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Digitalisation of Education and Digital Exclusion: Selected Legal-Administrative Aspects

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Introduction

Education, like every sphere of human activity in society, is undergoing transformations in the conditions of digital transformation in the way and speed of acquiring and using information and knowledge, developing competences of the future in the context of digital competences (Raszewska-Skałecka, 2009a, pp. 455–485; Plebańska, 2021, p. 7; Blicharz & Raszewska-Skałecka, 2025). Progressive digitalisation is transforming education into a media-based education, increasingly dependent on modern electronic devices, including computers, multimedia and communication devices, educational platforms, and robots, which are being implemented into educational practice. Information technology in education is constantly enriching new forms of information and knowledge transfer, as well as the development of technical teaching aids. It is also expanding the scope of media, new information technologies, and computer-based teaching techniques as tools and methods for education (Koczy, 2016, p. 54).

The digital transformation of education aims to shift the teaching paradigm. Technological and civilisational advances in a changing reality are reshaping educational challenges, including teaching methods and strategies, as well as the management of educational content. Digital tools introduced in education are intended to, among other things, enable better organisation of classes, increase lesson interactivity, support various modes of educational delivery, including online and hybrid teaching and learning, enrich the educational process in formal, non-formal, and informal education

institutions, and, in a labour market shaped by automation and platformisation, enable employees to adapt their skill profiles to the needs of changing employer expectations – remote and hybrid work (Plebańska, 2021, p. 8).

Digital changes in the educational process create new opportunities to support teachers and students in implementing digital tools, and highlight the need to invest in the technological infrastructure of schools. As new AI innovations develop, their use in education is growing. AI algorithms and educational robots are now an integral part of educational management systems. They create innovative opportunities to enrich and transform the learning experience (Blicharz & Raszewska-Skałecka, 2025; Walusiak et al., 2023, pp. 172–181; Michalska, 2024; Celiński, 2024; Plebańska, 2021; Płusa, 2023; Raszewska-Skałecka, 2021, pp. 43–54).

The changes taking place in education against the backdrop of digital technologies and artificial intelligence (Raszewska-Skałecka, 2021, pp. 43–54) seem undisputed – the problem is in what direction they are heading and what impact they have on the quality of education and the development of digital competences in the 21st century, as well as what consequences the lack of participation in using the achievements of modern electronics has on the information (educational) space. Sebastian Koczy notes that "[…] from the perspective of the needs of each individual, as well as social requirements, schools should provide students with the opportunity to become familiar with the basics of information technology and its use. Every student should have the opportunity to encounter new technologies on their path to general education, so that in the future, both at school and in their professional careers, they can become not only an observer, but above all a participant and co-creator of the changes around them" (Koczy, 2016, p. 61)[1]. Moreover, these new technologies (in the tech-

[1] All translations of fragments of the publications come from the authors.

nical sense) improve communication, education and social interaction, creating a media space in which different generations function (Koczy, 2016, p. 63).

This publication takes a broader view of human and social education within the context of its global development and evolution. Education and knowledge impact everything a person encounters. Education and the development of educational services in the information society are the most important spheres of state activity (Raszewska-Skałecka, 2009a, pp. 478–485; 2020, pp. 11–40). Individual education in the face of modern technology and technological progress is not limited to preschool, school, university, or continuing education. Education, as a coherent system of education and upbringing, encompasses various levels of learning, in both institutional and non-institutional forms (Raszewska-Skałecka, 2009b, pp. 593–613). It is seen as an essential catalyst, without which the processes of building an information society cannot proceed properly. The foundation for the existence and development of the knowledge society is a learning society. Education, including increased access to it, openness of the education system, higher-quality education, and education and competences, is among the most important priorities and values of the contemporary information civilisation and knowledge-based economy (Raszewska-Skałecka, 2006, pp. 47–62; 2013a, pp. 59–77). The dynamics of environmental change in the context of contemporary societal development indicate that education and human competencies are crucial to information civilisation and the creation of knowledge-based societies. In a knowledge society and in the context of globalisation, the education market is one of the fastest-growing markets of the 21st century (Raszewska-Skałecka, 2020, p. 18). Education is fundamental to the development of society and to the possibility of active civic participation in the state's public sphere (Blicharz & Raszewska-Skałecka, 2020). It is one of the key areas of state activity and the responsibility of public administration

(Raszewska-Skałecka, 2002, pp. 233–265; 2013b, pp. 238–260; 2017, pp. 159–182; 2024a, pp. 783–790).

Digital transformation in education, while offering numerous benefits, such as interactivity and access to modern tools, carries a significant risk of digital exclusion. Combating digital exclusion in education is essential to ensuring equal access to knowledge, developing future competencies, and preventing the deepening of social and economic inequalities. Education is both a right in itself and a necessary means to realising other human rights. The right to education is enshrined in numerous international human rights documents and must be protected and promoted. New technologies, including artificial intelligence (AI), have the potential to transform learning and improve educational outcomes, but only if AI is used ethically. If ethical AI is not implemented responsibly in the education system, it could pose a serious threat to human rights. This highlights not only the challenge of accommodating cultural differences in the use of AI in education but also the need to create technologies that are more inclusive and grounded in the protection of human dignity and justice.

By presenting not only our own reflections but also those of other eminent authors, we articulate the significant problems of contemporary digital exclusion in education, and understanding them can provide a favourable basis for at least limiting (if not overcoming) many undesirable phenomena, from both the individual and the larger society's perspective. For these reasons, the work contains numerous citations to scholarly works. This idea also became the starting point for the proposal to include, where necessary, a rather broad concept of digital exclusion as a category of social exclusion, treated not as a rigid, closed phenomenon but as a functionally variable category dependent on political, economic, and social relations.

The following hypothesis was formulated in the monograph: although digitalisation has the potential to address some of the

greatest to address some of the greatest challenges of contemporary education and to introduce innovations in teaching and learning practices, rapid technological development inevitably brings with it many risks and challenges that have so far overtaken political debates and regulatory frameworks.

The monograph utilises the formal-dogmatic method and the method of analysing literature sources. The research methods employed allowed for the achievement of the objective and the verification of the research hypothesis.

The entire material is divided into four chapters. The first chapter is devoted primarily to the legal foundations of building an information society, with particular emphasis on the concept of the information society, digital education transformation policy, digital education and digital literacy, media literacy, and digital security. The second chapter discusses digital services in education, access to digital education, and digital inequality. The third chapter addresses the essence of digital exclusion in education, with particular emphasis on its occurrence in the context of artificial intelligence development. Finally, the fourth chapter discusses digital inclusion in the education sector and its barriers, with particular emphasis on the problem between the neoliberal approach to education and the requirements of inclusive education in contemporary education policy.

Chapter I

Legal Foundations for Building an Information Society

1. The Concept of an Information Society

Lifelong learning is one of the most important challenges facing contemporary humanity and societies. Education is a fundamental right and obligation for human development, a social obligation of citizens, a public good, a public task, and a condition for the development of society, the state, culture, and the economy. It is an example of a complex educational system, perceived as a legal obligation to guarantee it and the responsibility of the state in the performance of educational tasks imposed on its public authorities (Raszewska-Skałecka, 2019; Blicharz & Raszewska-Skałecka, 2022; 2025).

It should be noted that in Polish conditions, changes in the educational system are multilateral and turbulent, as they coincided with the political transformation, European integration, the processes of globalisation of economies, the marketisation of education, scientific and technological progress and the challenges of digital technology in global education (Blicharz & Raszewska-Skałecka, 2022). Learning, knowledge and modern digital technologies are the fundamental challenge of the contemporary development of the information society and the increase in the competitiveness of modern countries (Raszewska-Skałecka, 2021, pp. 43–56).

Importantly, elements such as the impact of new technologies on teaching models, the development of virtual learning, the role of artificial intelligence in the school and extracurricular reality, and the need to acquire digital competences are essential in the education process in the era of technological transformation (Celiński, 2024, p. 7). This poses new tasks and challenges that public authorities responsible for the education process in the country must meet (*Usługi dla obywatela w zakresie edukacji*, n.d.). The ability and willingness to learn in various forms, places and stages of life facilitates effective adaptation to the changing and increasingly demanding reality in the increasing activity of public administration in the country (Krajowa Szkoła Administracji Publicznej, 2025). During the COVID-19 pandemic, a remote work and online learning system was implemented as a result of the accelerated computerisation process and, consequently, digitalisation (Florek, 2022, pp. 169–175). The pandemic has forced public administration, in its relationships with citizens and public offices, as well as in schools, universities, and other entities, to seek new information and communication technology tools to support their operations and ensure the continuity of electronically provided services. The COVID-19 pandemic has largely resulted in the transfer of many public administration activities to the virtual space, enabling citizens to handle their affairs using information technology (ed. Ura, 2022, p. 9).

It should be noted that such actions were, among other things, forced by restrictions on movement in accordance with the Act of 2 March 2020 on special solutions related to the prevention, counteraction, and combating of COVID-19, other infectious diseases, and crisis situations caused by them[2]. Actions to change the approach to e-services were forced during the pandemic, accelerating the pace of change and how public administration performs tasks online. In

[2] Journal of Laws of 2020, item 374.

terms of providing electronic services, one of the most well-known forms of providing e-services to the public is the Electronic Platform for Public Administration Services (ePUAP), which allows citizens and businesses to communicate with public administration offices (Świtał, 2022a, pp. 137–150). In turn, the effectiveness and efficiency of public administration during the pandemic, as exemplified by university administration, in P. Dobosz's opinion, "were caused, on the one hand, by the adoption of nationwide legal solutions and, on the other, by the ability to adapt to the emerging social situation. In this respect, personal skills in intelligent university administration played a creative role. […] the creative capacity of university administration, adequate to the changing social situation in conditions of dynamically changing factual and legal circumstances" (Dobosz, 2022, p. 167). The COVID-19 pandemic has contributed to an increase in demand for digital public services and revealed different aspects of the functioning of public administration (ed. Ura, 2022).

It is also worth pointing out that in accordance with the Act of 17 February 2005 on the computerisation of the activities of entities performing public tasks[3], entities such as kindergartens, schools and other educational institutions[4], are obliged to have an electronic mailbox on the electronic platform of public administration services ePUAP[5]. The electronic mailbox on this platform serves "not only for contact between citizens and public administration units, but also for contact between public administration units themselves, in this case, education system units with the education board and other offices. […] The education board cooperates in its duties with local government units, other offices, and representatives of governing

[3] Journal of Laws of 2025, item 1703.

[4] Act of 14 December 2016 – Education Law (consolidated text: Journal of Laws of 2025, item 1043, as amended).

[5] Pursuant to Article 16 of the Act of 17 February 2005 on the computerisation of the activities of entities performing public tasks, Journal of Laws 2025, item 1703

bodies in carrying out its duties. The use of digital forms of contact and digital handling of matters undoubtedly shortens the time required to process them and also enables local government units to realise savings resulting from electronic documentation transfer" (Dubojski, 2024, p. 25).

The contemporary streamlining of public administration is closely linked to the prospect of the state's computerisation. In the process of computerisation of public administration, significant emphasis is placed on ensuring that public authorities can provide electronic services to citizens and other stakeholders (Świtał, 2022b, pp. 11–20). There is a noticeable "permanent increase in the scope of use of information and communication technologies in the economy, public administration, and also in the everyday lives of citizens. […] the information society is being built" (Sitek, 2022, p. 93), and its construction is an important element of European Union policy (Sitek, 2022, p. 94). Moreover, "computerisation has become a fundamental instrument of globalisation processes, which are rapidly encompassing humanity, regardless of geographical location or cultural conditions. The use of microelectronics, computerisation, and automation has initiated the so-called information revolution and the construction of the information society" (Sitek, 2022, p. 94).

The COVID-19 pandemic has contributed to the widespread use of e-services, and the ongoing process of computerisation of the state and the development of technology poses new challenges for public administration in terms of adapting electronic public services to the needs of people and society (Świtał, 2022a, pp. 137–150). The internet has become a place for learning, work, and entertainment, and a tool for handling official matters. One of the country's key goals is to "improve the quality of life of citizens through digitisation", and the priorities of the State Digitalisation Strategy until 2035 include "improving citizens' digital competences and digital transformation in all areas of state functioning" (*Cyfrowe państwo*, n.d.).

The Ministry of Digital Affairs' plans for 2026–2027 include "building a friendly, secure, and modern digital state. […] the ministry's activities aim to genuinely improve the quality of life of citizens through digitisation. […] they will include developing national infrastructure and regulations for artificial intelligence, strengthening cybersecurity, protecting children and young people online, combating disinformation, and streamlining data management rules. In parallel, public e-services will be developed, including mObywatel, e-Doręczenia, and EZD RP, as well as the digital competences of Poles" (*W cyfrowym państwie żyje się lepiej*, n.d.). During this period, „specific actions are planned – from the development and implementation of legal regulations, through the construction of technological base, research, international and national cooperation between sectors and industries, to education" (*W cyfrowym państwie żyje się lepiej*, n.d.). Modernising public administration (public services) and access to high-quality digital services requires intensifying efforts to develop digital education (Skoczylas, 2024, p. 66). The importance of digital competences for the functioning of e-government in Poland is reflected in the assumptions of the government's Digital Competence Development Programme[6]. Its creation was certainly influenced by the EU policy programme "The Road to a Digital Decade" by 2030[7].

In education, digital tools – educational platforms, learning applications, and advanced artificial intelligence (AI) systems – play an important role in adapting to the needs of individuals and society in the digital age. Examples of digital tools supporting teachers and students in the educational process include Padlet, Kahoot!, and Qui-

[6] Resolution No. 24 of the Council of Ministers of 21 February 2023 on the establishment of a government programme called the "Digital Competence Development Programme", Polish Monitor, 2023, item 318.

[7] Decision (EU) 2022/2481 of the European Parliament and of the Council of 14 December 2022 establishing the Digital Decade Policy Programme 2030, OJ EU L 323, 19.12.2022, p. 4.

zlet, as well as learning management systems (LMSs) such as Moodle and Google Classroom, as well as more advanced AI systems (e.g., GPT-4), and multimedia content creation applications such as Canva and Powtoon, which enable the creation of interactive presentations and educational materials. Platforms that support the development of programming skills (e.g., Scratch, Code.org, and Khan Academy) also support learning programming and algorithmic thinking. Examples of digital tools that support the independent acquisition of knowledge through experimentation and the development of scientific thinking include the STEM education model.

In the future, the development and use of digital skills will impact every aspect of our lives, underscoring the significant role of digital education in shaping them. This raises the question of the role of digital skills in private/professional life and society, and the impact and role of digital education on their development. There is no doubt that "digital skills development must begin at an early age, and e-education, as one form of digital development, should support the development of digital skills" (Plebańska, 2021, p. 163). Although it is often pointed out that "technology itself is merely a tool that can be used in many different ways" (Plebańska, 2021, p. 163), it is nonetheless changing the face of contemporary education, introducing new forms and methods of teaching and opportunities to acquire information and knowledge. The issue of education in a knowledge-based society is vast and constantly evolving, prompting cyclical research and an updated perspective on the impact of new information technologies in the civilisational and social context. Access to the internet and mobile devices, as well as the continuous development of digital technologies, are transforming teaching and learning processes, ways of working, access to information and knowledge, access to public and private goods and services, and are causing changes in social relations, driven by the widespread use of information and communication technology tools and resources. Modern

technology, as Celiński (2024, p. 91) notes, "significantly changes the way we learn, how we teach others, and how the teaching process is organised, along with how modern students acquire knowledge".

However, it is important to remember that the implementation of technological tools and the dynamic development of technology in various spheres of public administration offer, on the one hand, tangible benefits for those who use them, but on the other hand, they also present limitations, or even so-called "digital overload" (Celiński, 2024, p. 92), or "information overload" (Michalska, 2024, p. 11), which can result from inappropriate or excessive use, which can negatively impact their recipients. As Pilarz (2025, p. 50) aptly notes, although the "majority of society uses devices such as smartphones and tablets daily, has constant access to the internet, and has at least minimal knowledge of the use of modern technologies and remote communication, this does not mean that significant social inequalities aren't present in this area of life".

The Organisation for Economic Co-operation and Development defines "digital exclusion" as inequalities between individuals, households, enterprises, and geographic areas at various socioeconomic levels in terms of access to information and communication technologies and use of the internet in various spheres of activity (OECD, 2001, p. 5; Pilarz, 2025, pp. 50–51). The phenomenon of digital exclusion manifests itself, among others, as hardware exclusion (a person does not own a computer, smartphone, or tablet to use electronic services) and competence exclusion (a person has the ability to use equipment but lacks the necessary knowledge, skills, and motivation to acquire them). The emphasis in the literature is that digital exclusion and social inequalities in access to electronic services are not the only barriers to the digitisation of public administration (Pilarz, 2025, p. 51).

New professions are emerging or will be needed in the future as a result of the changing digital landscape, including data detectives,

blockchain analysts, influencers, and others stemming from technologies we already have today, such as drones, alternative energy, autonomous cars, cryptocurrencies, and blockchain. New trends in the future labour market are also emerging (Michalska, 2024, pp. 26–44): 1) a world without full-time jobs, or the gig economy – hiring workers for a specific project who are paid for their work; giggers prefer independence and flexibility of work, not being tied to one job or place of work; 2) a new long life – the need for continuous learning is coming, and the labour market is to be the motivating factor for improving skills and knowledge; AI already allows us to solve important medical problems, innovative digital approaches as support – solutions in the low-code and no-code models (application design methods using intuitive tools that allow us to program without having to delve into the secrets of coding); 3) artificial intelligence – the labour market will need AI experts, because the ongoing automation based on artificial intelligence, machine learning, and robotics is changing the way many industries work; data analysis systems, chat bots and virtual customer service assistants, intelligent product search engines, autonomous machines and vehicles are increasingly present everywhere; there is a need for human-machine cooperation, etc. The dizzying speed of change means that "we are also becoming increasingly specialised, interdependent, living in complex and dynamic systems. It is impossible not to recognise that we are paying enormous environmental and social costs for this" (Michalska, 2024, pp. 26–44).

Much indicates that the implementation of further e-services is consistent with the development of computerisation in public spaces and the information society, where e-education will be tailored to the needs of modern consumers in terms of digital skills required to use new technologies. Electronic public services are becoming increasingly important. They are increasingly becoming an alternative to services provided traditionally. As can be seen, a number of legal pro-

visions are being implemented that provide the basis for e-services and enable their use (Świtał, 2022a, pp. 147–148; Pilarz, 2025, pp. 46–56; Skoczylas & Świtał, 2024). This means that e-education in the use of public e-services is becoming crucial in various spheres of public life. The arrival of the fourth industrial revolution at the beginning of the 21st century (Blicharz, 2023, p. 13) ushered in the era of the industrial Internet of Things (IoT), artificial intelligence, virtual and augmented reality, cloud computing, advanced robotics, 3D printing, and blockchain, as well as the use of new technologies as the primary transmitter of information (Wodnicka, 2021, p. 52). This period also directly influenced the shape of Polish society, assessed from the perspective of its information capacity (Grabowska, 2024, p. 29).

2. Digital Transformation of Education Policy and Public Programmes

The literature emphasises that the development of new competencies is possible thanks to a "constantly changing range of methods and tools. The development of the Industrial Revolution 4.0 has given rise to the need to develop competencies of the future, as well as digital competencies. […] Competencies that distinguish humans from the work of IT systems, robots, or artificial intelligence are becoming crucial" (Plebańska, 2021, pp. 7–8). According to M. Plebańska (2021, p. 8), these include cognitive competencies (called thinking competencies) – "covering both creativity and logical reasoning and solving complex problems"; social competencies necessary in the work environment – "these include effective teamwork, leadership and entrepreneurship, as well as emotional intelligence"; digital and technical competencies (so-called hard skills) – „are not limited to programming or data analysis, but cover a wide range of skills from digital problem-solving to knowledge of privacy and cy-

bersecurity" (Plebańska, 2021, p. 8). He also states that the "development of the information society is one of our priorities. To achieve this, the continuous development of employees' digital competences is necessary […]. E-education is a component of the development of employees' digital competences, and as a set of online development methods and tools, it provides significant support in this process. It is difficult to imagine an information society without e-education; its continuous development […] is one of the main paths to the development of society's digital competences, and therefore one of the main factors in building an information society" (Plebańska, 2021, pp. 164–168). Moreover, she demonstrates that digital skills are highly sought after in the labour market, and their importance is recognised by employees entering the labour market and young workers starting their careers. According to M. Plebańska, acquiring appropriate skills is crucial. These skills combine knowledge, understanding, valuing, and the efficient use of new technologies. A person possessing them can, among other things, categorise and evaluate information, manage information overload, and analyse and compare information (Plebańska, 2021, pp. 164–168).

Scientific discourse notes that digitally competent individuals are expected to think independently, take initiative, solve problems creatively, and use technology in ways that align with the current labour market or, more broadly, the current industrial revolution. This aspect has become particularly evident during the COVID-19 pandemic. The need to develop digital competences is being recognised by decision-makers in the modern world. The outlined patterns can be illustrated with selected examples of the systemic development of e-education and digital competences, based on the example of Poland (Plebańska, 2021, pp. 164–168).

It is worth noting that on 9 March 2021, the European Commission published the Communication "Digital Compass 2030: Europe's path in the Digital Decade" (Komisja Europejska, n.d.), which

sets out the vision and goals for Europe's digital transformation by 2030. It states: "The European way to create a digital economy and society is based on solidarity, prosperity and sustainability, underpinned by empowering citizens and businesses, while ensuring the security and resilience of the European digital ecosystem and supply chains". The key values that will ensure the EU's future-proof digital transformation by 2030 are solidarity, prosperity and sustainability. The Communication builds on the strategy Shaping Europe's Digital Future presented in February 2020. The European Commission has identified four main directions of the Digital Compass for ensuring Europe's digital transformation:

1. A digitally literate society and highly qualified digital professionals;
2. A secure, efficient, and sustainable digital infrastructure;
3. Digital transformation of enterprises;
4. Digitalisation of public services (Komisja Europejska, n.d.).

Since January 2023, Poland has been implementing the "Road to a Digital Decade" policy programme until 2030 (*Program polityki "Droga ku cyfrowej dekadzie" do 2030 r.*, n.d.). It was adopted by Resolution No. 125 of the Council of Ministers of 22 October 2024 on the National Action Plan for the "Road to a Digital Decade" policy[8]. It outlines the directions for the development of the digital transformation of European Union countries by setting a number of general goals and digital objectives, a monitoring and cooperation mechanism aimed at, among other things, creating conditions conducive to innovation, structuring cooperation between European institutions and Member States, and creating a coherent and transparent EU monitoring and reporting mechanism. The programme provides a framework for multi-country projects in this area (Ministerstwo Cyfryzacji, 2023).

[8] M.P. item 989.

Using European funds – the National Recovery and Resilience Plan and European Funds for Social Development – the Ministry of National Education (MEN) plans to train over 100,000 teachers in digital and media literacy by 2029. The training addresses both legal and personal data protection issues, as well as practical aspects of using digital educational resources. The Education Development Centre (ORE) regularly organises webinars and courses, such as "Methods and Tools for Critical Verification of Information Available Online", "Opportunities and Threats Online", and "Digital Education Including Artificial Intelligence (AI)". These training courses support the development of teachers' competencies in media education, digital literacy, and the ethical use of technology (Ministerstwo Cyfryzacji, 2023).

The Ministry of National Education (MEN) is undertaking initiatives to promote informed internet use and combat disinformation. In 2025, it assumed honorary patronage over a number of initiatives that contribute to the "fight against disinformation and promote responsible and informed use of the internet among children and young people. These important initiatives include the Digital Youth Forum 2025, which encourages positive use of digital space and counteracts cyberbullying; Safer Internet Day, which focuses on young people's safe access to online resources; and the Predator Games project, which develops students' digital and social skills through esports. Furthermore, competitions such as the CyberSkiller Challenge Edition 5, promoting practical cybersecurity knowledge, and the Digital Wizards programme, supporting the development of modern technological skills, were held under the Ministry of National Education's patronage. […] these initiatives work together to build awareness and resilience among young citizens to information manipulation, which aligns with the Ministry of National Education's broad strategy for media education and digital security" (Ministerstwo Cyfryzacji, 2023).

The Council of Ministers has adopted a public policy, the "Integrated Skills Strategy 2030 (detailed section) for developing skills in line with the concept of lifelong learning", which is an annex to Resolution No. 195/2020 of December 28, 2020[9], in which it is indicated that: "Changes taking place in the modern world – globalisation, urbanisation, technological progress, digitisation – force citizens to successively update their knowledge and acquire new skills. In an increasingly rapidly changing world, lifelong learning is becoming necessary, which is why the traditional division of human life into the period of education (youth) and the period of professional activity (adulthood) has become irrelevant. As a result of these changes, contemporary education policy is transforming into a policy for lifelong learning" (Ministerstwo Edukacji Narodowej, 2020b, p. 50). The areas of impact within the Integrated Skills Strategy 2030 (detailed section) are (Ministerstwo Edukacji Narodowej, 2020b, p. 50):

1. Basic, transversal, and vocational skills for children, youth, and adults.
2. Developing skills in formal education – management staff.
3. Developing skills in formal education – teaching staff.
4. Developing skills beyond formal education.
5. Developing and utilising skills in the workplace.
6. Career counselling.
7. Collaboration between employers and formal and non-formal education.
8. Planning lifelong learning and validating skills.

[9] According to the adopted assumptions, the Integrated Skills Strategy 2030 consists of two parts: Zintegrowana Strategia Umiejętności 2030 (część ogólna) – przyjęta przez Radę Ministrów 25 stycznia 2019 r.; Zintegrowana Strategia Umiejętności 2030 (część szczegółowa). Polityka na rzecz rozwijania umiejętności zgodnie z ideą uczenia się przez całe życie – przyjęta przez Radę Ministrów 28 grudnia 2020 r. (Ministerstwo Edukacji Narodowej, 2020b, p. 50).

Each impact area includes activities and a list of entities involved in implementing the strategy. The Integrated Skills Strategy 2030 (ZSU 2030) provides a strategic policy framework for developing the skills necessary to strengthen social capital, social inclusion, economic growth, and achieve a high quality of life (*Zintegrowana Strategia Umiejętności 2030…*, n.d.). Education, in all its forms, is moving towards the future, and there is no future without it. Education is changing under the influence of technology and digital tools that ensure access to high-quality learning. Digital education serves to shift the teaching paradigm (Plebańska, n.d.)[10], and is the "key to acquiring future competencies" (Sulmicka, 2024). It manifests itself in the acquisition and development of broadly understood digital competencies and the use of technology in teaching.

Pursuant to Article 12a section 1 of the Act of 4 September 1997 on Government Administration Departments[11], the computerisation department covers the following matters: "1) computerisation of public administration and entities performing public tasks; 2) ICT systems and networks of public administration; 3) supporting investments in the field of computerisation; 4) implementation of international obligations of the Republic of Poland in the field of computerisation and telecommunications; 5) participation in shaping the European Union policy in the field of computerisation; 6) development of the information society and counteracting digital exclusion; 7) development of services provided electronically; 8) shaping

[10] Cyfrowa edukacja „[…] powinna wspierać sposób myślenia o procesie uczenia się – nauczania, w którym uczeń staje się twórcą, a nie tylko uczestnikiem procesu dydaktycznego, zaś szkoła – środowiskiem uczenia się. […] Podstawową przesłanką wykorzystania nowych technologii w szkole jest indywidualizacja procesu kształcenia**,** umożliwienie uczniom poszukiwania własnej drogi, nauka we własnym tempie oraz stylu, przygotowanie do samodzielnego korzystania z zasobów edukacyjnych, przygotowanie do dorosłego życia, w którym obecni uczniowie będą musieli stale rozwijać się, aby nadążać za stale zmieniającym się światem".

[11] Journal of Laws of 2025, item 1275.

the state policy in the field of personal data protection; 9) telecommunications; 10) cyberspace security in the civil dimension; 11) the PESEL register, the Identity Card Register, the Civil Status Register and the Passport Document Register; 12) vehicle register, driver register and parking card holder register; 13) supervision over the provision of trust services within the meaning of the provisions on services trust; 13a) electronic identification". The minister responsible for computerisation supervises the President of the Office of Electronic Communications (Article 12a Section 2 of the Act). Therefore, the Minister of Digital Affairs is responsible for the digitisation of public administration, oversees ICT systems, and supports investments in digital technologies (Ministerstwo Cyfryzacji, 2018).

According to the Minister of Digital Affairs, one of the challenges in the context of digital development is "preparing society to function in […] a changing world and to reap the benefits of these changes, as well as to bridge the growing divide between those who 'can' and those who 'can not' […] The Digital Competence Development Programme has been created, the goal of which is to continuously increase the level of digital competences by providing everyone in Poland with the opportunity to develop them according to their needs. […] it envisages the development of universal digital competences among citizens, from preschool and early school education to senior age. Support […] for all those who want to improve their digital competences, including teachers, entrepreneurs, employees in all economic sectors, and public officials, as well as digitally talented individuals who will join the future pool of highly skilled ICT specialists. […] digital inclusion activities aimed at eliminating digital exclusion by promoting and increasing the accessibility of digital websites and mobile applications for people with disabilities. […] increasing awareness of the use of digital technologies and promoting digital hygiene. […]". On February 21, 2023, the Council of Ministers adopted a resolution establishing a government programme called

the 'Digital Competence Development Programme'"[12], which will run until December 31, 2030[13]. Its implementation is coordinated and monitored by the minister responsible for computerisation[14].

The main goal of the Digital Competence Development Programme is to "continuously increase the level of digital competences by providing everyone […] the opportunity to develop them according to their needs, taking into account all stages of life, both among ordinary users of digital technologies and ICT specialists. The implementation of the Programme is intended to contribute to the building of a modern, resilient society, which, on an individual level, will translate into a better quality of life in the realities of the digital economy, and, on an economic level, will contribute to the development of a competitive economy. The Programme consists of activities […] for the development of digital competences: developing digital education; providing everyone with the opportunity to develop digital competences; supporting the digital competences of working people; developing advanced digital competences; strengthening the management and coordination of activities in the field of digital competence development. […] The Digital Competence Development Centre (CRKC) was established within the Chancellery of the Prime Minister – a centre for managing the implementation of the Digital Competence Development Programme and a centre for research and analysis of the development of digital competences in Poland will support the country's digital transformation" (Ministerstwo Cyfryzacji, 2020).

[12] Resolution No. 24 of the Council of Ministers of 21 February 2023 on the establishment of a government programme called the "Digital Competence Development Programme" (M.P. item 318).

[13] Digital competence development programme, Annex to Resolution No. 24 of the Council of Ministers of 21 February 2023 (M.P. item 318).

[14] Pursuant to § 1 of Resolution No. 24 of the Council of Ministers of 21 February 2023 (M.P. item 318).

The Council of Ministers has adopted a resolution on the Digital Transformation of Education Policy[15]. Pursuant to § 2 of the resolution[16]: "Monitoring the implementation of the public policy entitled 'Digital Transformation of Education Policy' is entrusted to the minister responsible for education and upbringing". The Digital Transformation of Education Policy, referred to as the "Digital Transformation of Education Policy", is a public policy defining the basic conditions, goals, and directions of national development in the social, economic, and spatial dimensions of education. It describes the actions necessary to implement the digital transformation of education amid the digital revolution. It is prepared as the Digital Transformation of Education Decalogue. The Digital Transformation of Education Policy covers the short-term perspective up to 2027, the medium-term up to 2030, and the long-term up to 2035. The Digital Transformation of Education Policy identifies specific actions (tools) to achieve its goals. The strategy defines the framework for state action in the field of digitalisation of education until 2035, placing emphasis on the safe use of media and information, developing critical thinking skills and protection against manipulative information (Ministerstwo Edukacji Narodowej, 2025).

Another issue worth mentioning is the Government programme to support school and institutional management bodies in developing the digital skills of children and young people for the years 2025–2029 – "Digital Student"[17]. Pursuant to § 1 of the aforementioned res-

[15] Resolution No. 98 of the Council of Ministers of 12 September 2024 on the adoption of a public policy called the "Digital Transformation of Education Policy" (M.P. item 812), see Digital Transformation of Education Policy, annex to Resolution No. 98 of the Council of Ministers of 12 September 2024 (M.P. item 812).

[16] M.P. item 812.

[17] Rządowy program wspierania organów prowadzących szkoły i placówki w rozwijaniu umiejętności cyfrowych dzieci i młodzieży na lata 2025–2029 – „Cyfrowy Uczeń", uchwała Nr 121 Rady Ministrów z dnia 17 września 2025 r. Załącznik do uchwały nr 121 Rady Ministrów z dnia 17 września 2025 r. https://

olution: "A Government programme to support authorities running schools and institutions in developing digital skills of children and young people for the years 2025–2029 is established – "Digital Student" – one of these tools, which is to support the achievement of the objectives set out in the PCTE: "1) new technologies, including artificial intelligence in schools; 2) educational methods, digital teaching, digital teaching resources; 3) teacher education and training; 4) equipment for students, teachers and schools. The programme is to develop and continue activities implemented under the National Plan for Recovery and Increasing Resilience in investments […] complements the activities planned in the European Funds for Social Development programme". According to the PCTE, it is essential to support educational institutions in developing the skills of teachers and students necessary for informed, responsible, and active participation in the digital society. This programme is one element of this support, providing schools and institutions with financial resources for activities necessary to enhance the effectiveness of the educational process using modern technologies, including those supported by artificial intelligence (*Cyfrowy Uczeń*, n.d.).

Regulation of the Council of Ministers of 17 September 2025 on detailed conditions, forms and procedures for the implementation of the Government programme to support authorities running schools and institutions in developing digital skills of children and young people for the years 2025–2029 – "Digital Student"[18] in § 6 section 1 states: the condition for participation in the Programme by schools or institutions is: "1) use of the ZPE[19] – in the case of schools; 2) supplementing the educational information system, referred to in

www.gov.pl/web/edukacja/rzadowy-program-wspierania-organow-prowadzacych-szkoly-i-placowki-w-rozwijaniu-umiejetnosci-cyfrowych-dzieci-i-mlodziezy-na-lata-2025-2029---cyfrowy-uczen [access: 17.01.2026].

[18] Journal of Laws, item 1254.

[19] Zintegrowana Platforma Edukacyjna. zpe.gov.pl.

Art. 2 of the Act of 15 April 2011 on the educational information system […], with data regarding computer hardware and other digital equipment; 3) development of a programme for the digital transformation of the school within the meaning of the Digital Transformation of Education Policy, constituting an annex to Resolution No. 98 of the Council of Ministers of 12 September 2024 on the adoption of a public policy called the "Digital Transformation of Education Policy", hereinafter referred to as "PCTE", together with an indication of the extent to which the support received under the Programme will contribute to the implementation of the school's digital transformation programme – in the case of schools; 4) an indication of how teachers of the school or institution will be prepared to effectively use the support received under the Programme; 5) failure to receive financial support for the purchase of equipment, teaching aids, or tools identical to the equipment, teaching aids, or tools specified in § 3, paragraph 2 and 3, during the last 4 years prior to the date of submitting the application for participation in the Programme". Pursuant to § section 2 of the Regulation: "The condition referred to in sec. 1 point 5 shall also be deemed to be met in the case of: 1) receiving financial support for the purchase of equipment, teaching aids or tools other than the equipment, teaching aids or tools specified in § 3 sec. 2 and 3, during the last 4 years prior to the date of submitting the application for participation in the Programme; 2) receiving equipment, teaching aids or tools the same as the equipment, teaching aids or tools specified in § 3 sec. 2 and 3 under the National Recovery and Resilience Plan, during the last 4 years prior to the date of submitting the application for participation in the Programme".

Schools or institutions that have received, or will receive, support as part of investments implemented under the National Recovery and Resilience Plan can also benefit from the "Digital Student" programme (*Cyfrowy Uczeń*, n.d.). Pursuant to § 3 of the same regulation: "The condition for participation in the Programme by a pre-

school education institution is: 1) an indication of how teachers will be prepared to effectively use the support received under the Programme; 2) an indication of the extent to which the support received under the Programme will contribute to the implementation of the preschool education institution's tasks arising from the core curriculum for preschool education". Based on § 4 of the aforementioned regulation: "The condition for participation in the Programme by a school in OPREG[20] is: 1) an indication of how teachers in an OPREG school will be prepared to effectively use the support received under the Programme; 2) an indication of the extent to which the support received under the Programme will contribute to the implementation of the OPREG school's tasks".

In the light of § 5 of this regulation: "The condition for participation in the Programme by an institution managed by the competent minister is to indicate how the support received under the Programme will contribute to the implementation of tasks consistent with the basic directions of the implementation of the state educational policy and the objectives of PCTE, concerning: 1) correct methodological use of equipment purchased as part of the investment [...]; 2) computational thinking, skills in the effective teaching of science and natural sciences – mathematics, physics, chemistry, computer science, biology and geography; 3) using ZPE and its resources in the work of a teacher".

Digital education and digital competences are the direction of change in Poland's Digital Transformation Policy for Education, as well as the transformations under *Reforma26.The Compass of Tomorrow* (Ministerstwo Edukacji Narodowej, n.d.). Strategic public policy programmes indicate that technology permeates every aspect of our lives, including education. Technologies are transforming education,

[20] Included in the Centre for the Development of Polish Education Abroad, called "schools in ORPEG".

encompassing "not only widespread access to computers and the internet, but also innovations such as artificial intelligence, the Internet of Things, and the development of virtual reality, which have opened up entirely new possibilities for education. […] modern technologies are introducing a new paradigm in education, providing teachers, students, and educational institutions with a wide range of tools that transform the dynamics of the school environment" (Celiński, 2024). Education in the context of digitalisation offers technology and is an integral element of the Ministry of National Education's Reforma26. The Compass of Tomorrow curriculum reform (*Reforma26, czyli zmiany w szkołach*, n.d.). The reform aims to address technological changes, widespread access to the internet and mobile devices, and the need for educational systems to adapt to the changing school environment, as well as social communication outside of it, in favour of digital communication (Celiński, 2024).

3. Digital Education and Digital Competencies

New technologies are transforming the teaching and learning process, eliminating the boundaries of time and space in education. The teaching system, acquiring knowledge and new digital competencies, faces a constant challenge to keep pace with the changing world toward digital education (Plebańska, n.d.; 2021). Teachers and students can access the resources of the Integrated Educational Platform free of charge, including teaching materials on disinformation. This IT tool offers "numerous teaching materials on media, disinformation, cybersecurity, and critical thinking. […] These materials develop the ability to assess the credibility of sources, recognise manipulation, and distinguish facts from opinions, as well as teach the principles of safe use of the internet and social media. […] There are also materials developed as part of the Cyberlekcje 3.0 project.

[…] materials addressed to teachers who want to effectively teach the principles of safe use of the internet" (Ministerstwo Edukacji Narodowej, 2025). These activities constitute a coherent strategy for strengthening educational and digital security, preparing education users for a conscious life in the digital environment.

The challenge in digital education is to provide students with opportunities to develop key digital competencies while leveraging technology in teaching. Technologies influence education, "not only because they influence how it is delivered, but also because education plays a crucial role in preparing young people for a technology-driven world" (Komisja Europejska, 2020, p. 19). Digital education encompasses "different but complementary perspectives: […] the development of digital competencies in students and teachers; […] the use of digital technologies in teaching to support, enhance, and transform the teaching and learning process" (Komisja Europejska, 2020, p. 20).

Digital competence "involves the confident, critical and responsible use of and interest in digital technologies for learning, working and participating in society. These include information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), security (including digital comfort and cybersecurity competencies), intellectual property issues, problem-solving, and critical thinking" (European Commission, 2020, p. 110)[21]. Digital competences include: "IT competences, which include the use of computers and other electronic devices, safe use of the Internet, applications and software, new intelligent digital technologies, and the ability to apply methods derived from

[21] Council Recommendation of 22 May 2018 on key competences for lifelong learning, 2018/C 189/01, p. 9 (OJ EU C 189, 4.06.2018) ; Council Recommendation of 23 November 2023 on improving the provision of digital skills and competences in education and training (OJ EU C/2024/1030 of 23.01.2024).

computer science when programming and creating IT solutions for problems in various fields (computational thinking); information and communication competences, which consist in the ability to search for information, understand it, select and critically evaluate it, as well as communicate remotely using digital technologies; functional competences, i.e. the actual use of the above competences in various spheres of everyday life, such as finances, work and professional development, maintaining relationships, health, hobbies, civic engagement, spiritual life, etc., in accordance with the principles of safe use of digital technologies […]" (Ministerstwo Cyfryzacji, 2020).

Technology will continue to evolve, and education is essential to learning how to use its tools. Changes in the digital world are accompanied by changes in education (Michalska, 2024). One of the key elements of changes in the school environment is the Graduate Profile, which sets the direction of students' development at all stages of education (*Reforma26, czyli zmiany w szkołach*, n.d.)[22]. It serves as a "compass for Polish education, guiding students: why they are learning, parents: what their children are learning, and teachers: what values, competencies, and knowledge should be at the centre of their attention" (*Reforma26. Kompas Jutra*, n.d.). As part of applying knowledge in practice, this includes: "Developing digital competences in students and teachers, with particular emphasis on safe online navigation and critical analysis of information available there. Teaching digital hygiene, including safe online navigation, responsible use of technology, and the ability to cope with online threats" (*Reforma26. Kompas Jutra*, n.d.).

[22] „The new Graduate Profile for secondary school graduates. […] one of the key links in the comprehensive, research-based education reform being developed. It is linked to the Graduate Profile for preschools and primary schools – together they create a coherent picture of educational outcomes from the earliest years to the end of school." The Profile was developed by the Educational Research Institute – National Research Institute

The reform is intended to be a response to challenges in the area of: "using new technologies while maintaining digital hygiene, resilience to threats, including those related to disinformation, learning critical thinking and verifying information" (*Reforma26. Kompas Jutra*, n.d.). The reform's assumptions include: "disseminating good educational practices and new solutions: new subjects and modular teaching (interdisciplinarity), educational experience (learning by doing), project week, a new method of assessment (better grading) and support for emotional development, digitisation of exams[23], responsible use of new technologies in education, and increasing teacher autonomy"[24].

It is assumed that "Digital competences are the ability to use digital technologies effectively, critically and responsibly in order to learn and function effectively in society, the ability to apply IT methods to create solutions in various fields (including computational thinking) and to acquire and analyse information in the digital environment"[25]. It is easy to see that digital competences constitute the "foundation for understanding transformations in a changing world and flexibly adopting new digital solutions. They are used and developed across all subjects, but the foundation for their development is high-quality computer science education at all levels, encompassing analysis and problem-solving in various fields, programming,

[23] „Dzięki wykorzystaniu nowoczesnych narzędzi cyfrowych co rok będzie podobny poziom trudności egzaminów, aby można było porównać wyniki. Egzaminy będą sprawdzane z użyciem narzędzi cyfrowych, co wyeliminuje prawdopodobieństwo błędów". https://reforma26.men.gov.pl/kompas-jutra-polska-szkola-wsrod-swiatowych-liderow/ [access: 17.01.2026].

[24] „W roku szkolnym 2025/26 do szkół trafi 12 tys. pracowni AI, 4 tys. pracowni STEM oraz 735 tys. laptopów i tabletów, wspierających naukę języków, programowania i indywidualizację pracy z uczniem". https://reforma26.men.gov.pl/kompas-jutra-polska-szkola-wsrod-swiatowych-liderow/ [access: 17.01.2026].

[25] Annex to the Council Recommendation of 22 May 2018 on key competences for lifelong learning – A European Reference Framework (OJ EU C 189, 04.06.2018).

robotics, the use of ready-made applications, digital devices, digital collaboration, cybersecurity, and digital law. Based on these competences, students can effectively use computer software, artificial intelligence, electronic devices, and the internet. Competencies related to working with information, such as navigating, searching, analysing, and selecting digital information, as well as communicating in the digital sphere, are also essential in this area. Knowledge of online safety, including dealing with information overload and digital hygiene, is also essential in these activities" (Pająk-Załęska et al., 2025, pp. 63–64).

It is also noted that "Students in all types of schools develop digital competencies, including coding, computational thinking, and the ability to search for and critically analyse information, communicate using technology, solve problems using computers, and ensure respect for copyright and online safety. […] have the opportunity to develop creativity, innovation, and self-expression by creating applications, multimedia projects, and other digital forms of expression. Knowledge in this area allows them to understand the operation of computer systems and networks, learn about the possibilities of using IT tools in various fields, and shape the attitudes of responsible technology users (personal data protection, netiquette)" (Pająk-Załęska et al., 2025, pp. 89–90).

In a changing world, digital competences constitute a "tool for communication, collaboration, and cooperation, […] characterised by convenience, independence from time and place, […] the possibility of increased interaction outside of traditional forms of communication. […] they teach critical thinking, support higher mental operations, develop socialisation processes, and are also an important tool for solving many problems" (Torończak, 2018, pp. 174–175). This is confirmed by the Council's recommendation: "Digital competences involve the confident, critical, and responsible use of digital technologies and an interest in them for learning, working, and participating

in society. They include the ability to use information and data, communicate, and collaborate"[26].

Education is a continuous, multifaceted process, acquired over years, without age limits, lasting from birth to death. The Polish education system is characterised by the heterogeneity of schools, their types, and educational services. Legislation provides numerous opportunities for public and private entities to establish and operate schools and other institutions engaged in educational activities. However, in today's digital world, an increasing amount of information and knowledge comes from outside the school environment, and we must learn to utilise it. Therefore, the questions "who am I?", "where am I?", and "what am I doing/what are we doing together?" seem relevant in this context (Michalska, 2024, p. 11).

The challenge of educational change is the transition from standardised education to an individualised and personalised learning process (Michalska, 2024, p. 12). The provision of educational services in the country, awareness of these changes, and educational diversity are increasing. Global educational trends force education to constantly modernise, as the world is changing, and education is changing with it (Blicharz & Raszewska-Skałecka, 2025, pp. 141–160). One must fully agree with J. Michalska (2024, p. 8) that "we live in interesting times, times of disruption and fundamental changes". Education is the future for the modern era in terms of accessible and new forms of educating society. The importance of knowledge and educational activity in the country and worldwide is constantly growing, forcing us to diversify our education and look to the future.

[26] Council Recommendation of 22 May 2018 on key competences for lifelong learning, Official Journal of the European Union, C 189/1, 4.6.2018

4. Media Education and Digital Security

The literature notes that digital technologies are playing an increasingly important role in both interpersonal relationships and the provision of public services. It is indisputable that the "concept of digitalisation is not limited solely to the use of ICT tools (primarily computers) in data processing or digitisation. Digitalisation is an ambiguous term, with specific social (society networking, digital accessibility), economic (production and offering online products), and strictly technological (development of ICT infrastructure, application of artificial intelligence) consequences" (Skoczylas, 2024, pp. 61–62). Under Article 5 of the Constitution of the Republic of Poland, one of the fundamental tasks of the state (public administration bodies) is to ensure the security of citizens[27], of which, due to widespread digitisation, cybersecurity is a special type (Skoczylas, 2024, p. 62). As a result, it should be considered a determinant of the functioning of electronic administration. There is therefore no doubt that the development of digital competences and digital education should be considered a sine qua non condition for the functioning of electronic administration (Skoczylas, 2024, p. 62).

"We learn throughout our lives" is a saying that takes on new meaning (Michalska, 2024, p. 50), as the development of new technologies, with artificial intelligence at the forefront, will generate new professions of the future related to digital transformation and new competencies of the future appropriate to the evolving reality. As Michalska (2024, p. 50) notes, "new technologies such as AI, VR, AR and other autonomous systems open up a huge space for the development of talented specialists combining design with programming, able to imagine and create solutions for the future"). The la-

[27] Constitution of the Republic of Poland of 2 April 1997 (Journal of Laws No. 78, item 483, as amended).

bour market already requires/will require a qualitative shift in the education system toward personalisation, enabling the use of generative artificial intelligence models, virtual reality (VR), and augmented reality (AR), among other things. ZPE – the official online platform of the Ministry of National Education, created to support teaching and learning – plays a crucial role in media education. Its primary goal is to provide free access to digital educational materials aligned with the core curriculum. It enables the creation and delivery of online courses, the sharing of teaching materials, and the monitoring of progress (Platforma edukacyjna, n.d.). E-learning platforms enable flexible learning anytime, anywhere. Platform participants have access to educational materials across various fields, lectures, and video resources, and they can interact with teachers and other course participants. Examples of e-learning platforms include LinkedIn Learning, Google Classroom, and Duolingo. It is quite obvious, and one should agree with J. Michalska that digital services "do not involve tapping on a mobile phone or tablet, but enable dealing with ambiguity, integrating various sources of information, and synthesising knowledge" (Michalska, 2024).

In educational policy, one of the directions of the state's activities is: "promoting digital hygiene and safe online navigation, developing skills in critical analysis of information available on the Internet, methodologically correct use of modern technologies by teachers, in particular those based on artificial intelligence, and using the resources of the Integrated Educational Platform" (*Podstawowe kierunki realizacji polityki oświatowej państwa w roku szkolnym 2025/2026*, n.d.). The Ministry of National Education has developed a guide entitled "Safety starts at school – education protects against disinformation" on the safe use of new technologies, which covers the following issues (Ministerstwo Edukacji Narodowej, 2025): Promoting digital hygiene, Safe use of media and information, Teacher training, Teaching materials on disinformation on the Integrated

Educational Platform (ZPE), Initiatives promoting conscious use of the internet and combating disinformation, Safety Week, Fighting disinformation.

The Ministry of National Education is also developing many initiatives to promote media education and build social resilience against disinformation. The strategic document, Digital Transformation of Education Policy, defines the framework for state action in the digitalisation of education until 2035, emphasising the safe use of media and information, the development of critical thinking skills, and protection against information manipulation. The Ministry of National Education also places great importance on teacher education. Using European funds, such as the National Recovery and Resilience Plan and the European Funds for Social Development, teachers are planned to be trained in digital and media competencies.

The training covers both legal and practical aspects of using digital educational resources. Students and teachers can access ZPE resources free of charge – an IT tool containing numerous teaching materials on media, disinformation, cybersecurity, and critical thinking. The Minister of National Education: "embraced honorary patronage over a number of initiatives that contribute to the fight against disinformation and promote responsible and informed use of the internet among children and young people. Another important element of safety and prevention efforts is the nationwide information and educational campaign 'Safety Week', addressed to students, teachers, and parents" (Ministerstwo Edukacji Narodowej, 2025).

In terms of digital security, installing and updating software to protect students from accessing content that may pose a threat to their proper development is permitted under Article 27 of the Education Law: "Schools and institutions providing students with access to the Internet are obliged to take measures to protect students from accessing content that may pose a threat to their proper develop-

ment, in particular by installing and updating security software"[28]. It is also important to note that in accordance with Article 2 paragraph 1 point 2 of the Act of 7 July 2023 on supporting the development of digital competences of students and teachers[29], support financed from public funds is available to teachers, educators, and other pedagogical staff in an employment relationship as of September 30, 2023, in public and non-public primary and secondary schools and in public art schools, as well as in non-public art schools with public art school authorisation. Guidelines issued by the Minister of National Education for each school year emphasise the responsible use of new technologies, including artificial intelligence-based tools. In accordance with applicable regulations, teacher training institutions develop training offers to ensure this goal is achieved (Ministerstwo Edukacji Narodowej, 2025).

As D. Skoczylas (2024, p. 68) states, "today, digital literacy and cybersecurity policy are the sine qua non conditions for the functioning of electronic administration. This stems from two fundamental issues: first, the need to ensure the secure provision of remote services, which entails protection against cyber threats. Second, it concerns the development of digital literacy among users of new technologies, which helps reduce barriers to digital accessibility and increase awareness of cyber threats".

In summary, education forces us to constantly learn how to use new technologies. Artificial intelligence (AI) in education is revolutionising this field, offering teachers and students tools to personalise learning, automate routine tasks, and enrich the educational process. Access to internet resources and innovative technologies enriches the educational process by engaging teachers and students

[28] Journal of Laws of 2025, item 1035, as amended, hereinafter referred to as the Personal Data Protection Act.

[29] Journal of Laws of 2024, item 1774, as amended.

in interactive activities and by adapting instruction to diverse educational needs. New technologies enable the transfer and acquisition of knowledge by students through interactive and personalised teaching methods (Grzywna, 2024, p. 9). The future of e-education means "moving forward" toward exploring ever new forms of teaching and educational methods. It is increasingly difficult to answer questions about the shape of tomorrow's education, the competencies necessary for the future, and, more broadly, the competencies needed in the 21st century. The future of education is determined by social change (Szymański, 2024, p. 124).

One must agree with M. J. Szymański (2024, p. 125) that this social change has become "rapid, forcing modifications to people's way of life, their assessment of their place in the world, their daily behaviours, values, aspirations, and life goals". Thinking about the competences of the future, as already indicated, "[…] allows for the appropriate design of the educational process, but also makes students aware of the need for continuous learning, autonomous and responsible response to a dynamically changing situation" (Kwiatkowski, 2018, p. 23). This type of discourse undoubtedly requires in-depth knowledge, because the use of the Internet and AI technologies in education offers transformative possibilities, but also brings with it concerns related to traditional ethical issues (including transparency, security, privacy and data protection, equality, protection of dignity and justice, and non-discrimination) (Blicharz & Raszewska-Skałecka, 2025).

Chapter II

Digital Services in 21st Century Education

1. The Concept and Types of Digital Services

In scientific discourse, 21st-century society is defined as an information society (Szewczyk, 2007, p. 10; Mikulski, 2008, pp. 147–159; Sitek, 2022, pp. 93–98; Papińska-Kacperek, 2013, pp. 19–31; Dąbrowska et al., 2009). Its foundation is "information. […] A knowledge-based society is similarly defined. The difference is that in this case, knowledge is developed, and it is this knowledge that forms the basis of social action. […] According to researchers, the information society is transforming into a network society, the essence of which is a network of social relations and free access for individuals to participate in various organisations, social groups, and interest circles. In these circles, participants exchange information or create new ones" (*Edukacja wobec wyzwań społeczeństwa informacyjnego*, n.d.).

The difference between knowledge and information is that knowledge is information on a specific topic, while information is data organised in a specific way (*Edukacja wobec wyzwań społeczeństwa informacyjnego*, n.d.). As we can see, the internet has long since gone beyond browsing websites, sending emails, using instant messaging, or playing online games. Using the internet at any time and in any location, we search for digital content – information in educational resources available online, or digital services – provided this way. The internet has become a space for handling official matters online (e-government), remote learning, entertainment, using bank-

ing services (e-banking), selected remote medical services, remote work, a place for professional and personal meetings, e-commerce – the ability to buy and sell goods and services online (e-commerce), and so on (Świat e-usług, n.d.).

In this part of the monograph, it is important to focus on education in the context of public services – educational digital services, their types and methods – in particular, how new digital services and intelligent solutions are impacting education in the 21st century. What is the educational role of online resources and educational platforms in fostering new teaching and learning methods? The issue of access to digital education, as well as emerging digital inequalities and digital exclusion, is discussed in the remainder.

Education, as a fundamental part of the public services sector, is present in all societies and economies. It is primarily education in the broad sense that should "shape the information society by teaching skills and shaping behaviours and attitudes related to the collection, processing, storage, use, and sharing of both information and knowledge. Globalisation, in addition to scientific and technological progress, also forces changes in the learning and teaching system" (*Edukacja wobec wyzwań społeczeństwa informacyjnego*, n.d.). Consequently, the tasks of education in shaping the information society include "shaping competencies within information and communication technologies; improving the quality of education and ensuring equal opportunities for all students regardless of place of residence; encouraging self-education and independent search for information and knowledge, including on the internet; and developing the ability to filter and process acquired information and knowledge, i.e., teaching analytical thinking" (*Edukacja wobec wyzwań społeczeństwa informacyjnego*, n.d.).

Based on the provisions of Directive 2000/31/EC of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the internal market (Directive on electronic

commerce)[30], the Polish legislator adopted the Act of 18 July 2002 on the provision of services by electronic means[31]. In Article 2 point 4 of the Act, the legislator uses the term "provision of a service by electronic means", which defines the subject matter of the Act. The definition of a service provided electronically is equivalent to the concept of an information society service. According to the legislator, the conditions for recognising that we are dealing with the provision of services by electronic means are: 1) performance of a service provided without the simultaneous presence of the parties (remotely); 2) through the transmission of data at the individual request of the service recipient.

The concept of electronically supplied services encompasses a range of activities conducted online (for example, searching for various types of content on the Internet, transmitting and storing data, offering commercial information, concluding online contracts) (Ganczar, 2010, p. 176). Thanks to the development of the Internet and new technologies, many e-services are now available to users. It is widely noted that it is difficult to determine with certainty whether a given online activity constitutes an e-service, as things change very quickly due to the digital revolution. We participate in the dynamic development of the potential of information and telecommunications technologies, which favours the modernisation and continuous improvement of e-services. It can be noted that an e-service is identified and understood as meeting the following conditions: "1) it is provided in a partially or fully automated manner by information technology, 2) it is implemented on the Internet and via the Internet, 3) it is individualised to the recipient (personalised), 4) the pages of

[30] Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market ('Directive on electronic commerce'), OJ EC L 178, 17.07.2000.

[31] Journal of Laws of 2024, item 1513.

the service provided are located in different places (remote service)" (Batko & Billewicz, 2013, p. 48).

It is also worth noting that e-services delivered over the internet are automated (and may require minimal human involvement) and delivered remotely. This means that e-services are typically distinguished from traditional services by the absence of human involvement and the provision of services remotely. It is generally accepted that e-services should be delivered via an IT system, such as a web application or website, and provided at the request of the service recipient (at any time and in various forms) (Batko & Billewicz, 2013, p. 48). As P. Romaniuk emphasises, implementing e-services that respond to evolving challenges is an important area of building relationships between citizens and specific public administration offices (Romaniuk, 2020, p. 270). It is worth noting that e-services are considered a new form of service delivery using the internet, from the moment a company contacts a customer to present an offer, through ordering the service, its provision, and subsequent contact with the customer (Dąbrowska et al., 2009, pp. 40–41).

The ongoing development of e-services presents public administration with new challenges in adapting services to citizens' needs. Services are a key sector of both the economy and public administration (Świtał, 2022a, p. 137). The development of electronic services can be observed in areas such as communication, administration, commerce, banking, healthcare, finance, science, tourism, and culture. For the sake of this topic, we will limit ourselves to e-learning – appropriate distance-learning techniques utilising all available media: the Internet, intranet, audio-video tapes, CD-ROMs, satellite broadcasts, television, radio, and meeting platforms (ClickMeeting, Microsoft Teams, Moodle LMS, and ILIAS LMS educational platforms). Dynamic technological, social, and economic changes in recent years have challenged the concept of traditional education. It can be noted that in environments where technological innovations take place,

"societies are becoming more and more culturally diverse, and economic structures are evolving towards a knowledge-based economy, the concept of competences of the future requires redefinition" (Smolak, 2024, p. 93).

Jolanta Blicharz and Lidia Zacharko point out that AI technology must be used in a way that ensures citizen trust and serves the general interest and public activities. In their opinion, the following factors should be considered when implementing AI in public administration: human primacy (AI must serve humans, who must maintain control over it); justice (AI application must ensure non-discrimination, which includes correcting hidden biases); transparency (necessary access to the system's operating principles), and security, which guarantees against the risks associated with cyberattacks (Blicharz & Zacharko, 2024, p. 353). As they correctly assess, AI in itself will not reform public administration, but it can significantly impact its development, making it more responsive, efficient, and citizen-oriented (Blicharz & Zacharko, 2024, p. 355). Grażyna Szpor emphasises that in the context of digital transformation, "digital solidarity", an element of "digital rights and principles", and "cybersolidarity", play an important role (Szpor, 2024, pp. 3–14). In turn, Magdalena Małecka-Łyszczek (2024, pp. 15–22) argues that the transformation of classically understood civil society requires building an interpretive context for digital solidarity by embedding considerations related to it within values such as human dignity, equality, democracy, and freedom. The author draws attention to the personalistic vision of digital transformation, reminding us of the axiological foundation of digital inclusion – human dignity (human dignity as conducive to digital inclusion); equality – so that everyone, on the basis of equality, can benefit from the opportunities offered by digital transformation; democracy – access to the digital public space enables access to diverse content, which, as the author writes, guarantees pluralism – the key to the development of digital civil society

structures and freedom – the choice regarding the use of modern technologies. One must agree with Małecka-Łyszczek (2024, pp. 17–20) that this will be an increasingly difficult task, as algorithms and artificial intelligence are increasingly embedded in our daily lives. In the literature, Szpor (2024, p. XVII) states that in a globalised and depersonalised world, the importance of protecting individual rights and dignity is growing, thus, the concept of solidarity is directed at people, whose rights and well-being should be the determinants of further technological development.

2. Digital Services Towards New Methods of Teaching and Learning

Distance learning via the internet is e-learning that uses information technology. There are many websites and platforms that enable remote learning and knowledge acquisition. The development of the internet as a tool for learning and knowledge acquisition is evolving, with new educational sites and technologies supporting learning emerging (*Edukacja w sieci*, n.d.). The COVID-19 pandemic, which began in 2020, forced the state to accelerate the digitisation of education and science. It should also be clearly emphasised that there is no education without learning. The digitisation of public services has become a necessity over time. During the COVID-19 pandemic, remote learning took place through online meeting platforms and e-learning platforms, which enabled group meetings, as well as the sharing of educational materials, etc. Using ZPE educational resources, it is worth noting that many such platforms were created or gained popularity during the pandemic, including (*Edukacja w sieci*, n.d.):

1) "Teams" and applications included in the Office 365 suite (Word, Excel, PowerPoint) – a platform developed and made available by Microsoft. In Poland, it is one of the most popular

platforms used for online lessons. In addition to virtual team meetings, it allows for assigning homework, creating tests, and similar options.

2) G-Suite for Education – a platform provided by Google, which includes: a virtual disk for storing data in the cloud, the Google Docs office suite (a free equivalent of Microsoft Office, including a text editor and a spreadsheet launched by the browser) and the Meet application for online meetings.
3) Moodle – one of the oldest platforms enabling distance learning, used by universities and some schools. It allows for creating lesson content, sharing educational materials, and monitoring learning progress. The Moodle platform is software that must be independently implemented at the school or university and made available, for example, via a website to registered users. Alternative solutions include the Dokeos and Fronter platforms, which offer more features for online meetings (Moodle does not offer these options).

When reviewing ZPE's electronic resources, the following platforms for distance learning can be considered (*Edukacja w sieci*, n.d.):

1) Khan Academy – a free platform founded in the United States by Salman Khan. Initially, it contained educational materials only in English, but for several years it has also been available to Polish-speaking users. The Khan Academy website offers educational materials in mathematics, physics, chemistry, biology, economics, and computer science.
2) Code Academy – a free platform that enables acquiring knowledge and skills in programming. Course authors allow users to choose development paths and suggest educational materials appropriate to their skill level. The platform is available in English.
3) Kahoot – a website and mobile app that enables creating quizzes and share them with others.

4) Quizizz – a website and mobile app that allows students to create and share multimedia presentations, as well as test their knowledge through quizzes, tests, and quizzes. The platform is available in Polish and can be used free of charge or for a fee to access additional tools.
5) Genially – a platform that allows students to create and share multimedia and interactive content. The ability to share content via popular social media platforms, as well as Teams and Google Classroom, is worth noting.

One of the online platforms that allow students to acquire specific knowledge and skills is YouTube, a video content platform. This platform features numerous channels where creators share educational and popular science content, as well as tutorials and guides. The platform's educational offerings are complemented by channels that publish specialised content in a given field, such as computer science, where one can learn programming or use a specific computer program (*Edukacja w sieci*, n.d.; *Poszukiwanie wiedzy w sieci*, n.d.).

3. Access to Digital Education and the Phenomenon of Digital Inequality

In scientific discourse, it is important to keep in mind the distinction between the concepts of access, availability, and digital access. Following Mędrzycki, access is associated with the existence of "something", availability with ease of use of that "something", and freedom of access. Digital access is ensured when a person has a computer with Internet access and the necessary digital skills (competences) and appropriate motivation to use electronic tools to search for information (Mędrzycki, 2024, p. 21). Digital accessibility can therefore be defined as the "practice of making websites accessible to people who require more than just traditional browsers to ac-

cess the Internet. […] the lack of accessibility of websites and mobile applications is a threat to people with disabilities because it leads to social exclusion" (Mędrzycki, 2024, pp. 37–38).

By law, every person should have equal access to information and e-services provided by public entities (*Dostępność cyfrowa podmiotów publicznych*, n.d.). Digital accessibility is one of the features that digital solutions should have to enable their use by the largest possible group of users (*Co to jest dostępność cyfrowa*, n.d.). This is a relatively new concept and simultaneously poses a challenge for public entities, which must ensure the digital accessibility of their websites and mobile applications (*Omówienie wymogów dostępności cyfrowej dla podmiotów publicznych*, n.d.). These digital accessibility solutions must meet legally required principles: perceptibility, functionality, understandability, and compatibility (robustness). Thanks to digital accessibility, these solutions can be easily used by people with varying degrees of hearing, movement, vision, or cognitive abilities. The internet was created so that virtually anyone can use it, regardless of hardware, software, language, location, or skills. However, for this universality to work, websites, web applications, mobile applications, and the programs that enable the creation and management of these solutions must meet specific principles (*Co to jest dostępność cyfrowa*, n.d.). Public entities throughout the European Union are obligated to ensure the digital accessibility of their websites and mobile applications (*Dostępność cyfrowa podmiotów publicznych*, n.d.). In Poland, these obligations are legally defined in the Act of 4 April 2019 on the digital accessibility of websites and mobile applications of public entities[32].

Access to digital education in the education system applies primarily to the suspension of classes in schools and educational institutions. For example, with respect to the suspension of educational classes and the use of distance learning methods and techniques,

[32] Journal of Laws, item 848.

based on statutory delegation in accordance with Article 125a paragraph 6 of the Education Law Act[33], the minister responsible for education and upbringing shall specify by regulation[34], detailed conditions for organising and conducting classes using distance learning methods and techniques in kindergartens, other forms of preschool education, schools and institutions, of classes referred to in Article 125a section 1 Education Law Act. Classes using distance learning methods and techniques are carried out using an IT tool provided by the Ministry of National Education, using electronic means of communication, ensuring the exchange of information between the teacher, student and parent, or by the student undertaking activities specified by the teacher, confirming that they have become familiar with the indicated material or have performed specific activities.

To make the system more flexible and adaptable to various circumstances, the legislator also allowed classes to be conducted using other methods, provided they enable the continuation of the educational process (Pilich, 2022). It should be added that, in connection with the suspension of classes and the transition to distance learning, the legislator imposed on the school principal the obligation to provide information in this regard to the governing body and the body exercising pedagogical supervision. This information covers the method(s) of conducting classes using distance learning methods and techniques, indicating the possibility of using various distance learning methods (Pilich, 2022). The school principal is responsible for carrying out specific tasks related to organising education through distance-learning methods and techniques. Ensuring conditions for stable and safe operations rests with the school

[33] Article 125a section 6 of the Act of 14 December 2016 – Education Law (consolidated text: Journal of Laws of 2025, item 1043).

[34] Regulation of the Minister of Education and Science of 2 September 2022 on organising and conducting classes using distance learning methods and techniques (Journal of Laws, item 1903).

principal and the school's governing body, whose role is to support schools in the education system during the implementation of distance learning. The school principal should inform parents, students, and school staff about the dates and rules for full or limited class suspensions, implemented individually at the school, as well as for remote learning. Remote communication in this regard includes, for example, electronic journals, email, instant messaging, telephones, bulletin boards, and the school website (Lesińska, 2020a; 2020b).

Importantly, as of September 1, 2022, issues concerning the suspension of classes in the face of various threats were elevated to the statutory level, specifically to Article 125a of the Education Act, and the principal's obligations regarding conducting classes via distance learning were established (Lesińska, 2023). The COVID-19 situation forced administrative entities to shift the provision of educational services to electronic channels, which has had, and continues to have, an impact on emerging challenges and social expectations regarding this form of public service delivery (Raszewska-Skałecka, 2024a, pp. 167–180). COVID-19 has prompted a review of remote learning methods and has become a priority in the state's educational policy, emphasising the use of digital tools and resources, as well as distance learning, in educational processes, including the safe and effective use of digital technologies. The educational resources at www.gov.pl/zdalnelekcje offer proposals for content aligned with the current core curriculum for use during remote learning[35].

[35] The COVID-19 situation concerned various forms of support from the Ministry of National Education and continues to include remote learning: Ministerstwo Edukacji Narodowej, „Dobre praktyki w zakresie zdalnej edukacji" – poradnik MEN (https://www.gov.pl/web/edukacja-i-nauka/dobre-praktyki-w-zakresie-zdalnej-edukacji--poradnik-men [access: 20.01.2021]); Lesińska, (2020b); Ministerstwo Edukacji Narodowej, *Lekcje z internetu – rusza serwis gov.pl/zdalnelekcje* (https://sip.lex.pl/#/publication/151362059/ministerstwo-edukacji-narodowej-lekcje-z-internetu-rusza-serwis-gov-pl-zdalnelekcje, LEX/el. 2020a; see *Poradnik dla dyrektorów* (n.d.); *Poradnik dla nauczycieli* (n.d.); *Poradnik dla rodziców* (n.d.).

The example of remote learning in education during this time has become a way to carry out educational tasks in the state, but it also highlighted the phenomenon of information asymmetry in public administration (ed. Cendrowicz & Chrisidu-Budnik, 2022), including education (Raszewska-Skałecka, 2022, pp. 83–91). Information asymmetry in public education is a phenomenon accompanying the diverse actions undertaken by public administration, the sources of which are diverse, especially during the period of an epidemic threat or epidemic, and in specific situations related to the prevention, counteraction, and combating of COVID-19[36], as we have experienced. Information asymmetry involves, among other things, unequal information resources on the part of one party to public education regarding access to distance learning services and their quality in the educational services market. Information imbalance in education creates legal uncertainty for the party, who cannot predict the correct course of action, including choosing a school in the competitive educational services market (Raszewska-Skałecka, 2022). The causes of information asymmetry in public education may stem from the public administration's application of legal provisions often unknown to the other party, from variable legal provisions created ad hoc depending on the development of specific issues, including the current epidemiological situation in the country for the recipients of its actions, or from the possession by public administration bodies of a specific administrative authority, which results in the inequality of entities expressed in the ability of a public administration body, such as the Minister of Education and Science, to shape the other party's situation, regardless of the other party's will, but in accordance with the law. This

[36] Act of 2 March 2020 on special solutions related to the prevention, counteraction and combating of COVID-19, other infectious diseases and crisis situations caused by them (Journal of Laws, item 374).

leads to the statement that "administrative activity causes changes in its environment" (Chrisidu-Budnik, 2017, pp. 29–43).

Education and learning in the educational services market are service-based, meaning that educational activities such as care, upbringing, teaching, and research exhibit service characteristics (Peszko, 2015, p. 182). At various levels of education, these services are characterised by the following characteristics (Peszko, 2015, pp. 182–183): immateriality, inseparability, diversity, impossibility of storage and appropriation, individualisation. The specific nature of these services indicates that schools' educational activities are intangible and directed at learners, and that the quality of their services depends on brand evaluation and credentials as factors that distinguish them from other educational institutions. In the case of inseparable educational services, knowledge is directly transmitted by the teacher and received by the student through communication. Currently, distance learning is a different state from in-person education. It is worth agreeing with the thesis that the "inseparability of the production and consumption of educational services allows for ongoing monitoring of its outcomes and recipient preferences" (Peszko, 2015, pp. 182–183). The multitude of schools, the diversity of educational services, their forms of instruction, and the variability in service quality make managing the educational process challenging, as it is difficult to clearly assess the services provided by all educational institutions. The argument that "[…] conclusions from comparative analyses of schools should be individually assessed by each entity" is plausible (Peszko, 2015, p. 183). Educational services are continuous; "they cannot be stored or acquired ownership rights", and the purchaser has access only to a given service activity. Like other products, an educational service also "has a life cycle". Furthermore, interest in the educational services offered varies from client to client-student. Therefore, "it is important to understand the needs of potential customers, develop

the offer, and appropriately communicate it to potential stakeholders" (Peszko, 2015, p. 183).

In the scientific discourse, apart from the classic features of educational services, individual features of schools in the educational process are also distinguished, including higher education institutions, which include (Peszko, 2015, pp. 183–184): interdisciplinary nature, multi-subjectivity, complex service provision process and long implementation time, one-time (homogeneous) use of the higher education institution service by student-clients, dual role of students – as clients and as a product of the educational offer, participation of students in co-creating the service, capitalisation of effects – temporary shift in the evaluation of the service effects. It is important to note that the decision-making process of a student client (parent, student, or learner) when choosing a school involves both a market decision and their future quality of life (Peszko, 2015, p. 183). Participants in educational services are forced to constantly monitor educational trends and gather all information about school offerings and the quality of the services provided. A direct factor influencing the diversity of schools and the quality of services provided in the market is the unstable environment and the challenges of civilisational progress. These significantly impact the choice of school and access to its services.

Initially, it should be assumed that just because we have access to digital technologies at a given time does not mean we are immune to the threat of digital exclusion. In line with the previous discussion, we must agree with the thesis that the "greatest limitation to the development of information technology may, in fact, be humans themselves. This is due to two aspects: limited human intellectual abilities and social disapproval of new technologies" (*Rozwój informatyki*, n.d.). The concept of limited human mental capacity "does not refer to whether humans can manage to acquire new knowledge or continue to develop current technology. What matters is whether

a machine can do it better, faster, and with less effort. We will reach a point where humans will be unable to physically match artificial intelligence, which has a very high capacity for self-learning and a high degree of verification of possible options, most necessary to achieve a given goal" (*Rozwój informatyki*, n.d.). In turn, "social disapproval of new technologies, such as artificial intelligence or industry automation, could stall technological development for years to come. Perhaps we will soon witness widespread strikes, driven by fear of job loss or by the rapid changes in our environment. There is also the issue of the increasing social stratification into two camps – those familiar with technology and those who do not understand it or consciously forgo it" (*Rozwój informatyki*, n.d.).

The literature points out that a knowledge-based society "may become, to a far greater extent than an industrial society, a society that excludes those who fail to meet its requirements. This also, and perhaps above all, applies to children and young people living in conditions of deprivation and poverty" (Belcer & Warzywoda-Kruszyńska, 2013). One factor that increases the risk of social exclusion is digital exclusion, which is characterised by the fact that "certain individuals or social groups have difficult or even impossible access to the Internet. […] it therefore refers to limitations in the use of modern technological achievements (or means, for example, lack of access to the Internet)" (*Wykluczenie cyfrowe*, n.d.; Batorski, 2009, p. 226). Digital exclusion is a "phenomenon in which people affected by it either do not have the opportunity to use digital technologies or this access is limited" (*Wykluczenie cyfrowe*, n.d.). According to Batorski (2009, p. 225), the concept of digital exclusion "refers to the differences between those who have regular access to digital and information technologies and are able to use them effectively, and those who do not". In his opinion, the "problem of digital exclusion is much more complex and multidimensional: in order to identify various barriers to the widespread use of new technologies, it is necessary

to examine different attitudes towards them. […] – motivations for using new technologies, – physical access (owning a computer, access to the Internet), – skills (strategic, information, operational), – use (different ways of using)" (Batorski, 2009, p. 226). On the other hand, Kurowska (2013, p. 3), points to two levels of digital exclusion: the first is related to the differences between those using new technologies and those who do not have access to them; the second, the differences in skills and ways of using new technologies. In the first case, the excluded group comprises individuals who lack access to digital technologies (e.g., computers, the internet), while the second level affects people whose ability to use computers and the internet is limited (resulting from a lack of desire or ability). The levels mentioned here also result from various reasons. First-degree exclusion may be related to logistical, economic, social factors, etc., in turn, second-degree exclusion may be caused by a lack of skills or opportunities (lack of opportunities means, among other things, lower physical fitness, reduced cognitive abilities – related to learning about the world or studying cognitive processes) (*Wykluczenie cyfrowe*, n.d.).

The digital divide is inevitably linked to the concept of the information society, as discussed in this publication. It cannot be ignored that the term was first used in 1963 by anthropologist Tadao Umesao (Papińska-Kacperek, 2013, p. 23)[37], who described the "stage of social development in which information has a superior value – it becomes, in a sense, a new denomination or commodity that, thanks to its powerful capabilities, displaces other tangible and intangible goods" (*Wykluczenie cyfrowe*, n.d.). It is worth recalling that the information society has also become a key issue in European Union

[37] The author points out here that the importance of information in the world was captured by Tadao Umesao, who in 1963, in an article on the evolutionary theory of society, called the beginning of the era johoka shakai, or "information society" – which emphasised the role of information processing in the modern world.

regulations and strategies. Numerous action plans have been developed for all member states, and since 2004, when Poland joined the EU, they have also applied to Poland (Papińska-Kacperek, 2013, pp. 28–31). The information society has been under construction in Poland since 2000, i.e., since the resolution of the Sejm of the Republic of Poland of 14 July 2000 on building the foundations of the information society in Poland[38]. And although we have already drawn attention to the foundations of the information society, let us only add here that the law should protect society against abuses related to new digital products within digital services and must define controversial issues in the use of new technologies (ed. Grzebyk, 2025).

It is important to remember that digitalisation creates significant opportunities for abuse: "personal data collected in public or commercial databases can be used to profile individuals or social groups, for commercial and political purposes. This perspective rightly raises concerns about the preservation of human freedom" (Sitek, 2022, pp. 98–102). The development of new information and communication technologies and access to digital products and services online can also lead to social stratification, resulting in digital inequality and digital exclusion. Therefore, expectations and challenges are directed at public administration, as it cannot remain indifferent to the opportunities and challenges that technological advancement brings to society, even beyond the sphere of direct influence of state bodies. Therefore, the state is engaged not only in developing information technologies within the administration itself and in its interactions with citizens, but also in intervening in situations that threaten digital security.

The involvement of the state and local government in expanding telecommunications infrastructure is aimed at counteracting the so-called digital divide, i.e., the phenomenon of deepening differences between citizens due to varying levels of access to the internet and

[38] M.P. No. 22, item 448.

electronic services (Mednis, 2014, pp. 221–222). It should be emphasised that digital exclusion is a "phenomenon that is not only related to the lack or limited physical access to the Internet, but also to the inability to use the Internet and the lack of knowledge of languages, however, the basis for using modern services, including digital administration, is physical access to the Internet, and with parameters that enable the efficient handling of current matters" (Mednis, 2014, p. 222). New digital technologies mean that the tools we use are algorithms, and these algorithms are changing the people who use them and, in turn, changing society (Piotrowski, 2025, p. 20).

The process of reversing the digital divide is digital inclusion, understood here as counteracting digital exclusion, so-called digital integration, encompassing the widespread availability of technologies and the ability to use them. Access to these services is often a prerequisite for participation in public life (*Wykluczenie cyfrowe*, n.d.). In the digital world, information and services provided electronically, including AI in education and technological innovations in this area of public administration, offer significant potential to develop and improve the quality of education and advance science. Their implementation is associated with many expectations and challenges of the information society. Teachers and students must acquire new skills, schools must invest in appropriate technological infrastructure, and employees in the labour market must expand or acquire new competencies of the future.

However, the key to all of this is maintaining a balance between traditional and digital forms and methods of teaching to avoid excessive reliance on technology (Walusiak et al., 2023, p. 180). Furthermore, it is important to remember that the biggest challenge in distance learning is still the lack of direct contact with others. Beyond the social aspect of distance learning, there's also the issue of insufficient knowledge when using professional equipment. The transition to online reality may be natural for some, but for others, it may be limited or

even impossible. Often, entering the digital world can be accompanied by anxiety and fear of the unknown, or by technical limitations.

To sum up, in the information society, despite the development of digitalisation of education and technology in the 21st century, the phenomena of digital inequality or digital exclusion are intensifying, determined by factors such as age, education, place of residence, difficult financial situation and income limitations in access to the purchase of computer equipment, appropriate knowledge and fees, or due to a given disease, etc. Hence, active measures by public administration seem crucial to ensure that children and young people, the elderly and people with disabilities have decent access to appropriate public digital services in the area of support for those in need, by making available the nearest public institutions or administrative facilities (schools and educational institutions, libraries, community centres, day care centres, social welfare homes) "and not only by leaving certain public funds at their disposal. From the point of view of the right to self-fulfilment and subjectivity in society, it is not enough, for example, to provide students with computer equipment, but it is also necessary to provide knowledge, so-called digital competences, among other things, to protect against possible abuses in the virtual world or "objectification of the user" (Pułło, 2024, p. 35) or threats to human rights related to new technologies, including artificial intelligence, "reducing people to the role of servants to the tools they create" (Piotrowski, 2025, p. 11).

Scientific research increasingly draws attention to the diverse assessment of new technologies and the consequences of their application in all areas of life, where: "The development of new information and communication technologies creates the need to formulate new human rights in response to expected threats, especially those attributed to artificial intelligence, sometimes in the anticipation that it may surpass human intelligence" (Piotrowski, 2025, pp. 11–12). According to Piotrowski (2025, pp. 11–12), the use of new technologies

results in the "objectification of the individual on a scale previously unknown, because the condition for social non-exclusion is the use of them, i.e. the produedsction of data obtained through the process of permanent surveillance within the structure of the new global economic system, referred to as „surveillance capitalism". We see, therefore, that on the one hand, new technologies offer enormous development and transformational potential for the state, but they also pose ever-new civilisational threats and challenges to the state and the law (ed. Grzebyk, 2025, p. 8). The view that "modern man increasingly depends on algorithms, which – due to aggressive and ruthless invasion of privacy-know better what he should think and do" (Piotrowski, 2025, p. 21), seems accurate. However, a question remains, difficult to answer unequivocally, as this publication also highlights: how and why we use new technologies or artificial intelligence? There is no doubt that the answer to this question should be sought primarily in education and the legal system, which should not lag behind the rapid pace of technological development.

As Szreniawski (2024, p. 28) rightly points out, new technologies can also create new types of problems that require legal solutions concerning privacy, cybersecurity, and online content. The rapid pace of technological change is becoming a challenge for the creators of administrative and legal regulations, requiring not only the ability to predict but also the adaptability necessary to keep up with subsequent technological changes. The author's thesis that public administration significantly influences legislation is one reason to advocate for developing the concept of legislation as learning.

The literature indicates that it is the state's responsibility to remove obstacles that prevent citizens from safely using modern technologies. This should be achieved through state investment, social and educational policies, and public spending choices. Analyses of digital solidarity cannot ignore education and research (eds. Gryszczyńska et al., 2024).

Chapter III

The Essence of the Digital Exclusion

1. Digital Exclusion in Education as a Category of Social Exclusion

In today's world, digital exclusion in education represents a significant form of social exclusion, creating a "digital divide" that limits access to education, resources, and future opportunities for marginalised groups. Due to inequalities in infrastructure, skills, and socioeconomic status, this divide disproportionately affects students from low-income families, those with disabilities, and students in rural areas.

Recent advances in information and communication technology have led to radical changes in the way we interact and communicate in our social, educational, and professional environments. However, the potential and opportunities offered by these technologies are not fully realised across society due to vast differences in their use and implementation, traditionally referred to as the digital divide. Current research indicates that digital exclusion and social exclusion are strongly correlated. Digital exclusion manifests itself primarily among groups with limited economic resources, where we observe the lowest rates of device ownership and personal internet access, exacerbating existing socioeconomic disparities and even generating new forms of social exclusion (López-Aguado et al., 2022, pp. 74–82).

The key concept in addressing digital exclusion is social exclusion. Although this is a well-known concept, defining its scope raises many doubts. It is worth noting that the term "social exclusion" finds support primarily in political debates but also in academic discussions (Dziewięcka-Bokun, 2003, p. 209). Exclusion, from the French (exclusion), like its Anglophone equivalent (exclusion), means removal, exclusion (Małecka-Łyszczek, 2017a, p. 57). This term stems from all types of inequalities that can be the causes of various types of discrimination, and consists in a kind of isolation from social life of people who do not conform to widespread norms (Sobczak, 2016, pp. 9–14). Due to the multidimensional nature of social exclusion, neither a standard definition nor a coherent concept of the concept itself has been developed to date (Dziewięcka-Bokun, 2003, p. 209)[39].

Reflection on social exclusion, which dates back to the 1960s, has evolved from a political-economic phenomenon to a sociological one, understood as the breakdown of the social bond between an individual and society. Although the concept of social exclusion has not been clearly defined in sociological and political science literature, the term can be reduced to "more advanced marginalisation" (Radziewicz-Winnicki, 2004, p. 62). It is also crucial to emphasise the essence of social marginalisation, defined as the lack of participation by individuals or social groups in the basic institutions of a given social order. Referring again to the literature, it is worth citing Frieske's (2003, p. 252) understanding of social marginalisation, who believes that this phenomenon "may be not only a consequence of the lack of specific rights, but also the practical impossibility of realising them".

[39] Contemporary discussions on social exclusion often lead to the conclusion that the mass processes characteristic of the post-industrial era – globalisation, deregulation of labour markets, welfare state crisis – have led to the intensification of this phenomenon in many societies (Blicharz, 2014, p. 13).

Studies on social exclusion analyse the following issues: the factors that determine the process of exclusion, the categories of excluded individuals, and the areas of life in which exclusion occurs. The causes of exclusion can be found in the economic sphere (poverty as a condition precluding a socially acceptable way of life); production (unemployment as an element of exclusion); and social cohesion (lack of family, social isolation, etc.). Other causes include, for example, disability or religious beliefs (Dziewięcka-Bokun, 2003, pp. 212–213). For this reason, the social groups most at risk of social exclusion include the unemployed, people with physical disabilities, people with mental health problems, drug and alcohol abusers, the poor, ethnic minorities, and so on. Social exclusion, as a universal phenomenon, affects all types of societies and cultures, occurring in areas of social life such as the labour market, education (Szreniawski, 2020, p. 18), health, social welfare, homelessness, and participation in local community life. It means limited access to goods and services, institutions, and rights (Behr & Blicharz, 2018, p. 21).

It is also worth noting that social exclusion is a multidimensional phenomenon, encompassing not only poverty and unemployment, but also the breakdown of social bonds and a sense of isolation, sometimes even leading to a loss of identity (Golinowska & Broda-Wysocki, 2005, pp. 33–37). For this statement to be fully operational, further analysis is required. Above all, it is important to note that while social exclusion is often equated with poverty, these phenomena are not equivalent, although they overlap to a large extent, especially in the economic sphere (Kalinowski, 2010). In short, poor people don't necessarily have to be excluded, and conversely, excluded people are not always deprived of adequate resources to meet their needs, and their exclusion is often not economic (Kalinowski, 2010).

At the same time, the advancement and spread of artificial intelligence (AI) in education have exposed digital inequalities stemming from pre-existing social inequalities (Qualter, 2024, pp. 120–144).

Addressing this challenge is not easy. AI technology has not yet been effectively integrated into teaching practices across Europe. The use and effectiveness of digital tools vary significantly across Member States and school environments. The pronounced digital divide and educational inequalities have deepened with the COVID-19 response, as most teaching practices have shifted to remote methods and online tools have been rapidly adopted. In a context of increasing digital devices and internet access, it is becoming increasingly clear that digital exclusion can lead to social exclusion. Digital education strategies have typically been designed for all learners, with insufficient attention to the specific barriers marginalised learners and groups face. Conversely, inclusive educational practices have not always included a clear digital dimension. Therefore, it is necessary to link digitalisation with inclusion to support vulnerable learners (e.g., migrants, refugees, those from low socioeconomic backgrounds, or those with special educational needs) by increasing their access to and use of digital resources (CEDEFOP, n.d.).

The vast area of freedom, combined with the obvious shortcomings of democratic governance and the risks created in the name of greater economic efficiency in society, makes losers and winners destabilising forces within the entire social system (Baszkiewicz, 2009, p. 170, 215). The scale of these disputes and the threats to individuals continue to require the use of appropriate protective mechanisms. These mechanisms are inherent to the nature of the instruments safeguarding the functioning of democratic institutions. In practice, actions aimed at combating social exclusion must be combined with a broad range of social policies, including targeted education (Lipowicz & Małecka-Łyszczek, 2020, pp. 7–12), healthcare, work-life balance, and family policies. The main goal of an active policy to combat social exclusion (including digital exclusion) is to provide those at risk with the opportunities and resources necessary to fully participate in economic, social, and

cultural life and achieve an adequate standard of living in a given society (Szatur-Jaworska, 2005, p. 64).

From this perspective, various categories of exclusion are also characteristic. These include structural exclusion (determined by, among other factors, place of residence, low qualifications, and low income), physical exclusion (caused by advanced age or, for example, poor health), digital exclusion (inequalities in access to the Internet, intensity of its use and ability to search for information) (Batorski, 2005, p. 113), and legal exclusion, which is typically associated with unequal access to institutions and legal remedies (Blicharz, 2020, p. 66; Blicharz & Boć, 2009, pp. 513–515). In the literature, it is defined as a qualified form of discrimination, created by law (Kojder, 2010). This concept highlights the problem of certain social groups failing to exercise their rights, which is associated with factors such as low legal awareness, limited understanding of the law, insufficient information about applicable regulations, and the high cost of legal advice (Kojder, 2010).

It is also worth noting the clear links between legal exclusion and the lack of participation of the poorest and most excluded in public and political life, particularly in the context of their influence and use of basic public institutions and their limited access to power and decision-making bodies, which ultimately leads to a sense of powerlessness and inability to influence decisions that affect their daily lives (Szatur-Jaworska, 2005, p. 64). What is disturbing is not only the lack of awareness of the real dimensions of the problem of social exclusion by politicians and the laws they create, but also the frequent inability of excluded individuals to articulate their own expectations and influence changes to the law – which consequently perpetuates the life situation of those excluded from society (Dziewięcka-Bokun, 2003, p. 202).

In short, the views presented on social exclusion conceal a much more serious problem. Namely, the key issue is not so much

the processes of social marginalisation – since we are all subject to them to a greater or lesser extent – but, above all, the fact that people of relatively low social status are marginalised "on a mass scale", and that this phenomenon is subject to intergenerational mechanisms (Dylus, 2005, p. 258). One can even discern a more general relationship: the greater the progress of civilisation, the more "global" it is, stimulated by new technologies that shape public life, the more the processes of social exclusion, marginalisation, discrimination, and alienation intensify, even on a "global" scale. This process will intensify in the coming years. The need to solve social problems arising from market functioning will remain a paradigm of the modern rule of law, but also an unattainable ideal toward which the state is increasingly moving (Blicharz, 2012, p. 100).

2. Implications of Digital Transformation in Education – Threats Associated with Digital Exclusion

Digital transformation is a strategic redesign that incorporates digital technology into every aspect of an organisation, fundamentally changing how it operates and delivers value. Digital transformation, largely supported by artificial intelligence (AI), has significantly transformed the educational landscape in recent years, integrating digital technologies and practices to enhance teaching and learning processes, broaden access to educational resources, promote digital literacy, and foster innovative approaches that improve learning outcomes and prepare students for the digital age. It encompasses integrating digital technologies into every aspect of teaching, learning, and management, representing a significant shift in how educational institutions operate and interact with students.

There's no doubt that digital technologies have profoundly transformed our lives in recent decades. Education is no excep-

tion – digital technologies are increasingly permeating schools and higher education institutions. While the COVID-19 pandemic has accelerated the digital transformation in education, it has also revealed that many education systems are far from ensuring equitable access to high-quality digital technologies and has shed light on some of the risks associated with their unregulated use. These changes raise the question of how education systems can fully realise the potential of digital learning while mitigating the associated risks of digital exclusion.

The transformation taking place in education is closely linked to technological advancements. Interactive learning tools such as e-learning platforms and mobile apps are becoming commonplace in schools worldwide. These tools allow teachers to quickly and effectively reach students, creating more engaging and personalised learning experiences. For example, e-learning platforms offer a variety of videos, tests, and interactive assignments. Mobile apps, in turn, enable learning anywhere, anytime, increasing the accessibility of knowledge. Simulations and virtual laboratories enable complex experiments in a safe environment (MindElevator, 2025).

Virtual and augmented reality (VR/AR) is another area where technology is transforming education as we know it. VR/AR applications in education offer a wide range of possibilities, from visualising difficult-to-understand concepts to creating interactive learning environments (Hornik, n.d.). Another innovative solution increasingly used in education is the Internet of Things (IoT). In practice, this term refers to a network of physical objects (things) equipped with sensors, software, and other technologies that can connect and exchange data with other devices and systems via the internet. IoT is also becoming a valuable tool for monitoring student progress, enabling real-time tracking of their development. Using IoT to monitor student development enables a personalised approach to learning, tailored to each student's individual needs (Hornik, n.d.).

Artificial intelligence has also entered the education sector, offering new opportunities to personalise the learning process. A key aspect is personalisation, which allows content and teaching methods to be tailored to individual students' needs. AI algorithms and educational robots are now an integral part of educational management systems (Wang et al., 2024). They create innovative opportunities to enrich and transform educational experiences.

Digital transformation in education, while offering numerous benefits, such as interactivity and access to modern tools, carries a significant risk of digital exclusion. This phenomenon exacerbates existing social and educational inequalities, creating a divide between those with easy access to technology and those without. The main aspects of the risk of digital exclusion in the context of education include: lack of access to equipment and the Internet (students from families with a lower socio-economic status, living in rural areas, often do not have appropriate computers, tablets or a stable internet connection, which prevents them from fully participating in distance learning or using educational platforms); low digital competences (exclusion concerns not only the lack of equipment, but also the ability to use it. This applies to both students and teachers, who are insufficiently trained in the use of modern technologies in teaching); widening gaps in educational outcomes (lack of access to technology directly translates into poorer academic performance, lower levels of engagement, and difficulty catching up); limited professional development (digital exclusion at an early stage of education blocks the path to many modern professions, limiting future opportunities in the labour market); a threat to vulnerable groups (students with disabilities, people from low-income families, and residents of smaller towns are most at risk of digital exclusion).

Therefore, key actions to prevent digital exclusion include not only equipping schools with modern technologies, but also developing digital competences (teachers should have access to digital skills

training, and students must be educated on the safe and proactive use of digital tools), providing infrastructure support in rural areas, and ensuring equal access to educational tools.

In this context, the EU's political commitment to the digital inclusion agenda in education is evident in the "Digital Education Action Plan 2021–2027"[40], which aims to develop a high-performing digital education ecosystem and enhance students' digital skills and competencies for the digital transformation. This is also in line with the adoption of a Polish public policy called the "Digital Transformation of Education Policy", aimed at improving digital competencies and skills needed in the digital age[41].

However, if public policy aims to promote an inclusive approach to education that combats digital exclusion, it is crucial first to reaffirm that education is not a commodity but a common good. Without this premise, it is unlikely to contribute to changing the *status quo* (Passey et al., 2024, pp. 1733–1750). Since the 1980s, a growing body of education policy worldwide has been driven by "New Public Management", which directly incorporates economic principles into education, including cost reduction, productivity growth, and accountability. Historically, central goals of education, such as democratisation and inclusion, have been replaced by industrial and managerial principles that prioritise educational efficiency and student and parent satisfaction (Passey et al., 2024, pp. 1733–1750).

New public management stems from the ideology of neoliberalism, specifically the belief in the power of markets and business

[40] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Digital Education Action Plan 2021-2027, Resetting education and training for the digital age, {SWD(2020) 209 final}, COM(2020) 624 final

[41] Resolution No. 98 of the Council of Ministers of September 12, 2024 on the adoption of a public policy called the "Digital Transformation of Education Policy", Polish Monitor, item 812.

practices to enhance both the efficiency and effectiveness of public organisations. Broadly speaking, the governance of the education sector has been transformed by neoliberal ideals (Lapuente & Van de Valle, 2020, pp. 461–475; Blicharz & Zacharko, 2018, p. 58). It emphasises the creation of institutional frameworks that promote competition, entrepreneurship, commercialisation, profit-making, and research into "private goods". This emphasis is accompanied by a proliferation of metanarratives about the importance of markets in promoting the values of freedom, choice, and prosperity (Cris & Wright, 2016, pp. 46–50). Neoliberalism absolutises economic and market rationality and prioritises values that serve the needs of the economy. As a result, it not only alters the goals and objectives of education but also undermines, marginalises, and replaces authentic pedagogical and social values with individualism, competition, efficiency, self-interest, autonomy, and responsibility (Teise, 2025).

On the one hand, digitalisation supports the neoliberal model of education, treating it as a commodity. Educational platforms, standardisation, and an emphasis on "efficiency" and "digital skills" prepare students for a knowledge-based economy, often promoting individualism and competition over cooperation. On the other hand, although the tool of neoliberal transformation has development potential, digital technologies, instead of equalising opportunities, can exacerbate existing social inequalities. For example, if education ceases to be a common good and becomes a product available on educational platforms (EdTech), often provided by private corporations (Google, Microsoft), the student becomes a customer, and knowledge becomes a measurable product. Digital tools facilitate the collection of large data sets (Big Data) on student performance. Simultaneously, the emphasis is on efficiency, testing, and digital skills (often defined by the labour market). While digitalisation has the potential to democratise knowledge, in practice, it often acts as a mechanism of exclusion. The emphasis on digital competences

promotes those who have better conditions for learning at home. Children from poorer backgrounds, often lacking support in learning advanced tools, become "more difficult clients" in a system that rewards efficiency. Furthermore, AI-based learning platforms can perpetuate stereotypes or direct students from lower social strata toward lower-status educational paths.

As for the education sector, it is being reconfigured by neoliberal rationality as an investment in human capital to increase one's future value. This transformation literally discredits the idea and practice of education as a democratic public good. All this impacts curricula, teaching and research practices, and hiring criteria (Brown, 2018, pp. 60–79).

Above all, digital technologies and markets are expected to collaborate in solving public problems for the common good. This further informs our thinking about the evolving nature of neoliberal capitalism, as technology becomes naturalised as "common sense" and a "public good". If we remember that the sole responsibility of the private sector is to maximise profits, while social responsibility is largely a duty imposed on the public sector, it would not be an exaggeration to say that the digitalisation of the education based on an economic logic based on profit maximisation (Gurumurthy & Chami, 2019), will impact the practice of education system management. Consequently, the interpretation of "education as a common good" will be diverse, controversial, and likely to change over time.

3. Digital Exclusion in the Context of Artificial Intelligence Development

Artificial intelligence is transforming the education sector, introducing innovative tools and methodologies that improve teaching and learning processes. The benefits of AI are undeniable: from

personalising learning and real-time progress monitoring, automating assessments, reports, and administrative tasks, through developing critical and digital literacy skills, to supporting students with disabilities and creating new educational materials (audio, video, and interactive). While AI has the potential to address some of the greatest challenges in contemporary education and to innovate teaching and learning practices, rapid technological development inevitably brings many risks and challenges that have, until now, outpaced policy debates and regulatory frameworks. These risks include: loss of student motivation and autonomy, declines in social interactions and relationships with teachers, growing inequalities among students with access to AI, a lack of teacher competence in assessing the quality of AI-generated content, and threats to student privacy and data security. In the current context, changing the approach to education in the era of artificial intelligence is crucial, as educational institutions must commit to taking action that adapts to the new reality while balancing it with the protection of fundamental educational values such as honesty, integrity, and intellectual autonomy. In the context of the current situation, changing the approach to education in the era of artificial intelligence is crucial, as educational institutions must commit to taking actions that adapt to the new reality and balance it with the protection of fundamental educational values such as honesty, integrity and intellectual autonomy (Gurumurthy & Chami, 2019).

At the same time, with recent advances in computer science, many definitions and explanations of what constitutes AI systems have emerged. For example, AI has been defined as the "ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings" (Akgun & Greenhow, 2022, pp. 431–440). Furthermore, AI is defined as the ability of a digital machine to perform tasks commonly associated with intelligent beings, and related technologies are divided into various

branches, such as computer vision, speech, machine learning, big data, and natural language processing (Chiu et al., 2023).

However, it seems that defining artificial intelligence as an imitation of full human intelligence is misleading, implying that machines can do the same things as humans. While we know a lot about intelligence and the human brain, this knowledge is far from complete, and there is no consensus on what exactly human intelligence is. Until this happens, it is impossible to precisely define how this intelligence can be artificially imitated (Sheikh et al., 2023).

It is also worth noting another definition of AI, proposed by the High-Level Expert Group on Artificial Intelligence (AI HLEG) of the European Commission (EC), which defines it as "systems that exhibit intelligent behaviour by analysing their environment and taking action – with some degree of autonomy – to achieve specific goals" (Sheikh et al., 2023). In this definition, too, concepts such as "some degree of autonomy" remain somewhat vague.

Finally, AI is often associated with cutting-edge technology. This includes advances in machine learning (ML), now called "deep learning" (DL), and "self-learning algorithms" (Sheikh et al., 2023). As the literature indicates, the effectiveness and efficiency of a machine learning solution depend on the characteristics of the data and the performance of the learning algorithms. Furthermore, deep learning is a subset of machine learning that uses artificial neural networks for intelligent data analysis (Sarker, 2021). A neural network, one of the fundamental machine learning algorithms, is modelled on the structure and function of the human brain. It consists of interconnected layers of nodes (analogous to neurons) that work together to process and analyse complex data. Neural networks are used for tasks involving the identification of complex patterns and relationships in large amounts of data (Stryker & Kavlakoglu, n.d.).

The increasing use of AI in various sectors that have a significant impact on societal development and, consequently, on the protection

of fundamental human rights, has highlighted the need for a regulatory framework (Pirozzoli, 2024, pp. 105–116). The EU Artificial Intelligence Act (AI Act)[42] defines an AI system as a "machine system that is designed to operate with varying degrees of autonomy after deployment, and that may exhibit adaptive capabilities after deployment, and that, for explicit or implicit purposes, infers how to generate outputs from received input, such as predictions, content, recommendations, or decisions that may impact the physical or virtual environment" (Article 3 point 1 of the AI Act).

In light of the above definition, the main functional criteria that distinguish the behaviour of an artificial intelligence system from other machine-based systems include: autonomy, adaptability and inference. Recital 12 of the AI Act explains that "autonomy" means a "degree of independence of action from human input and the ability to operate without human intervention", while "adaptability" refers to the "ability of a system to learn on its own, allowing it to change as it is used". Inference, on the other hand, refers to the "process of obtaining results such as predictions, content, recommendations, or decisions that can impact physical and virtual environments, and the ability of AI systems to create models or algorithms based on input information or data". Techniques that enable "inference" when building an AI system include machine learning mechanisms that learn from data how to achieve specific goals, and logic- and knowledge-based approaches that rely on "inference" based on encoded knowledge or a symbolic representation of the task to be solved (Recital 12 of the AI Act).

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[42] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act), OJ EU L, 12.07.2024, hereinafter referred to as the AI Act.

As AI continues to develop, its impact on education becomes increasingly evident. One significant impact is the disruption of traditional teaching methods. AI-powered platforms have the potential to replace certain teaching roles, such as grading assignments and providing feedback. At the same time, the integration of AI into online education, particularly through platforms like ChatGPT, has introduced a paradigm shift in how students access and interact with educational content (Aldawsari & Almohish, 2024). ChatGPT is a prime example of generative artificial intelligence (GAI), developed by OpenAI. Generative AI is a broad term for AI systems designed to create new content. This content can range from text and images to music, simulations, and videos.

Although the European Artificial Intelligence Act (AI Act) does not define GAI, recitals 99 and 105 explain that large GAI models are typical examples of general-purpose AI models (GPAI) because they enable the flexible generation of content such as text, audio, images or video that can easily respond to a wide range of specific tasks. There are differences between artificial intelligence systems (Article 3 Section 1 of the AI Act) and GPAI models (Article 3 point 63) and general-purpose artificial intelligence systems (GPAI systems – Article 3 point 66). As explained in Recital 97 of the AI Act, an AI system differs from a GPAI model. GPAI models are characterised by their versatility and ability to perform various tasks. These models are typically trained on large amounts of data using various methods, such as self-supervised, unsupervised, or reinforcement learning. The AI Act defines GPAI as an AI model trained on large amounts of data using large-scale self-supervision, that demonstrates significant generality and is capable of competently performing a wide range of different tasks, regardless of how it is marketed, and that can be integrated with various downstream systems or applications – excluding AI models used for research, development, and prototyping prior to market introduction[43].

[43] Article 3 point 63 of the AI Act.

A GPAI system is defined as an AI system based on a general-purpose AI model that can serve a variety of purposes, both for direct use and for integration with other AI systems (Article 3 point 66 of the AI Act). As emphasised in the literature, GPAI models are part of GPAI systems. An example of a system is a chatbot or a tool that many people use daily, such as ChatGPT (Quintais, 2025).

In education, generative AI is primarily used in intelligent learning systems and adaptive learning platforms (Moons, 2025). GAI can be used in a variety of educational contexts, from creating innovative content and generating personalised learning materials to automating assessments and feedback. For example, students can use GAI as a general search tool to find answers to immediate questions on a specific topic, get homework support, and learn new skills. At the same time, GAI can help students with reading and writing skills by suggesting improvements in syntax and grammar (Rashid et al., 2024). Furthermore, GAI can power intelligent tutoring systems that provide students with personalised guidance and support (Rashid et al., 2024). GAI-based apps like "goblin.tools" can also help students with attention deficit hyperactivity disorder (ADHD) by simplifying tasks they find overwhelming or difficult (Rashid et al., 2024).

Despite the potential benefits, there are also risks associated with using GAI in education. One of the greatest risks associated with using GAI in education is its potential to replace meaningful interpersonal engagement. As GAI increasingly dominates classrooms, relationships between teachers and students may weaken, reducing education to a transactional exchange (Bozkurt et al., 2024, pp. 487–513). Furthermore, GAI increases the risk of entrenching biases in training data and algorithms, thus reinforcing gender, racial, and cultural stereotypes (Wei et al., 2025). These biases can reinforce harmful stereotypes, shaping user perceptions and perpetuating social inequalities, especially in education. GAI can also contribute to a widening digital divide. Unequal access to AI-based tools is a sig-

nificant concern, as advanced GAI technologies are often expensive and inaccessible to disadvantaged students, particularly in low-income or rural areas (Bozkurt et al., 2024, pp. 487–513).

Another challenge is the potential bias of chatbots. According to some researchers, the use of AI-based chatbots is fraught with potential bias, which could ultimately lead to unfair assessment results and potentially perpetuate discrimination and inequality in higher education (Kooli, 2023).

It is also worth noting that the AI Act introduces specific transparency requirements for certain AI applications, such as those that pose a risk of manipulation (e.g., chatbots) or deepfakes. Users should be aware that they are interacting with a machine. Article 3 point 60 of the AI Act defines "deepfake" as AI-generated or AI-manipulated images, audio, or video content that resembles real people, objects, places, entities, or events, and that the recipient could mistakenly believe to be authentic or real.

Deepfakes, or fakes created through the use of advanced artificial intelligence and deep learning, raise concerns about privacy, intellectual property, defamation, and information integrity in the digital age, and pose numerous ethical and legal issues (Hynek et al., 2025). The AI Act currently lacks a clear legal framework for the liability of creators of deepfake technologies, which can have harmful effects and should be considered high-risk products. While Article 5(1)(a) of the AI Act explicitly prohibits manipulative practices, it lacks provisions specifically addressing the emerging and diverse threat of deepfake-based extortion.

The AI divide is not just a technological issue; it is a multifaceted problem with far-reaching social, economic, and ethical consequences. As AI systems become increasingly sophisticated and integrated into various aspects of our lives – from education to employment – those who lack access to or understanding of these technologies risk being placed at a significant disadvantage.

As emphasised in the literature, digital inequalities do not result solely from the introduction of AI; they also stem from deeper linguistic, cultural and algorithmic biases that determine the interactions between students using AI tools (Matjie et al., 2026).

First and foremost, AI-based educational technologies are designed primarily with English in mind, with limited consideration of multilingual or native linguistic and cultural contexts. This linguistic and cultural bias reduces the relevance and pedagogical effectiveness of AI systems for diverse groups of learners, thereby reproducing exclusion through the design of the technology rather than its access (Matjie et al., 2026).

Unlike cultural bias, which involves interpreting phenomena based on the norms of one's own culture, algorithmic bias occurs when a computer system systematically produces unfair results, often because human cultural biases are embedded in the system's design and training data (Matjie et al., 2026). Algorithmic bias in education operates through multiple channels, from data collection and algorithm design to implementation practices and institutional policies. When AI-based systems perpetuate or amplify bias, they can systematically discriminate against students from marginalised communities, creating a self-perpetuating cycle of educational inequality. The long-term implications are particularly concerning, as these algorithmic decisions could impact students' educational paths, career opportunities, and socioeconomic mobility (O. Boateng & B. Boateng, 2025).

According to many researchers, the widespread adoption of AI technologies in education, accelerated by the demands of remote learning, means that biased algorithms could systematically influence entire generations of students, creating new forms of digital exclusion. Consequently, this threatens to undermine decades of progress in educational equity. Therefore, it is crucial that institutions critically examine and address algorithmic biases in the implementation of educational technologies (O. Boateng & B. Boateng, 2025).

Regarding countering algorithmic bias, Article 10 of the AI Act includes an obligation to eliminate bias in AI systems. AI system providers must assess whether their training, validation, and testing datasets meet certain quality criteria. These criteria include "screening for potential bias" and implementing appropriate measures to detect and prevent potential bias. Despite these regulatory safeguards, the AI Act's effectiveness in fully eliminating algorithmic discrimination remains uncertain. Prevailing research emphasises that AI, while positioned as a neutral and universal technology (Ofosu-Asare, 2024), is often deeply rooted in historical data. Even if an AI system is designed to be "neutral", it can still replicate previous patterns of discrimination due to historical inequalities reflected in training datasets (Ofosu-Asare, 2024). Given that AI technologies, from machine learning algorithms to advanced data analytics, are now key tools in educational environments (Ofosu-Asare, 2024), stronger legal measures and clear enforcement strategies are necessary.

This is particularly relevant in the context of AI systems developed primarily in technologically advanced Western countries, which largely reflect Western, English-speaking environments and promote certain worldviews and epistemologies, often excluding or marginalising others (Ofosu-Asare, 2024). This trend can lead to a loop of dependency, where institutions in developing regions become constant consumers rather than innovators in educational technology. This results in limited technological autonomy, leaving these institutions unable to adapt solutions to their specific educational challenges and contexts. Furthermore, this can result in educational content that is not only linguistically homogeneous but also culturally narrow (Auh, 2024). In other words, the spread of Western-developed AI technologies in educational systems worldwide may inadvertently promote a form of cultural and intellectual imperialism (Borenstein & Howard, 2021, pp. 61–65).

While the impact of generative AI has led to one of the most significant transformations in education, we should beware of the naive notion of "technological solvability" – AI will not solve all our problems, including those in education. It risks being used to promote a "technocratic paradigm" that believes all the world's problems can be solved solely through technological means[44]. Moreover, AI systems are often designed to serve the interests of for-profit corporations, so educational institutions should be cautious about how corporate interests might influence the AI-generated information. If AI systems are driven by revenue or political agendas, they can shape the responses students receive, thus impacting their learning and critical thinking (Bozkurt et al., 2024).

To summarise the above considerations, it must be stated that, on the one hand, AI has the potential to revolutionise education by providing personalised learning experiences and improving access to high-quality education. On the other hand, AI-based education also carries implications related to privacy and biases in data collection and processing. It can also deepen digital exclusion, perpetuate prejudices, and undermine human rights (including the right to education). Combating digital exclusion in education is essential to ensuring equal access to knowledge, developing future competencies, and preventing the deepening of social and economic inequalities. Education is both a right in itself and an indispensable means of realising other human rights. The right to education is recognised in numerous international human rights documents and must be protected and promoted. AI systems have the potential to transform learning and improve educational outcomes, but only if AI is used ethically. If ethical AI is not responsibly integrated into the education

[44] V. M. Fernández, J. Tolentino de Mendonça, Antiqua et nova. Note on the Relationship Between Artificial Intelligence and Human Intelligence (28 January 2025) [access: 23.01.2026].

system, it could pose serious threats to human rights. This highlights not only the challenge of accommodating cultural differences in the use of AI in education but also the need to create technologies that are more inclusive and grounded in the protection of human dignity and justice.

Chapter IV

Digital Inclusion in Education and Its Barriers

1. Some Reflections on Digital Inclusion in Education

What is digital inclusion? It is difficult to answer this question without a satisfactory explanation of the broader issue: how is it that inclusiveness comes to be seen as "good", right, and worth pursuing? (Frysztacki, 2005, p. 18). A valuable inspiration in this regard is the view formulated by K. Frysztacki, who aptly expresses the essence of this phenomenon: "Whatever one may say about inclusion – writes K. Frysztacki – in its various variants, it is, above all, a specific worldview and the theoretical and ideological construction resulting from it: it is an attempt to construct a desired image of the social world, something better than before, worth the effort and even significant costs, if such must be incurred" (Frysztacki, 2005, p. 19).

The question arises: can we therefore conclude that digital inclusion is simply the reverse of exclusion? Rather, digital inclusion is a multidimensional, evolving process aimed at overcoming structural inequalities (Małecka-Łyszczek, 2017b, pp. 405–418; Lipowicz & Małecka-Łyszczek, 2020, pp. 7–12), whereas exclusion is the inability to engage with the digital world. For example, someone may have access to the internet (technically not be excluded) but lack the digital skills or competencies to use it effectively, safely, or to their advantage.

In short, digital inclusion is not just about the absence of exclusion, but also about the presence of opportunities and possibilities. Digital inclusion is increasingly viewed through the lens of social jus-

tice, with the goal of eliminating deeply rooted social inequalities, not just providing internet access to more people. It is about empowering marginalised communities not only to use technology but also to influence its development.

Digital inclusion is widely recognised not as a one-time goal but as an ongoing, dynamic process. As technology rapidly evolves (e.g., the rise of artificial intelligence), what constitutes "being included" also changes. If digital skills training fails to keep pace with technological advances, people risk being excluded again. Therefore, digital inclusion can more aptly be described as a solution to the multifaceted problem of digital exclusion, rather than simply its opposite.

Digital inclusion is the process of ensuring that all people, regardless of age, disability, location, income level, or skills, have equitable, safe, and meaningful access to digital technologies and the ability to use them. In the age of digitalisation, this is a key element in combating social exclusion, enabling full participation in economic, educational, and civic life. Digital inclusion prevents a segment of society from being "left behind", losing access to education, the labour market, and information. In other words, digital inclusion is essential for modern society. When a segment of society lacks access to technology or the digital skills to use it, they face: educational gaps (lack of access to remote learning and digital resources); economic marginalisation (inability to apply for online jobs) and information poverty (lack of access to healthcare, government, and local information). Closing this gap is crucial to ensuring everyone has equal opportunities to participate in a modern economy and society.

It is worth noting in this context that the United Nations Educational, Scientific, and Cultural Organisation has defined inclusive education as a "dynamic approach that responds positively to the diversity of students and sees individual differences not as problems but as opportunities to enrich the learning process" (Mintz et al., 2024, pp. 15–119).

Inclusive education is considered a key direction in contemporary education systems, responding to the growing need to build a society based on equal opportunities and respect for diversity. Its essence is to provide all children – regardless of their health, disability, social, cultural, or economic background – with the opportunity to learn together and fully participate in school and social life. According to the definition adopted by the European Agency for Special Needs and Inclusive Education (EASNIE), inclusive education is a systemic approach to providing high-quality education in mainstream schools that effectively meets the educational and social needs of all students (Ejdys et al., 2025).

The concept of inclusive education establishes key elements that assume that: 1) inclusion is a process, therefore, the best solutions to ensure the achievement of the goal should be constantly sought; 2) inclusion concerns the identification and removal of barriers, which requires a holistic view and integrated analysis of all areas of life of people with disabilities in order to skilfully solve problems; 3) inclusion encompasses the presence, participation and achievements of all students; 4) inclusion assumes providing special attention and work to those groups that may be at risk of marginalisation, exclusion, poorer results (Wojciechowska, 2020, p. 188). Broadly speaking, inclusion can be defined as the process of removing barriers (e.g., physical, psychological, social) that limit or prevent attendance, participation and success in learning (Cerna et al., 2021).

The use of digital technologies in school settings can support teaching and learning, increase accessibility for those who need them, and provide more personalised learning experiences. When used appropriately, digital tools can help create more inclusive education systems. On the one hand, digital technologies can promote inclusion in education when used inclusively and do not exclude specific groups of students. On the other hand, digital technologies can promote inclusive education, for example, by incorporating design

features or functions specifically designed to support students with diverse learning needs (Gottschalk & Weise, 2023).

It is assumed that is digital inclusion is understood to require several prerequisites. According to the US National Alliance for Digital Inclusion, these factors include: affordable and reliable access to broadband internet; internet-enabled devices that meet user needs; access to digital literacy training; high-quality technical support, applications and digital content designed to enable and support self-sufficiency, participation, and collaboration. Therefore, digital equity and reducing digital inequalities are precursors to digital inclusion (Gottschalk & Weise, 2023).

Although inclusive digital technologies encompass aspects such as good pedagogy, student-centred learning, and universal design that recognise student contribution and sensitivity to diversity, they fail to address fundamental societal challenges. Evidence from neuroscience and the learning sciences indicates that students learn in very different ways, and these differences are the norm, not the exception. Therefore, a universal approach to teaching and learning ignores the many aspects of diversity present in classrooms. In response to increasing diversity, a universal design for learning (UDL) approach can be used to create technology-rich learning environments that are flexible and meet the needs of diverse student groups, with particular attention to students with special educational needs. UDL is expanding into education, striving to facilitate access to the curriculum and learning for all students (Gottschalk & Weise, 2023).

2. European Union Actions in the Field of Digital Inclusion in Education

The European Union is actively combating digital exclusion in education, treating inclusiveness as a cornerstone of digital

transformation. These efforts are based on the premise that access to technology and digital skills is a right, not a privilege, aiming to equalise educational opportunities for all students, including marginalised groups and people with disabilities.

The most important documents at the European level regarding the digitalisation of education, including the development of digital skills and competences, include the European Commission's Action Plan for Digital Education for 2021–2027, which adopts two priority areas: supporting the development of a highly effective digital education ecosystem and improving digital competences and skills appropriate for the era of digital transformation. This plan includes 14 actions, such as using EU tools to invest in teachers' professional development and exchanging best practices in teaching methods, with a focus on high-quality, inclusive computer science education at all levels.

It is also worth noting that the European Committee of the Regions, in its opinion on the European Commission's Digital Education Action 2021–2027, emphasised that the digitalisation of education can bring significant benefits if it is student-centred, age-appropriate, and development-oriented. Such education, with appropriate resources, would guarantee accessible, high-quality, inclusive education for all and would realise the right to education as a fundamental human right.

Another key European document is the "Digital Competence Framework for Citizens". Developed by the European Commission, the model defines the skills that citizens of EU member states should possess to function effectively in a knowledge- and digital-technology-based society. The model consists of five areas of competence:

1. Information and Data: The ability to evaluate, process, and create information in the digital environment and the ability to effectively manage data.
2. Communication and Collaboration: The ability to communicate effectively, collaborate, and participate in the digital society, including using various online communication tools.

3. Content Creation: The ability to create, edit, and publish content in various forms of digital media.
4. Safety: Understanding the risks associated with using digital technology and the ability to make informed decisions to protect oneself and others in the online environment.
5. Problem-Solving: The ability to solve problems in the digital environment through the use of information and communication technologies[45].

It is worth noting that in October 2022, the European Commission (hereinafter referred to as the Commission) published guidelines on the ethical use of artificial intelligence in education, aimed at promoting trustworthy artificial intelligence. The guidelines emphasise that trustworthy artificial intelligence must characterise the system that incorporates it throughout its lifecycle: it should be lawful, i.e., compliant with all applicable laws; it should be ethical, ensuring compliance with ethical principles and values; it should be resilient from both a technical and social perspective, as artificial intelligence systems can cause unintended harm even when used in good faith. The guidelines also point out that the use of artificial intelligence requires educational responsibility, accountability, and transparency at all stages, accessibility and inclusiveness, and the development of competencies that shape individuals' readiness to navigate a changing world.

Issues related to data privacy, algorithmic transparency, and mitigating bias in the context of artificial intelligence in education were also recognised by the Council of Europe (Council) in its 2024 document "Regulating the use of artificial intelligence systems in education"[46], which emphasised that the adoption of artificial intelli-

[45] European Commission, DigComp 3.0, https://joint-research-centre.ec.europa.eu/digcomp/digcomp-framework_en [access: 02.01.2026].

[46] Regulating the use of Artificial Intelligence systems in education – Preparatory study on the development of a legal instrument, Council of Europe, October 2024 [access: 19.11.2025].

gence systems should be consistent with human rights values and respect the dignity of every learner. The Council also adopted a position to promote a nuanced and inclusive understanding of the multifaceted relationship between artificial intelligence and education, in line with the principles of human rights, democracy, and inclusiveness (Cortoni, 2024).

It is also worth noting that on September 30, 2020, the European Commission published a Communication on the establishment of the European Education Area by 2025, in which it defines inclusion as one of its key objectives. The Eurydice 2022 report, "Towards equity and inclusion in higher education", emphasises that inclusion is both a human right, guaranteed by Article 26 of the Universal Declaration of Human Rights and Article 2 of Protocol 1 to the European Convention on Human Rights. Providing high-quality education for all is considered a social responsibility and an investment in personal and social development. Therefore, the opportunity for everyone to benefit from high-quality education is an important aspect of our understanding of social responsibility. Furthermore, investing in education is an investment in personal and social development. In this sense, inclusion is at the heart of our understanding of democratic culture.

The AI Act represents a paradigm shift in the regulatory landscape for AI applications across Europe, including in the educational technology sector. Its provisions establish a comprehensive framework that ensures the safety, ethics, and transparency of AI systems. The AI Act places a strong emphasis on the ethical use of AI, aligning with core educational values such as transparency, security, fairness, privacy and data protection, and the prevention of bias. Transparency refers to ensuring that AI systems are understandable to users. In terms of security, the AI Act requires that high-risk AI systems be designed and developed with appropriate levels of accuracy, robustness, and cybersecurity, and that they operate consistently in these aspects throughout their lifecycle (Article 15). The justice system re-

quires that AI systems be designed to be fair and impartial. Privacy focuses on protecting personal data and obtaining informed consent for its use. Data protection and privacy regulations are crucial to increasing transparency and accountability in AI systems. At the same time, AI applications covered by the AI Act that may pose a serious threat to health, safety, or fundamental rights are classified as "high--risk cases". In the educational context, these include:

- AI systems designed to make decisions about access to or placement in educational;
- AI systems designed to assess learning outcomes, where these outcomes are used to guide the learning process of individuals in educational and vocational education institutions at all levels;
- AI systems designed to assess the appropriate level of education that an individual will receive or may have access to in the context of or within educational and vocational education institutions at all levels;
- AI systems designed to monitor and detect student misconduct during tests in educational and vocational education institutions at all levels[47].

AI systems classified as high-risk must meet a number of legal requirements set forth in the AI Act. These requirements concern not only the technical aspects related to the quality, security, and transparency of AI systems, but also the documentation and certification of these systems, as well as the maintenance of appropriate procedures for monitoring, reporting, and cooperation with supervisory authorities. In this regard, the AI Act imposes a number of obligations on suppliers of high-risk AI systems, as well as other supply chain participants (importers, distributors), and entities using these systems. For example, supplier responsibilities include: implement-

[47] Annex III, point 3 (a), (b), (c), and (d), AI Act.

ing a risk management system; implementing data management and quality management policies; developing technical documentation for the AI system; ensuring transparency of information for users; ensuring human oversight and appropriately ensuring levels of accuracy, robustness, and cybersecurity. The obligations of importers of AI systems include verifying that the supplier of a high-risk AI system has conducted the appropriate conformity assessment procedure and ensuring that the system has the appropriate technical documentation and is accompanied by an EU declaration of conformity and an operating manual (Article 23 of the AI Act). Distributors of high-risk AI systems are required to verify, before making a high-risk AI system available on the market, that it bears the required CE conformity marking and that a copy of the EU declaration of conformity is included.

One of the most notable aspects of the AI Act is the ban on the use of emotion-inference systems in educational settings. This includes any AI applications that attempt to interpret students' emotions using biometric data. The rationale behind this ban is to protect students' fundamental rights and prevent manipulative practices that could negatively impact their educational experience. Systems used to determine access or admission to educational courses, assess learning outcomes, and monitor performance during assessments are considered high-risk systems. These systems require rigorous data management practices to ensure accuracy, privacy, and security. The AI Act requires that high-risk AI applications be transparent and that their operations be understandable to users. In education, this means that algorithms used for functions like grading or adaptive learning must be accessible and explainable to both teachers and students, ensuring that users can understand and trust the AI decision-making process. This highlights the need to create AI technologies that are more inclusive, based on the protection of human dignity and justice.

It can therefore be concluded that inclusiveness at the European level is a strategic issue for the education sector, as it influences institutional culture, research, learning, and teaching. It sets a shared vision for high-quality, inclusive, and accessible digital education in Europe and aims to support the adaptation of EU Member States' education and training systems to the digital age. This is achieved by developing a high-performance digital education ecosystem and enhancing digital skills and competencies to support digital transformation.

3. The Conflict Between the Neoliberal Approach to Education and the Requirements of Inclusive Digital Education

In contemporary studies of neoliberalism, it is treated as an ideology that began to emerge in the 1970s, but the process of its implementation, particularly in shaping economic policy, became evident only from the 1980s (Oręziak, 2015). A key assumption of this ideology is that the free market and free enterprise are the basic conditions for the realisation of individual rights, and that the role of the state should be as minimal as possible and essentially limited to guaranteeing property rights and implementing other measures to maintain the free market (Oręziak, 2015).

Since the 1980s, neoliberalism has been the ideological foundation for the transformation of the Western liberal state. Beyond privatisation and the marketisation of public services, its dominant feature has been the subordination of the public sector (public administration) to market logic or market-mimicking principles (Sörensen & Olsson, 2020, pp. 33–47). Under neoliberalism, with its increasing commercialisation of everyday life, the progressive privatisation of the public sphere, and the reconceptualisation of the

relationship between the public sector and citizens in terms of producer and consumer, came the belief that market principles would contribute to increased efficiency and quality of service provision (Sörensen & Olsson, 2020, pp. 33–47).

Structural adjustment policies imposed by the World Bank, the International Monetary Fund, and other international organisations have forced the developing world to unleash market forces. "The market" has become a modern, rational, practical discourse, embedded in everyday life. It is in this context that neoliberals posit that human well-being can be achieved by unleashing individual freedoms and entrepreneurial skills. In short, being creative means being entrepreneurial (van der Walt, 2017, pp. 1–11). It is like the classic Darwinian notion that "if you can evolve, you will survive in a turbulent market".

Let us add here that in the neoliberal concept, man is not treated as a human being subject to emotions, but as a rational, model "ideal type", i.e., homo oeconomicus (Mączyńska & Pysz, 2014, p. 230). Neoliberalism, especially in its contemporary form, conveys a utilitarian vision of man as an entrepreneur managing his own life (Potulicka, 2011, p. 241). The imperative of autonomy requires each individual to be independent from others. This is an economic entity, a private owner of goods that he strives to maintain and expand. At the same time, all human rights can be viewed as property rights, derived from a single fundamental right of self-ownership (Potulicka, 2011, p. 239).

Over the past several decades, the public sector in most countries (including Poland) has been transformed by reforms under the umbrella of New Public Management (NPM), which represented a manifestation of certain universal trends. Crucially, this approach placed particular emphasis on the rationality and economic efficiency of public administration (Kijowski, 2018, p. 197).

New Public Management was rooted in the ideology of neoliberalism, particularly the belief in the power of markets and business

practices to increase both the efficiency and effectiveness of public organisations. Broadly speaking, private-sector management ideas were introduced in a previously unknown way into the public sphere and across all areas of public policy: from healthcare and education to transportation and security. The central assumption was that business practices would increase both the efficiency and effectiveness of public organisations. The depth and breadth of NPM's impact on public administration was so significant that it has been described in the literature as the "overwhelming infiltration of NPM into public administration", describing it as a "permanent feature of the administrative landscape".

In general, public-sector governance has changed as a result of neoliberal ideals. It emphasises the creation of institutional frameworks that promote competition, entrepreneurship, commercialisation, profit-making, and research on "private goods". This is accompanied by the spread of metanarratives about the importance of markets in promoting the virtues of freedom, choice, and prosperity (Cris & Wright, 2016, pp. 46–50).

It should also be noted that in practice, neoliberalism does not so much promote competitive markets as lead to the privatisation of public institutions. It is widely recognised that the neoliberal policies adopted by governments around the world, including Poland and other EU countries, and the accompanying deregulation and privatisation, expand corporate power and enable them to broadly enter areas previously inaccessible to them, primarily healthcare, education, and employment institutions (Cris & Wright, 2016, pp. 46–50). As for higher education, it is being reconfigured by neoliberal rationality as an investment in human capital to increase its own future value. This transformation literally incomprehensibly transforms the concept and practice of education as a democratic public good. All of this impacts curricula, teaching and research practices, and even hiring criteria (Brown, 2018, pp. 60–79).

Neoliberalism is one of the forces that has most profoundly transformed the educational landscape (particularly higher education), which in Poland, as in many other countries, constitutes an integral part of the public sector. This situation stems primarily from the nature of the goods produced and the associated externalities. To offset the policies of sharp cost reduction at a growing number of higher education institutions, neoliberal theories and models have proliferated and served as the ideological basis for public-sector reforms (Nureev et al., 2020).

The implications of mass academic education, confined to the boundaries of the National Qualifications Framework for Higher Education, seem far-reaching. They impose on learners, as Malewski (2014, pp. 16–17) emphasises: "unified educational content offered in packages (knowledge, skills, social competences), which […] are adapted to the qualification needs of the labour market and the requirements of civil society. This is accompanied by the belief that commercialised and commoditised university graduates will become a reservoir of qualification resources capable of dynamising the economy and contributing to building a knowledge society". The second type of doubt, closely related to the above, concerns the parameterisation of academic teachers and their qualification levels, scientific production, international cooperation, participation in scientific conferences, as well as the evaluation of teaching staff by students. The latter, the so-called consumer satisfaction index for the teaching service, in line with the neoliberal tendency, places the responsibility for educational outcomes solely on the teacher and shifts it away from the student.

The dominant goals of teaching and research are economic and commercial. Knowledge is only important because of its economic utility. We are witnessing the transformation of some academic institutions into "business academies", a shift in academic "values" and attitudes toward knowledge. Neoliberalism, by breaking with the

humanist foundations of the university, transforms it into an instrument solely at the service of economic competitiveness within the framework of globalised capitalism.

According to some authors, the preference for economic utilitarianism characteristic of neoliberal philosophy results in the commodification of education and its subjects. It ceases to be a common good (Malewski, 2014, pp. 254). In this context, education, amidst the ongoing process of globalisation, accompanied by the development of the neoliberal doctrine, operates on the basis of a model similar to capitalist production (Gromkowska-Melosik, 2016, p. 112). This emphasises the concept of new managerialism, which places a high value on productivity and efficiency, as well as on the products and outcomes of work, thereby guaranteeing a strong market (Gromkowska-Melosik, 2016, p. 112).

As emphasised in the literature, neoliberal values and a consumerist lifestyle are changing the ethos of contemporary schools (Michałowska, 2013, p. 18). In scholarly discussions, this issue is linked to the purpose of education in the context of the individual and society. Above all, as Michałowska (2013, p. 19) notes, the purpose of education "is clearly directed at single, individual entities, perceived through the prism of economics and the market". In turn, "society is important if it fulfils an appropriate function in the global economy as a homogeneous production or consumption organism" (Michałowska, 2013, p. 19).

Moreover, at the heart of neoliberal ideology is the desire to undermine the university's commitment to truth and critical thinking, its duty to fight for justice, and its responsibility to protect the interests of young people entering a world marked by massive inequalities, exclusion, and violence at home and abroad. Higher education is arguably one of the few institutions in neoliberal societies that offers a protective space for questioning, challenging, and thinking outside the box. Neoliberalism considers such a space dangerous and has

gone to great lengths to eliminate higher education as a place where students can become critical citizens, faculty can participate in governance structures, and education can be seen as a right rather than a privilege[48].

The conflict between neoliberal approaches to education and the demands of inclusive education constitutes a significant problem in contemporary education policy. Neoliberalism, which promotes standardisation and competition, contradicts the inclusive values of diversity and cooperation. Furthermore, the neoliberal model of education often views schools as part of the market, while inclusive education treats them as a public good. This hinders the implementation of inclusion in neoliberal environments, leading to an "educational utopia" or the appearance of inclusion.

The connections between neoliberalism and the digitalisation of education are profound and multifaceted, often based on the assumption that technology is the primary driver of innovation and market efficiency in schools. Neoliberalism, which promotes privatisation, deregulation, and the treatment of education as a commodity, uses digitalisation to reorganise the teaching process in a market-oriented manner. Teachers are no longer the primary source of knowledge; they are becoming facilitators or mentors who use digital tools. As indicated, policies promoting privatisation, instrumental (technical) approaches to teaching, and narrow definitions of "equality" and "social justice" reduce the teaching profession to routine tasks detached from the broader educational and social context (Sellami, 2025).

Neoliberalism, with its focus on market principles, has increasingly permeated educational systems, transforming them into competitive environments that prioritise individual success over collective well-being. This shift is evident in how public education has

[48] The Language of Neoliberal Education – CounterPunch.org, 25.12.2018 [access: 02.02.2026].

become more vulnerable to commercial interests, with policies often overlapping with privatisation efforts that marginalise the values of community and equality. As a result, teachers are under pressure to conform to a market-oriented model of education, which impacts their role, autonomy, and ability to foster inclusive, democratic learning spaces (González-Calvo, 2025).

The neoliberal culture surrounding higher education is dominated by a political discourse that assumes that learning is automatically "improved" by digital technologies. This simplistic approach is underpinned by the notion of harnessing the "digital revolution", including the new generative AI tools that now permeate everyday lives to measure performance and improve outcomes (Hayes, 2025, pp. 109–126).

Despite the potential benefits, there are also risks associated with the use of generative AI in education. One of the greatest such risks is its potential to replace meaningful interpersonal engagement. As generative AI increasingly dominates classrooms, relationships between teachers and students could weaken, reducing education to a transactional exchange (Bozkurt et al., 2024, pp. 487–513). Furthermore, over-reliance on AI support could undermine students' ability to work or think independently (Capraro et al., 2024).

Another issue that must be considered is the role of human values and identity. We learn to be human from those who teach us, whether formally or informally. But what happens when we broadly transfer the tasks of teaching and learning performed by humans to something non-human? This not only risks losing the social and inclusive value of education but also dilutes the cultural roles of educational systems, which could, in turn, contribute to diminished cognitive abilities in future generations (Dron, 2023, pp. 319–335). For this reason, educational technology should be preserved as much as possible as a complementary alternative and not a substitute for other forms of teaching.

In summary, inclusive digital education, while often promoted as a tool for equality, is increasingly shaped by neoliberal values that prioritise market efficiency, individual responsibility, and economic outcomes over social ones. In a neoliberal context, technology is often presented as a solution to educational inequality – a "techno--utopian" vision – that often serves to commercialise learning and reinforce existing power structures rather than achieve true, equitable inclusion. Digital platforms and educational technologies are deployed to maximise "efficiency" and "data-driven" learning, reducing learning to measurable, standardised outcomes. Digital education encourages competition between schools and students, viewing education as a consumer product rather than a public good. The combination of inclusive digital education and neoliberalism often leads to a paradox in which the "inclusion" of digital tools ends up excluding marginalised groups by imposing market standards on the educational process.

Technological progress in all spheres of human existence is a phenomenon that has existed since time immemorial. There is no doubt that technology has significantly improved the quality of human life over the years and continues to have enormous potential to transform living conditions. Humboldt's concept presupposed academic freedom, with scholars free to choose their own curriculum and teaching methods. Importantly, Humboldt emphasised the need for universities to maintain "distance from the market in order to foster and sustain a critical academic consciousness". However, in recent years, Humboldt's perspective has been weakening, and the boundaries between universities and the corporate world have become much more permeable (Le Grange et al., 2022, a205).

The need to survive in the competitive, neoliberal market of university education has meant that financial and human resources managers in universities are now gaining powerful seats at the proverbial academic table, a place that once belonged to academia.

These non-academic entities have systematically introduced industry--inspired models of academic personnel management over the years, for example, by developing and implementing "advanced" performance management systems aimed at quantifying and measuring the rich, qualitative work of academia (Le Grange et al., 2022, a205).

People often believe they shape their own circumstances, but this is a covert tactic to govern them by persuading them to see their lives as the result of their own choices. People should be governed by their own freedoms and choices, and the irony is that individuals believe they choose their own freedom (González-Calvo, 2025).

Conclusions

The digital transformation of education aims to shift the teaching paradigm. Technological and civilisational advances in this evolving reality are reshaping educational challenges, including teaching methods and strategies, as well as the management of educational content. Digital transformation in education, while offering numerous benefits, such as interactivity and access to modern tools, carries a significant risk of digital exclusion. Combating digital exclusion in education is essential to ensuring equal access to knowledge, developing future competencies, and preventing the deepening of social and economic inequalities. Education is both a right in itself and a necessary means to realising other human rights.

The right to education is enshrined in numerous international human rights documents and must be protected and promoted. This highlights not only the challenge of accommodating cultural differences in the use of AI in education but also the need to create technologies that are more inclusive and grounded in the protection of human dignity and justice. The conflict between neoliberal approaches to education and the demands of inclusive education constitutes a significant problem in contemporary education policy. Neoliberalism, which promotes standardisation and competition, contradicts the inclusive values of diversity and cooperation. Furthermore, the neoliberal model of education often views schools as part of the market, while inclusive education treats them as a public good. This hinders the implementation of inclusion in neoliberal environments, leading to an "educational utopia" or the appearance of inclusion.

Neoliberalism, with its focus on market principles, is increasingly permeating educational systems, transforming them into competitive environments where individual success is prioritised over collective well-being. This shift is evident in how public education has become increasingly susceptible to commercial influence, and in how its policies often overlap with privatisation policies that marginalise the values of community and equality. As a result, teachers are under pressure to adapt to a market-oriented model of education, which impacts their role, autonomy, and ability to create inclusive, democratic learning spaces (González-Calvo, 2025).

Another issue to consider is the role of human values and identity. We learn to be human from those who teach us, whether formally or informally. But what happens when we massively transfer the tasks of teaching and learning performed by humans to something non-human? This not only risks losing the social and inclusive value of education but also dilutes the cultural roles that educational systems play, which in turn may contribute to diminished cognitive abilities in future generations (Dron, 2023, pp. 319–335). For this reason, educational technology should be considered, to the greatest extent possible, a complementary alternative rather than a substitute for other forms of learning.

Neoliberal logic employs management methods specific to private enterprise, modifying in particular the economic and political role of the state in the public sector, leaving room for privatisation, the knowledge economy, and the reproduction of inequality. In other words, neoliberalism is expressed, among other things, in the growth of "private" interventions in the public sphere, including education, in the name of promoting individual freedom, the market economy, and collective efficiency (Laval et al., 2012, p. 112).

The growing market orientation of higher education is associated with the widespread occurrence of managerialism. At the same time, the implementation of managerial ideas and policies leads to

restrictions on academic freedom, autonomy, and self-governance, as well as unhealthy competition between universities at the local and global levels. Marketisation can lead to exclusion. Universities, operating like businesses, may seek to eliminate unprofitable programmes or select students based on their economic potential rather than pursuing a social mission.

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Abstract

The digital transformation of education aims to shift the teaching paradigm. Technological and civilizational advances in this evolving reality are impacting educational challenges in terms of teaching methods and strategies, as well as the management of educational content. Digital transformation in education, while offering numerous benefits, such as interactivity and access to modern tools, carries a significant risk of digital exclusion. Combating digital exclusion in education stems from the need to ensure equal access to knowledge, develop future competencies, and prevent the deepening of social and economic inequalities. Education is both a right in itself and a necessary means to realizing other human rights.

Keywords: education, digital transformation, digital exclusion, digital services, digital inclusion in education



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