



Digital World of Excess – Pedagogical Reflections on Students and Education Immersed in New Technologies

Katarzyna Borawska-Kalbarczyk 

CONTACT: Katarzyna Borawska-Kalbarczyk, Ph.D., Associate Professor, Faculty of Education Science, University of Białystok, Białystok, Poland, E-mail: borawska@uwb.edu.pl

Keywords:

digital technologies, mobile generation, information overload, information processing, media education

Abstract:

The article presents selected aspects of the process of cognitive functioning of the users of contemporary technologies and the Internet, with special consideration of the negative effects of being immersed in the digital culture. The introduction synthetically characterizes the digital world, focusing on the most active users of the virtual space. In the body of the text, the author analyzes the negative effects of an individual's functioning in the Internet space, especially those related to the change in the way of information acquisition and processing. The conclusions refer to implementing educational postulates connected with helping students develop the culture of behavior in the virtual space, involving as major elements the ability to distance oneself from digital media, to engage in deep reflection, and to organize and sort the acquired information. These skills are treated as crucial, ensuring the rational use of digital technologies. Focusing educational activities on the formation of youths' media competence offers them an opportunity of fuller intellectual development, the sense of security in the context of expansion of the media, and active participation in the information society by structuring the available information and the knowledge constructed on its basis.

1. Introduction: selected aspects of digitization of the world

Not so long ago, people used to live in similar conditions throughout their lifetimes. The world in which they grew up as children and then lived as adolescents and adults did not change much as regards culture or technology. We lived in an offline world, relatively calm and organized; we had time to cultivate tradition and uphold values. We did not often experience the pressure or loss of time. The external world offered few stimuli or options to choose from and did not require people to switch quickly from one activity to another. Thus, we did not have to use our attention resources more intensely. We would establish real, deep relationships with others and we did not glide over the surface of everyday events. The stationary, linear and organized offline world has been changed dramatically by information and communication technologies accompanying the development of the information society. Although this expression was introduced into scientific discourse by Tadao Umesao in 1963, changes towards the increasing engagement of the world in virtual reality accelerated in the 1990s and in the early 21st century. Referring to the sentence *'Tempora mutantur nos et mutamur in illis'*, uttered by Lothair I, we can clearly see that the changes in the world around us inevitably change the way we function. This tendency is a natural consequence of development of civilization and society, but it seems we have never experienced it with such clarity and in so many negative aspects. According to Ray Kurzweil, an American scholar, author and futurologist, the nature of growth is exponential rather than linear: it develops slowly and imperceptibly in the beginning, but upon gliding through the knee of the curve, events suddenly erupt and induce deep changes. He argues that although today we are aware of constant technological advancement and the resultant negative effects, the future will be much more surprising than most



people think, because only few have really understood the importance of the fact that changes are accelerating (Kurzweil, 2013, p. 25-26). Hartmut Rosa uses the term “vicious circle of acceleration” to refer to the cultural consequences of technological changes. He claims: “technological inventions intensify social change, and the high level of social changes makes us feel that we need to be more and more busy just to retain our place in the world, so they accelerate the pace of life. However, when we feel that we are running short of time (treated as a resource), we demand technological acceleration so as to regain the resources we have lost: we want the train to run faster, the computer to operate quicker, etc.” (Kaczmarczyk, 2010, p. 243). This, unfortunately, prevents us from getting out of the vicious circle of acceleration. Apart from the fragmentation of life, haste and the worship of the present, another category permeating the contemporary culture is excess, surplus and overload (see Crary, 2015), especially in the sphere of information. Analyses by Tomasz Szlendak show that the problem of excess is particularly visible and perceptible in the field of culture (Szlendak, 2013, p. 16). The issue of excess actually affects all the areas of human existence, leading to the multiplicity of options and difficulty making choices, as well as impatience and new temporal requirements. We are living under the pressure of time and excess of – we may say – everything. The sense of overload of the reality generates the perception of excess, and the plethora of objects, meanings and opportunities forces us to select, which is difficult and not possible for everybody in all situations.

According to Zygmunt Bauman, the revolution in the human condition through information technology took place within one generation: from gigantic machines to thousands of gadgets, portable computers, finally so small that they can be held in one hand, accessible 24/7, for billions of owners and users of all ages, which may be carried in a pocket or a bag, but for most of the time are actually held in our hands (Bauman, Leoncini 2018, p. 77).

There is no doubt that currently, two separate worlds, the offline and online one, function beside each other, located on two opposite poles, constantly fighting for our residence. The online world is a natural place of functioning of so-called digital children and adolescents, having unlimited access to information online. They belong to the generation most actively using the textual, multimedia and Internet accomplishments of digitization of our life. People born after the year 2000 have been brought up in the age of common digital culture, which has dynamically entered the phase of mobility. Constantly connected to the global network, they do many aspects of their lives (communication, entertainment, education or passions) using mobile devices. The most obvious device connected with daily functioning is the smart phone, enabling instant connection with groups of friends and the world outside. An important function of a mobile device is to allow constant activity in social networks, hence the term “generation Z” used in social discourse to refer to the generation of digital natives (see McCrindle, Wolfinger 2011), emphasizing their strong attachment to the social media. Social media allow them to create enclaves of privacy, usually isolated from adults’ control, in which private groups of friends are formed, contacts with others are established, and many intimate aspects of their lives are shared with others.

The young people’s immersion in the virtual space results in a change in the way of information acquisition and processing. According to Maggie Jackson this generation is particularly susceptible to the processes of distraction as a negative consequence of dominance of new technologies. She points out that: “amid the glittering promise of our new technologies and the wondrous potential of our scientific gains, we are nurturing a culture of social diffusion, intellectual fragmentation, sensory detachment. In this new world, something is missing. And that something is attention” (Jackson 2008, p. 13).

The digitization of the society has contributed to producing a specific world, which on the one hand offers us the opportunity to creatively use digital tools, but on the other hand promotes dangers and threats affecting cognitive processes of the users of new forms of digital media.

The aim of the article is to characterize the process of cognitive functioning of teenage digital natives and identify the negative effects of being immersed in digital culture. The conclusions refer to implementing educational postulates connected with helping students develop the culture of behavior in the virtual space, including the ability to distance oneself from digital media, to engage in deep reflection, and to organize and sort the acquired information. These skills seem to be considerably hampered as a result of intense, often uncontrolled use of the virtual space. I regard these skills as crucial, ensuring the rational use of digital technologies.



2. The digital world of excess

It is assumed that information is an important resource of the contemporary society, so its value is acknowledged and it is treated as equal to valuable material resources in industrial societies. Skills connected with acquiring and processing information have measurable effects for the development of an individual. Information is considered as a strong force modifying individuals' functioning. It is treated as a vital factor of creativity and innovation, the basic component of building human knowledge and an instrument used in the learning process, which enables individuals to achieve better results in different areas of their activity. Despite the obvious multiple benefits of functioning in the world of information, we must not concentrate only on the positive aspects of its use. Contemporary adolescents' functioning in the environment of digital information, especially excessive information, has many psychological consequences and causes various cognitive difficulties. Nowadays, the world is full of information created by humans through various media, and its negative consequence is the surplus and ubiquity of information. Every day, we are exposed to false, valueless, incomplete or simply unnecessary information. As Magdalena Szpunar rightly puts it, "information abundance, treated as an inherent characteristic of information society, paradoxically is not our blessing but a curse, because we do not know how to use this abundance effectively and how to cope with the excess of content competing for our attention" (Szpunar 2017, p. 71).

Every day, we devote a portion of our time for online activity. For some, it may be a few minutes, while others spend many hours in the virtual space. As shown by data from the report "Polska jest mobi.2018", 48% Poles declare they use mobile devices more than 2 hours a day. The average time spent using them is 2.3 hours, i.e., more than in the previous year (1.8 hours). The findings of another report, "We are social 2018" (online document: We are social 2018. Global Digital Report) show that there are 14 million Polish users of social media on mobile devices (an increase by 17% within one year). The number of those who use the Internet via mobile devices has exceeded the number of those who surf the Internet using laptop or desktop computers (over 60% vs 40%). The report presents data showing that Poles spend 5.5 hours online on a daily basis, including almost 2 hours (1 h 42 min.) on social networking sites. The platform most frequently visited by Polish users is YouTube, followed by Facebook (64%). The third place in the ranking is taken by Messenger (41%), the fifth by Instagram (24%), and the eighth by Twitter (18%).

We are witnessing the digitization of our life. We live in the form of data: tweets on Twitter, posts on forums and Facebook, photos on Instagram, search engine results, favorite sites and play lists on YouTube. The Internet is getting fat from Big Data and becoming a digital diary of the life of a human, who is a tiny part of the global digital library. According to Piotr Prajsner from CEO Cloud Technologies, the Internet currently has approx. 2 zettabytes of data, which, converted into weight, means between 2 and 4 kilograms. In 2011, it was approximately 50 grams. We send so much data that it is very difficult to count it. Scholars estimate it at petabytes each hour (Prajsner, online document). The volume of Big Data on the Internet is constantly growing, on average by 40%. The estimates presented by Oracle are huge: by 2020, the Internet will weigh over 45 zettabytes of data, i.e., 44 times more than in 2009 (Prajsner, online document).

The growing popularity of social networking sites and applications, as well as the amount of content we generate, are both impressive and disquieting. Analyzing the flow of the huge stream of data and information within just 60 seconds, we find out that it is truly a ruthless and constant fight for our attention and engagement. For example, in one minute, 973 thousand users log in to Facebook, 25 thousand GIFs are sent via Messenger, and Instagram is scrolled 174 thousand times. Within the same time, 2.4 million Snaps, more than 1.1 million Tinder swipes and 4.3 million video views on YouTube are recorded. In addition, 281 thousand tweets are sent on Twitter. We send 187 million emails and 38 million WhatsApp messages. We also download 375 thousand applications from Google Play or App Store. Internet users spend over 862 thousand dollars on online purchases. Those who use Netflix watch up to over 266 hours of material, and fans of Twitch view it over 936 thousand times (Kuchta, online document).

3. Attention deficit in the digital world

The impressive numbers mentioned above look dreadful but also help us realize that nowadays, we cannot live without the circulation of information and the technology behind it. The appearance and development



of the Internet caused the production of a great amount of chaotic, non-reviewed and non-selected data. The rapid increase in the amount of data, access to it, the ease of storage and the high speed of information transmission cause various psychological problems. The main source of these problems is the considerable difference between the great amount of constantly produced and speedily transmitted information and the limited capabilities of the human brain. According to Herbert Simon, “a wealth of information creates a poverty of attention and a need to allocate that attention efficiently among the overabundance of information sources that might consume it” (Simon 1971, pp. 40-41). Dangers connected with the seemingly obvious dominance of information in contemporary social structures were noticed by Neil Postman, who stated: “the genie that came out of the bottle proclaiming that information was the new god of culture was a deceiver. It solved the problem of information scarcity, the disadvantages of which were obvious. But it gave no warning about the dangers of information glut, the disadvantages of which were not seen so clearly” (Postman 1993, p. 60).

The simplified and digitized way of producing, storing and distributing information as well as improved access to its many sources or speed of data transmission result in specific psychological consequences affecting an individual as a potential recipient of information. The consequences can be discussed with regard to the amount of produced information: then, we speak of infoglut or information smog (see i.a., Tadeusiewicz 2002; Goban-Klas 2008) or to our mental limitations: then, we speak of information anxiety or data overload (see Ledzińska 2009; Gleick 2012; Shenk 1997). We cannot but agree with the conclusion by Kazimierz Krzysztofek, who observes that “we are sinking in the junkyard of data, information waste, with which we do not know what to do. In effect, as individuals, organizations, states and societies, we are getting more and more cluttered. At a certain point, we no longer deal with excess, which can be somehow measured, but with immensity that cannot be measured in any way. At that point, negative feedback occurs, just like in a thermostat: if we exceed the capabilities of perception and analysis, we escape from that excess – so the more data, the less we are able to analyze it” (Krzysztofek 2013, p. 23).

When surfing the net, contemporary adolescents as a group living in the digital world apart from the real one are prone to a significant problem of information selection and the assessment of its credibility. They may often feel lost in the complex, digital maze of contradictory opinions, facts and fake news, and a mixture of reliable and unreliable sources. It is visible that contemporary young Internet users, having access to more and more information, only “glide over the surface” of its resources, which results in shallow understanding and wrong use of the acquired knowledge. This way of using Internet resources is pointed out by Polish media scholar Tomasz Goban-Klas (2002, p. 43), who defines surfing as a form of low information activity. He contrasts it with browsing, considering that form of using the Internet as more cognitively demanding, and thus, more difficult. Janusz Morbitzer defines the surface character of searching online resources with two terms: googlism and googlification of the mind (Morbitzer 2011). Both are strongly connected with cognitive limitations of unreflective Internet users. According to the author, “googlism is a view that the Google search engine is the definition of the reality, and the number of search results is the measure of reliability” (Morbitzer 2011, p. 30). The other term, googlification of the mind, is “unreflective and frequent use of the copy-paste method in many situations, particularly in school education” (Krawczyk 2007). An obvious and disquieting consequence of the inability to navigate in the excess of information is the problem with transforming the acquired information into useful knowledge.

The virtual world of text modifies human thinking and gives it a different direction, which has an impact on the reception of traditional sources of information (Ong 2011). As pointed out by Nicholas Carr, “the shift from paper to screen doesn’t just change the way we navigate a piece of writing. It also influences the degree of attention we devote to it and the depth of our immersion in it” (Carr 2013, p. 90). The fact that the Internet has absorbed the traditional medium, i.e., printed text, has led to the elimination of its physical form, mainly due to the specificity of hyperlinks. On the one hand, they are important tools building the complex structure of the Internet, but considering the effects of their use from the cognitive perspective, we need to point out that their value as navigation tools is closely related to the dispersion of attention of the readers of digital content. Hyperlinks give us the opportunity to alternately use various texts online and quickly move from one to another, which means that the reader’s attachment to text becomes loose and casual. We do not feel the need to focus on a single fragment of the text; the Internet offers us the opportunity to focus attention just for a moment and postpone deep analysis for later / some other time / never. Maria Kozielska rightly observes that “evaluating hyper links and finding the routes between them are mental tasks which are not part of actual



reading” (Kozielska 2019, p. 134). This process increases cognitive load, weakening the mind’s ability to interpret the text properly.

With reference to the above, online readers of hyper text often fall into the trap of unreflectively clicking more and more sites, which has been proved in experimental research on the quality of memorizing the content from different sources, i.e., electronic and paper ones. The group reading traditional documents had better results, which leads to the conclusion that hyper text creates a higher cognitive load for the reader. “People who read linear text comprehend more, remember more, and learn more than those who read text peppered with links” (Carr 2013, p. 127). The process of reading on the Internet is compared to gliding, barely touching the surface, without the possibility to tell valuable things from rubbish, which has a highly negative impact on the verticality of our reception, the transformation of information, and generally, thinking. The mental process affected by the hyper media structure “has taken on a ‘staccato’ quality”, i.e., deep immersion in reading has been replaced with quickly scanning short paragraphs (Carr, 2013, p. 7).

Another negative phenomenon connected with the structure of the Internet is the fragmentation of content, resulting from the possibility of searching for texts online. In the analyses by Nicholas Carr, search engines direct our attention to specific fragments of a longer text, not encouraging us to read the whole of it. The growing process of fragmentation of content additionally deepens the process of dispersing the online readers’ attention. Nowadays, the patchwork character of content published on the Internet can be found in the trends of designing the graphic outline of printed magazines, which look more and more like websites. Articles are short, presented in boxes and highlighted with color; they have brief summaries and attractive graphics, and are divided into smaller chunks. “We don’t see the forest when we search the Web. We don’t even see the trees. We see twigs and leaves” (Carr 2013, p. 91).

Another characteristic feature of young people from the discussed generation is their media multitasking. It is often said that doing many complex activities related to perception and being immersed in digital multimedia at the same time is an inherent characteristic of this generation, and ongoing contact with modern media makes their brains used to constant shifting of attention from one task to another. This approach to multitasking may suggest that a multitasker experiences more mental benefits than losses. However, scholars point to reduced efficiency resulting from multitasking, higher risk of making mistakes, the lack of mindfulness and the inability to concentrate on a task in 100%. In addition, they mention fatigue, reduced energy and distraction caused by the influence of many digital stimuli at the same time (see Spitzer 2013; 2016; Small, Vorgan 2011; Richtel 2012).

Multitasking developed under the strong influence of digital technologies has negative consequences analyzed at the neurobiological level. Digital media reduce the depth of processing, which can be briefly summarized as follows: “the more superficially we approach some content, the fewer synapses in our brain are stimulated, so the less we learn” (Spitzer 2013, p. 6).

Overloading human nervous system in the form of shifting attention from one activity to another is not very effective. Multitasking may double the time necessary to carry out two activities in comparison to doing them separately (Small, Vorgan 2008). Research results have proved that in the situation of shifting brain activity from one task to another, neural circuits take short breaks between activities, which takes time, reducing human efficiency (Small, Vorgan 2008). The cognitive style displayed by the young generation can be called hectic: digital technologies combined with living in the age of hyper culture motivate them to demand everything immediately, and the depth and subtlety of thinking is replaced by instantaneous and superficial review of facts. Because the brain cannot cope with the constant influx of information, experiments have showed that people who are deeply engaged in the process of multitasking lost to people who were not so much involved in simultaneous mental processes (Ulanowski 2011). It has been proved that “the brain takes time to change goals, remember the rules needed for the new task, and block out cognitive interference from the previous, still-vivid activity”, so the cost of switching is high (see Jackson 2008, cited in: Carr 2013, p. 133).

Scholars from Stanford University have found that media multitaskers pay a high mental price. In the course of multi-stage experiments involving high and low multitaskers, psychologists from Stanford – Eyal Ophir and Anthony Wagner – found that the latter did much better at tests. “When they’re in situations where there are multiple sources of information coming from the external world or emerging out of memory, they’re not able to filter out what’s not relevant to their current goal” (Gorlick 2009). The failure in filtering information was a sign of slowing down their cognitive processes by unimportant information coming from



the outside. The researchers found out that high multitaskers could not ignore the information reaching their perception or sort it in their minds (Gorlick 2009).

Therefore, it seems that glorifying multitasking as a pro-development consequence of media use is a myth. According to Paul Kirschner from the Open University of the Netherlands and Pedro de Bruyckere from Ghent University in Belgium, students' problem with paying attention at school and the low interest in or even inability to follow the course of the lesson are more the result of constantly switching from one application to another, from one device to another, and inability to ignore the unwanted stimuli (Postoła 2019).

In the context of discussion on the superficiality of the process of acquiring information, we discover that in the pursuit of information, "slower may mean better. Carefully examining bookshelves in old-fashioned libraries has its advantages. Reading an old book or even leafing through it offers specific emotional support which is never a result of searching through online databases. Patience is an asset, and information gluttony may be a vice" (Gleick 2012, p. 374). In the face of difficulty navigating in information overflow and the accumulating problems with mentally processing it, the term of xerox culture used by Umberto Eco seems interesting: "the neurosis of photo copy is often also an intellectual alibi, because the person who leaves the library with a bundle of photo copies usually knows for sure that he will never be able to read them all, or even find them, if they are already in a mess, but at the same time, he has the feeling that has the control of the content of the books" (Eco 2007, p. 28).

Easier access to information on the Internet gives the youths an illusive belief that they remember more if they can return to the searched content at any time. Analyses show that if we treat the Internet as external resources of our memory, in the long run we lose the ability to store information in our own brains. The emergence of the Internet reduced the need to remember information important for the individual, which Daniel Wegner refers to as the Google effect (Sparrow, Liu, Wegner 2011). Hence the conclusion that the more often we use Google, the less probable it is that we will keep in memory what we see.

4. Tasks for education in the digital culture

From the very birth, children and adolescents grow up in a world of digital devices and applications, which make their home environment, school reality and culture. In the view of researchers studying the phenomenon of digital culture, new technologies are "flexibly integrated into our life, which is rapidly getting more and more mobile, affecting entertainment, education, work, hobby, sports, organization of daily routine, health monitoring, sleep, and the multiplicity of places and spaces. The activity of those devices is most properly referred to as 'stand-by', but the fact is that they stand by us" (Bougsiaa, Cackowska, Kopciewicz, Nowicki 2016, pp. 533-534). What may be disturbing is the fact that the process of using digital technology by children and adolescents is often superficial, or even primitive, especially with regard to the use of information, as indicated above. However, digital technologies should not be perceived exclusively from the perspective of their destructive role in shaping the minds of the young generation. On condition of proper organization or arrangement, students' contact with modern information and communication technologies may result in increased opportunities of their intellectual development, stimulating cognitive activity and perception/motor development. Thus, it may become an important educational tool (see Pyżalski, Klichowski 2014).

The ubiquity of digital technologies in everyday life forces education to revise the previous didactic paradigms and prepare for significant changes in the process of education. The static presence of digital technologies in the lives of students and the educational process on the one hand opens significant opportunities of increased efficiency of didactic activities, but on the other hand – as I would like to stress – requires professional activities connected with the formation of proper media attitudes in the young generation.

Zbyszko Melosik identifies pedagogical activities based on increased intellectual activity of students without the distracting effects of media influence with the sphere called the "pedagogy of concentration, contemplation and organization ability, which according to the author may create the conditions to stop in time and space, giving the opportunity to distance oneself from the world of stimuli and go from clicking to linearity (...)" (Melosik 2018, p. 148). He also doubts whether "the contemporary teens are smarter, more creative and intelligent, have a richer identity and are happier than those from forty years ago" (Melosik 2018, p. 148). In the context of this view, the results of the research by a group of scholars led by Sue Bennett from the University of Wollongong, who decided to undermine the idea of digital natives, arguing that there may be as many



variations within the digital generation as between generations, are really interesting. The researchers warn that the idea of the new generation who learn in a different way may actually have an educational effect opposite to the intended one, because young people really do not have different kinds of brain which require new approaches to school and work (Bennett, Maton, Kervin 2008). Similar conclusions from general European research on youths' activity on the Internet, "EU Kids Online", are formulated by Jacek Pyżalski and colleagues, who point out it is a myth that young people are unusually competent in the digital area and can teach us how to use mobile devices in a creative and smart way. The results of the scholars' analyses stress clear deficits in critical reception and creation of content, because 90% participants could not creatively use technology and were only its passive recipients (Pyżalski, Zdrodowska, Tomczyk, Abramczuk 2019).

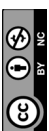
The most important for the development of the proper media attitudes in the digital culture is adults' support in the process of using new technologies, the Internet, and creating digital content. In this context, it is also important to take remedial actions preventing "school from avoiding the responsibility for the formation of competence connected with the mobile culture" (Kopciwicz 2016, p. 536). Dorota Klus-Stańska points to the inertia on the part of school, displaying the reconstruction clumsiness typical of cultural practices (Klus-Stańska 2018, p. 172). It is expressed i.a., in simplified educational use of media technologies, where the Internet is treated as a source of information approached in the traditional way and the teacher remains the main administrator and model of valuable knowledge (Klus-Stańska 2018, p. 172). As shown by Michał Klichowski's analyses, the process of using information and communication technologies in education is ineffective and very often connected with only partial use of their potential. He sees the reason for that among others in teachers' negative attitude to digital technologies, considering it as the product of their own, relatively low IT competence and strategies of using them superficially. In addition, in order to strengthen the justification for such didactic activities, teachers depreciate the educational value of ICT (Klichowski 2015, p. 86).

It is worth referring here to the theory of soft technological determinism by Paul Levinson, including the mutual influence of technology (media) which gives an opportunity, and people who act upon that opportunity (Levinson, 2006, p. 24). Understanding the essence of soft determinism sets an important educational task both for teachers and pedagogists and for each of us as active users of digital media. The way of using media space with the abundance of its applications and tools depends on the individual, whose activity, on the one hand, may lead to maximizing the benefits, but on the other hand, to abusing their potential in an uncontrolled, irrational and negative way.

The topic of overcoming difficulties resulting from intensive use of new digital technologies by children and adolescents should be included as a permanent element of education at all educational stages. An important role in forming the media habits of the young generation is played by well-thought out media education and culture, which should be implemented not only in educational institutions but also by significant adults from the children's and adolescents' closest environment. Focusing educational activities on the formation of youths' media competence offers them an opportunity of fuller intellectual development, the sense of security in the context of expansion of the media, and active participation in the information society by structuring the available information and the knowledge constructed on its basis. All the activities should aim at the development of students as critical and reflective recipients of media messages and responsible creators of digital content.

5. Conclusion

The social space we live in, filled with various increasingly complex technical devices, has caused a disturbing belief. We are close to believing that digital technologies surrounding the contemporary youths are an indispensable, even inseparable, element of their lives, without which their daily functioning may be incomplete or less valuable. Undoubtedly, we must renounce the thought that technology is effective in itself. As rightly pointed out by David Buckingham, "[t]here may indeed be great creative, educational and democratic potential here; but whether this potential is realized depends on how the technology is used, and on the social relationships that are constructed around it" (Buckingham, 2008, p. 168). Teachers' educational effort should focus on building the conditions of responsible and conscious use of modern digital tools, as well as on showing alternative values and meanings of the offline world as a parallel and still important space of life of a contemporary human.



REFERENCES

- Bauman, Z., Leoncini, M. (2018). *Płynne pokolenie*. Warszawa: Wydawnictwo Czarna Owca.
- Bennett, S. J., Maton, K. A., Kervin, L. K. (2008). The 'digital natives' debate: a critical review of the evidence. *British Journal of Educational Technology*, 39 (5), 775-786.
- Bougsiaa, H., Cackowska, M., Kopciwicz, L., Nowicki, T. (2016). *Smartfon i tablet w dziecięcych rękach*. Gdańsk: Katedra.
- Buckingham, D. (2008). *Nowe media, nowe postaci dzieciństwa?* In: M. J. Kehily (Ed.), *Wprowadzenie do badań nad dzieciństwem*. Kraków: Wydawnictwo WAM, 151-169.
- Carr, N. (2010). *The Shallows: What the Internet Is Doing to Our Brains*. New York: W. W. Norton & Company, Inc.
- Crary, J. (2013). *24/7: Late Capitalism and the Ends of Sleep*. Brooklyn, New York: Verso.
- Eco, U. (2007). *O bibliotece*. Warszawa: Świat Książki – Bertelsmann Media.
- Goban-Klas, T. (2002). *Surfowanie czy żeglowanie w cyberprzestrzeni, czyli o wychowaniu człowieka medialnego i mobilnego*, In: L. Haber (Ed.), *Polskie doświadczenia w kształtowaniu społeczeństwa informacyjnego: dylematy cywilizacyjno-kulturowe*. Kraków: Wydawnictwa AGH.
- Goban-Klas, T. (2008). *Rwący nurt informacji*. In: J. Morbitzer (Ed.), *Komputer w edukacji*. Kraków: Pracownia Technologii Nauczania Akademii Pedagogicznej im. KEN.
- Gorlick, A. (2009). *Media multitaskers pay mental price, Stanford study shows*. *Stanford Report*, Retrieved from: <https://news.stanford.edu/news/2009/august24/multitask-research-study-082409.html>
- Jackson, M. (2008). *Distracted: The Erosion of Attention and the Coming Dark Age*. Amherst, N.Y., Oxford: Prometheus Books.
- Kaczmarczyk, M. (2010). Głód czasu w kulturze przyspieszenia. Z Hartmutem Rosą rozmawiają Tomasz Szlendak i Michał Kaczmarczyk. *Studia Socjologiczne*, 4(199), 237-244.
- Kozielska, M. (2019). *Internet w aspekcie tworzenia wiedzy i pracy mózgu człowieka*. In: A. Karpińska, K. Borawska-Kalbarczyk, K. Kowalczyk (Eds.), *Innowacje w edukacji w perspektywie jakości kształcenia*. Toruń: Adam Marszałek.
- Klichowski, M. (2015). *Model TPACK. O potrzebie technopedagogicznego podejścia do wiedzy i kompetencji nauczycieli*. In: J. Pyżalski (Ed.), *Nauczyciel w ponowoczesnym świecie. Od założeń teoretycznych do rozwoju kompetencji*. Łódź: the Q studio.
- Klus-Stańska, D. (2018). *Paradygmaty dydaktyki. Myśleć teorii o praktyce*. Warszawa: PWN.
- Krawczyk, S. (2007). Problem plagiatowania w szkolnictwie wyższym. Charakterystyka elektronicznego systemu antyplagiatowego, *E-mentor*, 2, Retrieved from: <http://www.e-mentor.edu.pl/artukul/index/numer/19/id/412>
- Krzysztofek, K. (2013). *Nowe media totalne – intruz w naszych domach*. In: K. Pokorna-Ignatowicz, S. Jędrzejewski, J. Bierówka J. (Eds.), *Nowe media a praktyki komunikacyjne*. Kraków: Krakowskie Towarzystwo Edukacyjne Spółka z o. o. – Oficyna Wydawnicza AFM, 15-35.
- Kuchta, M. *Czy wiesz, co dzieje się w ciągu minuty w social media?* <https://socialpress.pl/2018/05/czy-wiesz-co-dzieje-sie-w-ciagu-minuty-w-social-media>.
- Kurzweil, R. (2013). *Nadchodzi osobliwość*. Warszawa: Wydawnictwo Kurhaus Publishing.
- Ledzińska, M. (2009). *Człowiek współczesny w obliczu stresu informacyjnego*. Warszawa: Wydawnictwo Instytutu Psychologii PAN.
- Levinson, P. (2006). *Miękkie ostrze. Naturalna historia i przyszłość rewolucji informacyjnej*. Warszawa: Muza.
- McCrindle, M., Wolfinger, E. (2011). *The ABC of XYZ. Understanding the Global Generations*, Sydney: University of New South Wales Press Ltd.
- Melosik, Z. (2018). *Młodzież, edukacja i przemiany kultury współczesnej: (re)konstrukcje kontroli, wolności i rozproszenia*. In B. Śliwerski, A. Rozmus (Eds.), *Alternatywy w edukacji*. Rzeszów – Kraków: Wydawnictwo Wyższej Szkoły Informatyki i Zarządzania z siedzibą w Rzeszowie, Oficyna Wydawnicza „Impuls”.
- Morbitzer, J. (2011). *O nowej interpretacji niektórych pojęć pedagogicznych w dobie technologii informacyjnych*, In: K. Denek, A. Kamińska, W. Kojas, P. Oleśniewicz (Eds.), *Edukacja Jutra w kontekście wyzwań współczesności*. Sosnowiec: Oficyna Wydawnicza Humanitas.
- Ong, W. J. (1982). *Orality and literacy: the technologizing of the word*, London; New York: Methuen.



- Postman, N. (1993). *Technopoly: The Surrender of Culture to Technology*. New York: Vintage Books.
- Postoła, A. (2019). Cyfrowi tubylcy nie istnieją! Większość młodych ludzi jest tylko biernymi odbiorcami mediów, *Gazeta Wyborcza*, 22 February.
- Prajsner, P. *Ile waży Internet?* Retrieved from: <https://newsrm.tv/ile-wazy-internet>
- Pyżalski, J., Klichowski, M. (2014). *Technologie informacyjno-komunikacyjne a dzieci w wieku przedszkolnym – model szans i zagrożeń*, In: J. Morbitzer, E. Musiał (Eds.), *Człowiek, media, edukacja*. Kraków: Katedra Technologii i Mediów Edukacyjnych, Uniwersytet Pedagogiczny im. KEN.
- Pyżalski, J., Zdrodowska, A., Tomczyk, Ł., Abramczuk K. (2019). *Polskie badanie EU Kids Online 2018*. Poznań: Wydawnictwo Naukowe UAM.
- Richtel, M. (2012). Pokolenie z inaczej rozwiniętymi mózгами. *Gazeta Wyborcza*, 24-26 December.
- Shenk, D. (1997). *Data Smog. Surviving the Information Glut*. New York: Harper Collins.
- Simon, H.A. (1971). *Designing Organizations for an Information-Rich World*. In: M. Greenberger, *Computers, Communication, and the Public Interest*, Baltimore: The Johns Hopkins Press.
- Small, G., Vorgan, G. (2008). *iBrain: Surviving the technological alteration of the modern mind*. New York: Collins Living.
- Sparrow, B., Liu, J., Wegner, D. M. (2011). Google Effects on Memory: Cognitive Consequences of Having Information at Our Fingertips, *Science*, 333, 776-778.
- Spitzer, M. (2013). *Cyfrowa demencja. W jaki sposób pozbawiamy rozumu siebie i swoje dzieci*. Słupsk: Dobra Literatura.
- Spitzer, M. (2016). *Cyberchoroby. Jak cyfrowe życie rujnuje nasze zdrowie*. Słupsk: Dobra Literatura.
- Szlendak, T. (2013). Kultura nadmiaru w czasach niedomiaru, *Kultura Współczesna*, 1, 7-26.
- Szpunar, M. (2017). *Imperializm kulturowy internetu*. Kraków: Wydawca: Instytut Dziennikarstwa, Mediów i Komunikacji Społecznej Uniwersytetu Jagiellońskiego.
- Tadeusiewicz, R (2002). *Społeczność Internetu*. Warszawa: Wydawnictwo Exit.
- Ulanowski, T. (2011). Czy nastolatki naprawdę „tracą rozum” na rzecz świata wirtualnego? *Gazeta Wyborcza*, 30 September.
- We are social 2018. Global digital Report*. Retrieved from: <https://digitalreport.wearesocial.com>