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## INFORMATION AND COMMUNICATION TECHNOLOGIES AS AN ELEMENT OF THE LEARNING ENVIRONMENT FOR GENERATION ALPHA

### TECHNOLOGIE INFORMACYJNO-KOMUNIKACYJNE JAKO ELEMENT ŚRODOWISKA EDUKACYJNEGO DLA POKOLENIA ALFA

**Streszczenie:** Artykuł analizuje znaczenie technologii informacyjno-komunikacyjnych (ICT) w edukacji w kontekście pokolenia Alfa. Tekst podkreśla, że ICT są integralną częścią codziennego życia uczniów, co wymaga przemyślanego wykorzystania technologii w środowisku edukacyjnym. Autorzy skupiają się na omówieniu znaczenia środowiska uczenia się w erze cyfrowej, gdzie media cyfrowe odgrywają kluczową rolę. W swoich rozważaniach teoretycznych autorzy zwracają uwagę na konieczność budowania środowiska, które przygotuje uczniów na przyszłość poprzez integrację uczniów, nauczycieli, treści i technologii. Takie podejście jest istotne dla pokolenia Alfa, które jest zanurzone w świecie mediów cyfrowych od urodzenia. Artykuł podkreśla również praktyczne rozwiązania dotyczące wykorzystania ICT w wspomaganych technologicznie strategiach, wskazując na różnorodność narzędzi edukacyjnych, platform e-learningowych i aplikacji komunikacyjnych. Autorzy, świadomi nie tylko korzyści związanych z ICT, ale także ich możliwości, zagrożeń i perspektyw rozwoju, przedstawili wnioski. Artykuł kończy się podsumowaniem, podkreślając potrzebę przemyślanego wykorzystania ICT w edukacji, uwzględniając zarówno możliwości, jak i zagrożenia, oraz dostosowanie środowiska uczenia się do potrzeb pokolenia Alfa.

**Słowa kluczowe:** Pokolenie Alfa, technologie informacyjno-komunikacyjne, edukacja, środowisko uczenia się.

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**Abstract:** The article analyzes the significance of Information and Communication Technologies (ICT) in education within the context for Generation Alpha. The text emphasizes that ICTs are an integral part of students' daily lives, necessitating thoughtful utilization of technology in the educational environment. The authors focus on discussing the importance of the learning environment in the digital age, where digital media play a crucial role. In their theoretical considerations, the authors point out the necessity of building an environment that will prepare students for the future by integrating students, teachers, content, and technology. Such an approach is essential for Generation Alpha, which has been immersed in the world of digital media since birth. The article also highlights practical solutions regarding the use of ICTs in technology-supported strategies, pointing out the variety of educational tools, e-learning platforms, and communication applications. The authors, aware not only of the benefits of ICTs but also of their opportunities, threats, and development prospects, provided insights. The article concludes with a summary emphasizing the need for thoughtful utilization of ICTs in education, considering both opportunities and threats, and adapting the learning environment to the needs of Generation Alpha.

**Keywords:** Generation Alpha, Information and Communication Technologies, education, learning environment.

## Introduction

The contemporary educational environment increasingly relies on the utilization of Information and Communication Technologies (ICT) as a key tool to support the learning process. In the context of Generation Alpha, who are growing up in the digital era, there is a need to adapt teaching methods to their world, where ICT is an integral part of everyday life. Creating a modern educational environment for these children requires understanding and incorporating their natural familiarity and skills in the area of technology (Dacka, 2023). Virtual tools, interactive educational applications, and e-learning platforms are becoming not only support for teachers but also a way to encourage students to actively participate in the learning process.

However, to effectively harness the potential of ICT in education, adequate preparation of teachers and access to appropriate technological resources are necessary. Implementing modern solutions also requires continuous improvement in the field of technology and monitoring progress in digital education.

It is worth emphasizing that the use of ICT in the education of Generation Alpha is not limited solely to acquiring school knowledge but also creates opportunities for developing digital skills, which are extremely important in today's world. "Education is attributed the role of preparing new generations for a knowledge-based society, and school is perceived as the best place in this regard. ICT is considered a key tool for learning in the new era and preparing for the future" (Pereira, 2013, p. 186).

## Learning Environment in the Digital Era

In today's world, the development of technology is changing the face of education, creating new possibilities and challenges for educational institutions. Digital media, therefore, are an indispensable element of the learning environment for representatives of Generation Alpha.

In the current times, the focus must be on building a learning environment aimed at preparing individuals for the future. "In school practice, this concerns cooperation and interaction within four main elements:

- learners (who?),
- teachers (with whom?),
- content (what to learn?),
- objects, equipment, and technology (where and with what to learn?)" (Dumont, Istance 2013, p. 52).

Integration of educational entities' activities, well-developed content, and the utilization of the potential of ICT can bring benefits to the individual in their learning process.

The learning environment can be considered as the set of conditions in which learning takes place, as the immediate context of every learning-related event (Dumont, Istance 2013). In the literature, we also find the term "learning environment." Its definition depends on the approach to the learning process. According to Dorota Klus-Stańska, "there are many models of a learning environment; they depend on the didactic paradigm, i.e., the assumptions related to the degree of activity and independence of learners, the goals and content of education, views on what knowledge is, and how it is created by humans" (Klus-Stańska, 2018, p. 42). Table 2 presents two categories of the approach to the learning environment. The first one focuses on the transmission of information from the teacher to the students. In the second one, the activating activity of the student, who seeks and experiences, is accepted.

**Table 1. Categories of Approaching the Learning Environment (Kruk, 2009)**

First Approach	Second Approach
<p>The learning environment as the school setting that triggers: cognitive processes, group communication, and all purposeful activities.</p> <p>It is characterized by:</p> <p>Enclosed space, Fixed frontal arrangement of desks and other school furniture, Prominent position of the teacher.</p>	<p>The learning environment as a diverse and variable space for learning, The aim of organizing the space is to facilitate the individual:</p> <p>Independence in action, Asking questions, Exploring, Engaging in other cognitive activities.</p>

Media play a significant role as part of the learning environment for Generation Alpha. With the activation of students in mind, ICT provides access to diverse educational content that can be easily tailored to the needs and preferences of each student. Additionally, they facilitate the development of technological skills through the use of tools or computer programs. However, it is important to remember that media are not always suitable for every student or for discussing every type of material. Skillful use of media in the teaching process is essential to support a child's development and prepare them for future challenges. "According to some researchers, even very well-educated, practically prepared individuals to use innovative technologies can 'get lost' in the abundance of information, in the flood of information. Unlimited access to information does not guarantee its reliability and credibility, nor does it construct a comprehensive identity" (Gruchoła, 2016, p. 12). Moreover, considering that Generation Alpha students have been surrounded by media since birth, it is important to take this into account when designing the learning environment, understanding the opportunities and threats associated with the use of ICT in the educational process.

### **Generation Alpha in the World of Digital Media**

The learning environment should be organized in a friendly and effective manner for students. Therefore, having knowledge about the students is crucial to adapt the educational process accordingly. Contemporary elementary school students represent Generation Alpha.

The term "generation" refers to a group of people born in a similar period, characterized by a similar age or life stage, during which significant social events occurred, which, thanks to technology, have a global character (McCrindle, Wolfinger, 2014, pp. 16-18). In the literature, there are several classifications of generations, taking into account the time frame or significant moments from the perspective of history or society. According to McCrindle, we can distinguish the following generations: Baby Boomers (1946-1964), Generation X (1965-1979), Generation Y (1980-1994), Generation Z (1995-2009), and Generation Alpha (2010-2024) (ibid). The year 2010 marks the emergence of new social media platforms, digital technologies such as the iPad, FaceTime, Instagram. As McCrindle emphasizes, "we decided to call them Generation Alpha because they are not a return to the old, but the beginning of something new" (McCrindle, 2022).

Generation Alpha is growing up in a digital world where technology plays a crucial role in their daily lives. They are usually familiar with electronic devices from a young age, which influences their way of learning, entertainment, and communication. They have a significant knowledge of technology and the ability to use various media. Zakhro notes that representatives of this generation can use YouTube before they acquire reading and writing skills (Zakhro, 2021). Moreover, Generation Alpha is increasingly aware of social, environmental, and health issues.

They have a greater awareness of ecology, health care, and physical activity. They are more socially engaged and tend to support social causes, which may influence their future interests and career choices.

In the context of this generation, an interesting phenomenon is the acquisition of knowledge and the acquisition of new skills, i.e., the learning process of Generation Alpha students. They can perform multiple tasks simultaneously and quickly acquire and process information. Furthermore, information processing is based on visualization, learning through action, games, and connections in this process are created randomly (Prensky, 2001). Therefore, Generation Alpha represents a unique group growing up in times of rapid technological and social development. A characteristic feature of the functioning of contemporary children is their rapid adaptation and learning of new technologies, the desire to possess the latest technological achievements to gain new experiences (Thomas, Shivani, 2020). It is important to pay attention to their needs and learning methods to best prepare them for future challenges and opportunities.

Creating a learning environment for representatives of Generation Alpha requires the introduction of diverse and modern teaching methods and resources. The planned activities should arouse curiosity, encourage action, problem-solving, and creativity. ICT, as an everyday element for contemporary students since birth, should also be applied in education. The goal should be to raise awareness and demonstrate the possibilities of using the Internet in the learning process through rational and selective acquisition of information (Rzońca, 2023). ICT provides and can be helpful in acquiring knowledge by students, as well as in individualizing the educational process, or providing distance learning opportunities. However, it is necessary to use available digital possibilities skillfully by teachers in appropriately selected technology-supported teaching models.

### **The use of ICT in technology-supported strategies**

Each educational strategy should be supported by the use of various tools that stimulate, inspire, and engage students in active learning (Gruchoła, 2016; Warchoł, 2022). The area concerning the use of ICT in the educational process is very diverse and rich, thus allowing for the implementation of innovative ideas. It is worth mentioning several teaching models based on technology utilization: TEL, smart education, BYOD, the 1:1 model, or flipped classroom.

In the current context, highly significant for the organization of technology-supported educational environments are e-learning platforms such as Moodle, Blackboard, Clouda, Canavas, Google Classroom, Schoology, Edmodo, Sakai, which allow for the complete “virtualization” of the learning environment (Szopa, 2009, Karaś, 2022). Through the use of any of these platforms, various strategies can be implemented, as each offers a range of functions aimed at facilitating the management of educational content, communication between students, and



monitoring progress in learning. Such environments support teachers' work, enabling them to easily create and share teaching materials, conduct discussions, tests, assign tasks, and systematically assess progress (Tuczyński, 2021, p. 27). These platforms provide flexible learning opportunities anytime, anywhere. Their versatility allows for the creation of a friendly educational environment tailored to the modern needs and requirements of Generation Alpha.

Modern educational environments cannot exist without suitable applications for creating educational content. Currently, it is not only about using applications for creating text documents but also about applications such as Keynote, Canva, Haiku Deck, Powtoon, Emaze, Zoho Show, Prezi, Google Slides, and Adobe Spark. These applications are just the tip of the iceberg resulting from the COVID-19 pandemic farewell (Kumar et al., 2020). It must be noted that these applications are excellent tools for creating presentations, videos, quizzes characterized by the ability to generate attractive, interactive, and professionally looking slides, exercises, tasks. The rich offer of functions, templates, and visual effects available in each of them allows for the personalization of presentations according to individual preferences and user needs. Additionally, intuitive interfaces ensure ease of use, making the process of creating presentations quick and efficient. It should be emphasized that almost all currently available applications offer online material sharing, facilitating collaboration with other users and publishing created materials online. Thanks to this, users have the opportunity to create and share attractive materials on various e-learning platforms using computers, tablets, and smartphones (Maciejowska et al., 2019, pp. 66-70).

It is also worth adding that direct support in this area comes from tools allowing the creation of graphic presentations in the form of mind maps, such as MindMeister, XMind, Notion, Evernote, Anki, Coggle, which significantly facilitate the process of hierarchical organization, flowchart presentation, visualization of information, organization of thoughts, creative thinking, project planning, knowledge retention, and collaboration (Szymankiewicz, Kucharczyk, 2016, pp. 188-190).

Working with modern technologies cannot be done without using platforms for communication and collaboration between students. Currently, communication on the network is carried out using various tools, including Discord, Slack, Zoom, Rocket Chat, Wire, Jitsi Meet, Snapchat (Lange et al., 2023, p. 273). Current communication applications are used in an educational context in various aspects. They mainly enable the creation of short, engaging content that attracts students' attention. They can be used to share educational content, organize competitions, build school communities, and support interaction between students and teachers. However, there are also concerns regarding privacy, data security, and negative effects on students' concentration and mental health, so it is important to monitor and guide the use of these applications appropriately in the context of the organized educational environment.

The current direction of ICT use in education focuses on combining the above-mentioned elements and implementing them into a completely virtual world. It seems to be the future learning environment for Generation Alpha. In this environment, besides various e-learning platforms, messengers, and educational apps, it will be possible to use advanced interfaces not only supporting communication between teacher and student but also enabling communication with machines. It seems that screens and keyboards will be the dominant elements of contact with education for this generation, and technologies such as augmented reality and virtual reality will allow for the implementation of natural interfaces in the virtual world, where voice, gestures, and facial expressions will be natural (Turk, 2017, p. 21). The development of ICT in the indicated technologies will be crucial for Generation Alpha. Additionally, with the logarithmic development of the Internet of Things, especially the Internet of Toys, Generation Alpha will have more and more interactions with artificial intelligence (AI). It must be stated that future educational environments will be based on internet infrastructure and mobile technologies with implemented virtual environments (Rywczyńska, Jaroszewski, 2018, p. 2).

### **Prospects, opportunities, and threats of using ICT in learning**

The use of ICT in the education process is currently widely implemented, and there is no doubt that in the coming years there will be an intensification of this phenomenon. ICT in the learning process encompasses a range of aspects that can positively or negatively impact the learning process in the long term.

It is certain that the use of ICT in the learning process allows for easy and quick access to a rich database of educational resources, including books, articles, and online courses. This provides students with the opportunity to expand their knowledge, tailor materials to their level of development, and even choose materials more suited to their individual preferences.

An important aspect in the further perspective of using ICT in the learning process is the possibility of increasingly utilizing technologies that enable interactive learning. This perspective, through the use of virtual actions and process simulations, allows for unlimited repetitions without the worry of resource depletion or equipment damage. In terms of the effectiveness of the learning process, this can be a significant aspect. Additionally, the use of interactive materials allows for the creation of interactive lessons with rich educational content, increasing student engagement and facilitating knowledge acquisition through their active involvement.

The prospects of using ICT also provide the opportunity to diversify teaching methods. With a wide range of ICT offerings, it is possible to choose from various materials and tailor them to different teaching methods. This makes these methods more suitable for the learning process and the individual needs of students.

In terms of collaboration and communication, which are among the most important aspects of learning, ICT plays a significant role. Contemporary education is based on collaborative student activities and group work, as it promotes the exchange of ideas and the development of interpersonal skills. The use of ICT enriches the learning process and remote contact with the teacher. In this way, students can easily consult their doubts and communicate with the teacher.

The use of ICT in innovative educational environments opens the door to global access to knowledge, regardless of geographical location. This universal accessibility is particularly valuable for people living in remote regions or with limited access to traditional forms of education. Thanks to ICT, such individuals can seamlessly access a variety of educational materials, e-learning courses, and interactive lessons, significantly supporting their intellectual development.

Personalization of the learning process is another aspect related to the use of ICT in education. Advanced data analysis tools and machine learning allow for the customization of educational materials to individual preferences, knowledge levels, and learning pace of each student. Such a personalized teaching method can significantly increase the effectiveness of the educational process by better aligning content with the needs and abilities of each student.

In today's digital world, to succeed, students must have developed digital skills. The use of ICT in the educational process provides an excellent opportunity to acquire these competencies. Through the use of various tools, applications, and educational platforms, students have the opportunity to practically expand their knowledge of computer operation, software usage, and internet utilization for educational purposes. Thus, ICT-based education supports not only intellectual development but also practical skills that are crucial in today's digitized society.

The prospects and opportunities also entail the emergence of various threats. In this case, we may be concerned about the growing and deepening digital inequalities in a rapidly developing ICT world. Unfortunately, not everyone still has equal access to the Internet and modern equipment, resulting in widening disparities in access to education.

Safety is an important and absolutely necessary aspect to emphasize. Due to the logarithmic development of ICT, the security of using educational platforms and online applications is risky and may involve violations of privacy and data security of students. When using ICT, one must learn proper data management, protection against cyber threats, and hacking attacks.

A significant threat is the ubiquitous access to information, which can lead to information overload, making concentration and effective knowledge acquisition difficult.

In the context of threats to innovative learning environments, there is also the phenomenon of addiction to technology. Excessive use of ICT in the learning process can lead to technology addiction and a decrease in interpersonal skills. This



may manifest in reduced face-to-face communication and teamwork if a significant number of activities are performed virtually.

Finally, another threat arising from the use of ICT in the learning process is the lack of student authenticity. While students have a wide range of options for completing homework, assignments, tests, or exams, they also have the opportunity for significant cheating regarding the independence of their work.

### **Summary**

The article analyzes the dynamics of education in the context of technological advancement, particularly in the digital era, and presents its impact on the learning process, especially among representatives of Generation Alpha. The authors of the article focus on the construction of the educational environment, whose fundamental basis is the interaction between students, teachers, educational content, and technology. The article emphasizes the importance of integrating the actions of educational entities, appropriately prepared content, and the use of the potential of information and communication technologies (ICT) for effective teaching and learning.

Various models of the educational environment are presented in the article, reflecting different approaches to the learning process, such as the transmission of information from teacher to student and activating student activity. The authors of the article particularly emphasize the need for consciously designing the educational environment, which fosters independence, questioning, research, and other cognitive activities of students.

An important aspect of the presented article is the specific tools that allow for familiarization with them and their use in the educational process. It is also worth noting that the contemporary role of these tools is extremely important for Generation Alpha, as it allows for the development of technological skills. It emphasizes the need for skillful use of media in the learning process, so as to support students' development.

In summary, the article presents a comprehensive analysis of the impact of ICT on the learning environment, highlighting the benefits, challenges, and the need for conscious use of technology in the education process, in order to maximize their potential and minimize risks.

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