

The Role of Smartphones in Strategic Planning of Educational Services for Generation Z

Maja Djurica, Nina Djurica and Slavica Dabetic

Abstract—Nowadays, the learning style has changed and paper-based teaching material has lost its dominance. Generation Z has access to various sources of learning, acquiring knowledge and competencies. One of very important source is certainly the Internet. The paper will try to points out to the new educational tendencies that have arisen due to the development of modern information and communication technologies and the Internet, but also the COVID-19 pandemic, which should be extensively analyzed when creating strategies for educational services. Since Generation Z uses the Internet mostly through mobile phones, the paper will present the advantages and disadvantages of using mobile phones in the process of teaching and learning. The paper also includes a presentation of mobile applications that are most often used for educational purposes.

Keywords—information and communication technology, mobile phone, mobile learning, strategic planning, educational services, generation Z.

I. INTRODUCTION

The offer of educational services is a complex concept composed of: basic educational services - creating a curriculum (an educational program) and its implementation, assessing the achieved learning outcomes, monitoring and improving the quality of service provision; supplementary services - realization of additional programs for acquiring extracurricular skills and knowledge necessary in the development of professional career; as well as services that enable, facilitate and accelerate the implementation of the educational process (services of administrative units of educational institutions, technical maintenance services, libraries, centers for scientific and innovative processes ...). When forming the offer of educational institutions, the following should be analyzed: the needs of service users (students, students as direct users of educational services, but also teachers, parents, competition, economy, public as indirect users of educational services); internal resources of the educational institution (human resources, financial resources, technical / operational resources); external (macro marketing) environment (demographic policy; economic situation in the country, but

also in the environment; political and legal environment; technical and technological environment; cultural environment). In the conditions of complex and turbulent environment, it is necessary to analyze the effect of all the above factors for the purpose of strategic planning of educational services. In this paper, we will pay special attention to the analysis of the technical-technological environment, i.e. the effects of modern information and communication technologies on generation Z.

One of the fastest growing and most advanced communication technologies is certainly mobile telephony, which has long ago surpassed its original purpose based on making and receiving calls. Over time, the mobile phone has changed our life habits and become something that is a part of everyday life of people of all generations and something that is most often hold in the hand, especially by generation Z. Today, the purpose of these devices is multifunctional, thus in addition to establishing communication it allows its users to search for different types of information, receive and send emails, check social networks, listen to music, play games, watch series, movies and other videos, take and share photos, perform various activities in which the smartphone is indispensable in terms of mobility and flexibility in comparison with other technologies, because all this can be done at any time and in any place. The smartphone is an incredibly powerful, multifunctional computer that includes advanced micro-sensors that were unimaginable anywhere other than in science fiction media a generation ago [5].

At the global level, the COVID-19 pandemic has caused new living and working conditions, which are largely enabled and facilitated thanks to modern information and communication technologies. Consequently, mobile technology has enabled the continuous teaching process, communication between professors and students, but in addition to teaching and learning it can also be used for entertainment and other educational purposes.

It should be emphasized that even before the COVID-19 pandemic mobile devices had a significant place and role in the daily life and teaching activities of Generation Z. During the pandemic, trends emerged in the process of providing educational services, such as: recorded lectures, google online tests, the use of digital notes, the use of mobile applications as teaching aids, and some of these are likely to remain in use after the pandemic. The increase in the number of mobile phone users in Generation Z, as well as their use in the process of providing educational services, has made educational institutions to develop their mobile applications. Currently, this type of methodologies has acquired great importance, reaching a

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“forced” momentum during states of confinement during the pandemic due to Covid-19 [13].

II. MOBILE LEARNING

The rapid growth of the use of modern information and communication technologies has an effect on all participants in today's complex and dynamic marketing environment, and consequently on all educational institutions and Generation Z as users of educational services. First of all, the development and application of these technologies has contributed to the creation of a new educational trend, which is mobile learning. Mobile learning is a learning model based on the application of mobile and internet technologies that create opportunities for increasing the efficiency of the teaching process and learning by providing and sharing of teaching materials regardless of space and time, contribute to the development of critical thinking skills, improve interaction between teachers and service users, etc. On the other hand, the COVID-19 pandemic has made educational institutions to follow this educational trend and pay significant attention to the use of modern technologies, as well as to contribute to its further development with the intent of improving the teaching process, quality of teaching and extracurricular life of Generation Z., which will certainly provide ample opportunities and mutual satisfaction. Little (2013) believes that the development of improved tools and technology has stirred the demand for mobile devices for educational purposes [10]. The smartphone is arguably one of the most impactful technological innovations to be introduced into society in general and education in particular [5].

The mobile phone has a very special role and importance considering the time that Generation Z spends using a mobile phone per day, but also due to the fact that all relevant applications are located on this device. In fact, mobile applications can be divided into: web applications and native applications. Web applications are available through a mobile phone web browser, so they do not require installation on a mobile phone in order to be used. On the other hand, native applications are installed directly on the mobile phone itself through online application stores or in the application market, such as the Apple App Store, Google Play Store, etc. Native applications are specially developed for one platform and can fully use the hardware components of the device - they can use a camera, GPS, accelerometer, compass, contact list, etc. [4]. The daily development of mobile applications contributes to the modernization of the process of providing educational services, and consequently facilitates M-learning and critical thinking.

According to Todoranov and Penchev (2019), the ten most popular M-learning applications are: Amazon Kindle, Coursera, Khan Academy, LinkedIn Learning, Udemy, Wolfram Alpha, YouTube, Duolingo, PhotoMath and SoloLearn. Significant gamification applications used in higher education are [2]: Kahoot, ClassDojo, Classcraft, Socrative. According to the results of the study, the applications have a version for Android and iOS operating systems. However, most of these applications are not typical M-learning applications, but e-learning libraries.

We will take look at a plethora of these applications. Amazon Kindle provides searching, purchasing, downloading and

reading of e-books, magazines, etc. via wireless networking to the Kindle Store. Coursera consists of online courses in various subjects. Khan Academy contains short lessons in the form of videos, as well as additional exercises and materials. LinkedIn Learning enables video-based M-learning. It also provides business networking, connecting with the Alumni Club, and thus makes it easier for students to do internships and employment. Udemy contains courses for improving the job-related skills. The Duolingo app provides the ability to learn 40 languages through different courses. Photomath is a mobile application that uses a smartphone camera to scan and recognize mathematical equations, and then perform explanations step by step on the screen. The purpose of the Kahoot application is to improve learning outcomes, as well as to encourage the development of the competitive spirit of Generation Z. This application is based on a quiz, and students should identify the correct answer among the answers offered. The number of points won and the student's position in relation to other colleagues is influenced by the speed of response. The ClassDojo application includes interaction between teachers, parents and students. It allows you to create a portfolio of student progress results, which is available to parents. Through ClassDojo, teachers control classroom work in an effective and interesting way. The Classcraft app allows you to learn through the fun of role-playing games. It creates a favorable learning climate and encourages the motivation of the participants. The Socrative application provides answers to questions on your mobile devices and at the same time receive feedback on the accuracy of the answers. The results obtained from the use of the Apps Socrative in the classroom suggest that implementing M-Learning tools may enhance student attendance, motivation and participation in class, as well as strengthen the acquisition of key learning contents - all of which is, in our view, critical to generate meaningful learning in the classroom [13].

Empirical research have shown that from year to year the time of using the Internet has increased mostly through mobile phones.

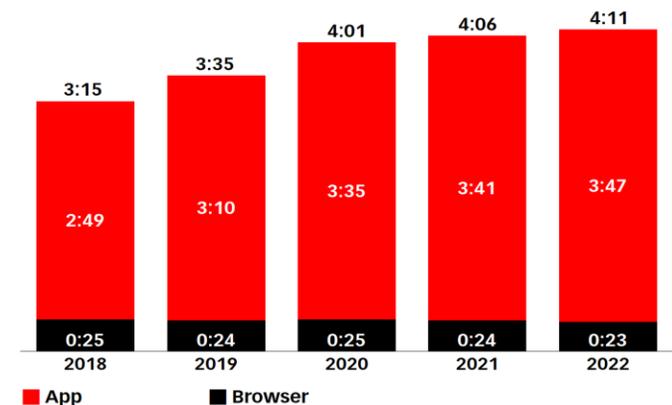


Fig. 1. Mobile Internet: Average Daily Time Spent in the US. App vs. Browser. 2018-2022 (hrs:mins per day among population).

Note: Ages 18+; includes all time spent with internet activities on mobile devices. regardless of multitasking; numbers may not add up to total due to rounding.

Source: <https://mindsea.com/app-stats/#app-usage>

Relying on the statistics given for Generation Z on the website (<https://99firms.com/blog/generation-z-statistics/#gref> on March 9, 2022), which has resulted from the research by various online marketing agencies, we downloaded the data which we consider relevant for the description of the behavior of Generation Z in terms of the use of mobile technologies.

“Generation Z Statistics (<https://99firms.com/blog/generation-z-statistics/#gref>)

- 74% of Gen Z-ers spend their free time online (IBM)
- Gen Z-ers spend 8+ hours a day online. (Global Web Index)

- 73% of Gen Z-ers use their internet-connected devices primarily for texting and chatting, 59% mostly use their devices to access entertainment, 58% to play games, 36% to do schoolwork, 28% to learn new things, and only 17% for shopping and browsing. (IBM)

- 95% of teens report they have a smartphone or access to one. This element of Generation Z statistics is a remarkable 22% increase over the 73% of teens who stated this in 2014/15. (PewResearch)

- Gen Z consumers are 2x more likely to shop on mobile devices than Millennials. (Forbes)

- Over 32% of Gen Z transactions happen on a mobile device (Criteo)

- 58% of Gen Z users check their email multiple times a day (Campaign Monitor)

- 62% of Gen Z-ers will not use an app or website that is too slow to load. (IBM)

- 55% of Gen Z use their smartphones for 5 or more hours a day. Over a quarter (26%) use their phones for 10 or more hours. It's not just that Generation Z enjoys early access to smartphones; this also creates a sort of dependence on these devices. 29% of Gen Z are on their phones after midnight every night, and 31% feel uncomfortable if they are without their phone for 30 minutes or less. These Generation Z trends that show extensive reliance on phones might be interpreted as unhealthy but also provide the surest way for businesses to target young customers. (CGK)

- 75% of Gen Z-ers don't consider college the only path to a strong education. (Forbes)

- Over half of Gen Z say they want to start their own company. Over 30% of Gen Z-ers said they considered taking a gap year after high school. (Forbes)

- 76% of Gen Z members describe themselves as capable of driving their careers. (CSP)

- 80% of Gen Zers aspire to work with cutting-edge technology. (Dell Technologies, Global Web Index)

- 52% of Gen Z are confident in their tech skills needed for employment. (Dell Technologies)”

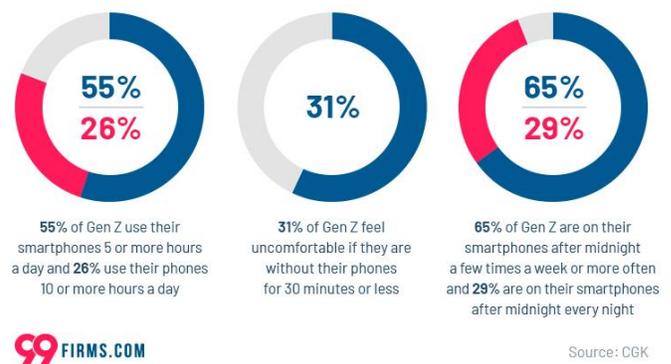


Fig. 2. Gen Z Smartphone Usage.

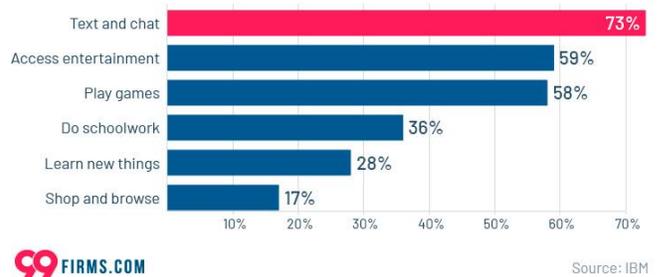


Fig. 3. What Do Gen Z Use Their Internet-Connected Devices For.

III. ADVANTAGES AND DISADVANTAGES OF USING SMARTPHONES IN THE EDUCATIONAL PROCESS

The use of mobile phones for educational purposes has its advantages and disadvantages. The advantages are as follows: ease of use and communication in any location and at any time; scrolling that enables easy and fast search of information that contributes to the acquisition of new knowledge and skills, exchange of ideas, encouraging creativity and innovation; faster availability of information compared to other devices, because Generation Z almost always carries a mobile phone with them, which helps them to save time searching for information; provides security and communication in an emergency; enables taking screenshots of teaching materials and their re-listening, as well as the saving (storage) of teaching materials, which is of particular benefit to students who are employed; facilitates learning and acquiring of the necessary technical and communication skills; contributes to the organization of activities through tools such as: notes, reminder, calendar, clock, etc.; mobile phones also serve as a means of online payment for tuition, textbooks, teaching and extracurricular activities; promote social and entertainment activities; The key advantage of using mobile technology in the process of providing educational services lies in the access to teaching content, sources of information and knowledge from anywhere and at any time. Empirical research shows that the use of mobile phones in teaching increases the interest of the generation Z. Huang, Liao, Huang and Chen (2014) believe that the use of mobile devices can significantly affect the creation of a more positive perception of teaching activities and students' interest in the topic and learning [6].

Disadvantages of using smartphones are: disruption of teaching and learning if the student uses headphones during the process or is inclined to follow social and entertainment activities; misuse of the phone during online testing by unscrupulous students who do not know the real answers but find answers to questions; exposure to risky content as well as unreliable sources of information; health risks (electromagnetic radiation, insomnia, stress, neurological diseases ...); costs of purchasing and using a mobile phone; reduction of communication and socializing outside the virtual environment, which results in the creation of antisocial patterns of behavior in generation Z. Negative effects of using smartphones in the process of providing educational services can also be caused by unstable internet connection, calls during classes and learning, monitor dimensions that are uncomfortable for learning.

TABLE I: STRENGTHS AND WEAKNESSES OF THE M-LEARNING METHODOLOGY

Potential Weaknesses	Potential Strengths
<ul style="list-style-type: none"> - Use of cell phone Internet data - Wi-Fi network limitations - Devices must be compatible with apps - Students may not be familiar with digital environments - Distraction from studies by using other apps 	<ul style="list-style-type: none"> - Increases motivation and interest - Improves class attendance rate - Promotes participation and collaboration - Allows preserve anonymity (masked identity) - Decreases the level of anxiety of students concerning questions posed in class and/or exam questions - Real-time results and feedback for teachers and students - Improved knowledge acquisition - Allows to identify gaps in the student learning process

Source: O. Romero-Ramos, E. Fernández-Rodríguez, I. López-Fernández, R. Merino-Marbán, and J. Benítez-Porres, 2022.

Hwang, Huang, Shadiev, Wu, and Chen (2014) point out that students may be more motivated when using mobile technologies, but their educational achievement is still unsatisfactory [8]. The COVID - 19 pandemic has spurred numerous studies on the strengths and weaknesses of online education. The vast majority of empirical research results favor traditional education despite the benefits of mobile learning and indicate that mobile learning increases the value of the traditional concept of teaching and learning. M-learning can supplement traditional learning. If we explore mobile learning in terms of its benefits, we can categorize them as follows: • Life - long learning. • Learning inadvertently • Learning in times of need. • Learning independent of time and place. • Learning adapted to location and circumstances [1].

IV. CONCLUSION

The development of modern information and communication technologies and the COVID-19 pandemic have created a new marketing environment, which has affected all market participants and accordingly, all educational institutions that in a short period of time were supposed to integrate technologies into the process of providing educational services. On the other hand, all of this required Generation Z digital literacy, as well as the possession of these technologies. The new educational environment has imposed the need to conduct numerous studies regarding the use and effects of modern information and communication technologies, among which the mobile phone plays a crucial role. The COVID-19 pandemic has accelerated the use of smartphones and other communication technologies. A new educational trend has been created to meet The Fourth Industrial Revolution, which consists of strategic planning and development of a new concept of educational services. At the same time, it creates the need to research digital destruction, i.e. social and educational consequences caused by the use of mobile phones and their effects on the self-regulated model of learning and competence development, which is reflected in the modernized concept of educational services.

REFERENCES

- [1] K. Al-Hussaini, "The Impact of 4G LTE Communication Technology on M-learning", *Global Summit on Applied Science, Engineering and Technology (GSASET2022)*, 2021.
- [2] H. Bicen, and S. Kocakoyun, "Determination of university students' most preferred mobile application for gamification", *World Journal on Educational Technology: Current Issues*, vol. 9, no. 1, pp. 18–23, 2017. <https://doi.org/10.18844/wjet.v9i1.641>
- [3] C. B. Davison, and E. J. Lazaros, "Adopting Mobile Technology in the Higher Education Classroom", *Journal of Technology Studies*, vol. 41, no. 1, 2015. <https://doi.org/10.21061/jots.v41i1.a.4>
- [4] S. Gaftandzhieva, N. Kasakliev, and R. Doneva, "Mobile Application for Quality Evaluation of Learning", *UNESCO International Workshop QED'16*, pp. 32–49, Sofia, Bulgaria, June 13–15, 2016.
- [5] K. Hartley, and A. Andújar, "Smartphones and Learning: An Extension of M-Learning or a Distinct Area of Inquiry", *Education Science*, 12, 50, 2022, <https://doi.org/10.3390/educsci12010050>.
- [6] M. Y. Huang, W. Y. Liao, H. S. Huang, and C. H. Chen, "Jigsaw-based Cooperative Learning Approach to Improve Learning Outcomes for Mobile Situated Learning", *Journal of Educational Technology & Society*, vol. 17, no. 1, pp. 128–140, 2014.

- [7] S. Hussin, M. R. Manap, Z. Amir, and P. Krish, "Mobile Learning Readiness among Malaysian Students at Higher Learning Institutes", *Asian Social Science*, vol. 8, no. 12, pp. 276–283, 2012. <https://doi.org/10.5539/ass.v8n12p276>
- [8] W. Y. Hwang, Y. M. Huang, R. Shadiev, S. Y. Wu, and S. L. Chen, "Effects of using mobile devices on English listening diversity and speaking for EFL elementary students", *Australasian Journal of Educational Technology*, vol. 30, no. 5, pp. 503–516, 2014. <https://doi.org/10.14742/ajet.237>
- [9] D. Manasijević, D. Živković, S. Arsić, and I. Milošević, "Exploring students' purposes of usage and educational usage of Facebook", *Computers in Human Behavior*, no. 60, pp. 441–450, 2016. <https://doi.org/10.1016/j.chb.2016.02.087>
- [10] M. Masrom, A. S. Nadzari, and S. A. Zakaria, "Implementation of mobile learning apps in Malaysia higher education institutions", *Proceeding of the 4th Global Summit on Education GSE 2016*, pp. 268–276, 2016.
- [11] B. H. Miller, and A. J. Cuevas, "Mobile Learning and its Effects on Academic Achievement and Student Motivation in Middle Grades Students", *International Journal for the Scholarship of Technology Enhanced Learning*, vol. 1, no. 2, pp. 91–110, 2017.
- [12] F. Ozdamli, and N. Cavus, "Basic elements and characteristics of mobile learning", *Procedia – Social and Behavioral Sciences*, no. 28, pp. 937–942, 2011. <https://doi.org/10.1016/j.sbspro.2011.11.173>
- [13] O. Romero-Ramos, E. Fernández-Rodríguez, I. López-Fernández, R. Merino-Marbán, and J. Benítez-Porres, "The Impact of the M-learning Methodology on University Students", *Journal of Technology and Science Education JOTSE*, 12(1), pp. 121–131, 2022. <https://doi.org/10.3926/jotse.1422>
- [14] L. Todoranova, and B. Penchev, "M-learning applications", *Proceeding of the International Conference "Information and Communication Technologies in Business and Education"*, pp. 188–197, University of Economics, Varna, Bulgaria, October 18, 2019.
- [15] <https://mindsea.com/app-stats/#app-usage>
- [16] <https://99firms.com/blog/generation-z-statistics/#gref>

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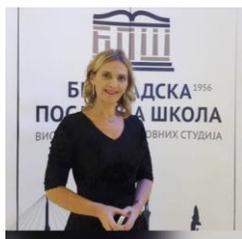


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