies²⁰; to what extent businesses recognise the role of LinkedIn in researching business relationships²¹.

Summing up, it can be said that social networks are in the focus of interest for disciplines such as psychology, in particular cyberpsychology, business communication, marketing, management, public relations, advertising among others. At the same time, the dynamics of social networking requires scientists to research new phenomena, processes, and look for both general and specific features, to outline trends and make predictions, to draw up guides on ethics in online social media communication.

¹⁵ **Freeman**, Linton. Visualizing Social networks. In: *Journal of Social Structure*, 2000, Vol. 1, Issue 1, p. 4.

¹⁶ **Howard**, Bill. Analyzing Online Social Networks. In: *Communications of the ACM*, 2008, Vol. 61, Issue 11, p. 14.

¹⁷ **Papacharissi**, Zizi. The Virtual Geographies of Social Networks: A comparative analysis of Facebook, LinkedIn and ASmallWorld. In: *New Media & Society*, 2009, Vol. 11, issue 1–2, pp. 199–220.

¹⁸ **Korzynski**, Pawel. Online Social Networks and Leadership. In: *International Journal of Manpower*, 2013, Vol. 34(8), Issue December, pp. 975–994.

¹⁹ **Pollet**, Thomas, **Roberts**, Sam, **Dunbar**, Robin. Use of Social Network Sites and Instant Messaging does not Lead to Increased Offline Social Network Size, or to Emotionally Closer Relationships with Offline Network Members. In: *Cyberpsychology, Behavior, and Social Networking*, 2011, 14, 4, pp. 253–258.

²⁰ **Latiff**, Zulkifli Abd, **Safiee**, Nur Ayuni Safira. New Business Set Up for Branding Strategies on Social Media – Instagram. In: *Procedia Computer Science*, 2015, Vol. 72, pp. 13–23.

²¹ **Quinton**, Sarah, **Wilson**, Damien. Tensions and Ties in Social Media Networks: Towards a Model of Understanding Business Relationship Development and Business Performance Enhancement through the Use of LinkedIn. In: *Industrial Marketing Management*, 2016, Vol. 54, pp. 15–24.

The above review shows that the main features of social networks are the following: social media are popular when there is a desire for self-expression, communication and self-help²².

In studying Facebook, the focus is on a wide range of online communication, from searching, finding, and realising communications in a virtual environment, to the impact on privacy, training and business²³. According to other authors, the use of Facebook is often treated as a monolithic activity where all the time is “social” in the same or similar way for everyone and the impact of Facebook is the same for all users; authors also explore how Facebook influences social capital and identifies factors and dependencies, among which are: (1) There is “one-to-one” communication that broadcasts a message to a wider audience, and there is passive consumption of social news, and (2) There are individual differences among consumers, and these differences also relate to consumers’ social communication skills and self-esteem²⁴.

Analyses made in connection with the LinkedIn social network are primarily focused on the following issues and thematic areas:

- what role does it play in the business of recruiting and how do make jobseekers present themselves in the online environment²⁵;
- how are candidates positioned and oriented towards career development²⁶;
- what advantages do candidates gain from presenting to the business social network and how do they maintain an active profile and up-to-date information²⁷;
- how corporations understand professional links in LinkedIn and how is the issue of trust resolved²⁸.

The Twitter social network also provokes researchers and they direct their research in several ways, namely creating valuable and long-lasting contacts, searching for and disseminating information, and more²⁹. A team of researchers come up with conclusions that however connected social networks structures are, they do not reveal real human interactions as well as in the case of Twitter when it comes to social relations we can speak about a hidden network of connections which are at the foundation of the “declared” selection of friends and followers³⁰.

²² **van Dijck**, Jose. 'You Have one Identity': Performing the Self on Facebook and LinkedIn. In: *Media, Culture & Society*, 20013, Vol. 35, Issue 2, pp. 199–215.

²³ **Grieve**, Rachel, **Indian**, Michaelle, **Witteveen**, Kate, **Anne Tolan**, G., **Marrington**, Jessica. Face-to-Face or Facebook: Can Social Connectedness be Derived Online? In: *Computers in Human Behavior*, 2013, Vol. 29, Issue 3, pp. 604–609.

²⁴ **Burke**, Moira, **Kraut**, Robert, **Marlow**, Cameron. Social Capital on Facebook: Differentiating Uses and Users. In: *CHI 2011*, May 7–12, 2011, Vancouver, BC, Canada. 2011, pp. 571–580.

²⁵ **Hempel**, Jessi. How LinkedIn will Fire up Your Career. In: *Fortune*, 2019, Vol. 161, Issue 5, pp. 74–82.

²⁶ **Zide**, Julie, **Elman**, Ben, **Shahani-Dennig**, Comila. LinkedIn and Recruitment: how Profiles Differ across Occupations. In: *Employee Relations*, 2014, Vol. 36, Issue 5, pp. 583–604.

²⁷ **Utz**, Sonja. Is LinkedIn Making you more Successful? The Informational benefits Derived from Public Social Media. In: *New Media & Society*, 2015.

²⁸ **Claybaugh**, Craig, **Haseman**, William. Understanding Professional Connections in LinkedIn – A Question of Trust. In: *Journal of Computer Information Systems*, 2013, Vol. 54, Issue 1, pp. 94–105.

²⁹ **Huberman**, Bernardo, **Romero**, Daniel, **Wu**, Fang. Social Networks that Matter Twitter under the Microscope. In: *First Monday*, 2009, Vol., 14, Issue 1.

³⁰ *Ibid.*

There are also benchmarking studies on social networks, such as a comparative analysis of the Facebook and LinkedIn interface. The authors conclude that, while Facebook focuses primarily on facilitating personal self-presentation, LinkedIn's interface focuses on professional performance. Yet both platforms have similar principles at the level of connectivity and narrative strategies and they concern digital architectures and online self-presentation and how to form public identities through platform interfaces and how to achieve the online identity of those who have profiles on these social networks³¹.

A comparative analysis of the benefits and disadvantages of social networks based on means of expression, content creation and reaching consumers intrigued researchers and presented research results. Matthew Pittman and Brandon Reach compare Twitter and Instagram at verbal and visual code levels, as well as the extent to which these two social networks contribute to overcoming loneliness and what changes occur in social networking behaviour³².

Research over Instagram has been triggered in recent years, focusing primarily on the extent to which people are searching for and gaining online popularity by primarily publishing visual content, even reaching an exaggeration of the image³³. This social network is intriguing to people, and to adults interested in it, who represent themselves³⁴. The focus of research interest is also on the extreme results of online positioning, including narcissism³⁵.

Based on our observations and analyses, we should note that Facebook and Instagram, in particular, create opportunities for those who post on them to prefer to be online too often, with some of these people going beyond the model of quiet publicity or comfortable anonymity. At the same time, there are tendencies of re-treating and distancing from excessive presence in these social networks, of a clearer understanding of the boundaries between the personal and the public, and of withholding deeply intimate things, preventing intrusion into the inviolable personal space. Socially significant events, which are imposed or presented as such, have a more frequent appearance on Twitter, and when it comes to Bulgarian, this social network does not enjoy the same degree of popularity as the previous two, with users remaining in a relatively passive position and preferring to be followers, instead of tweeting themselves. As far as LinkedIn's business social networking is actively used by IT professionals, it is growing in popularity by providing online learning opportunities through courses and video lessons, and through the constant,

³¹ **van Dijck**, Jose. 'You Have one Identity': Performing the Self on Facebook and LinkedIn. In: *Media, Culture & Society*, 20013, Vol. 35, Issue 2, pp. 199–215.

³² **Pittman**, Matthew, **Reich**, Brandon. Social Media and Loneliness: Why an Instagram Picture may be Worth more than a thousand Twitter Words. In: *Computers in Human Behavior*, 2016, Vol. 62, pp. 155–167.

³³ **Ferrara**, Emilio, **Interdonato**, Roberto, **Tagarelli**, Andrea. Online Popularity and Topical Interests through the Lens of Instagram. In: *Proceedings of the 25th ACM conference on Hypertext and Social Media*, 2014, pp. 24–34.

³⁴ **Stapleton**, Peta, **Luiz**, Gabriella, **Chatwin**, Hannah. Generation Validation: The Role of Social Comparison in Use of Instagram Among Emerging Adults. In: *Cyberpsychology, Behavior, and Social Networking*, 2017, Vol. 20, Issue 30, pp. 142–149.

³⁵ **Sheldon**, Pavica, **Bryant**, Katherine. Instagram: Motives for its Use and Relationship to Narcissism and Contextual Age. In: *Computers in Human Behavior*, 2016, Vol. 56, pp. 89–97.

fast and sustainable enhancement of software and access to various options, including courses, events, and more. Despite certain attempts to “intervene” or “add” a more informal language in LinkedIn, this is not allowed. Preserving the business style of virtual communication on LinkedIn is a fact; for example, congratulations on a new position or career advancement, or years of service experience in a company, these congratulations remain within the proposed clichés and the business etiquette (in this case business netiquette), respecting a business-appropriate register, however in its more dry and uniform phrases. Our observations show that even in cases of personalisation in expressing congratulations, this is done briefly politely.

The term “welfare”

The review of the meaning of the term “welfare” in dictionaries in French, English and Russian gave the following results. In the French online version of the Larousse dictionary the term *bien-être* is presented as, firstly, a pleasant state that is the result of satisfying the needs of the organism; secondly, welfare is associated with tranquility; thirdly, it has a connection with material aspects and affluence, which allow for a pleasant life³⁶.

There are three terms in English: *well-being*, *welfare* и *prosperity*. Under the term *wellness*, the meanings are pleasure, satisfaction, as they relate to satisfying the needs of the body and/or the mind, as well as good health or luck, with *comfort*, *happiness*, *prosperity*, *welfare*, *advantage*, *benefit*, *ease*, *good* indicated as synonymous³⁷. The online version of Merriam-Webster reads that *well-being* is a noun and refers to a state of happiness, health and prosperity³⁸. In another online dictionary – Dictionary.com – *well-being* is associated with a good life, satisfactory living conditions; but in a broader sense with happiness, prosperity and humane treatment, as well as with the well-being of the nation and the people³⁹.

The term *welfare* in the online Cambridge Dictionary is presented in a narrower and more specialised meaning and is associated with financial parameters, money, wealth of companies, less unemployment in the state among others⁴⁰.

The term *prosperity* refers mostly to financial gains, economic development of the state or company and personal success and career development.

In Russian the meaning of *welfare* is: 1. Calm and secure life, success and prosperity; 2. A normal life, devoid of any unpleasant phenomena, pointing to material well-being on a personal level, and in the economy – total well-being⁴¹. Prosperity, success and, flourishing are given as synonyms of welfare in the same dictionary.

³⁶ **bien-être**. In: *Larousse*. Available from: <http://www.larousse.fr/dictionnaires/francais/bien-être/9159>

³⁷ **well-being**. In: *Thesaurus.com*. Available from: <http://www.thesaurus.com/browse/well-being>.

³⁸ **well-being**. In: *Merriam-Webster*. Available from: <https://www.merriam-webster.com/dictionary/well-being>

³⁹ **well-being**. In: *Dictionary.com*. Available from: <http://www.dictionary.com/browse/well-being>.

⁴⁰ **welfare**. In: *Cambridge Dictionary*. Available from: <http://dictionary.cambridge.org/dictionary/english/welfare>

⁴¹ **Благополучие**. В: *Популярный толково-энциклопедический словарь русского языка*, 2012. Доступно от: <https://slovar.cc/rus/tolk-enc/1460605.html>

Another online dictionary, lists over ten words as synonymous, including prosperity, well-being, happiness, luck, chance, prosperity (economic), contentment, sweet life, prosperity, wealth, among others⁴².

By *welfare* in the context of the study presented in this article we shall mean, namely the well-being of students while using social networks in the process of learning and in the initial steps in their career development. We shall also make the following clarifications: we shall avoid one-sided meaning as well as too broad a definition:

First: Create and constantly maintain very good living, learning, training and career conditions that include access to the Internet, computers, mobile devices, smart phones, electronic readers, application access, and electronic resources.

Second: Creating conditions for online communication, building virtual groups, gradually creating the need to belong to them and actively participate in their activities, as well as gradually developing attitudes, skills and digital competence for participation in virtual communities.

Third: Developing skills and the need for participants in virtual groups and communities to step out of the role of a passive recipient, to be ready to share information and engage in interactive online communication, to engage in virtual dialogues, and to enjoy and satisfaction with these participations, not only by facilitating access to information through technical devices and software.

Fourth: Forming and creating attitudes and patterns of online and offline collaboration and satisfaction with online creativity and receiving recognition and evaluation online and offline from students, teachers, and network users.

Though seemingly beyond the terminological clarification, here we present Oliver Luket and Michael Casey's views presented in their book "The Social Body" 2017: First, "A key point in shaping knowledge is the concept that cognitive skills depend on the ability of people to recognise repetitive models," and secondly, "... but our brains have evolved to discard information that wastes valuable processing resources to target more attractive or important information. In this way, they create a kind of defense for the racing memes"⁴³. We accept the terms "social organism", "memi", "social memes", "social DNA", "memic iconography", "digital biodiversity" which is associated with the use of local platforms in countries in South and Southeast Asia⁴⁴. At the same time, we express some reservations with regard to Oliver Luket and Michael Casey's ultimate conclusions, and we do not accept all parallels and associations in relation to social networking and information-dependent well-being.

We also find it important to formulate the assumptions that information welfare associated with the theories about the social organism is related to:

- knowledge of the potential of the Internet;
- the use of different social networks;

⁴² **Благополучие**. В: *Glasses.ru* Достъпно от: <http://www.classes.ru/all-russian/russian-dictionary-synonyms-term-3942.htm>

⁴³ **Лъкет, Оливър, Кейси**, Майкъл. *Социалният организъм*. София: Кръгзор, 2017, с. 48, 72, 124.

⁴⁴ Пак там, с. 31, 49, 73.

- continuous self-development and formation of models and behaviour suitable for admission and active participation in virtual groups;
- gradual orientation towards and development of a sense of belonging out of membership and activities in virtual communities on the basis of recognition, satisfaction, independent and collaborative activity online and offline during school and university education;
- neutralising the blind and uncritical following of examples and the superficial sense of the benefits of being part of a group.

Research design, methods, results, and analysis

Methods

The present study is part of the “Information-dependent well-being” project, implemented by lecturers and PhD students at the Department of Library Science, Scientific Information and Cultural Policy at the Faculty of Philosophy, Sofia University. The research was carried out using quantitative methods, with a 26-question questionnaire. Altogether 135 students from all faculties of the Faculty of Philosophy, mainly bachelors and one master program, were included. The surveys were conducted by completing them in person over the period of April – May 2017 in the second semester of the academic year 2016–2017.

In the current paper, the focus is on the use of social networks by students and welfare, so the analysis focuses on this issue. Four social networks have been selected, assuming that they are more popular with students and are more commonly used by them: Facebook, LinkedIn, Twitter, Instagram. Students are given the opportunity to designate other social networks that they have access to, which they prefer and use.

Results and analysis

In connection with determining whether the availability of and access to computers, smartphones, mobile devices is part of students’ welfare, the following is the answer to the questions of the students. Fifteen of them use computers very often, 13 – often, 19 – sometimes, 54 – rarely and 32 – never. 89 of the surveyed students use laptops often, 18 – often, 16 – sometimes, 8 – rarely, 3 – never. 20 of the surveyed students use tablets very often, 111 – often, 23 – sometimes, 33 – rarely and 46 – never. Smartphones are used very often by 107 students, they are used often by 16 students, sometimes by 2, rarely by 1, and they are never used by 6 students. The data show that laptops and smartphones are preferred by students, and technology development allows them to access the Internet and use social networks from their mobile phones, laptops, computers and tablets. With regard to welfare, understood in terms of material, technical, technological and software conditions, it is secured to a very high degree. The question is how this technology, these devices and the access they provide are used by students and to what extent they create a sense of information welfare in them.

To the question, “Are you personally involved in a social network?”, 130 students respond they are, and only 4 give a negative answer. This proves the particularly high activity of the students at Sofia University when using social networks in general, as 96,3% of the students know them and are oriented towards inclusion in

virtual groups. There is a need to belong to such groups on part of young people studying at universities, as well as to obtain online approval primarily from their peers, but not only those who are also members of such virtual groups. This can be defined not just as a fashion and following well-established models, but also as an attempt to be satisfied with their presentation in the online environment, as well as not being anonymous or poorly recognisable. Students want to receive recognition from other people who are members of virtual groups using social networks, even if these testimonials and ratings are just for their small and personal successes, achievements, events, and more.

The response to the question “If you are on a social network in c: open answer?”, again confirms that only 4 of the 135 respondents are not included and do not use social networks. After the review and analysis, students found the following social networking sites: Facebook, LinkedIn, Twitter, Tumbli, Trumble, Printerest, Tagget, Google+, Snapchat, Youtube, Soundc, 500 px, VKontakte. Facebook is the most popular, it is present in 47 replies in combination with other networks, but it is always the first in a combination of 2, 3 or 4 other social networks. Instagram occurs in 24 of the responses, more often in combination with other networks. The most common is the Facebook and LinkedIn combination and it is repeated 10 times. Twitter was mentioned by 12 respondents. Therefore, assumptions that these are the four most popular with, preferred and used social networks by students at the Faculty of Philosophy have been confirmed. Other social networks include Trumble – 3 times, Pinterest – 3 times, Tagget – 2 times, Google+ – 6 times, Snapchat – 4 times, 1 time 500px, 2 times VKontakte.

The YouTube social networking video site is mentioned 4 times. It is interesting to note that there is no mention of other video social networks, including Vimeo, which qualifies as a video sharing platform. A peculiar feature is that HD video and 4K are supported, that is, the quality is high, and in the preparation of the clips there are teams of professionals who have high digital competence or who are directors having professional experience and adequate education. There is no mention of the Bulgarian version Vbox7, which does not have a dynamic and sustainable development and does not have high quality clips, subtitles, translations and others.

It can be concluded that students are oriented towards popular and already established social networks, showing curiosity and interest for new ones, but they do not react quickly and spontaneously to their use. Consequently, although with a certain degree of conditionality, we can say that convenience is the motif for the use of information, at the same time new potential of social networks is explored.

It is noticeable that some students do not differentiate between social networking and applications, software programs and other popular ways of online communication. They mention sporadically that they use Viber and Skype, which feature easy, fast, and multi-functional communication (through videoconferencing, audio, chatting, sending attachments) through personal computers and smartphones. Skype is mentioned by respondents less often than Viber, that is, they are oriented towards more advanced applications. Viber was set up in 2010 for iPhone, and in 2011 there was already a version for Android, that is, the dynamics of technological development, the attitudes of students as consumers and their orientation towards more and more active use of smartphones is registered.

Although sporadically, some students refer to e-mails as social networks, especially gmail.com, abv.com, which is indicative of the lack of high enough digital competences, while as users students do not differentiate between them.

Fifty respondents or 37,0% have listed Facebook, and this social network is present in most responses in combination with other social networks being first on the list. This correlates well with students' active behaviour on Facebook, with the attitude to having friends, with communicating their number and growth, changing their profile photo, sharing news about travel and success, marks and graduation. The intensity of using Facebook is relatively constant, but it grows in situations and instances that are important to the student and relate to personal success or more significant stages of completing a semester, a year, or graduation. They also publish information on career development, long-term engagements, travel and vacations. There is a recent phenomenon on Facebook when some students report information about tragic events and the loss of loved ones, that is, not only pleasant and jolly moments. The presentation of Facebook information, which is related to engaging with causes and ideas, with programs or activities of student groups, with courses or master programs, is also part of what students post. For them, it is a variation of the so-called "information-dependent well-being", that is, receiving and disseminating information important to them rapidly among the members of the virtual group.

It should be noted that there are also closed student groups on Facebook to support their education and training. These closed groups have a function of informing, recalling, mobilising, organising, stimulating the learning process. With these closed student groups on Facebook relying on the attitude to get informed through this online communication channel, that is, outside the university administration, students help each other as members of student virtual groups. Virtual communities can also be spoken of if they have a 1 to 4 year baccalaureate at bachelor or a master course. There are several different manifestations in closed student groups on Facebook. Students on a course need to be in these groups and pragmatically approach the organisation of the learning process and their exams, both current and final. In these cases, there is reason to speak about guided and moderated communication in academia where the university administration does not take part, as it is about self-organisation and mobilisation in achieving individual and group goals.

However, there are also cases where teacher also participate in such groups and as information, organising, mobilising functions remain, the relationships remain hierarchical, but they rely on the speed of information provision. Through the exchanged messages, students develop attitudes towards belonging to virtual groups which are relatively constant, given the organisation of the learning process at the university. Students are not only user, but they also post, that is, they temporarily step out of the consumer model, developing relationships in a virtual environment, enriching their social skills. In addition, there is satisfaction in providing and receiving assistance from colleagues and teachers, constant feedback is generated. Interactive communication can be reached, to the satisfaction that the student is accepted and active in the virtual group, and this is related to the understanding of the welfare of the representatives of the so-called Net generation, app-generation, called digital natives. In this way, students develop and improve their digital competence simultaneously with satisfying their need to accept and belong to certain online groups where there is a relatively permanent membership.

However, when talking about other groups on Facebook, then there is reason to summarise that there is some fluidity on them and it is expressed, on the one hand, by membership, as well as by switching to other groups with no sense of remorse, seeking recognition and acceptance. It can be said that this is also a manifestation of the so-called virtual nomadism, a lack of stability and a quest for retention, and an unwillingness to continue for a longer time to be a member of the group, due to weighing the pros and cons, not to a loss of interest.

In addition, Facebook communication also reflects some phenomena and behaviours that include informal language, brief and even elliptical expressions, frequent use of emoticons, uncritical or conjunctive expressions of mainstream likes. There is also no individualisation of ratings and subtext or different layers and figurative language in Facebook comments, i.e. clichés dominate, there are positive ratings through labels and qualifications like *princess*, *beauty*, *charmer*, etc., especially in women posts, which from a gender perspective has not been studied enough, for example, see Martha Dabrowska's articles⁴⁵.

Some students prefer the behaviour of users and content sharing, not that of creators and distributors of their own authored content. Therefore, it can be said that their welfare involves the use of social networks due to the speed of provision of and receiving information; at the same time, creativity, criticality and analytics are not reduced for some students, authorship leads to satisfaction and has a connection with welfare, but already at another level and when taking into account other benefits of social networks.

A total of 129 answered the question "To what extent is it important for you to be active in social networking?". For 17 respondents this is very important, for 32 – rather important, for 55 – somewhat, for 20 – rather unimportant and for 5 – this is not important. The data show that about 50 of the respondents find their active participation important and rather important, and for 55, that is, for almost the same number, it is important to some extent while 25 declare more passive positions. Signing up in a social network does not mean the creators of an account are active and find this activity important for them. At the same time, they are part of these groups and follow the behaviour of "declaring" presence and declaring the number of friends, followers, members of certain virtual groups. It is a question of personal choice, experience and attitude to what extent the student connects social networks, their presence and popularity through them with self-assessment about real activity or about satisfaction, recognition, loneliness avoidance, searching for online contacts, etc. The availability of Internet access and smartphones does not in itself lead to social networking.

The answers to the question "Does social networking contribute to your welfare – social contacts, acceptance and evaluation by different groups?", with regard to Facebook, are as follows. Of those surveyed, 32 said that Facebook contributes to a

⁴⁵ **Dąbrowska**, Marta. *Variation in language: Faces of Facebook English*. Series: Text – Meaning – Context. Cracow studies in English language, literature and culture. Frankfurt am Main: Peter Lang Edition, 2013; **Dąbrowska**, Marta. Communicating emotions online. The function of anonymity and gender. В: *Реторика и комуникации* [онлайн]. бр. 14, октомври 2014. Достъпно от: <http://rhetoric.bg/реторика-и-комуникации-лингвистика-к>

high degree, 48 – that it contributes to some extent, 12 responded with “neither contributes nor does not contribute”, 31 – with “contributes to a small extent”, 6 respondents – with “does not contribute”. The assumptions are that Facebook is the most preferred social network by students. This assumption is confirmed, and Facebook has been found to make a contribution to creating and maintaining online contacts, as well as to being accepted by some groups and rated by them for some 50 of the respondents. For 31, however, this social network is not of such importance, although they have Facebook profiles. These data are also interesting in view of the phenomena and even trends not only for young people to close their Facebook profiles and not to seek popularity and acceptance, preferring anonymity, discretion, privacy and failure to provide information to broad circles about what they find significant on a personal level.

The answers to the question “Does social networking contribute to your welfare – social contacts, acceptance and evaluation by different groups?” with regard to LinkedIn, the answers are as follows. Only 4 students answer that the business social network contributes to a high degree, 17 – that it contributes to some extent, for a few it neither contributes nor does not contribute, for 7 it contributes to a small extent, and for 66 responding students it does not contribute at all. It is obvious that there is awareness among students that this social network does not have such a personally significant role, at the same time, not enough importance is being attached to it in view of their future career development. When LinkedIn grows and invests in creating groups and stimulating membership, the questioned Bulgarian students do not associate so well with welfare.

The answers to the question “Does social networking contribute to your welfare – social contacts, acceptance and evaluation by different groups?” with regard to Twitter, the answers are as follows. Only 3 respondents declare that it contributes to a high degree, 16 – that it contributes to some extent, 18 – that it neither contributes, nor does not contribute, 11 people answer that it contributes to a small extent, and 67 – that it does not contribute. These results correlate with the assumptions that Twitter is generally not a very popular social network in Bulgaria, particularly among students, even as followers.

The answers to the question “Does social networking contribute to your welfare – social contacts, acceptance and evaluation by different groups?” with regard to Instagram, the answers are as follows. For 13 students surveyed, this social network contributes to a high degree, for 20 it contributes to some extent, for 24, it neither contributes nor does not contribute, for 17 it contributes to a small extent, and for 45 it does not contribute. These results show that Instagram is increasing its popularity among young people and students at universities in Bulgaria but, for most of them, their visual presentation in this social network is not particularly important for their acceptance and evaluation by different groups. This may be due to the traditions and the habit of being more active on Facebook, which has evolved and allows for membership in virtual groups linked to majors in universities, by supporting causes such as reading books, celebrating alumni clubs and others. While virtual groups have a way to switch from one group to another, as well as some fluidity, it is not possible to give a firm answer why students do not accept the dominant visual codes as important for their online evaluation on Instagram.

When it comes to other social networks, 62 of the respondents state that these social networks have no influence, 8 – that they have little influence on them, 9 – that they neither do nor do not; for 17 respondents these social networks are important to some extent, and only 5 declare a high degree of importance as far as how they contribute to their welfare.

Another group of questions are formulated so that we can establish the influence of a social network on students' welfare but this time in relation to their career development. These questions have been formulated, taking into account the fact that students are preparing **for** their future career while still at university, some of them already have a job, others do internships, a third group look for career opportunities while they are studying.

The group of questions related to social networks and their career development reveal the following results.

The question "Does social networking contribute to successful career development?" with regard to Facebook, leads to the following results. For 47 of the respondents it has no influence, for 14 – it has little influence, for 20 – it neither has nor it does not, for 35 students it contributes to some extent and for 13 it is helpful to a high extent. The results as to whether or not Facebook contributes to one's career development are almost equal, which can be attributed to the fact that students have a positive attitude to this social network when it comes to organising the learning process, mobilising before exams, supporting and quickly providing information to members of a group. Students are aware that real, current and potential employers and human resource professionals are looking for and verifying information from their Facebook profiles, but they do not see this as direct impact on their career development.

The question "Does social networking contribute to successful career development?" with regard to LinkedIn, leads to the following results. For 72 of the respondents it has no influence, for 9 it has little influence, for 18 it neither has nor it does not, for 10 it contributes to some extent and for 5 – to a high extent. There is a certain paradox, as LinkedIn is a business social network and through it employees are hired, the candidates maintain profiles and participate in groups precisely in order to find a job that suits their expectations. However, students do not appreciate its role, perhaps one of the reasons is that they are students of the Faculty of Philosophy who study humanities and social sciences, and most of the respondents are in their first or second year, only a few of them are master students, so they do not appreciate the importance of the business social network. Thirdly, they possess digital literacy, but it should be matched by social maturity and career guidance and developing skills for online self-presentation and interactive communication should be part of their university education from its start. Students are present in social networks, but they are not aware of building a sense of belonging and combining it with pragmatism, and it is only in a few disciplines that they study web writing and working online.

The question "Does social networking contribute to successful career development?" with regard to Twitter, leads to the following results. For 87 of the respondents, it has no influence, 6 claim it has little influence, 17 say that it neither has nor it does not, but 6 declare that has influence to some extent. The results show once again that Twitter is not particularly popular with students, and and on the other

hand its purpose does not affect career development as it presents information, news and events from the public sector and is PR-oriented.

As far as the question “Does social networking contribute to successful career development?” with regard to Instagram is concerned, the results are as follows. For 82 it has no influence, for 8 it has little influence, for 17 it neither does nor it does not, for 9 students it has influence to some extent and for 3 – to a high degree. There again, the assumption that this social network is increasing in popularity, but students do not consider it important for their career as there are basically photos and videos there which are related to their private lives. At the same time, it is important to note that human resource professionals verify and compare Facebook, LinkedIn, Instagram, and other social networking profiles to determine the level of digital literacy, attitudes to providing personal information, or withholding it.

The results regarding responses about other social networks are the same – for 44 students these are of no impact, while for 7 – of little impact.

The next group of questions seeks to find an answer to whether social networks contribute to career development satisfaction, again with regard to the four main social networks and the others mentioned by the surveyed students.

The answers to the question “Does social networking contribute to career development satisfaction?” as far as Facebook is concerned, the results are as follows. For 64 of the respondents Facebook does not contribute, for 12 – it contributes to a small extent, for 21 it neither contributes nor it does not contribute, for 22 it contributes to some extent, for 10 it contributes to a great extent. There is realistic assessment of Facebook and the specificity of this social network on part of the students, with regard to whether it contributes to creating popularity and satisfaction with business success, but not to a big extent, and one of the reasons is that it people publish mainly but not only posts, photos and videos related to private events, and they are rated, liked by friends there. In the future, Facebook may start to attract more interest as a channel, a medium and a set of presentation tools for career success, however, whether this will contribute to the satisfaction of those who publish there remains to be explored.

The answers to the question “Does social networking contribute to career development satisfaction?” as far as LinkedIn is concerned, the results are as follows. For only 3 respondents, this social network contributes to a great extent, for 9 it contributes to some extent, for 19 it neither contributes nor it does not contribute, for 9 it contributes to a small extent, and 74 students think that it does not contribute at all. Paradoxically, despite the functional orientation of the business social network, whose purpose is to present career development results, recommendations, appraisal, belonging to groups, training courses and upgrading, the students display no sense of these opportunities and advantages. This can be viewed as insufficient awareness, as well as skills to create profiles and this implies that university training should be developed in a pragmatic aspect, looking for the intersection of university education – business – career development of future employees.

The answers to the question “Does social networking contribute to career development satisfaction?” as far as Twitter is concerned, lead to the following results. For 89 of the respondents, this social network does not contribute at all, for 5 – to a small extent and for of them 19 it neither contributes nor does not contribute. For 3 respondents it contributes to some extent. These results correlate with those for the

previous questions as they confirm that Twitter is not particularly popular with students, especially having in mind it is not career oriented, but rather towards news about politicians and celebrities.

The answers to the question “Does social networking contribute to career development satisfaction?” as far as Instagram is concerned, lead to the following results. Only one of the respondents says that Instagram contributes to a high extent, for 10 of them it contributes to some extent, for 18 students it neither contributes nor it does not contribute. The essence of Instagram with its orientation towards a dominating visual performance and so far reduced verbal expression and coding as well as the shortness of verbal messages as well as its focus on personal moments, emotions, experiences presented through pictures and videos cannot affect career development satisfaction, unless the latter present awards from competitions, diplomas, papers, celebrations, conferences, seminars, etc., but these are not frequent phenomena in students’ lives, and not everyone appreciates the importance of presenting this information precisely in relation to their careers.

As for the other social networks, 51 of the respondents say they do not contribute, and the rest claim that they do not contribute much.

Discussion

Summing up, it can be said that students have a good awareness of social networks, they understand their functionality, there is clarity about genres, coding on verbal and visual levels. Students have developed from good to high digital literacy, but have a preference for moderate activity, following well-known models, and mainly publishing on Facebook, they have come to realise the importance of differentiated performance on different networks but have no experience of using LinkedIn actively for career development. Although with a certain degree of conditionality, one can say that students possess the respective attitudes, readiness and experience to be members of virtual groups, to receive ratings and recognition from friends, especially on Facebook, but not on Instagram, which has been bought by Facebook. Also, the informal way of writing, evaluating, liking, choosing between ready emoticons, and visual elements to evaluate is preferred by most of them. At the same time, LinkedIn implies a more formal way of expression and online communication, interaction through established genres such as recommendation, verbal and visual self-presentation, use of arguments of authority.

The analysis of the results justifies the conclusion that the three formulated hypotheses have been confirmed to a great extent.

On the first hypothesis: Students possess rather good and very good digital literacy, some of them reach digital competences, they can use electronic resources, they are oriented quickly, they take advantage of easy access to them during the semester and during an exam session and in their preparation during the training and during the exams.

The second hypothesis is strongly confirmed, students use social networks with varying degrees of intensity, and they do not always realise their benefits in terms of career development when it comes to LinkedIn and their personal well-being, particularly with regard to Instagram.

The third hypothesis is somewhat difficult to prove because of the specifics of the questions, but the assumptions remain that most students prefer to be part of virtual groups and receive ratings and recognition from their members, especially on Facebook and Instagram, while on Twitter they prefer to be followers. It can be concluded that memberships have both active and declarative character, which at this stage does not create conditions for active participation in virtual communities and online collaboration.

Conclusion

The results of the study show that students are familiar with and use social networks, and to a greater extent, they relate to the provision and dissemination of information related to their personal lives and the organisation of the learning process. They take into account the benefits of social networks such as the speed of information transfer, easy access, opportunities for discussion and sharing within social networks, developing online communication skills. At the same time, the capacity of the business social network for career development is not yet sufficiently realised, due to insufficient experience and digital competence to create online publications in formal business styles and to follow the rules of netiquette as the informal and semi-formal Facebook communication helps student to develop a preference for short and elliptical sentences, use of emoticons and visual imagery, etc. At this stage, social networks are primarily used to disseminate information related to education and training, but there is already a desire to extend their application to knowledge sharing, i.e. to contribute to another level of education, and this implies more often conducting research to identify changes in dynamics and making decisions to improve the quality of education. In addition, social networks are still not understood as social capital. That is why, in principle, the members of the research team are planning to carry out research into this issue in the future.

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BRAIN IMPLANT INFLUENCE ON PERSONAL IDENTITY AND FREE WILL

Nikola Nikolov

Abstract

Emerging and developing technologies are transforming human daily life more and more. Wherever we go, we are surrounded by “clever” devices whether we realise they are such or not. They think for us and more often than not, they take decisions about what would be useful or convenient for us in our own daily lives. These technological innovations are unique; however, they should not be considered only part of the “outside world” because they are turning into a real part of our “inside world”. Brain implants are now of such technological quality that they are capable of preventing conditions which some time ago were thought of as “irreversible”.

The aim of the current paper is to discuss the variations in understanding what is personal identity and free will and how these two things are influenced by modern technological discoveries, namely brain implants.

This is done in order to formulate a definitive consolidated evaluation of whether brain implants are dangerous or, on the contrary, they contribute to asserting a person’s autonomy and freedom.

Some of the different theoretical schools of thought presented in the paper support their ideas with experimental data thus giving evidence of the theories they support, and they allow the reader to formulate their own opinion on the matter.

Key words: personal identity, free will, brain implants.

Cutting-edge technologies are transforming human daily life more and more. Wherever we go, we are surrounded by “clever” devices whether we realise they are such or not. They think for us and more often than not, they take decisions about what would be useful or convenient for us in our own daily lives. These technological innovations are unique, however, they should not be considered only part of the “outside world” because they are turning into a real part of our “inside world”. Brain implants are now of such technological quality that they are capable of preventing conditions which some time ago were thought of as “irreversible”.

Neural-prostheses belong to a new generation of brain implants that are able to restore human brain abilities brain through electronics and software installed directly into our nervous system. People who suffer from degenerative conditions such as Parkinson’s and Alzheimer’s find new hope in using such implants which, once embedded in the brain, are capable of sending electronic impulses that activate the affected neuronal connections associated with psychomotor, memory, or emotional personality disorders.

Brain implants are able to decode brain signals, interpreting the intentions of patients suffering from various forms of paralysis. We have come to the conclusion that today’s technological achievements have the potential not only to “understand” a paralyzed person, but also to perform certain actions “ordered by them” – such as searching for information on the Internet, transferring data directly to or from their brain to other information points, etc. All this sounds like science fiction, but it is becoming

real tool of the human body a more and more as we speak. In addition to the therapeutic purposes, such technologies can also be used to improve a user's memory, attention, concentration, or confidence even when there is no real medical need.

The many positive effects of using such tools are undoubted, and their number does not allow summarizing the information about them in a few lines. Nevertheless, in order to be objective, we must mention some risk points about this cutting-edge technological breakthrough – there are still problems with the process of embedding / implanting these tools, precisely because of the complexity of the body or organ in which they are placed. Risks of infection, brain haemorrhage, and rejection of the target element are to be carefully analyzed and prevented. Also, the influence that metal plates or additional electronic signals may have on the surrounding part of the brain in which they are embedded is also not fully investigated. It is not known whether helping one does not become an obstacle to another.

Together with the fears of purely physiological risk influences, there is a certain sense of uncertainty that raises the question – whether or not purely mental risks are also possible? Does the change that will be made affect only the damaged brain structures? Will it not have an impact on the essence of the affected consciousness? On a person's sense of identity? On a person's autonomy and free will? All these issues are of particular importance to the individual as a distinct and independent subject of his/her life.

In order to try to answer these questions, we need to deal with what we think, know or think we know about personal identity and free will. We need to establish if there are any threats to our autonomy connected to using brain implants or if we can safely trust science by assuming that its main purpose is to preserve our health, authenticity and ability to choose freely.

Apart from the analysis of the two concepts and the possible impacts on the personality, we will also look at how people nowadays perceive the use of such types of implants. This issue also has its significance due to the fact that sometimes things such as lack of sufficient information, mistrust or irrational disagreement with emerging innovation, prove to be a significant problem for one's perception. Here comes the role of science, which, through a combination of theoretical and empirical evidence, must serve as a guarantee of the essence of everything which is not familiar and brings about uncertainty about our well-being.

Hypotheses and development of the idea of personal identity

There are a number of thinkers, philosophical trends, and even religions that have dealt with the subject in depth, but for my introduction I would like to focus our attention on a preexisting problem that may be the beginning of the idea of personal identity. It is about the correlation between spirit and body or consciousness and body or mind and body – between what we identify as “internal” and what we recognize as “external” to our own being.

Materialism supported by John Serle, for example, offers a theory of how thought should be identified with the presence of a brain, and nothing but the physical beginning, should be accepted as credible. This idea builds on the theory that consciousness, mind, soul – all these are the result of materialism in one form or another. Of course, in the context of the topic of identity, it must depend entirely on an individual's body. Since antiquity, however, in the face of the first philosopher

who professed idealism in some form – Parmenides, and a number of others after him, such as Kant, Berkeley, and so on, we see that it is not physique but thought that is regarded as the substance that creates a personality. According to this theoretical direction “only what can be thought, exists”. This is the basis of the idea that personal identity must be sought where it is thought that occupies a space, rather than any other substance (body, brain, etc.).

For a third type of theorists, falling into extremes it is an unsuccessful attempt to seek the truth. They express the opinion that the balance between the two substances is what builds a personality (mental and corporal). Interactionism, mainly in the face of Descartes, speaks precisely about the duality that forms the personality – on the one hand, the mind occupies its important place, on the other – the body, and these two sides enter in such a correlation that they succeed in creating a product of their interaction, thus realizing the personality of the subject.

These three strands give us the opportunity to formulate three different ideas that are related to our theme:

1. Personal identity is where the mind is;
2. Personal identity is where the body is;
3. Personal identity is a result of the connection between mind and body.

Before starting to discuss the theories related to the subject, we must accept another, fourth idea, which is also widely embedded in some religious, philosophical and even sociological schools of thought, namely, that there is no such thing as personal identity in general. Let us trace what is meant by this.

One of the most characteristic ideas in the Eastern religious teachings is the doctrine of “anatta” (not-me). The essence of this doctrine presents the notion that there is no such thing as personal identity at all and yet – there is absolutely nothing that can be accepted as “you” or “me”, no matter at what moment and in what context it is being considered. Every concept of personal identity is an illusion, and it is this illusion that is the root of all the suffering in the world, according to Buddhists. Although the idea is primarily related to the human personality, it is also connected to absolutely everything (animals, plants, objects) – nothing has its own identity or its own essence. The term “anatta” is a translation of “not-me”, “without myself” or even “without a soul”.

Within the “anatta” concept there is no such thing as “man” or at least not what we understand under this notion – something that is distinct, consisting of its own integrity. What we call “man” is a sort of set of different sensations, thoughts and states of consciousness that are available and valid for a certain period of time before being replaced by others. None of these instant components can be called “man”. This is precisely why, according to Buddha, man does not exist, it is just an illusion. For him, the essence of such an object is composed of six elements – hardness, fluid, heat, motion, space and mind. He does not define any of them as an ingredient that can be identified with the concept of “I” in explaining how consciousness appears and disappears, how pleasure, pain, or neutral states appear and disappear¹.

¹ Wayne, L., Anatta: The Buddhist Doctrine of “No self”. In: *CARM* [online]: Christian Apologetics & Research Ministry. 4/01/2016. [Viewed 25.08.2017]. Available from: <https://carm.org/doctrine-of-no-self>

In this sense, Buddha's teachings are in full consensus with David Hume's ideas – "where there is a totality, there can be no identity".

Hume thinks that, despite the constant idea that we are aware of what we call "ourselves" there is no real argument in favour of such conviction. He believes that we have never had an "encounter" with such an unchanging and constant phenomenon that we can call "I", but rather our self-perception, which we erroneously recognize as "ourselves". This is the result of a stream of perceptions that are replaced by one another in a constant, never-seizing sequence. Hume says that whenever he has had the strongest sense of something like "I" he has felt he was in the field of some perception of warmth, cold, love, hatred, pleasure, or pain, but he has never "caught himself" beyond a certain sense or perception, so that he can separate it from it, let alone analyze its nature².

We often think that an object that exists at any given time is identical to another at another time because of a close relationship or interaction between them. In order to realize at a mental level, the possibility of such an identity, according to Hume, we are inclined to reach the idea of some unexplained mysticism, which plays the role of an organizational element that realizes the possibility of identity between these two objects or, in this case, perceptions. Hume analyzes the incentive or the reason why one has an affinity for mentally realizing such a relationship without having real arguments for it. The answer to this question lies in the essence of our imagination. The reason to make such a connection between things is nothing more than a thought flow flowing from one object to another accomplished by such a smooth transition that our perception is in a state of impossibility to capture a distinction. This gives way to our imagination to perceive the two objects as one or to "create identity" where it is missing³.

In conclusion, we can summarize that Hume's idea of the identity of human consciousness is that it is something like a chain of mental events which are related in such a causal way that in their essence they are not able to form a whole unchanging phenomenon but represent a continuous process which is of a variable and non-permanent nature.

This hypothesis about the non-existence of "I" contradicts with John Locke's, who clearly opposes the theory of a lack of a specific identity. He, unlike Hume, thinks that personal identity can be changed. For him, it is bound with and depends on one thing – our consciousness.

Locke's analysis of identity in his "Identity and Diversity" reveals that the most important condition for an individual's identity depends on "the continuity of their lives" because being connected with our consciousness identity needs a living organism to support it. Interestingly, there is no need that this has to be the same organism. This may sound strange, but with the following example, it will become clear what Locke means: denying the idea that bodily identity is a must-have part of the identity of a person, he brings forward the example of "the Prince and the Pauper" change of essence. The transfer of the soul along with the Prince's mind into the pauper's body, carrying all the informational content of his life so far enters and supplies with information the pauper's body, which is simultaneously abandoned by

² Hume, D. *A Treatise on Human Nature*. Oxford: Oxford University Press, 1978, p. 252.

³ *Ibid.*, p. 256.

his own soul and consciousness. As a result of this transfer, everyone could see that the current pauper has become a prince, even if just by his actions and behaviour. With this example, Locke shows us that the body cannot be an argument for personal identity, since you can observe the same personality realized in two different bodies. It is for this reason that the physical body cannot maintain a person's identity in a substance. This idea allows Locke's to conclude that the criterion for maintaining personal identity must be psychological, that is, the personality is realized and identified through consciousness, which in turn means psychological connectivity and duration. Even if transferred to another body, the consciousness carries all the information with which it used to supply the old one – memories, feelings, desires, in general – the personality. This does not interrupt the “accumulation of experiences and memories”, and this thread is continued.

According to Locke, memory is part of consciousness, and it is decisive for preserving a personality – when we have the same person who has done a certain action but has subsequently forgotten about it, we can say that it is the very same human being, but not the very person, Locke says⁴.

Investigating the theoretical path of the concept of personal identity to understand its essence, we reach the technological explanations of its nature. An example is the next prominent philosopher, the American Daniel Denette.

He thinks that the question “Where am I?” requires a response or at least a guess that serves as a clarification of the question – “What am I?”, “What is the thing that references my name” or “I”? Denette thinks that when our brain perceptions connect to the material world through sensory mechanisms – eyes, ears, etc., placed in our body, they are what should make us identify ourselves as a definite essence and guide our sense of identity by default. However, he accepts something different – our sensory mechanisms are not necessarily responsible for this sensation, but rather – the prospect of “perceiving the world”⁵.

To realize his idea, we will use a thought experiment in which Denette has to go to a dungeon in Oklahoma, where nuclear warheads are kept in order to be disposed of. Unfortunately, they emit radiation that damages a person's brain but keeps his body intact. That is why, it is decided that his brain has to be separated from his body before he leaves. Through radio transmitters and thousands of radio waves, his brain, which is removed and placed in laboratory conditions, is connected to the central nervous system of his body. He is capable of perceiving sensations and controlling his body. However, due to the increasing distance between the two objects (brain and body), the response time of the body, relative to the commands given by the brain, increases and he begins to feel how it reaches a point where some of his senses begin to disappear or stop functioning. Continuing this intriguing story, we

⁴ **Nimbalkar**, N. John Locke on Personal Identity. In: *NCBI* [online]. PMC: US National Library of Medicine National Institutes of Health. *Mens Sana Monogr.* 2011 Jan–Dec; 9(1): 268–275. doi: 10.4103/0973–1229.77443. [Viewed 25.08.2017]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3115296/>

⁵ **Hahn**, M., **Friedrich**, N. Dennett and Personal Identity. In: *SFU* [online]. Simon Fraser University: Department of Philosophy. Tuesday, November 26th, 1996. [Viewed 25.08.2017]. Available from: http://www.sfu.ca/~nicolea/papers/Dennett_and_Personal_Identity.htm

understand that the radio connection is weakening even further, and he loses his muscles completely, loses his ability to speak and hear. After a while he loses his eyesight. So he finds himself in a situation where he cannot see, speak or hear.

Suddenly, as a final moment of the radio connection, he senses how he has gone back to Houston (where the lab is), and he is just like a bodyless brain. He touches his cheek with his tongue (imaginarily) and, to his surprise, feels a sense of touch. All this, he says, is an absolute argument for the immateriality of the soul, which, even without substance, is capable of feeling things related to the body. Suddenly, from a situation where he couldn't see, hear and speak in Oklahoma, he becomes a bodyless mind in Houston. No material being is capable of such a transition, which inevitably means that what has made such a transition is immaterial by its nature.

We can draw three conclusions from this:

1. Denette identifies himself with the existence connected to where his body is, not because of the senses with which he perceives the surrounding world, but rather because of the brain that is the subject responsible for this perception and awareness.
2. He also believes that the relationship with the perspective from which we see the surrounding world, is random. According to him, it is not necessarily bound to the body, because when the connection between the body and the brain is broken, the perspective to the world has returned to the place where the brain was housed.
3. The feeling he felt from the touch of the tongue to his cheek is an argument about the soul's intangibility and about the fact that nothing which is object-perceived can determine identity.

The story he offers has its sequel, which sounds even more fantastic. Denette recounts how he has awakened from this state of oblivion feeling that he has been given a brand new physical body, identical to his old one, which was created by scientists and related to the same radio links as the previous one. Denette very soon takes it for his own, without any change in his sense of identity. While looking at his brain in the laboratory, he surprisingly finds out that scientists have created not only a new body-replica but also a copy of his brain that has been uploaded to a computer. From there researchers feed his new body with signals duplicating those he himself sends from his brain. The synchronization between the two brains is so successful that there is no disparity between the sensations, feelings, decisions, and actions that came from "the different sources". Scientists have also created a switch that Denette can control. He still perceives his identity as untrue, for it is in his "hands" whether to control his own new body or leave it to his "helper". The things that are transmitted from the computer to the body are transmitted as sensations to his brain, so he is fully aware of what is happening at any moment.

The experiment ends with the fact that at the time when he decides to switch the signal in order to check the synchronization between the two sources, he hears a voice that "is thanking the Lord, thinking that Denette would never make that switchover again". Denette is amazed to hear a voice that is identical to the one he recognizes as his own and at the same time to express things he has not intended to say.

The conclusions we can draw from the second part of this story are the following:

1. Denette assumes that whichever of the two brains controls the body does not matter to his identity. The perspective of observation and sensation provided by the body's receptors remains invariably the same.

2. Despite the presence of two sources of commands to the body, there is actually only one “Denette”, which means that identity cannot be strictly attributed to any of these sources – it is always the product of their cooperation.

3. Two identities can only be obtained by splitting the perspectives themselves. Two brains create one identity only if they act together. In case of deviation, even if they contain the same memories, personality and consciousness, they become different individuals who communicate with each other individually⁶.

All of these conclusions suggest that identity can be transformed into software that, through appropriate equipment, can fully supply a quality body and transmit information from the outside world to it. Our brain is classified as a technical information device and it only creates a sense of self-perception. This is an interesting theory on the part of Daniel Denette, which so far remains purely theoretical and unproven empirically.

In contrast, the next section of our chapter presents real moments of analysis of personal identity that will be commented upon by two of the most prominent information philosophers.

We will present an interview with real patients who have undergone brain operations and have different implants to improve their condition. Our analysis will go through the familiarization with the philosophic theories of our two analysts, and then we will find out if they are empirically confirmed by the real facts derived from the patients’ perceptions of their sense of identity.

The close connection between our brain and our behaviour, considering it also a connection between our brain and ourselves, poses issues that require a very serious comparative analysis between two different approaches – philosophical and neuroscientific.

Our analysis, as mentioned, will be accompanied by two very famous researchers in the theory of personal identity – Thomas Nagel and Derek Parfit. Let’s start from the beginning: “*I am my brain and my identity is totally dependent on it*”, says Nagel, and Parfit replies, “*No, I am not my brain*” adding: “*The brain is neither a necessary nor a mandatory criterion for my personal identity. My personal identity is absolutely unnecessary itself*”.

And now – where to

Our goal, as we have defined it, is to look at the two philosophers’ theories which will be subjected to empirical testing, thus using the epistemological force of philosophical arguments, analyzing something that is strictly scientific and obtaining some real product verification. This will allow to make a conclusion about whether the description of things is credible as an analysis of the essence of personal identity and what remains a purely theoretical rationale without a real result, all of which is in the context of the use of revolutionary neural implants.

“Additional fact”

Nagel adopts the brain as a necessary criterion for personal identity. He accepts the term “identity” as a defined (ultimate) rather than a conditional term. The term

⁶ Banach, D. *Who Do You Think You Are? Relations, Subjectivity, and the Identity of Persons* [online]. [Viewed 25.08.2017]. Available from: <http://www.anselm.edu/homepage/dbanach/who.htm>

is defined by the fact that it has accepted the form of a “Yes” or “No” verification, that is, the personality is identical or non-identical without the existence of a middle position. By the same logic, the term is unconditional in the sense that it does not accept any mandatory condition. It can vary. Until it accepts some mandatory condition, it contains some empty space, an empty position that is filled with an “additional fact” (a basic concept for Nagel). He illustrates his idea with the example of gold, which before being clearly chemically formulated as “gold” had an “empty position” that is subsequently filled with its formula – “an additional fact”.

He believes that this “additional fact” must fill the gap between the subjective experience of an individual, that is, his first-person perspective and the objectively necessary structure that maintains that subjectivity, that is, his physiology. It is the brain, according to him, that can fill this gap – the “empty position”⁷.

On the one hand, the brain must be accepted as a prerequisite for the subjective experience without which we would have the rest without the possibility of experiencing mental states from the commented personal perspective, and on the other hand – it serves as a bearer of the psycho-physiological processes that are in the foundation and maintenance of our body. This means that the loss of our brain would lead to the loss of our personal identity. For this reason, the brain must be perceived as an absolute must for our identity⁸.

Parfit opposes this idea completely rejecting the notion of personal identity and replacing it with something that is far more important to him, namely the “survival” of the personality. According to him, what really matters is not personal identity but the survival of the personality. Contrary to the above-mentioned Nagel’s pattern of identity, Parfit’s “survival” does not accept the need for the ultimate “yes” and “no” states to restrict the concept. Parfit believes that what is responsible for the continuity of personality in time and space is psychological connectivity and duration, the so-called “Relation R” concept⁹. He exemplifies the cases in which, after hemispherectomy, a person remains with half his brain, but that does not prevent him from preserving his personal identity.

He also denies Nagel’s idea that identity is not a conditional concept, saying that if the term “identity” can be replaced by the term “survival”, then perhaps we should still think about the definitivity of this notion. The person can survive without referring to something specific, so the term “survival” can avoid the characterization of both Nagel’s concept of “empty position” and “additional fact”.

He gives an example of the fact that the nation in a country does not refer to either a single resident or someone’s property, but in any case, it “survives”. That means that it is not necessary that the concept of identity is strictly defined, as Nagel thinks¹⁰.

Physico-mental interactions

As already mentioned, Nagel believes that the brain fills the gap between the subjective experiences of mental and psychophysical states. That is why, the brain

⁷ Nagel, T. *The view from nowhere*. New York: Oxford University Press, 1986, p. 71.

⁸ Ibid, p. 72.

⁹ Parfit, D. *Reasons and persons*. Oxford: Oxford University Press, 1989, p. 206.

¹⁰ Ibid., p. 471.

should not be perceived simply as a physical organ because mental states and subjective experiences cannot be reduced to strictly physiological elements. Rather, the brain must be perceived as part of mentality because it is the conductor of these mental experiences. However, “physical-mental relationships” as a concept, according to Nagel, must be defined more as a relation between mental and physiological states.

Characteristics of the brain

Even if the brain does not need an “additional fact” or some other mandatory condition, it should be considered as the reason, the requisite condition for “Relation R”, and hence the “survival” of the personality. Parfit thinks that the brain is a “normal”, “natural” cause of “Relation R”, although it does not define it as a “mandatory” one. He thinks that both the brain and other things can turn into causes for, in the sense of “engines” for “Relation R” and “survival”. He believes that a computer that is trustworthy enough can be a replacement to the brain¹¹.

Psychological Survey: Subjective experience of persona identity and personality in patients with brain implants

Methods. Five patients with Parkinson’s disease were the subject of the study. Two of the patients were implanted with brain-embryonic tissue, and three were implanted with electrodes in the basal ganglia. All of them were tested using standardized tests and interviews. They aimed at exploring a possible change in the patients’ sense of personal identity (the subjective survival of the “I”), as well as a feeling of personality after the operations.

Results. No patient felt a change in their self-perspective. Electrodes, despite the fact that they are technical devices, rather than some type of cells, are gladly accepted by patients as part of their bodies. They called them “my electrodes”, which speaks of a sense of “compatibility” between their bodies and the “innovations”. Moreover, patients thought they could sense the influence of implants through their own psychological states. One of the patients even claimed she felt when the electrode in her brain was switched on and when it was turned off. Patients with implanted embryonic cells also accepted them very well, with one of them, even meditating before surgery, to create a favorable environment for their integration. Neither the disease nor the implantation therapy resulted in a change in the patient’s personal identity or personality. Some of them even talked about “great freedom and individuality” because of the freedom and control of their body movements after surgery. Embryonic cells were accepted as natural psychological substitutes for their dopamine deficiency, and electrodes – as technical means that “made their brains work in the right way”. There was no difference in the responses given by patients and their partners about whether any change in their nature was observed. The conclusion that can be made about the patients’ subjective experiences after surgery confirms that the patients did not feel any change in their personal identity. Moreover, they were able to psychologically integrate the new elements into their worldview¹².

¹¹ Parfit, D., *Reasons and persons*. Oxford: Oxford University Press, 1989: p. 207.

¹² Northoff, G. “Am I My Brain?” *Personal Identity and Brain Identity*. [online]. PDF 3.0 MB. [Viewed 25.08.2017]. Available from: <https://static1.squarespace.com/static/528facb6e4b0a18b7>

Continuation of the philosophical discussion

The additional fact

Nagel suggests that his “additional fact” can be empirically confirmed, but in practice – the information that has been received shows that there was no indication of the existence of such a thing. Patients, as we have learned, have experienced no change in their personality. In this line of thought, Nagel’s idea of the existence of such a phenomenon remains unrealized, hence the whole theory becomes unacceptable.

On the other hand, the Parfit’s presumption of psychological durability and psychological connectivity – “Relation R”, as essential to personal identity, is well recognized in empirical results – the memories and personality of the patients have remained unchanged, hence their identity has been preserved – and the theory is empirically confirmed¹³.

Physico-mental interactions

Some patients share about their sense of interaction between their mental states and the implants – cells and electrodes. They, for example, describe that they can sense the impact on their brain by changing the implant performance, as we have seen above. Nagel’s assertion of the existence of such a physical-mental relationship can be accepted as a confirmation of the existence of such interactions through empirical evidence. Subjective sensations about the influence between the psychological and mental attitudes of the individual and the devices implanted in them cannot be possible without such interactions¹⁴.

Characteristics of the brain

As we have previously explained, Parfit accepts the brain as a “natural”, but not a mandatory reason for psychological continuation and for Relation R because any sufficiently reliable form of a “brain model”, such as a computer, can successfully accomplish this task. In our case, we have some confirmation of this theory because the embryonic cells and electrodes in a certain sense replace the brain by completing the functions it has previously performed. At the same time, we do not see any change in people’s personal identity. Parfit’s idea that the brain is not a mandatory reason to preserve personal identity finds its empirical confirmation. On the one hand, we have the tests and studies on patients, and on the other hand, they declare psycho-subjective sensations that they do not feel anything in their identity has changed, except that their brains function again in the “right way”.

However, the physico-mental sensations that patients describe in some sense are in an opposition to the fact that the personality can be managed by a computer configuration because of the fact that the described psycho-physiological connection would then be broken. The idea that each implant is intended to fit technically into a certain brain, with certain deficits and needs is also a counter-argument to Parfit’s idea. His view can be defined as mechanistic and hence – static. It has been

e9cde91/t/5314ed59e4b0defc67483336/1393880409301/Am+I+my+Brain_Personal+Identity+and+Brain+Identity_low.pdf, p. 10, 11.

¹³ Ibid., p.15.

¹⁴ Ibid., p.16.

empirically proved that a biological and dynamic concept would be more acceptable in terms of preserving identity. This is because the integration of something new into something old is possible only through the idea of specificity of both the receiver and the implant¹⁵.

After numerous reflections, discussions and empirical evidence of what personal identity is and whether it would be influenced by brain implants, it is time to move on to the next part of our study – namely, what we call free will and what is its interaction with brain implants.

Hypotheses of the idea of free will

Free will, as an idea that we have a choice of what decisions to realize, implies that we are free to choose our behaviour, in other words, we are self-determinant. This does not mean that the behavior is arbitrary, but that it is free from the influence of any previous situation. The idea of free will is that one is responsible for one's actions here and now without letting something that has happened in his past influence his current choice. This approach is known as indexing.

In contradiction to this ideology there is one that says, “We are not free in anything we choose or do”. This is the so-called determinism. External determinism postulates that we are influenced by society, parents and rules. Internal determinism defines the “internal factor” as crucial to our decisions – unconscious motivations or genetic predispositions – “biological determinism”, for example the coefficient for intelligence is considered related to gene IGF2R¹⁶.

Free will

The basic idea of the humanistic approach is that people have free will and to a large extent their behaviour is not predetermined. Indeterminism is the notion that the decisions we make are the result of some kind of chance, that is, they are random. They could have happened otherwise, but what happens in practice comes as a result only on the basis of a chance. Just as in the case of determinism, which we will look at later on, there is a different form of indexing that we will look at over the following pages. Regardless of their variations, however, we must have the clear idea that the common element between them remains the same – our decisions and actions are triggered by chance.

Interdeterminism

Libertarianism

Robert Kane is one of the leading supporters of the theory of libertarianism – a leading part of the interdeterminism. He stands by the idea called “libertarian freedom” and contends the following:

1. The existence of an alternative (so that the agent can act in a different way) is a necessary condition for acting freely.
2. Determinism is not compatible with alternative options. This means that it cannot be accepted together with the availability of free will.

¹⁵ *Ibid.*, p. 19.

¹⁶ **Chorney**, M. J. at all. A quantitative trait locus associated with cognitive ability in children. In: *Psychological Science* [online]. Vol. 9, No. 3 (May, 1998), pp. 159–166. Available from: http://www.jstor.org/stable/40063273?seq=1#page_scan_tab_contents

It is important to note that the essence of Kane's theory is not to defend the existence of such alternative options, but to impose the concept which he binds with "ultimate responsibility". Therefore, "alternative options" are a necessary, but not a mandatory, criterion of free will because, even if it is necessary to have real alternatives to our actions, this is not enough – our actions may be arbitrary without being really under our control. Control is the basic and essential condition of "absolute responsibility". Precisely this leads to the idea that the agent is an absolute creator and supporter of his goals. There has to be more than one "change of choice" option, but more importantly, no matter what change happens, it must be based on a person's will, namely – to be our own choice.

Kane says that "the agent has to be responsible for everything that is a mandatory cause (condition, motive) for action". He calls what is essential to create such a type of action "self-forming actions" – these are moments of indecision where people experience contradictory feelings about what they should choose. They are indefinite and voluntary volitional actions that form the basis of what is defined above as "absolute responsibility". Such decisions, according to Kane, form our own character¹⁷.

Event causal theory

This theory does not differ significantly way from libertarianism, but we still have to write a few lines about it to show its basic ideas. Its supporters believe that agents can be accepted as free only when the events that are related to their actions, and hence to their mental states, occur in an indefinite manner. As we have seen above, the idea that the freedom of the agents depends on the fact that the actions they are performing are dictated solely by their own mental states or decisions, is present here as well. The main idea is that a person is free when deciding on a certain action in an indefinite (random) way¹⁸.

Moderate Libertarianism

Alfred Mele gave the name to "moderate libertarianism" in contrast to the "radical" one expressed by Kane. This type of theory accepts the view that an agent's action is determined by the events that have taken place before the decision for this action is made. Here we cannot talk about determinism emerging from external forces or biological determination, rather from the nature and an agent's values, feelings, desires and motives. This model of free will can be defined as "causative".

The role of pure luck, irreversible chance, or quantum uncertainty is limited to the alternative possibilities for action. Chance is not the reason for our thoughts and actions, as radical Libertarians believe. Here the two theories diverge because Mele thinks that it is precisely our character that is fundamental and responsible for what decisions we make. This theory can be accepted as morally responsible because,

¹⁷ **Robert Kane** (philosopher). In: *WikiVisually* [online]. [Viewed 25.08.2017]. Available from: [https://wikivisually.com/wiki/Robert_Kane_\(philosopher\)](https://wikivisually.com/wiki/Robert_Kane_(philosopher))

¹⁸ **Martin**. The free will debate – a broad outline of positions [blog post]. In: *ApologiaPad* [online]. Posted on September 28, 2011. [Viewed 25.08.2017]. Available from: <https://apologiapad.wordpress.com/tag/event-causal-libertarianism/>

according to it, if chance is a decisive factor for our decisions, it will hinder the ability to be responsible for what we do¹⁹.

Agent causal theory

The philosopher Rodrik Chisholm says: “If we are responsible for what we are doing then we seem to have the prerogatives that some would have reserved for God’s prerogatives: each of us acts in his actions as a non-driven but at the same time a moving agent. We are the reason certain things happen, but at the same time nothing or no one is the reason to do these things”.

The consequence of agent causality is that free will is not a process, but an unchangeable substance: it creates spontaneous actions and decisions not related to a causal connection.

Agent causality depicts human free will as a binary state – a quantum that has no internal structure and cannot be divided.

Although he is a supporter of this idea, Chisholm thinks that free will is incompatible with the idea of the complete indeterminacy because he thinks that if something is unreasonable, it is accidental and cannot be a product of free will.

He further develops his idea that even if sometimes our actions are not caused by any clear events, they are surely caused by certain substances – humans – “immanent causality”²⁰.

Non-causal theory

The non-causal index theory suggests that free actions do not require an internal causal structure or, more precisely, free actions have no cause. These free actions arise in the mind of the individual. They are mental actions that take the form of decisions and choices, but the mind itself cannot be defined or accepted as their cause creator.

Carl Ginet is a representative of this deterministic approach, and in his view, every action begins with a simple event or a simple mental act – plan, choice, intent, belief, desire, and so on. These simple mental states explain, but are not the cause of an action. The simple act of acting has in itself an “active phenomenal quality” – which gives rise to the false idea that an agent himself provokes the action. According to Ginet, however, an agent simply performs an action, but does not provoke it, that is, he is only its executor, but not its creator²¹.

After we have finished examining the non-causal index theory as the last representative of the non-deterministic theories, let us look back at the deterministic ones, so that we can get a comprehensive idea of the picture that the two theoretical strands of free will paint.

¹⁹ **Modest** Libertarianism. In: *The Information Philosopher* [online]. [Viewed 25.08.2017]. Available from: http://www.informationphilosopher.com/freedom/modest_libertarianism.html

²⁰ **Agent-Causality**. In: *The Information Philosopher* [online]. [Viewed 25.08.2017]. Available from: <http://www.informationphilosopher.com/freedom/agent-causality.html>

²¹ **Free Will v. Determinism** [online]. [Viewed 25.08.2017]. Available from: <http://utminers.utep.edu/acvillalobos2/>

Determinism

Impossibilism

The first type of determinism that we will consider is the so-called “Impossibilism”. Its main representative is Gaëln Strawson.

He, like all other supporters of this idea, thinks that the idea of free will is absolutely impossible. Strawson says that all that we do depends not on having a free choice whether to do it or not, but on what kind of people we are actually. For example, if a person is often angry with others, we can say that his temper is the reason for that, while if someone is kind and polite in most situations, we can assume that this is because of his “good heart”. Everything we do is a result of what we represent as humans. But where does this lead us? If we are responsible for what we are now, we should also be responsible for what we have been in our past. This is because our momentary image must be a product of something that has already happened. Going that way, we find that we have to be responsible for our essence at every stage of our lives, reaching our early childhood. Naturally, this sounds illogical now, because how can a child be responsible for what it is? In the process of growing a child is exposed to the influence of his/her parents, teachers, friends, environment and all this shapes a child’s essence, even without taking into account the genetic predisposition, that is, it is completely free of responsibility for his/her personality. This, according to Strawson, is a sufficient argument to believe that if we were not able to be responsible for what we were in the past, then by the same logic we could not be responsible for what we are now. He thinks that what we are now is just a product of what we have been before and nothing more²².

Illusionism

Illusionism in the face of its main supporter, Saul Smilansky, proposes the idea that free will does not exist in the traditional sense of that word, but it would be very bad and dangerous to society if it is understood.

Examples such as: a paratrooper who wonders whether to fulfill his duty in a military service, a worker who has a dilemma whether to reproach a colleague, suggests that if every person accepts the lack of free will, we would all be guided by the argument “Whatever we do, we cannot be blamed for it” which in turn will take away the need for morality in society. He identifies this as particularly dangerous and thinks that the more people accept the notion of free will, the more difficult it will be to maintain social responsibility among individuals. Determinism does not just take away the guilt, but it also takes away the idea of the “price” that is needed to pay whatever an individual is doing. Returning to the paratrooper, we see a man who risks his life for the benefit of his nation, but is this gesture valued? If we are determinists, rather not. Everything would be impaired and neglected as an effort. Heroes would seem less inspiring, and our achievements would seem less and less remarkable. “This would lead to decline and despair”, Smilansky says. That is why he defends the idea of illusionism in which free will is precisely an illusion but a

²² Michaud, N., ed. *Frankenstein and Philosophy: The Shocking Truth* [online]. Chicago: Open court, 2013, p. 97. [Viewed 25.08.2017]. Available from: https://books.google.bg/books?id=59UBAWAAQBAJ&redir_esc=y

necessary illusion, an illusion that protects society. According to him, the idea of determinism must be “hidden somewhere” because there is something drastic and even terrible in its views and arguments. It is for the good of society, even if it is logical and plausible, Smilansky believes that it is better to choose the good over truth²³.

Hard determinism

When we climb up the ladder of deterministic theories, we inevitably get to their strongest version – hard determinism contends that social, external forces control the whole behaviour of a person. It is not possible for the individual to implement any decision of his own, without it being dictated by any external factors. The following two statements will describe this position:

1. No action that occurs is accidental and therefore free.
2. For each X event there is a pre-existing reason that provides the emergence of X in accordance with objective, mechanical causal laws.
3. The conclusion is clear: no decision or action is free.

The acceptance of hard determinism as a theory of true value leads to several conclusions through which we will get an even clearer idea of its essence:

1. There is no freedom in the sense of moral responsibility.
2. There is no point in punishing or blaming those who do “wrong” things because they cannot do anything other than their actual behaviour. In this train of thought, there is no point in making moral judgments about people and there is no problem if people differ in their actions. If a person decides to change something, he does it simply because it is pre-determined for him. The same goes for not changing one’s actions. In both cases a person cannot be judged for that.

3. The term “sin” is unsubstantiated by condition. And if “sin” is unsubstantiated, then the fundamental doctrines of Christianity are meaningless.

People cannot be considered “special” or “higher” than other animal species or physical objects. Therefore, the interests of people should not automatically be considered as interests superior to those of other living creatures²⁴.

Consequently, hard determinism has a very radical position on things. A person is an absolute prisoner of his destiny and as a subject of fate, and he has no right to be judged for his deeds. The theory may sound suppressive to one, but another would consider it “relieving” because of the said absolution of any blame. In any case, the purpose of our work is not to give concrete assessment of the theory, but to look at the general picture of ideas that are somehow associated with the notion of free will.

So far, we have outlined one side of determinism – the “harder” one and now we could turn our attention to the one which we would more generally describe as “more moderate” determinism.

²³ **Cave**, S. There’s No Such Thing as Free Will But we’re better off believing in it anyway. In: *The Atlantic* [online]. June 2016 Issue. [Viewed 25.08.2017]. Available from: <https://www.theatlantic.com/magazine/archive/2016/06/theres-no-such-thing-as-free-will/480750/>

²⁴ **Abbreviated** Determinism. In: *Course Hero* [online]. [Viewed 25.08.2017]. Available from: <https://www.coursehero.com/file/21266624/Abbreviated-Determinismdoc/>

Moderate determinism or compatibilism

Moderate determinism is the idea that determinism and free will are compatible. The term was introduced by the American philosopher William James in his essay “The Determinism Dilemma”. Moderate determinism supports two basic assumptions.

1. Determinism is available. Every human action is triggered by something else. If one chooses vanilla ice cream instead of chocolate, then he has made this choice, given his incapability of any other one. His decision is determined by his own personality. We can even accept the idea that a person with sufficient knowledge of another individual, taking into account the circumstances of his life and his individual condition, can predict what his choice would be in any situation.

2. A person could act freely when he is unconstrained. If his legs are tied, he would not be free to escape. If he handed over his wallet, threatened by a thief with a pistol pointed at his head – he could not once again be determined to be free in making his decisions.

What is meant by these examples is that a person acts freely only when acting according to one’s own desires without being forced by different circumstances.

Moderate determinism is in contrast with hard determinism. While hard determinism denies the existence of free will in general, here we have a clear regulation of the conditions in which it is possible. On the other hand, however, moderate determinism, despite being moderate, remains deterministic, and here a certain problem appears because it is an ideology that is a supporter of determinism, which states that we have free will. So how can our actions be accepted to be both intentional and free?

The answer stems from the idea that the notion of free will should be understood in the right way. Freedom of will is something different from freedom of action. We are free when we act against what we want to do, but we will always remain determined in our essence – whether because of our upbringing, social-cultural affiliation, genetic predisposition or other similar factors.

This type of determinism denies the idea that free will can be placed on a kind of metaphysical axis as if were able to “create” events that are not predetermined. On the contrary, moderate determinism asserts the principles of determinism, nevertheless, it states that if a person is in a situation in which he acts according to his own desires and incentives, he acts according to his free will. Consciousness is a must, which also determines the need for social responsibility²⁵.

Scientific experiments proving the lack of free will

Libet’s Experiment

In 1983, the psychologist Benjamin Libet conducted a very interesting neurobiological experiment to show the illusory nature of the idea of free will. The main components of this experiment were three: a situation requiring choice, a clock, and computer techniques to account for and analyze brain activity.

²⁵ Westacott, E. Soft Determinism Explained: Trying to reconcile free will and determinism. In: *ThoughtCo*. [online]. Updated March 18, 2017. [Viewed 25.08.2017]. Available from: <https://www.thoughtco.com/what-is-soft-determinism-2670666>

Several volunteers were gathered for this purpose. Motion sensors were placed on their hands and they were instructed to move the wrist of their left or right hand at any point in time that resulted not from a planned action but from a spontaneous decision. In addition to these sensors, electrodes were attached to the back of their heads, where the cerebral cortex that is responsible for motor functions is. Their function was to reflect the moment when the designated subject was ready to perform the movement of their hand – the so-called readiness potential.

Each of the participants was given a clock to accurately determine the moment they decide to move their hand.

For years now, neurobiologists have been aware that the above-mentioned readiness potential happens before the moment of movement itself within a fraction of a second.

However, after the end of the experiment, something far more intriguing than this was made – not just the movement of their hands happened after the readiness potential but registration of their decision – too. This means that their conscious, subjective feeling that they make a decision to carry out their movement (action) happens at a time that is in terms of time takes place after the moment of the emergence of this readiness potential. It is as if the decision they think they have taken has already been taken by someone else or something else, and they have just registered it as theirs only afterwards.

This example is very useful because of its experimental scientific value and shows us that even the decisions that we think are taken entirely by us may be a product of something we are do not even aware of.

Here we can say that we should not exclude the possibility that this “thing” is some part of our subconsciousness that transmits information to our consciousness (the moment when we take into account a decision), but even so, the feeling that we do not control our own decisions still remains²⁶.

The Pig Latin Experiment

This experiment conducted in San Francisco by scientists at the University of California gives us another perspective of the theory that our perception of free will is in fact false.

Thirty-two students were gathered and “taught” the so-called “pig Latin”, whose idea is to take the last two letters of any word and replace them with their prefix, while the letters “a” and “y” are placed at the end of the word. Example – “car” becomes “arcay” while “star” – “arstay”. After a huge number of words translated in this way, students were asked to stop “thinking like pigs”. They were shown a set of different words with correct spelling and they were asked to translate them in the same way they see them (in the correct spelling). In case one of them starts writing the “piggy” word model, he was obliged to report this by pressing a key on the keyboard. The result was that 43% of all words were written in “pig Latin”. This happened despite the conscious efforts of the participants to deal with the prerequisite for proper word spelling.

²⁶ **Stafford, S.** Why do we intuitively believe we have free will? In: *BBC Future* [online] 7 August 2015 [Viewed 25.08.2017]. Available from: <http://www.bbc.com/future/story/20150806-why-your-intuitions-about-the-brain-are-wrong>

The conclusion that scientists have made is that our consciousness, as we know it, is rather a data receiver than a creator of information, that is, the feeling that we control what we are doing through our own mind turns out to be wrong in almost half of the cases. Clearly, as in the previous experiment, there appears to be a “hidden source” which “relays” solutions to our consciousness which we simply carry out in practice, thinking that they are the product of our own initiative²⁷.

These experiments sound really confirmatory and categorical, but the question of whether the subconscious is what “issues the commandments” or it is another element that we have not found yet remains, an element which is external to us and is not part of our own personality. After all, when we have revealed much of the available theories about whether or not there is a free will, we come to the conclusion that, as in the first concept discussed here – personal identity, we cannot define a clear, definite and secure position on whether we have (and to what extent) the freedom to decide and act freely.

Why is it important to believe that we have free will?

After examining the existence of free will, things seem more like having to reconsider this belief. Determinists of all kinds argue, and not without reason, that everything we think we do, even the things we think that we think, is a dictated decision and action. When we look at things in a rational, impartial way it sounds as if we have to accept the idea that we have no freedom to choose.

“Self-agency” is a concept related to the ability to make decisions – to be effective, to influence your own life and to accept responsibility for what you do. The sense of self-agency is fundamental to the sense that we control our lives, the belief in our capacity to influence our own thoughts and behaviours. To have the belief that we have the ability to make right and wise decisions in everyday situations. This feeling is especially important for us to feel ourselves as individuals who have psychic stability – to be tough or flexible in meeting what life brings – joys, misfortunes, conflicts or changes²⁸.

Being agents of ourselves entitles us to enjoying ourselves, to suffering or to being indifferent to what is happening. Authentic agency, if it can be called like this, must be accepted both as a public and as a personally fundamental basis which is very important because, through it, we are able to feel responsible for our actions on the one hand and on the other – only through such a form of perception can we identify ourselves as subjects who are aware of the correctness of their own existence. Responsibility to ourselves can only take place when we realize that the life we feel is lived precisely by us and not by some fictions of existence related to us as to available objects.

²⁷ *Свобода воли отсутствует — доказано поросычей латынью* [online] 18.04.2016 [Viewed 25.08.2017]. Available from: <http://tomsk-room.ru/svoboda-voli-otsutstvuet-dokazano-porosyachej-latynyu-40286>

²⁸ **Lamia**, M. Your Sense of Agency: Are You In Control of Your Life? What do you bring to your relationship? In: *Psychology today* [online]. Posted Sep 24, 2010. [Viewed 25.08.2017]. Available from: <https://www.psychologytoday.com/blog/the-white-knight-syndrome/201009/your-sense-agency-are-you-in-control-your-life>

It is thus appropriate to accept the theory of distinguishing free will as consisting of two separate elements – an absolute and a practical one.

Free will is expressed in the idea that we are capable of creating the reality we live in, there is nothing that can oppose us or change our decisions. Nothing but ourselves. The absolute nature of this type of ideology, can not only cause us to go mad, but it would also prevent us from being religious in any way, assuming we are nature-making. In a sense, this absoluteness would have a restrictive effect on ourselves rather than make us feel more secure or more identical, more autonomous.

On the other hand, thinking about practical will, we can see that it is capable of preventing all these possible negatives. It can be accepted as an “adequate form” of believing that we make our own decisions. It is precisely what we described earlier in the text – responsibility, stability and ability to deal with the present. The essence of practical free will is expressed in the idea that even if we are genetically predisposed to certain decisions, actions, ways of thinking, even if we are “educated” in a socio-cultural model that society and time impose, even if our parents have instilled certain values and world views in us or some metaphysics constantly controls our thoughts and decisions, the question “And now what?” remains. We must clearly distinguish between taking into account something and accepting it. Knowledge and awareness of the possibilities of our existence are rightly defended by the dissident, because it is important to have a “broad point of view”. This breadth of perception will not only give us more knowledge, but I think we will be given even more morality. We may be sufficiently informed and aware that we are probably not free, but we are still sufficiently informed and aware that we are aware of the importance of being socially and personally responsible. The idea of having free will in each of us gives us the right and the opportunity to be such.

Influence of brain implants on (practical) free will

After all the above theorization about “what the matter is with” free will, maybe it is time to turn our attention to what is really important. Not only for our work, but also for the world as we see it every day. As we have established the theories of how it could be felt or how it could not, free will is an infinite sea of philosophical discussions which will, unfortunately, always remain mutually contradictory, without the opportunity of empirical-and-pragmatic categorization.

Now, having the opportunity to look at something that is a technological fact at the present time, it is good to reduce the wealth of impressions we have gained so far on “what free will is” to the question of “how it is influenced by the development of brain implants” and “why they are at all necessary”.

Perhaps the best way to study free will is through neurological and psychiatric illnesses that result from dysfunction of the structure and movement of the regulatory neuronal connections, cognition and moods. Patients with Parkinson’s disease experience uncontrollable tremor or hardening of their limbs, leading to their disability.

Others, such as those with obsessive-compulsive disorders, experience disturbing intrusive thoughts and become victims of constant behavioral rituals that seem impossible to stop.

Major depressive states often suppress motivation and destroy any enjoyment. Damage to regions of the brain that regulate memory or other mental functions can

limit the sense of any enjoyment of life or limit or destroy the ability to reproduce memories or projections of the future (plans and dreams).

Other brain traumas limit free will (as we imagine) because of extensive paralysis and inability to communicate. If we accept free will as the ability to plan and act without mental or physical compulsions and constraints, then these brain diseases represent a spectrum in which free will ranges from mild to severe conditions. With the restoration from the damage, free will can be restored too. And when it comes to new technologies, some of the solutions that help in this process have already been invented and others are getting closer to being ready for use.

Solution

Neural prostheses are brain implants that have the ability to alter or circumvent damaged areas of non-functional neuronal connections. These devices could restore the lost control over patients' minds and bodies, and hence allow them to regain their free will.

Deep brain stimulation (DBS) is the most commonly used brain-prosthetic technique which is something like a brain pacemaker. In "DBS" electrodes are implanted into non-functional neural connections connected through a wireless network to a power impulse generator located below the clavicle. The activity of the electrodes stimulates different brain regions thus altering the inactive damaged zones and restoring normal brain functions. DBS acts both as a probe and as a modulator of the neural connections.

Application

Many patients suffering from Parkinson's with tremors or stiffness of the limbs report a recovery of their motor functions immediately after switching on a similar type of electrode.

A study conducted in Toronto in 2008 shows that DBS helped nearly 60% of the patients with depression who had not felt better with the help of any other treatment methods. They say that pain, fear, anxiety and depression are completely gone, and they are able to feel happiness again, to work and find their individuality again.

DBS also deals with the reduction of compulsive thoughts of patients with obsessive-compulsive disorder, allowing them to regain the ability to independently control their thoughts and behaviours. Something that is virtually impossible for them because of the disorders that are the cause of the disease and its symptoms.

DBS has also successfully intervened in one of the most destructive diseases that violate free will – Alzheimer's disease. Researchers used the technique in early-stage patients, stimulating the fornix, which is connected to the hippocampus, helping to regulate the process of memory formation and preservation. They found that after 12 months of prolonged stimulation of the fornix they managed to increase glucose metabolism, a key indicator of neuronal activity in the brain. Patients who, after such intervention as early as 2008 and today, maintain the majority of their cognitive and motor functions.

DBS also helps patients with epilepsy. Their entorhinal cortex which is also associated with the hippocampus, is stimulated thus helping these patients to overcome their memory problems.

However, this method is not the only one. Most of the newest brain implants promise effective treatment, and hence return of free will to treated patients.

Such is, for example, the hippocampal prosthesis – HP.

When the hippocampus is damaged or removed by surgery or brain trauma, it can be replaced by an HP chip designed to function in the same way as the hippocampus implanted in its place. So far, it has been used only tested on animals, and the results of its activity are related to the opportunity of restoring the ability to memorize by accepting sensory information from the world and turning it into new memories. These memories can be stored and retrieved for planning or action in the present or the future. HP are expected to be ready for implantation in the human brain in the coming years.

Treating paralysis in patients with similar problems can restore free will through applying brain-computer interface – BCI, a technology that translates mental desire into action in the physical world. In its coarser application, BCI can help its user perform a planned action through his thoughts generated in the brain motor cortex, with electrodes attached to this skull area. They in turn send a signal to a computer that moves a mechanical device allowing body movement. The most sophisticated BCI models contain a microelectronic matrix that is implanted directly onto the motor cortex and the signals are sent to the computer via a radio or wifi signal, eliminating the need for any kind of wire. By turning desires into agency of a kind, free will is restored.

BCI combined with brain-imaging technology can restore free will, even in patients with a minimal level of consciousness or in those who are “locked” in their own bodies – a state in which brain-damaged patients who are conscious, are so severely violated that they cannot give any sign of it. Currently, such patients cannot in any way express an opinion whether they want to be artificially hydrated or be given oxygen, or undergo any other interventions that keep them alive. With new technologies, the activity in the brain regions controlling language and thought can be recorded and translated, giving them a chance to express an opinion whether they want to continue their lives.

Can neural prostheses improve the lives of people without brain damage or neuropsychiatric diseases? Can they increase self-control, determination or control impulsivity in healthy people? Interestingly, the answer to all these questions is positive. After stimulation of neurons in the prefrontal cortex, the brain’s executive center can increase the ability to make more deliberate decisions or limit excessive impulsivity in certain life situations²⁹.

The future seems to offer a perspective which will positively impact not only on people suffering from brain diseases but also on those who display certain emotional or character deficits.

Probably the topic will become more and more relevant as these technical devices progress, but what we can say at this stage of development is that brain implants provide invaluable help in the realization of this “practical free will”. Without

²⁹ Weintraub, P., ed. The free-will fix: New brain implants can restore autonomy to damaged minds, but can they settle the question of whether free will exists? In: *Aeon* [online]. 01 October, 2014. [Viewed 25.08.2017]. Available from: <https://aeon.co/essays/how-new-brain-implants-can-restore-and-enhance-free-will>

them, many illnesses would, to a different extent, prevent the sick from feeling and living fully, and hence from realizing their personality the way they want it.

Whether or not free will is in its absolute sense, brain implants give humanity what people actually need to feel that they “hold their fate” at least if not their personality “in their own hands”.

The discussion outlined above clearly shows trends that provoke the reader to adopt the idea of using brain implants as far more positive than negative.

However, it is good to look at the statistics related to public opinion we have at our disposal. In this case we have a sample of a poll conducted at the Sofia University “St. Kliment Ohridski”, Faculty of Philosophy.

The survey begins with the question whether the surveyed students believe the future development of civilization is related to the development of brain implants. The expressed opinion is divided equally between three aspects of the answer – “Yes”, “No”, “I do not know” (about 33%), which in turn demonstrates two possible scenarios – uneven public attitudes expressed through a strong personal opinion on the question or simply insufficient familiarity with the topic. Let us follow the rest of the answers to get a clearer picture of students’ attitudes.

The second question is: “Would you like to have a brain implant installed if you had solid evidence that it will improve your memory, intelligence, and concentration?”

The answers here highlight a categorical opinion, namely – over 70% say they are rejecting such a possibility by refusing to use brain implants. The rest of the answers are evenly divided between 15% for – “I have no opinion” or in favour of such use. This response discloses a clear attitude to implants, but where does such an attitude come from? It may be a matter of finding out the answer in subsequent inquiries.

The third question is related to the respondents’ position on whether they think such implants would be an instrument capable of curing people from mental or physical illnesses – depression, Parkinson’s, paralysis, etc. The answers are also hesitant (33% for “yes”, “no” and “I do not know”) again showing an insufficient level of trust in the essence of these implants. But is this mistrust related to doubts about their potential for efficacy, or is there another, deeper root?

The fourth question is a transition to the key to understanding the respondents’ opinion: “Do you think brain implants can affect people’s identity and will?”

The answers here are as follows – about 30% answers support the “No” option. Nearly 25% have responded with “I do not know”, while 45% state that brain implants would be able to influence human identity and motivation for decision-making – free will. With this answer to the question posed, an image of a certain concern about these implants begins to emerge, which is also a factor for the prevailing people’s attitude towards them.

The last, fifth, question is identical to the previous one, but it is put in a slightly different (stylistic) way: “Do you think brain implants are dangerous – can they be used as a means of controlling the individual?” Less than 15% declare there is no such danger, 20% state that they do not know, while over 65% define this idea as an absolutely real opportunity.

What conclusion can be drawn from this study

Assuming that this sample is an example of Bulgarians' attitude towards the use of brain implants, we can draw the following conclusions: society has no dominant position on the importance of brain implants in general. Most people have their own opinion which, however, is not based on clear arguments, and it is more like avoiding the "mystery of the unknown", rejecting the possibility of using such implants, even with possible beneficial consequences to their mental abilities. They are ashamed of confirmation that brain implants could be used to relieve an illness and see them rather as a threat to their own identity and free will. Despite this conclusion, this discrepancy between the value of the positive answers between questions 4 and 5 is odd, while these two questions in fact amount to the same thing. This rather shows that respondents are not completely aware and have no realistic idea of the possible advantages and disadvantages of using such implants than to maintain a clearly argued negative position against their use. In any case, this analysis is absolutely necessary in order to track the extent to which society is aware of the emerging brain implant technology.

In this paper, we have traced the essence of the theoretical and research achievements of human thought in terms of what personal identity and free will are and gained an insight of the importance of clearly defining and understanding brain implants. Drawing on clear evidence of the impact of these technical devices on human nature we seem to have been able to take the first steps towards building the socially beneficial image of brain implants.

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