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Selected Determinants of the Digital Divide Among Seniors

Vybrané determinanty digitální propasti mezi seniory

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Abstract:

This theoretical-empirical study examines the level of the digital divide with a focus on seniors, based on data obtained from a survey of University of the Third Age (U3V) Hradec Králové (UHK) students. The results of the survey showed that while most of the participants have a high level of digital literacy, significant differences persist in advanced digital skills, especially in the use of social networks and other digital platforms. Social context is a strong predictor of internet and digital technology use, with help from family and friends being as important as course instruction. These findings point to the need for targeted training programs that develop advanced digital skills and take into account the specific needs of older adults.

Keywords:

Digital divide; seniors; determinants of the digital divide; internet access; university of the third age

Abstrakt:

Teoreticko-empirická studie zkoumá úroveň digitální propasti se zaměřením na seniory, přičemž se opírá o data získaná z výzkumné sondy mezi posluchači Univerzity třetího věku Univerzity Hradec Králové (U3V UHK). Výsledky šetření ukázaly, že zatímco většina účastníků vykazuje vysokou úroveň digitální gramotnosti, přetrvávají značné rozdíly v pokročilých digitálních dovednostech, zejména v oblasti využívání sociálních sítí a dalších digitálních platforem. Sociální kontext je silným prediktorem pro používání internetu a digitálních technologií, přičemž pomoc ze strany rodiny a přátel je stejně důležitá jako výuka v kurzech. Tato zjištění ukazují na potřebu cílených vzdělávacích programů, které by rozvíjely pokročilé digitální dovednosti a zohledňovaly specifické potřeby starších dospělých.

Klíčová slova:

Digitální propast; senioři; determinanty digitální propasti; přístup k internetu; univerzita třetího věku

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Introduction

The aging population and the digital divide are two key global challenges that affect today's society. The proportion of people aged 65 and over is expected to increase globally between 2022 and 2050. Projections suggest that by 2050, one in four people in Europe and North America could be 65 or over (United Nations, 2022). This trend is not avoiding the Czech Republic either. During 2022, the number of seniors will increase by 1.8 %, with the latest data on the age composition of the population at the end of 2022 showing 2.21 million people aged 65+ in the Czech Republic, 38.7 thousand more year-on-year (Český statistický úřad [ČSÚ], 2023a).

Demographic changes, characterized by the growing proportion of older people in society, are accompanied by the rapid development of digital technologies that increasingly affect everyday life. While digital technologies offer new opportunities to improve quality of life and access to information, services, and social networks, the older population often faces barriers that prevent them from fully exploiting the potential of these technologies.

The digital divide, i.e. the difference in access to and use of digital technologies between different population groups, is particularly pronounced among older people. This phenomenon is caused by several factors, including low digital skills, low technological literacy, economic barriers, and sometimes psychological resistance to new technologies. As a result, older people are often excluded from digitally mediated services and information, which can lead to social isolation, limited access to health services, and even economic disadvantages. The digital divide can also manifest itself in access to AI-based technologies such as virtual digital assistants etc. (Lutz, 2019).

Current research is increasingly focused on identifying the factors that contribute to this digital divide and finding ways to bridge the gap. When designing and implementing solutions, it is important to take into account the specific needs of the older population The chosen issue is therefore not only a technological challenge but also a major social problem that requires a comprehensive approach.

The present study focuses on identifying the main factors that contribute to the digital divide among seniors. Although the research part of this paper focuses on the audience of a specific third-age university and the results obtained cannot be fully generalized, they can nevertheless serve as a valuable source of inspiration for adult educators and also provide suggestions for further research on the digital divide in this target group.

1 The digital divide

The digital divide is a multidimensional term and we can encounter different variants of this term in the literature, e.g. digital exclusion, digital divide, digital exclusion. Regardless of its negative or positive connotations, it is by its very nature closely linked to information and communication technologies, particularly the Internet. Broadly speaking, the concept of the digital divide is always related to unequal access to or use of technology from the perspective of individuals or groups of people. Van Dijk (2006) defines this concept as the gap between those who have and those who do not have access to new forms of information technology. In the Czech context, Jiří Zounek (2006) was among the first to use this term. It can be assumed that the definition of the digital divide is evolving along with the digital transformation that accelerated during the coronavirus crisis and the emergence of artificial intelligence (Van Dijk, 2012).

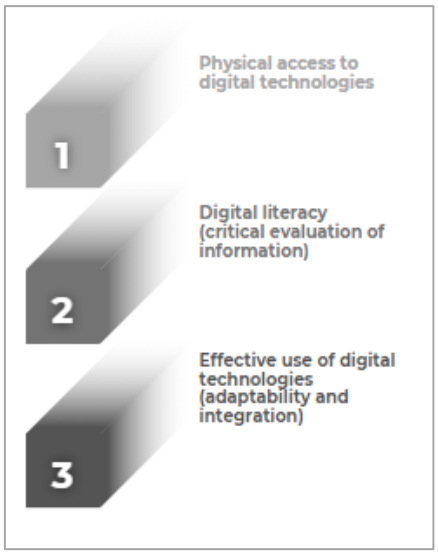

Diagram 1 *Three levels of the digital divide* (own elaboration)

Diagram 1 vividly summarizes and articulates the continuum of the digital divide into three levels. **The first level** focuses on access to digital technologies, particularly the Internet and computers. Differences in access to these basic technologies lead to the primary form of he digital divide. Given the current availability of the Internet and technology, the expert community assumes that this level is beginning to close.

The **Level 2** digital divide can include people's limited ability to use available digital technologies (Attwel, 2001). It includes basic digital literacy, such as the ability to use the Internet, operate software and applications, and the ability to critically evaluate information available online. Gaps in digital skills are often the result of differences in education, age and socioeconomic status, further widening the digital divide even for those who have physical access to technology.

The tertiary gap represents the level of effective use of digital technologies. It deals with the ability to use digital technologies effectively and productively to achieve specific goals such as education, employment, entrepreneurship, and civic engagement. This level of the digital divide includes not only technical skills, but also the ability to adapt to new technological changes, creatively use digital tools, and integrate technology into daily life and work (Van Deursen & Helsper, 2015).

It is clear from the above that the original indicator of the digital divide, which was physical access to digital technologies, is no longer relevant. Most noticeable are the differences between groups of people who differ in their level of skill in using the available digital technologies (Van Dijk, 2012). In this context, it becomes crucial to examine the information needs of specific segments of the population and then apply these findings to the structure of lifelong learning, with a particular focus on the development of digital literacy. One of the most disadvantaged groups is the elderly. Foreign research that has focused on this target group (Choi et al., 2014) suggests that the issue lies more in the effective use of these technologies. The greatest difficulties are not related to basic computer skills, but to navigating the wide range of available services, searching for relevant information, evaluating the data obtained, and using online tools (e.g. internet banking, online shopping, distance learning, navigating health information, or using e-government).

1.1 Selected determinants of the digital divide

The key determinants of the digital divide, based on available studies and research surveys, include the following factors:

Economic factors: access to digital technologies is often influenced by economic conditions such as household income. Lower incomes limit the ability to buy computers, and smartphones or pay for internet access. Among other things, it appears that higher-income earners use the internet more efficiently and productively, while lower-income earners tend to use the Internet more generally and superficially (Van Deursen & van Dijk, 2014).

Education: education level plays a key role in the development of digital skills. People with higher education are more likely to be proficient in modern technologies and to use them effectively. The positive relationship between educational attainment and internet use stems from greater awareness, higher and better ability to evaluate content (Van Deursen et al., 2015).

Age factors: older generations often face difficulties in adopting new technologies, contributing to the digital divide. This factor is associated with lower digital literacy and lower levels of adaptation to technological change. Seniors are the least likely of all age groups to use the Internet. A survey conducted by the Czech Statistical Office (ČSÚ, 2023b) recorded a dynamic shift in the last five years from button mobile phones to smartphones in the 65-74 age group from 21% to 56%, and the share of internet users in the Czech Republic has also increased for people aged 65+ from 13% in 2010 to 52% in 2023.

Geographical location: Access to digital technologies is often limited by geography. Rural and remote areas may have poorer access to the internet and digital infrastructure, making the situation worse than in urban areas.

Socio-cultural factors: cultural and social norms can influence individuals' willingness and ability to adopt and use digital technologies. For example, in some societies, women or certain social groups may be less exposed to technology because of traditional roles and expectations. Generational differences can also be observed, with older generations often being less digitally savvy. This may be due to both less exposure to technology during their lifetime (e.g. working age employment patterns) and physical or cognitive barriers that prevent them from adapting to new technologies. Support from family, friends, or the community, as well as access to training and development programs can greatly facilitate an individual's ability to bridge the digital divide.

Technology infrastructure: the availability and quality of digital infrastructure, such as broadband and mobile networks, are key to bridging the digital divide. Inadequate infrastructure can limit access to technology even in developed areas.

These determinants are intertwined and together form a complex web of factors that contribute to differences in access to digital technologies. The professional community views the issue through a broader lens toward the gap in knowledge, interpretation, and understanding of the information presented (Graham, 2011). This shift in the focus of current research confirms that the study of the digital divide has expanded beyond a purely technological approach and moved beyond the primary level of the digital divide.

2 Empirical survey

The sub-objective of the research project "Digital Literacy of seniors in the Context of Universities of the Third Age" was to analyze the factors influencing the digital divide of seniors in terms of the use of digital technologies and the Internet. The analysis of social context as a predictor of digital technology and internet use, the influence of family and friendship support including the role of teaching in University of the Third Age courses. The motivation for the choice of the topic is the relevance of the issue of educating seniors against the background of demographic aging with an emphasis on the changing demands of today. This allows for the development and implementation of targeted educational programmes and strategies that reflect the specific needs and challenges associated with strengthening digital competences in this demographic group.

Given the complex and multifaceted topic, a mixed research design was chosen. A focus group was chosen for data collection in the pilot phase of the research, followed by a questionnaire survey in an attempt to contribute to the validity of the research instrument. This paper presents selected outputs of the qualitative part of the research project.

The research sample consisted of students of the University of the Third Age of the University of Hradec Králové (U3V UHK) in the academic year 2023/2024. Universities carry out accredited study programs and lifelong learning programs, which include the activities of the so-called universities of the third age, focused on the education of seniors[2] (Zákon č. 111/1998 Sb., o vysokých školách). These educational activities are intended for citizens of the Czech Republic of retirement age.

A total of 294 seniors participated in the survey, i.e. 44 % of the total number of 665 participants in lifelong learning. Table 1 presents the overall demographic profile of the research sample. These data offer insight into the gender structure, age stratification, level of educational attainment, place of residence, and pre-retirement economic activity of the audience who participated in the survey.

The research group was predominantly female 93.9 %, while men were represented in only 6.1 %. This significant **gender imbalance** suggests that the program is much more popular among women, which could reflect broader societal trends in preferences for further education or opportunities among older adults. **The age distribution of respondents** was heavily weighted towards older adults, with the majority aged between 65 and 74 (52.4 %) and over 75 (46.3 %). Only a very small proportion (1.4 %) fell into the 55-64 age group. This reflects the program's focus on education for the elderly, which is characteristic of U3V initiatives.

There were no students with only primary or incomplete education. The data obtained show that the research participants are relatively well educated, with a significant proportion having undergone higher education.

[2] In demographic statistics, a senior citizen is commonly defined by the criterion of his or her age, i.e. a person aged 65 or over.

Table 1 *Demographic profile of the research group of U3V UHK students*

Demographic profile of the research group of U3V UHK students		
Category	**Subcategory**	**Percentage (%)**
Gender structure	**Female**	93,90%
	Male	6,10%
Age stratification	**Less than 50**	0,00%
	55 - 64	1,40%
	65 - 74	52,40%
	More than 75	46,30%
Highest level of education	**Basic incl. incomplete**	0,00%
	Secondary, incl. apprenticeship (not matriculated)	12,90%
	Full secondary education and higher voc. education	59,90%
	Higher education	27,20%
Settlement units by number of inhabitants	**Village/municipality up to 3 thousand**	12,20%
	Small town up to 10 thousand	33,30%
	City up to 100 thousand	46,30%
	Large town over 100 thousand	8,20%
Pre-retirement economic activity	**Technical and professional staff**	23,10%
	Occupations in the health sector	15,00%
	Education and training	15,60%
	Officials (public administration)	24,50%
	Service and sales workers	9,50%
	Other	12,20%

A third (33.3 %) live in small towns with a population of less than 10 thousand, and 12.2 % are from villages or towns with a population of less than 3 thousand. Only a small fraction (8.2 %) come from large cities with a population of over 100 thousand. The U3V programme at UHK attracts students from a variety of backgrounds, with the most popular being in medium-sized urban areas. **The economic activity of respondents before retirement** was varied. The largest groups worked in public administration (24.5 %) and technical and professional roles (23.1 %). Other significant areas included education and training (15.6 %) and health care (15.0 %). Service and sales workers made up 9.5 %, while 12.2 % were engaged in other activities. This range of professional backgrounds highlights the diverse expertise and life experience that students bring to the U3V programme.

In summary, the demographic profile of the research cohort suggests that the UHK U3V programme attracts predominantly older, educated women from urban areas, particularly those with previous work experience in public administration or technical professions. This demographic information is important for tailoring the content and structure of the programme to better meet the needs and interests of its participants.

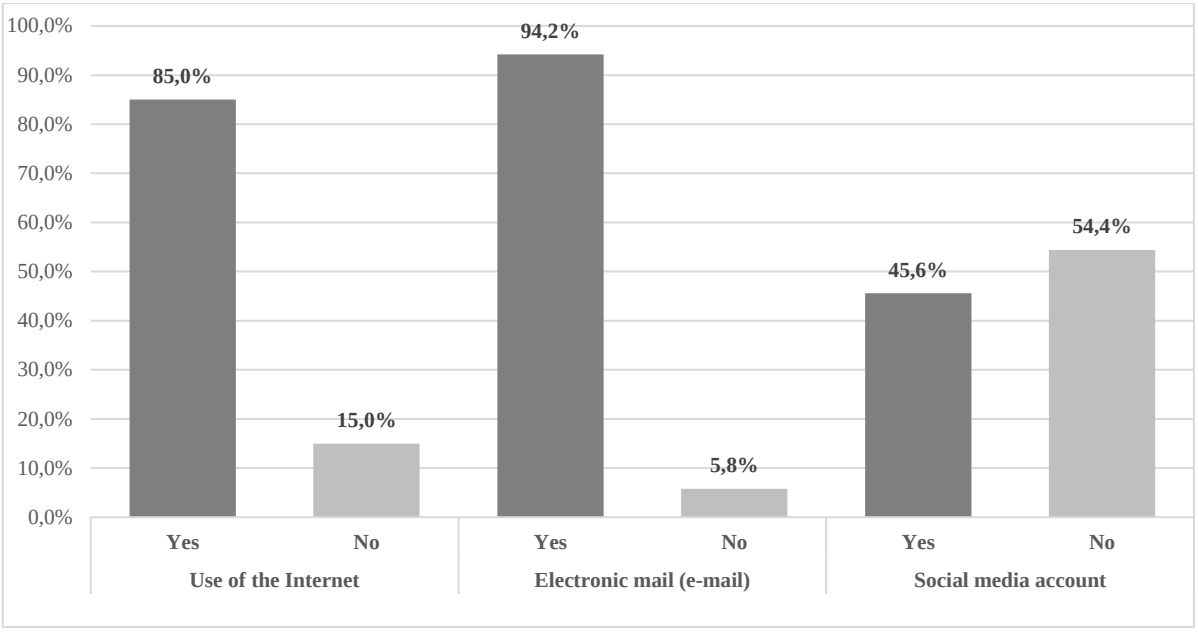

Chart 1 *Digital literacy and online activities*

Chart 1, entitled "Digital Literacy and Online Activities", provides an overview of digital engagement in the U3V UHK student research group. The data focuses on three main areas: internet use, electronic mail (email) use, and social media account ownership. A substantial majority of participants (85.0 %) reported **using the internet**, indicating a high level of digital engagement among students. A strong foundation in digital literacy can be interpreted as essential for participation in many modern educational and communication platforms. However, 15.0 % of students do not use the internet, indicating a segment of the population that may be at risk of digital exclusion, especially in an increasingly online world. The highest level of engagement is observed **in the use of email/e-mail**, with 94.2 % of students using this form of communication. Email is an essential tool for personal and educational communication and its widespread use among students highlights their ability to work effectively with digital communication tools. Only a small fraction, 5.8 %, do not use email. This points to barriers such as lack of access, skills, or preference for other forms of communication. In contrast to internet and email use, **engagement with social media** is significantly lower. Only 45.6 % of participants have a social media account, while the majority (54.4 %) do not engage on social media platforms. This could reflect generational preferences, where older adults may prefer other forms of online communication to social media, or it could indicate a conscious decision to avoid these platforms due to concerns about privacy, complexity, or relevance. Overall, the data show a high level of digital literacy among U3V UHK students, especially in the use of the Internet and e-mail communication. However, lower engagement with social media suggests a selective approach to online activities, which may be influenced by the specific needs and preferences of the demographic group. Understanding these patterns is essential for developing educational strategies and support systems that accommodate the different levels of digital proficiency within this group.

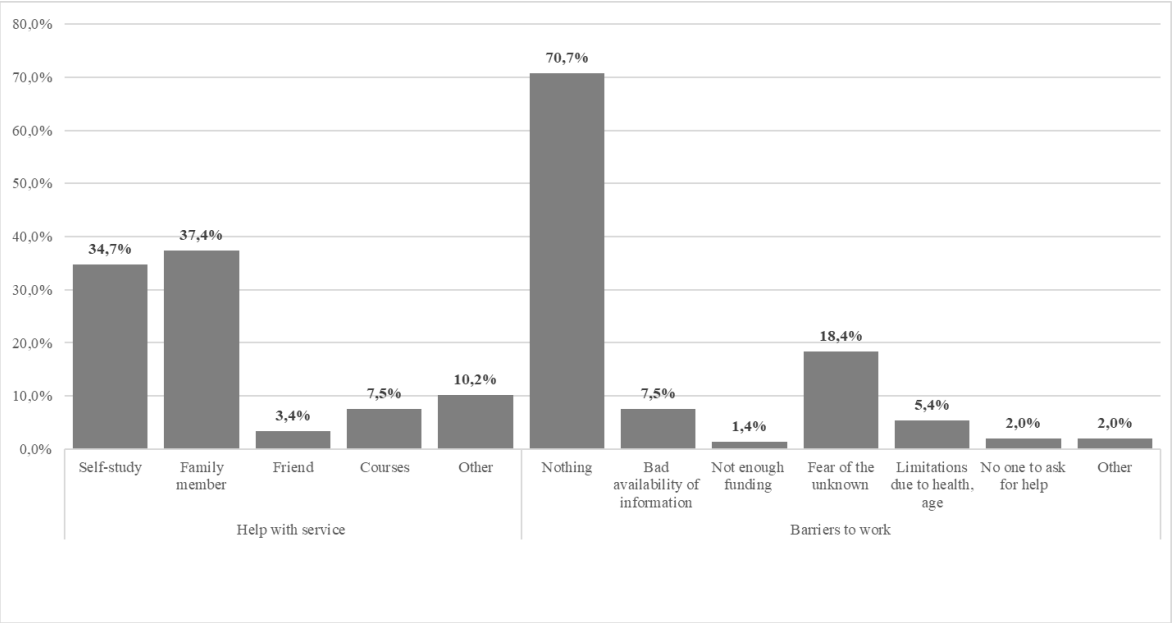

Chart 2 *Supporting and challenging the use of digital technologies*

The analysis and evaluation of the data presented in Chart 2 "Supporting and challenging the use of digital technologies" focuses on the interpretation of the results and their contextualisation within the framework of digital technologies. The chart presents two groups of data: the **first part** focuses on how individuals were supported **in their use of digital technologies**. A significant proportion of respondents acquired digital technology skills through **self-study** (34.7 %). This figure suggests a high level of autonomy and independence among users, which may reflect access to online resources and tutorials. **Support from family** plays a key role in the presented (37.4 %), even more than self-study. This result may indicate the importance of interpersonal relationships in learning new technologies, especially in a family environment. The low proportion of help from friends (3.4 %) suggests that friends are not the main source of support, perhaps due to the availability of other more effective resources. Structured courses (7.5 %) are also less preferred, perhaps due to cost or lack of availability. The research survey indicated that there is a smaller (10.2 %) but significant group that gets support from other sources, which could include online communities, professionals or other informal avenues.

The second part of the data set in Figure 2 focuses on the **barriers that prevent individuals from working with digital technologies.** An overwhelming majority of respondents reported **no barriers** at 70.7 %, which may indicate a high level of adoption of digital technologies or a sufficient level of support and knowledge. **Fear of the unknown** was identified as a **fear of the unknown** by 18.4 % of the U3V audience. This proportion suggests a psychological barrier where fear of the unknown prevents individuals from using digital technologies. In practice, this implies a need for greater emphasis on educational initiatives including psychological support in the adoption of new technologies. The problem of **accessibility of information** (such as unclear interfaces etc.) was identified by 7.5 % and **health and age** emerged as relevant barriers by 5.4 %. This points to the need to adapt technology to older or disabled users. Financial resources (1.4 %) and lack of help from others (2.0 %) emerged as the least represented barriers to working with digital technologies.

The results of the charts provide important insights for designing interventions and strategies to promote wider adoption of digital technologies. For example, the high proportion of respondents facing fear of the unknown suggests the need for educational programs that reduce this fear, providing clear and easily accessible information. Support from family members and self-study as the main avenues in the process of acquiring digital skills highlight the importance of the availability of quality educational materials and social context. The somewhat low proportion of respondents who cited funding as a barrier may be related to the higher social status with respect to higher education attainment of the research sample.

Conclusion

Research work on the determinants of the digital divide is crucial in the context of accelerated digitization and in response to the challenges of demographic change. The elderly population is a heterogeneous group with diverse specific needs and learning experiences, which is clearly evident from the research study presented here. It should be noted that the advent of digital technologies has affected different generations and years at different stages of their lives, particularly in relation to their educational or professional activities. The partial results of the empirical investigation showed that female students of the University of the Third Age of the University of Hradec Králové have a high level of digital literacy. Key elements such as social context, family and peer support, and the role of educational courses are crucial in shaping this behaviour. However, it is important not to forget the smaller subset of seniors who do not yet use digital technologies, have no internet connection or use email communication. For organisers of educational programmes for the elderly, these differences represent a significant challenge that requires the adaptation of educational approaches and content.

The presented research probe highlights the self-confidence of U3V UHK students in the field of digital literacy, which refutes the prejudices of ageism. Although respondents overwhelmingly declared independence and ease of use with digital devices, we can analyze social context as a significant predictor of Internet use. Family members, especially the younger generation, often act as facilitators and help older adults navigate the complexities of digital technologies. This support is essential not only for initial adoption but also for continued engagement, making it an important factor for sustained use of the Internet and digital devices. Overall, it appears that educational programs but also other initiatives are important to bridge the digital divide.

Respondents to the survey show a significantly higher level of digital literacy. However, it is important to note that while basic digital skills such as the use of the internet and email are relatively well developed among students in these programs, more advanced skills such as the use of social networking sites remain less widespread. This lack may be due to the content of basic-level digital literacy courses and the lower level of focus on specific but key applications of digital technologies that have the potential to significantly improve the quality of life of seniors. "The digital divide cannot be understood as a deviation in the development of a social order in which social participation is conditioned by access to the infrastructure of information and communication technologies" (Lupač, 2015, p. 210). The issue of the digital divide cannot be reduced only to the question of material ownership of digital technologies or internet connectivity;

however, the results of the research show that seniors are already using digital technologies and it can be assumed that the primary first-level divide is closing.

Understanding these dynamics of the digital divide is crucial to designing measures that can further enhance the digital inclusion of older adults and ensure that they can fully engage in the digital age or respond to the ever-changing challenges of the day. The results of this study show that targeted educational interventions that take into account the social context and individual needs of older people have the potential to make a significant contribution to bridging the digital divide. Third Age Universities play an important role in this process.

Project affiliation

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References

Attewell, P. (2001). Comment: The First and Second Digital Divides. *Sociology of Education*, *74*(3), 252–259. https://doi.org/10.2307/2673277.

Český statistický úřad. (2023a). Senioři v datech – 2023. https://csu.gov.cz/produkty/seniori-v-cr-v-datech-ajnoatmxkq.

Český statistický úřad. (2023b). Využívání informačních a komunikačních technologií v domácnostech a mezi osobami – 2023. https://www.czso.cz/csu/czso/3-pouzivani-mobilniho-telefonu-a-internetu-na-mobilnim-telefonu-kyi27xljd6.

Graham, M. (2011). Time machines and virtual portals: The spatialities of the digital divide. *Progress in Development Studies*, *11*(3), 211-227.

https://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2019-Highlights.pdf.

Choi, J. H., Kim, S., Moon, J. Y., Kang, J., Lee, I., & Kim, J. (2014). Seek or provide: Comparative effects of online information sharing on seniors' quality of life. *Communications of the Association for Information Systems*, *34*(1), 27.

Lupač, P. (2016). *Za hranice digitální propasti: nerovnost v informační společnosti*. Sociologické nakladatelství (SLON).

Lutz, C. (2019). Digital inequalities in the age of artificial intelligence and big data. *Human Behavior and Emerging Technologies*, *1*(2), 141–148.

United Nations, Department of Economic and Social Affairs, Population Division. (2022). *World Population Prospects 2022: Summary of Results.* United Nations. https://www.un.org/development/desa/pd/sites/www.un.org.development.desa.pd/files/wpp2022_summary_of_results.pdf.

Van Deursen, A. J., & Van Dijk, J. A. (2014). The digital divide shifts to differences in usage. *New media & society*, *16*(3), 507–526.

Van Deursen, A. J., Van Dijk, J. A., & Ten Klooster, P. M. (2015). Increasing inequalities in what we do online: A longitudinal cross sectional analysis of Internet activities

among the Dutch population (2010 to 2013) over gender, age, education, and income. *Telematics and informatics*, *32*(2), 259–272.

Van Dijk, J. A. (2006). Digital divide research, achievements and shortcomings. *Poetics*, *34*(4–5), 221–235.

Van Dijk, J. A. (2012). The evolution of the digital divide-the digital divide turns to inequality of skills and usage. In *Digital enlightenment yearbook 2012* (pp. 57–75). IOS Press.

Zákon č. 111/1998 Sb., o vysokých školách a o změně a doplnění dalších zákonů (zákon o vysokých školách). (1998). https://www.zakonyprolidi.cz/cs/1998-111.

Zounek, J. (2006). ICT, digitální propast a vzdělávání dospělých: Socioekonomické a vzdělávací aspekty digitální propasti v České republice. *Sborník prací Filozofické fakulty brněnské univerzity, Studia Paedagogica* (s. 101–118). Masarykova univerzita.

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