Chapter 2
Education, Life, and Digital Technologies in the Czech Republic: The Story of a Post-Socialist Country in Central Europe

Abstracts In this chapter, we focus on the national context of our research, within which we briefly introduce the Czech Republic, its history and economy, changes in education after the fall of the Communist regime, and the current school system. Our primary focus is on the developments and the current changes of the education policy in the field of digital technology, but we also briefly mention some steps, specifically the fulfillment of political goals and the implementation of the suggested measures in education practice, that form the general framework of our research.

Keywords Czech Republic · History · Communist regime · Economy · School system · Education policy · Curricular documents · Digital technologies

2.1 Czech Republic: A Short Introduction to Its History, Economy, and Life

The Czech Republic, also known by the short-form name Czechia, is a country located in the central part of Europe. The Czech Republic was founded as an independent country when Czechoslovakia split in 1993 (see Table 2.1 for detailed characteristics).

2.1.1 History

In the fourth century BC, what are now the Czech lands were inhabited by the Celtic tribes of Boii, after which the territory was named Boiohaemum, or Bohemia in Latin. The territory of the main historical lands (Bohemia and Moravia) has not

J. Zounek et al., *Life and Learning of Digital Teens*, Young People and Learning Processes in School and Everyday Life 6,
https://doi.org/10.1007/978-3-030-90040-3_2

Table 2.1 Basic information on the Czech Republic

Land area:	78,871 sq. km
Population:	10.6 million (December 31, 2018); 5.3% immigrants and asylum seekers
Official language:	Czech
Political system:	Parliamentary republic
Capital:	Prague, population 1.3 million (December 31, 2018)
Administrative divisions:	14 regions
Religions:	Catholic: 10.4%; atheist: 34.5%; no religion stated: 44.7% (2011 census)
Currency:	Czech crown (CZK)
Neighboring countries:	Germany, Austria, Slovakia, Poland
Visegrád Group member:	Since 1991
OECD member:	Since 1995
NATO member:	Since 1999
European Union (EU) member:	Since 2004
Schengen area member:	Since 2007
GDP per capita (current $US):	23,069.4 (2018)

Czech Statistical Office (2014, 2020b, 2020c, 2021) and The World Bank (n.d.)

essentially changed since the Middle Ages; in the sixteenth century, the Lands of the Bohemian Crown became part of the Habsburg monarchy. The formation of an independent Czechoslovakia in 1918, in which two nations, Czechs and Slovaks, were united into a single state, is an important historical milestone. The resulting democratic state guaranteed personal freedom and dignity to its citizens. World War II interrupted the development of the young country: for six years, the Czech lands were part of the Nazi Third Reich as the Protectorate of Bohemia and Moravia, and Slovakia became an independent state. After World War II, Czechoslovakia was reinstated. In 1948, all power in Czechoslovakia was assumed by the Communist Party, which rather quickly built a totalitarian state that was a part of the Soviet bloc (McDermott, 2015; Zounek et al., 2017).

In the 1960s, there was an attempt to reform the socialist regime. The reformation movement culminated in the 1968 Prague Spring, which was terminated by an invasion of the Warsaw Pact armies (Zounek et al., 2017). This invasion started a period of "normalization" (return to normal); in other words, a return to the state before the reformation movement. The changes brought a return to totalitarian practices, including the inability to travel to Western countries, to conduct business, and to freely express opinions.

The fall of the Communist regime in 1989 meant the reconstruction of a democratic state (Fawn, 2000; see also Saxonberg, 2001; Berend, 2009; Vaněk & Mücke, 2016). In 1993, Czechoslovakia peacefully separated into two independent countries: the Czech Republic and Slovakia. The two countries still maintain very close economic and cultural ties, due in part to the fact that the Czech and Slovak

languages are mutually understandable as they are both in the West Slavic group of languages. The history of the Czech lands has always been influenced by both the Slavic and the German culture; Czech cultural traditions are a combination of both influences.

2.1.2 Economy

After the fall of the Communist regime, the Czechoslovak economy experienced a widespread restructuring and privatization of the economy, which had been exclusively owned by the state before 1989. These processes were connected to the liberalization of business and commerce, the privatization of state enterprises, and the deregulation of prices and of the job market. The country also opened to international markets and foreign investments. Other former Soviet bloc countries, including Poland and Hungary, underwent similar changes.

After the fall of the Communist regime, the Czech Republic experienced several periods in which economically successful years alternated with less successful ones. In the mid-1990s, the Czech Republic was considered one of the most successful economies of post-communist Europe. The country had handled the radical structural economic changes rather well and the economy grew quickly.

However, a crisis in the mid-1990s threw the country into a recession. The period of crisis was caused by internal rather than external problems, including the failure to fully implement some reforms. Other weak points of the developments after 1989 include the late formation of an insufficient and barely functional legal framework; some reforms that were not carried out, such as pension reform; and the insufficient funding of schools, science, and research. This resulted in the situation in which after 30 years of economic restoration, Czech gross incomes are still only at 30–50% of German and Austrian gross incomes (Semerák & Švejnar, 2019). This was also a reason that the Czech Republic was selected by foreign investors and companies: for its cheap and skilled workforce, including its car manufacturers.

The Czech Republic was not very negatively affected by the worldwide financial crisis of 2009. This was due in part to the Czech Republic's refusal to accept the euro as its national currency, which partially "protected" the Czech Republic from many consequences of this global crisis. The Czech Republic also has one of the lowest long-term unemployment rates in Europe. For example, in 2018, the overall unemployment rate in the Czech Republic was 2.2%, a record low value; the EU average for the same year was 6.8% (Czech Statistical Office, 2020b, c, 2021).

In terms of gross domestic product (GDP) per capita in purchasing power standards (PPS), in 2018, the Czech Republic achieved 91% of the EU average: the same as Spain, but more than Slovakia (74%), Poland, or Hungary (each 71%). For comparison, Germany achieved 123% of the EU average and Finland achieved 112% in the same year. According to EU data (European Union, 2020), in 2018, industry was the most important sector of the economy (30%), followed by

wholesale and retail trade, transportation, and hotels and restaurants (19%), and public administration, defense, education, healthcare and social work (16%).

The IT field is also an important part of the Czech economy. For example, Avast, a well-known cybersecurity software manufacturer, is originally Czech, and is the current owner of AVG, another originally Czech manufacturer of antivirus programs. Several popular computer games were created in the Czech Republic, including Operation Flashpoint, Ylands (Bohemia Interactive a.s.), the Mafia series (2K Czech), and Kingdom Come: Deliverance (Warhorse Studios). Many successful digital start-up projects and companies operate in the Czech Republic, such as Prusa Research (3D printing and printers) and Kiwi.com (an online travel tech company).

Since 2014, the European Commission has been tracking the progress of individual countries in the field of digitalization development by monitoring the Digital Economy and Society Index (DESI), which covers the following indicators: connectivity, human capital, use of Internet services, integration of digital technology, and digital public services (European Commission, 2020a, b). In the 2020 report, the Czech Republic placed seventeenth out of twenty-eight member states[1] with a score of 50.8, which is slightly below the EU average of 52.6. The Czech Republic has improved slightly since 2018, when it was nineteenth in the EU (European Commission, 2020a, b).

The Czech export market is focused especially on EU countries, with Germany taking 32% of total exports, Slovakia 8%, and Poland 6%. Outside of the EU, the largest portion of exports goes to the United States and Russia, each taking 2% of the total export. Germany is the largest exporter for the Czech Republic, at 29% of total imports, followed by Poland with 9% and Slovakia with 6%. Outside of the EU, 8% is attributed to imports from China and 2% to imports from the United States.

2.1.3 Daily Life and Households

The Czech Republic has undergone several important demographic changes. As a result of population aging, the representation of senior citizens has increased and the ratio of people of productive age has decreased. Natality has decreased; at the beginning of the twenty-first century, the overall fertility was one of the lowest in the world (Czech Statistical Office, 2020b, c, 2021).

The job market has also changed. The emphasis on time intensity has increased; this is connected to long-term daily absence from the home. The overall stress rate has increased as well. Job insecurity has become a new issue that did not exist in its present form before 1989 (Dudová, 2007). Before the fall of the Communist Party in 1989, work was mandatory for each inhabitant, which means that job insecurity, particularly in terms of letting people go, was not an option. For many people, this

[1] The United Kingdom is still included in the 2020 DESI (figures refer to 2019).

represented an entirely new situation that they had to deal with after the regime change.

As in other European countries, there have been changes in personal and family lives (Coyette et al., 2015). The most prominent changes include the declining importance of the institution of marriage and an increase in unmarried cohabitation, increasing divorce (almost one out of two marriages ends in divorce in the Czech Republic), and a consequent increase in the number of single parent and separated families. In 1993, the ratio of children born outside of marriage was less than 13%; in 2018, it was 49% (Czech Statistical Office, 2020b, 2021). The postponement of parenthood and an increasing portion of people living alone are also related to these changes (Lacinová et al., 2016).

The Czech Republic can be measured using the Human Development Index (HDI), which can be described briefly as a marker of the standard of living. It is a tool used by the UN to compare key dimensions of human development in individual countries, including: a long and healthy life, being knowledgeable, and having a decent standard of living. In 2019, the HDI[2] measured the Czech Republic at 0.891, assigning it to twenty-sixth place out of over 190 countries. Spain was in 25th place with 0.893, and France had an identical index (0.891). The index of Poland was 0.872, putting it in 32nd place, and Slovakia was in 36th place with 0.857.

2.1.4 Digital Technologies in Households

Almost all Czech households own a (mobile) phone, and nearly 78% of households own a computer. For several years, there has been a large difference in the possession of digital technologies between households with and without children. In 2015, almost 94% of households with children had a computer; 65% of households without children had one. A more detailed look at the devices that are available in Czech households in the long-term perspective reveals an increasing ratio of mobile devices, especially laptops (Czech Statistical Office, 2020a, c). At the same time, in the Czech Republic, as in Cyprus and Slovakia, mobile network operators offer the most expensive mobile broadband products (European Commission, 2020a, b).

In 2009, the Internet was used by 90% of inhabitants between the ages of 16–24; in 2019, the rate was almost 100% (Czech Statistical Office, 2020a, c). However, in terms of access to the Internet, Czech households are below the EU average.

[2] For more information, see http://hdr.undp.org/en/countries/profiles/CZE and http://hdr.undp.org/en/content/human-development-index-hdi

2.2 From a Totalitarian to a Democratic School System

School systems in individual countries are the result of specific developments. The changes occurring after 1989 were decisive for the current Czech education system (von Kopp, 1992; Mitter, 2003).

In Czechoslovakia before 1989, the school management and administration system was highly centralized. The competences of the government toward the school system were divided among several ministries, and the Communist Party leadership enforced the education policy, the educational content, and the course of the pedagogical process in a centralized manner, either directly or through the ministries. After 1989, a widespread democratization and decentralization of the school administration system occurred, which led to the following changes:

- The state school system monopoly was cancelled and the establishment of private schools, including religious schools, was enabled.
- Unified and binding education programs for primary and secondary schools were cancelled and the education system was gradually significantly diversified.
- The goals and the content of education were rid of all ideological components and the right to freely voice one's opinion started to be respected.
- New textbooks were created, with a new system of competition among textbook publishers.
- Centrally determined numbers of students accepted to individual schools were cancelled and the offer of schools was adapted to the demands of the applicants, especially in secondary schools.
- School management was altered, during which the administrative, economic, and pedagogical autonomy of schools was improved, as was the role of school principals.
- Foreign relations shifted; in connection with joining the EU, the Czech Republic started increased participation in related school activities and initiatives.

The post-revolution period also brought some negative phenomena, such as the termination of the institutional system of further educating pedagogical workers, which had functioned rather well (Walterová, 2004).

Discussions about significant changes in the school system went on for almost 15 years after the Velvet Revolution. Until 2004, the primary and secondary school system was governed by a "socialist" Education Act from 1984, which was merely amended many times in the post-revolution period.

The discussions about the form of the Czech school system culminated in the acceptance of a new Education Act (Act No. 561/2004 Coll), which was prepared as a complex legal standard with a number of new features, including:

- A new two-stage curriculum was established (framework and school education programs).
- The rights and obligations of the participants in education were extended, both inside and outside of schools and educational facilities; the extent of the rights

and obligations of children, pupils, students, and their legal representatives was also newly explicitly described.
- The autonomy of schools and educational facilities was extended; for example, school boards were introduced as a mandatory school body and the evaluation of schools was introduced.
- The Education Act emphasized a lifetime approach to learning.

In addition to that key legal regulation, the Act on Pedagogical Workers (No. 563/2004 Coll.),[3] which can be considered another important Act significantly shaping the form of education in the Czech Republic, was adopted. This Act newly modified the conditions during the establishment of employment contracts of pedagogical workers, defined the prerequisites for the performance of work of pedagogical workers, and included further education and a career system for pedagogical workers (prepared in accordance with Ministry of Education, 2009b).

The Czech school system currently consists of several types of schools that are hierarchically connected. The Czech school system form is anchored primarily in the school system Act (Act 561/2004 Coll.). The schools are managed as a part of public administration and the powers are divided among central governing bodies, regions, and municipalities (Eurydice, n.d.). Figure 2.1 shows the structure of the Czech education system.

The Ministry of Education, Youth and Sports, as a state administration body in the school system, is responsible for the condition, conception, and development of the education system, allocates financial resources from the state budget, sets out the qualification requirements and working conditions of teachers, and determines the general content of education from pre-primary to secondary level. The regions (local government) then establish upper secondary schools (ISCED 3). Nursery

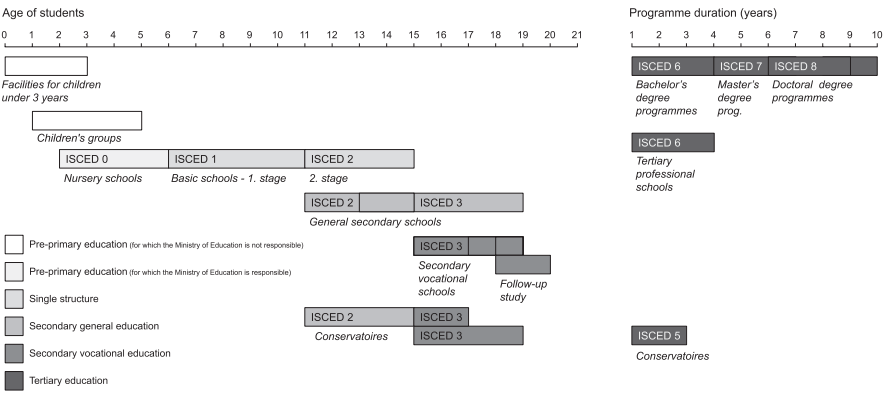

Fig. 2.1 School system in the Czech Republic. (Adapted from Eurydice n.d.)

[3] According to the aforementioned Act (Section 2), a pedagogical worker is a person who carries out direct teaching, direct educational (...) activity by direct action on the learner, …; is an employee of a legal entity that carries out the activities of a school, or an employee of the state, or the director of a school.

schools (ISCED 0) and primary schools (ISCED 1, ISCED 2) are established by municipalities, which also provide compulsory education. This begins at the age of six and takes nine years. Primary schools can also be established by private subjects and churches, as well as by regional governmental bodies or the Ministry of Education. Primary and lower secondary education (basic education) usually takes place in primary schools of nine grades, which are divided into two stages (unified structure). Six-year or eight-year primary schools can also provide lower secondary school education. After completion of the compulsory education, most students continue to upper secondary education (ISCED 3). The high selectivity of the Czech education system has been discussed since the 1990s (Matějů et al., 2006). The high dependence of student results in school education on their parents' education and the rather large differences between the student results from different types of schools have been observed repeatedly, for example by the PISA assessment.

Similarly to other OECD countries, public funding is the main funding source of primary to tertiary education. In the Czech Republic, the funds expended on the operation of educational institutions are lower than the OECD average. The total (public and private) expenditure on primary to tertiary education as a percentage of GDP was 3.5% in 2016, well below the OECD average of 5.0%, and the salaries of Czech teachers are among the lowest in the OECD countries (OECD, 2019).

In the Czech Republic, the content of the education is outlined by two levels of curricular documents: framework educational programs (FEPs) that represent the national level, and school educational programs (SEPs) that are created by every school on the basis of the "boundaries" stated in the FEP. The educational content in the FEP is defined by educational areas that are developed in two categories: the definition of the curriculum and the expected outcomes of students. Information and communication technologies are one of the nine areas in both the first and the second stages of primary education and they allow all students to achieve a basic level of information literacy.[4] The document further states: "The skills acquired in the educational area of Information and Communication Technologies allow pupils to apply computer technology using a wide range of educational software and information sources in all areas of their basic education. This application level goes beyond the content of the educational area of Information and Communication Technologies and becomes part of all educational areas of basic education" (Ministry of Education, 2007, p. 32, 2017, p. 38[5]). In Czech schools (ISCED 1–3), digital technologies are taught as an independent compulsory subject, but digital technologies should also be a part of all other compulsory subjects within the curriculum of the given stage of the school and they are also understood as a cross-curricular

[4] In this context, information literacy means elementary skills in the use of computer technology and modern information technologies, orientation in the world of information, creative work with information, and the use of information in later education and in practice in life (Ministry of Education, 2017).

[5] The only FEP for basic education available in English is from 2007. We quote directly from that text (*.PDF version) here; the 2017 version of the document was not translated, but the text in Czech was identical to the 2007 version.

theme Eurydice (2019). The newest education policy strategy of the Czech Republic (Ministry of Education, 2020), which we will discuss later, makes allowances for revisions of the FEP and therefore also the revision of teaching digital technologies.

The FEP for basic education lists a total of six key competences: competence to learn, competence to resolve problems, communicative competence, social and personal competence, civic competence, and work competence. Digital competence is not explicitly included in the key competences, but it forms a part of some other key competences. For example, the communicative competence includes the use of information and communication means and technologies for good and effective communication with the surrounding world (Ministry of Education, 2017). Another example is the cross-section topic of environmental education, in which the active use of digital technologies is expected in the course of searching for current information on the condition of the environment, determining the seriousness of ecological problems, and recognizing their interconnectedness (Ministry of Education, 2017).

2.3 The Path of Digital Technologies into the School System

The permeation of various technologies and technical means into education in the Czech Republic is not a matter of mere decades; with only slight exaggeration, the entire twentieth century can be denoted as the "century of technologies" in education. In the 1920s, educational programs for schools were prepared for radio broadcasts; it can be said that the radio broadcast was connected to the initial use of audio technologies in education. Even before World War II, gramophone records were used in education for learning languages (Zounek & Šeďová, 2009).

2.3.1 Technology and Education Behind the Iron Curtain (Before 1989)

In Czechoslovakia, the educational use of television started in the early 1960s. Great expectations were connected to the use of television in education. It was even considered that in certain phases of education, televisions could completely replace teachers. The television was also considered as an aid for a more graphic lecture by the teacher, as a complement of the teaching lesson (Lauda, 1962), and it was used in the course of preparing teachers (Mareš, 1976).

Czechoslovakia was greatly affected by the wave of programmed learning and teaching machines. From a modern viewpoint, these devices were very simple, but the legacy of programmed learning formed one of the basic building blocks of the later pedagogical use of computer technologies (Kulič, 1986). Pedagogical research focused on programmed learning and its experimental analysis developed in

parallel, and the different degrees of tiredness in programmed teaching and classic teaching were compared (Kulič, 1963; Šímová et al., 1969). Television and its use as a teaching tool were the subject of many studies (Jošt, 1986) as was the pedagogical efficiency of teaching videoprograms (Macek, 1987).

The first theoretical concepts capturing the beginnings of the expansion of modern technologies in the widest possible sense appeared in the 1960s. The Czech environment saw the birth of a multi-field study analyzing the state of society with significant overlaps with the future, published as *Civilization at a Crossroads* (Richta, 1969). The book operated with the contemporary term of a scientific-technical revolution, which was understood as a "universal and permanent transformation of the structure and dynamics of manufacturing forces of human life" (Richta, 1969, p. 170). The publication showed both positive and negative sides to the development of technology in modern society rather graphically. For example, the authors of the study presumed that new technologies would soon be able to provide people with completely new options of communication using new transfer principles and information storage. On the other hand, they warned that the technologization of society would lead to human solitude and to a lack of social contact. The book tried to systematically compare developments in capitalist and socialist countries and to use the available statistical markers. The book was written in the late 1960s in the relatively free period before the invasion of the Warsaw Pact armies. The neo-marxist opinions of its main author, Radovan Richta, were discussed by Daniel Bell in his book, *The Coming of Post-Industrial Society: A Venture in Social Forecasting* (1973).

It is generally known that the countries of the "Eastern bloc" were rather behind in terms of computer development in comparison to more developed countries. In the early 1960s, the lag in computer development was estimated at approximately ten years (Zelený & Mannová, 2006). The situation was made more difficult by the impossibility to import high-quality contemporary computers from Western countries and by the similarly impossible contact with international institutions and sites at which first-rate research and development took place (especially after the invasion of the Warsaw Pact armies). Despite all the handicaps, Czechoslovakia was the figurative peak among the "Soviet bloc" countries (Naumann, 2009).

Czechoslovakia manufactured the school microcomputers IQ 151 G, Didaktik Alfa, and PMD 85 (for more information, see Rambousek, 1989). These computers did not achieve the parameters of computers manufactured to the west of the Czechoslovakian borders and their usability in education was rather limited. The absence of good teaching software, as well as basic program equipment, was one reason for this condition. Even text editors and table processors were often unavailable. Graphics editors were not part of the standard program equipment in the contemporary computers. Nevertheless, at that time, these computers represented a technological advancement under the given conditions. The technologies and computers were attributed rather significant importance in education, which is confirmed by the fact that research in the field of technologies became a part of the state plan for research work between 1976 and 1980, covering principal questions such as whether a "division of labor" between humans and machine was possible,

whether the living work of teachers could be replaced, and what elements of the teachers' work could be replaced with a machine and how (Tollingerová, 1977). In the 1980s, studies were focused on the creation and use of various didactic tools in primary and secondary schools (Kouba, 1985, 1986).

Inclusion of technologies into education in Czechoslovakia in the 1980s was reflected in the document *A complex long-term electronization program in upbringing and education in the school system*, which was approved by the socialist government in 1985. Its implementation was divided into several steps. The first step was to equip schools with computational technology and electronic aids, according to the contemporary terminology. The next goal was to implement the questions of electronics and computer technology into teaching plans and curricula. The plan was to train a large number of teachers and to create programs for education and for the use of computers in the individual subjects. The entire program was also supposed to be accompanied by pedagogical research (Caha, 1986). Disregarding the fact that the plan was created in the strongly ideological environment of the Communist regime, it is interesting that in principle, it contains topics and goals similar to those of documents created approximately fifteen years later in a different social context.

The previous section returns to times that might seem to be a technological Stone Age to many people today. Nevertheless, before addressing the developments after 1989, we would like to point out one interesting fact. In pre-1989 Czechoslovakia, the activity in the field of "computational" technology implementation into education was accompanied by a rather lively expert debate that went quiet after the revolution. It is clear that all activities before 1989 were strongly affected by the policies of the time and especially by communist ideology. It is also clear that the technologies of that time had very limited options in comparison to the digital technologies of the twenty-first century. In addition, they were often not available to schools. Despite all these differences and negatives, some research findings and thoughts from the period before 1989 from the field of pedagogy and psychology remain remarkably current, such as the problems of technologies and controlled learning.

2.3.2 Post-revolution Waiting (1990s)

The interruption of the expert discussion and of national implementation steps in the field of digital technologies can probably be considered negative consequences of the Velvet Revolution in Czechoslovakia. In the effort to "purge" the school system of totalitarian practices and to create a modern democratic school system, little attention was paid to the valuable and usable results of the existing research and development. The fact that the opening of the borders and the fast development of digital technologies and their expansion into all fields of life were understood as a completely new stage that had almost nothing in common with the previous developments is another explanation for this discontinuity.

Apart from opening the market with computers and other digital technologies, the second key milestone was the connection of Czechoslovakia to the Internet in 1992 and the subsequent commercial expansion of the Internet from 1995. The first search browsers start to appear at this time, and the options to connect to the Internet from home or elsewhere appeared gradually. During the 1990s, the price of computers and other digital technologies decreased, so ICTs became much more accessible to ordinary users. They were still very far from being a part of everyday life, as the prices of more powerful desktop computers were as much as ten times the average monthly salary of that time.

Understandably, digital technologies started to permeate the field of education as well. In the 1990s, the equipping of schools with ICT was de facto the decision of the individual primary or secondary schools and of their management, including the funding. At that time, there was no national program or project that coordinated or otherwise helped the schools in their activities. Nevertheless, there were schools that started to implement digital technologies into education or into various other activities within the school, such as its management. One interviewee perceived the 1990s as a period in which the number of restrictions and limitations decreased and the number of choices and responsibilities increased. Older teachers had to learn the basics of working with computers and other digital technologies (Zounek et al., 2018a). Some Czech schools participated in the Second International Information Technology in Education Study Module 2 (SITES M2) international qualitative research, conducted from 2000 to 2003 (Kozma & Voogt, 2003).[6] Case studies of Czech schools focused on school intranets, on school libraries as multimedia centers, and on computer literary courses for students.[7]

After 1989, no journal focusing specifically on the topic of digital technologies in education, similar to *The British Journal of Educational Technology*, was being published in the Czech Republic. The topic of digital technologies had not found its way even into the general Czech scientific pedagogical journals. We performed a content analysis focused on 1998–2002 (Zounek, 2006) that showed that not even the two most important Czech pedagogical journals or the top Slovak pedagogical journal paid much attention to the issues of information and communications technologies on its pages. This topic concerned only a very small percentage of articles from the total number of published texts. The articles were generally focused on the Internet (the option of using the Internet in the school system, comparing the Internet to exercise books, etc.), teaching (for example, using ICT as a didactic measure in education), and teachers (information education and practical preparation of teachers on the use of digital technologies). The topic of digital technologies in preparing future teachers was the subject of a single contribution, and the topic of ICT-supported teaching of students did not appear at all.

[6] Basic information is available here: https://sitesdatabase.cite.hku.hk/sites_submenu/about_what.htm (cited on 24 May 2020).

[7] The description of case studies is available in Czech and English at: http://it.pedf.cuni.cz/sitesm2/ (cited on 24 May 2020).

Czech pedagogical journals for the wider (pedagogical) public – *Moderní vyučování* [Modern Education] and *Učitelské listy* [Teacher Pages] – reflected the topic of digital technologies in education similarly rarely. Between 1998 and 2002, the researched journals dedicated a rather low degree of attention to ICT, with articles focused on digital technologies constituting less than 3% of all published articles, especially considering that both journals declared a positive relationship to innovations in school and education more or less explicitly. This is rather interesting, especially with regard to the fact that at the end of 1990s, the topic of digital technologies in education started to become a subject of lively discussion in the school system and in society as well.

Some media definitely communicated the message to their readers that this topic was not important enough to deserve more attention. Of course, their readers potentially included teachers or educators of teachers, as well as parents, who could thus form a very narrow view of digital technologies in education and of the wider contexts of this topic.

2.3.3 New Era, New Challenges (2000–2014)

A new era dawned in the field of digital technologies at the beginning of the twenty-first century. After 2000, the first and key strategic documents were approved that concerned digital technologies in education, determining the national priorities and the implementation steps leading to the fulfillment of these priorities.[8] Table 2.2 shows that the inclusion of ICT in education was the subject of a whole range of documents created by the government (at the governmental level) and by the Ministry of Education.

The National Program for the Development of Education in the Czech Republic: White Paper is one of fundamental strategic documents of the modern democratic Czech education policy (Kotásek, 2001). The document was based on analyses and evaluations of the Czech school system between 1995 and 2000 by both Czech and international experts (OECD). A public discussion announced by the Ministry of Education in which the problems of the education system development were discussed by social partners, representatives of the civic society, and various interest groups, became the second source for determining the intentions and recommendations included in the document. The preparation of the document itself thus represented a rather new element, because the vision of the development was based not only on political decisions or expert documents, but also on the opinions of almost all parties participating in education. Such an approach had been completely unthinkable in the socialist totalitarian Czechoslovakia and it was not used even in the 1990s.

[8] The Czech Republic was among the last countries in Europe to approve such documents (Eurydice, 2001).

Table 2.2 Important documents and strategies in the implementation of ICT into education in the Czech Republic

Year	Document (strategy) name	Basic description/focus (goals)
1999	State Information Policy[a] (government document)	Building and developing an information society, creating prerequisites especially for improving the quality of life of individual citizens, improving efficiency of the state administration and self-administration and improving the quality of support of business development. In the field of education, creating prerequisites for mastering work with information using ICTs on schools of all types and creating a moral codex for working with information.
2000	The Concept of State Information Policy in Education (document from the Ministry of Education)	Ensuring the availability of digital technologies (infrastructure) to all people participating in education (in schools, other education, or lifelong learning). Supporting the integration of digital technologies into education at all stages, with an emphasis on the key goal of prepared teachers.
2001	National Program for the Development of Education in the Czech Republic: White Paper (document by the Ministry of Education)	Developing student competences at all school levels, effectively using information and communication technologies in education and in work and personal life. Supporting schools in forming conditions to use ICT in modernizing the methods and forms of education, including supporting the development of teacher competences in this field.
2004	State Information and Communication Policy (government document)	Equipping institutions with an infrastructure (to complete the connection of all educational institutions to the Internet and increase connection speed), systematically increasing the information literacy of educational institution workers, and increasing the ability of schools to use ICT and educational software (e-learning).
2008	Developmental Strategy on ICT in Education for 2009–2013 (document from the Ministry of Education)	Allowing a standard use of digital technologies in teaching of most subjects as well as the use of ICT as a standard information and communication tool for teachers and students. Supporting the equipping of schools with digital technologies, supporting teachers and administrators in their education in the use of ICT, and supporting electronic communication between the school and parents.
2013	Digital Czech Republic v. 2.0: The Way to the Digital Economy (government document)	Update of the previous state information policy. Education represented one of the priorities. Increasing digital literacy of the inhabitants and developing lifelong learning.
2014	Digital Education Strategy 2020 (document from the Ministry of Education)	Three priority goals: opening the education to new methods and ways of teaching using digital technologies, improving student competences in the field of work with information and digital technologies, developing the computational thinking of students.
2015	Digital Literacy Strategy of the Czech Republic for 2015–2020	Increasing the level of digital literacy of citizens of the Czech Republic in order to support a competitive economy, adaptable human resources, and the individual quality of life. Four main priorities: employment rate, competitiveness, social integration, support of family.

(continued)

Table 2.2 (continued)

Year	Document (strategy) name	Basic description/focus (goals)
2020	Strategy 2030+ (document from the Ministry of Education)	Providing support for the development of student digital literacy (and computational thinking) as part of teaching of all subjects. Supporting the digital competences of pedagogues. Decreasing the inequality of students in terms of access to digital technologies and preventing a digital chasm.[b]

[a]This document was not primarily focused on the field of the school system and education; it expressed the priorities of the Czech Republic in the field of ICT at the given time
[b]Strategy 2030+ was being prepared at the time of writing. The background materials are available only in Czech

Almost at the same time (in 2000), the Czech government approved the Concept of State Information Policy in Education (further referred to as the Concept), which is one of the most fundamental and important documents of the Czech education policy, because it declares the importance of digital technologies in education. The preparation of this document was not preceded by a more extensive discussion and the document itself does not mention any background studies or authors as the white paper does.

The Concept works with the term *information literacy*, which it perceives as "an ability to use information sources and information and communication technologies in order to increase work and life efficiency ... the knowledge of ICTs and the ability to use them on a level comparable to other knowledge components of literacy perceived in a complex way, such as reading, writing, and calculating (Government of the Czech Republic, n.d.). This document uses the term *literacy*, or more specifically *information literacy* (not digital literacy), and perceives it to be as important as other basic literacies. This is interesting especially because in discussions, documents, and education policy, the terms *competence* and *ICT competence* were later preferred. The term *competence* is perceived as an individual's ability to use digital technologies as tools and at the same time to understand the digital technologies as a phenomenon affecting and constantly changing the world around us (Altmanová et al., 2011).

The terms *literacy* and *digital literacy* were rarely used in this context until recently, when the Digital Education Strategy 2020 from 2014 was approved (see below for more information). The Concept from 2000 also worked with the Czech Republic's planned joining of the EU, stating that within the future free movement of workers within EU borders, the knowledge of ICT use on the same level as other EU countries would be indispensable for mutual recognition of qualifications for the performance of works.

The actual implementation of the Concept started in 2001; it was divided into several phases. The first phase dealt with a rather wide range of tasks connected to the introduction of ICT into schools; the second phase focused on the education of the wider public in the field of ICT use.

Since 2001, the Concept implementation process has been accompanied by much confusion, uncertainty, mistakes, and delays. For example, the schedule of

partial goals was rewritten, including the postponement of the term of implementation by up to one year. Initially, the project was mostly focused on equipping schools with digital technologies, and the pedagogical goals themselves were secondary. The dominance of the technological focus was also emphasized by the fact that teacher training was initiated a full two years after the beginning of the implementation and specialized trainings focused on advanced users (including the didactic use of ICT in individual subjects) were initiated more than one year later. One weakness of the Concept was the lack of consideration for specific training of school administrations in the field of digital technologies. Therefore, the school principals, who had the decisive influence on the implementation of digital technologies in their schools both in the fields of planning and concepts and in the field of implementation, were even not supposed to be trained. People who were supposed to support teachers and create the environment in which ICT could be implemented in schools were not sufficiently prepared. At that time, similar weaknesses in national strategies could be found in other European countries as well (Eurydice, 2001).

Furthermore, the Concept did not consider the preparation of future teachers on the use of digital technologies in their teaching despite the fact that the digital technologies were starting to become a part of most school equipment at that time. The absence of a systematic pedagogic evaluation of the project or of pedagogical research beyond its mention in the document can be considered another weakness of the entire implementation phase of the Concept.

Despite these problems, the schools were able to purchase training programs and other electronic teaching materials and train their teachers in the (basic) use of digital technologies.

In 2006 and 2007, there was a surprising reversal of the implementation of digital technologies into education in the Czech Republic and the implementation of the Concept was de facto stopped without a clear reason. The responsible department at the Ministry of Education was disbanded and the funding for planned activities was removed from the budget draft for 2007–2010. Central support of the inclusion of ICT into education in its original form was terminated. In some programs, such as the equipment with infrastructure, this development was expected, because their goals had been generally achieved earlier; however, many specific projects in schools were stopped directly in the course of their implementation.

In a short period of time (in 2008), activities leading to the preparation of a new concept of governmental policy in the field of the inclusion of ICT into education were initiated. By September 2008, a document by the Ministry of Education titled *Proposal of the concept of the development of information and communication technologies in education 2009–2013*[9] was written.

However, in 2009, at the beginning of the economic crisis, it was discovered that the concept of the development of ICT could not be implemented to the extent planned, especially with regard to the condition of public finances in the Czech Republic.

[9] The same as *Developmental Strategy on ICT in Education 2009–2013*.

Despite all the difficulties, between 2007 and 2014, the integration of digital technologies into education was supported (in the amount of more than 5 billion CZK) from the European Social Fund and including a contribution from the state budget (Ministry of Education, n.d.). The support focused on all priority fields. For example, it concerned the compilation of electronic materials available online, the transformation of teaching methods, and provision of educational software. At this time, many digital educational materials and good practice examples were created; for example, schools purchased interactive digital boards, tablets, various measuring devices, etc. During this time, a methodical portal (rvp.cz) was established; it is still operated and continues its development.[10] Pedagogues increased their competences, especially in the ICT field. Nevertheless, the expected transformation of traditional education in the direction of education focused on skills and competences did not take place. Similarly, the planned regional school centers were not established. These were supposed to become the local methodical (support) centers of the surrounding schools and they were supposed to support the sharing of good practice examples in the field of use of digital technologies. The efforts to use digital technologies for the purpose of informing all the participants in school education (parents, school management) on the problems of digital technologies in education and to improve communication between these participants were left almost completely without any support from the state (Ministry of Education, n.d.).

It cannot be said that the portal focuses only on a single matter, such as the teaching of students or the use of digital technologies in connection to students' results or changes in the lives and learning of students in connection with equipping schools and households.

2.3.4 Strategy vs. Reality (2014–Present)

After the awkward implementation of the previous phase, in 2014, the *Digital Education Strategy 2020* (further referred to as Strategy or DES) laying out the priorities of the *Education Policy Strategy of the Czech Republic 2020* was adopted.[11] In the DES, digital education is the key concept; it is perceived as "education reacting to the changes in society related to the development of digital technologies and their use in various fields of human activities" (Ministry of Education, n.d., p. 3). It includes both the education that effectively uses digital technologies to support education and learning and the education that develops the digital literacy of

[10] The rvp.cz methodical portal was established as the main methodical support of teachers and for the purpose of FEP support (curricular reforms) in schools. The portal represents an environment in which teachers can inspire each other and share their experiences. The portal uses a number of online tools, including blogs, video, e-portfolios, wikis, and webinars. Other materials shared/available here include teaching materials created by teachers, articles, and current curricular documents.

[11] Available at: https://www.msmt.cz/vzdelavani/skolstvi-v-cr/strategie-digitalniho-vzdelavani-do-roku-2020

students and prepares them for the requirements of society and the job market, requirements in skills and abilities in information technology that keep increasing (Ministry of Education, n.d.).

The DES declares that the given goals cannot be achieved without providing support to the teachers who are to introduce the planned changes into the everyday school life and into teaching. The document includes activities that should lead toward a better-informed public and an understanding of why digital technologies are being included in education. On one hand, the effort to equip schools with digital technologies was clearly suspended; on the other hand, the DES certainly tried to include the neglected features of the digital technology implementation.

The DES and the individual measures are based on available data from the Czech Statistical Office, the Czech School Inspectorate, Eurostat, the Eurydice network, etc.; during the compilation of the document, some data from Czech and international (pedagogical) studies were used as well.

At the time of writing of this book, it was too soon for a full-scale evaluation of the implementation of the DES, but some partial evaluation reports written by various institutions were already available. However, no systematic evaluation of the implementation stages and no pedagogical research are being conducted. The implementation process is monitored by the Czech School Inspectorate, but it only provides insights into the problems, and it does not offer any representative studies.

The evaluation of the implementation of the priority goals of the DES by the Ministry of Education (Ministry of Education, 2019) stated that all measures except two are in some phase of implementation. The acceptance of the Digital Competence Framework for Educators (DigCompEdu) (European Commission, n.d.) as a standard for the digital competences of teachers in the Czech Republic can be considered a fulfilled goal.[12] However, the report is not very clear on how the framework will be implemented in the real world.

Limited progress was recorded in the offer of available further education for pedagogical workers; a system of online courses, including the evaluation of the course quality by participants themselves, should have been created. According to the interim evaluation by the Ministry, progress was reported in the informed status of the public and in the popularization of programming lessons (in this case, the activities were connected to the Code Week campaign[13]).

The interim evaluation by the Ministry of Education seemed rather positive, even though some statements concerning the fulfilled activities marked as "significant progress" very non-specific and unclear statements that do not provide a clear account of the real performance of the given activity.

[12] For more information, see: https://ec.europa.eu/jrc/en/digcompedu/supporting-materials

[13] Website: https://codeweek.eu/

The fulfillment of the DES is independently monitored by the Union of Computer Specialists[14] (hereinafter referred to as UCS), which tends to evaluate the progress of implementation on the basis of real measures or impacts. The evaluation of the UCS does not refer to any methodology or sources on the bases of which its evaluation was made. Therefore, this is more of an opinion of a professional organization based on monitoring the reality of Czech schools. The UCS participates (through its members) in a number of projects in schools; UCS members serve on various commissions and attend meetings on various levels of the school system with the goal of supporting implementation into schools. Some members are teachers at primary or secondary schools and some teach at universities.

The latest UCS evaluation report (Lessner, 2019) stated that actual results of the fulfillment of individual measures of the DES are visible for the first time. The DES was introduced in 2015 and the report from 2019 stated that the results of fulfillment of the DES were visible for the first time. As an example of results, the evaluation report mentioned prepared changes in curriculum in the field of informatics and digital literacy from preschool education through secondary schools. The report mentioned an interesting paradox; Lessner (2019) wrote: "A school inspection has stated and proven with data that school equipment does not correspond with the current needs." The implementation of the research showing the actual conditions in schools was a positive result, as it represented the fulfillment of one of the measures included in the DES: the evaluation of the results of the implementation of the DES. However, the research result, suggesting insufficient equipment in schools, was negative. This indicates a failure to fulfill some of the measures approved within the DES as well as within the plans and visions before 2014.

Furthermore, the report suggested that the fulfillment-related problems concern key areas, such as curriculum innovation, digital teaching materials, teacher education, and stable and more long-term financial support of the reforms. A traditional problem appears: the professional development of school management in the field of implementation of digital technologies into school life. The report summarized the condition of DES implementation very critically. "Once again, we can repeat that DES is not a priority, or that it is only a declarative priority" (Lessner, 2019, para).

The report of the Supreme Audit Office (SAO) represented a rather non-traditional source of evaluation of the implementation of digital technologies in the Czech Republic. The audit focused on the period between 2011 and 2018, and the goal was to assess whether the measures and projects related to developing education digitalization in the Czech Republic effectively contributed to the fulfillment of strategic goals in this field (Audit, non-paged). The audit concerned a

[14] The Union of Computer Specialists z. s. [*Jednota školských informatiků*] is a professional organization (registered association), which associates pedagogues and experts focused on the ICT in the school system. The UCS was created in order to acquire and spread knowledge and experience on the use of ICT in education both in the CR and abroad and to actively participate in the introduction and use of ICT in education (http://www.jsi.cz/).

period longer than the implementation of DES, and it did not focus exclusively on the Ministry of Education, but also on several selected schools and companies that were the partners of the schools in implementing the projects (in teacher training, creating digital education materials, etc.). This is a rather extensive document, and the following quote from the conclusion seems completely fundamental (Beznoska, 2019, p. 3):

> The MEYS [Ministry of Education – authors' note]...did not provide the appropriate offer of further education for teachers and digital education sources. At the same time, the MEYS did not introduce a standard of digital competences for teachers into practice, and in that manner, it did not set a technical standard for the equipment of schools with ICT...Therefore, according to the SAO, the MEYS did not create the conditions necessary for the successful education digitalization development in the long term or for the improvement of digital literacy. The MEYS did not make systemic changes in education that would ensure the desirable digital competences of students and teachers and demonstrably improve their digital literacy...The measures implemented by the MEYS and other projects connected to education digitalization therefore did not effectively contribute to the fulfillment of goals in this field.

When reading the conclusion of the SAO report, it is necessary to understand that it mapped the situation until 2018, which means that some activities had already been completed, such as the adoption of the Digital Competence Framework for Educators (DigCompEdu) as a standard for the digital competence of a teacher in the Czech Republic. More recent documents, such as the UCS report, suggest that the "adoption" of the framework does not yet represent its practical use. The SAO report is very critical, but at the same time, it shows how many projects were supported and how many funds was expended. It is one of the very few sources that explicitly published at least some specific economic data. The SAO report also shows that the implemented measures do not aim for principal transformations of the school system and education, but that the digital technologies are meant to rather complement the traditional school education. The trend of low emphasis on students and their competence in the field of digital technology thus continues. The planned communication of the DES goals to the general public lags far behind as well. Parents continue to learn very little about the meaning of the integration of digital technologies into school education or about the wider contexts of the process.

On the other hand, it cannot be said that the Ministry of Education has been completely passive in terms of introducing ICT into schools. In recent years, the Ministry has supported the schools in the field of introducing digital technologies through grants ("ICT templates"), which are co-funded by the EU. In addition, these projects are in the "simplified reporting" regime, through which the Ministry tries to decrease the administrative burden related to these projects. Within the implementation of the DES, the Ministry of Education also supported activities leading to processing documents for revising FEPs, for writing new textbooks, for teacher education, and for organizing conferences. All pedagogical faculties (faculties

educating future teachers) in the Czech Republic participate in these activities. These projects are also supported by EU funds.[15]

The wider contexts of the integration of digital technologies into education involves one more important Czech political document, which focuses on the support of the development of digital literacy in society – the Digital Literacy Strategy of the Czech Republic for 2015 to 2020, written in 2015 (further referred to as the Digital Literacy Strategy), which was created by the Ministry of Labor and Social Affairs. This document focuses on the development of the digital literacy of citizens, and its main goal is to support the competitive capacity of the economy, adaptability of human resources, and the quality of life of individuals. Its priorities include the support of the family; the goal is to increase the family ability to take opportunities and to eliminate the risks connected to the anchoring of digital technologies in the family, school, and free-time spaces (Ministry of Labor and Social Affairs, 2015).

The Digital Literacy Strategy explicitly mentions the importance of cooperation between families, schools, and free-time institutions. The document reflects the importance of the usability of digital technologies in informal teaching. Even though one measure of the strategy is "to increase the availability of relevant data for monitoring and evaluating the status of digital literacy in the individual priority spheres of this strategy" (Ministry of Labor and Social Affairs, 2015, p. 76), at the time of writing of this book, little information based on empirical data was available on the fulfillment of goals.

2.4 Conclusion

The problems of the use of digital technologies in education are often discussed in various fields and contexts. Digital technologies are an important topic for education policy, which represents one of the key contexts/frameworks by which digital technologies are implemented into education, but it represents only one framework of our research.

We have described the development of the education policy in the Czech Republic in the field of digital technologies in detail. After the fall of the Communist regime in 1989, Czechoslovakia was no longer isolated from the developed world, and its education policy started to gradually reflect the European context as well. The education policy in the Czech Republic in the field of digital technologies in the last two decades can be illustratively divided into phases, as described in the report "Digital Education Policies in Europe and Beyond: Key Design Principles for More Effective Policies" (Conrads et al., 2017). This

[15] More about these projects is available at https://imysleni.cz/about-the-project and https://digigram.cz/ (in Czech). These projects were in progress at the time of writing.

approach makes it possible to perceive Czech politics in the European context and to remember national characteristics.

The first phase of the policy (after 2001) in the Czech Republic focused especially on equipping schools with infrastructure and on connecting schools to the Internet. These priorities were identical in other European countries. The education of teachers was among the goals in the first phase of the policy in the Czech Republic, but the focus was primarily on operational abilities in the use of digital technologies and less on the use of ICT by pedagogues. The compilation of electronic materials was also among the priorities of the education policy. With certain simplification, the goals can be summarized thus: school equipment was the first priority, followed by the pedagogical aspects of integrating digital technologies into education.

According to the report by Conrads et al. (2017), the second phase of education policies in Europe emphasized teacher preparation, the development of teacher and student competences, and the compilation of digital content. The focus on "educational innovation" and the integration of ICT into the innovation processes within school systems were also significant (Delrio & Dondi, 2008). In the Czech Republic, both phases merge into one another to a certain extent and cannot be unequivocally distinguished, because teachers were a priority in the first political documents. The diffusion of the first and the second phase in the Czech Republic is probably caused by the fact that the first national documents were adopted with a certain degree of delay in comparison to most European countries. At the time these measures were adopted, the education policy in other countries was already shifting its attention to the education of teachers and their competences. At the same time, the school equipment had to be taken into consideration, because the level of equipment of Czech schools had been very inconsistent since the 1990s. The implementation of ICT into education was perceived as an education innovation in the Czech Republic, at least in political documents. With a certain degree of simplification, the Czech Republic is currently situated between the second and the third phases of education policies.

The third phase of education policies (approved after 2010) is characterized as: "better linking the systemic and the operational policy levels and, on the other, combining pedagogical competence development with the provision of digital devices or resources" (Conrads et al., 2017). This phase is trying to correct the weaknesses of the previous policies, and it emphasizes the key role of teachers in the meaningful implementation of digital technologies into everyday practice. Lately, the Czech education policy has emphasized the innovation of educational methods through digital technologies and the digital competences of students and teachers who will be able to use ICT in lessons and thus implement pedagogical innovations and not merely operate digital technologies. Equal access to digital study materials is also one of the priorities.

The implementation steps, specifically the fulfillment of political goals and the implementation of the proposed measures in school practice probably represent

the largest challenge. No completely operational connection of "systemic and operational policy levels" is available. In this context, in accordance with Elmore (2004), it is possible to consider the Czech education policy manifesting certain characteristics of a "symbolic policy" intended primarily to demonstrate a symbolic interest in a topic by adopting various concepts and strategies, thus acquiring political favor, thereby de facto terminating the professed interest in the topic. The subsequent implementation steps, including funding and the evaluation of these activities, therefore remain out of the field of view. This raises the concept of a "parallel game" in which the principals and teachers bring this symbolic policy to life by only implementing superficial changes with no actual impact upon the quality or principles of teaching or learning with the support of digital technologies. In that way, they play some sort of a "game of change or innovation." If there is no feedback, the same mistakes can be made and then repeated over and over again. In Norway, the strategies and implementation of the policy can be changed, modified, or innovated rather quickly and flexibly thanks to regular evaluations (Zounek et al., 2018b). No such systematic evaluation systems or research exist in the Czech Republic and the education policy aim changes are thus very difficult and slow.

The Czech education policy has been oriented mostly toward the implementation of digital technologies in schools and toward the teachers' work, especially in the first two phases. It has not seriously considered other participants or institutions outside of schools, such as parents or free-time institutions. Cooperation among the ministries has been nonexistent and the cooperation and involvement of regions and school authorities has not worked, either. Only in the last couple of years has a wider range of political documents been seen in the field of nonformal or informal education. The development of digital literacy outside of formal education, and, generally speaking, lifelong education is a challenge for the future. It is connected to an improved awareness outside of school education on the opportunities and limitations of digital technologies in education and in various forms of teaching.

Bibliography

Act No. 561/2004 Coll., On pre-school, primary, secondary, higher vocational and other education (School Act). https://www.msmt.cz/dokumenty-3/skolsky-zakon

Act No. 563/2004 Coll., The act on teachers and on the amendment of certain acts. https://aplikace.mvcr.cz/sbirka-zakonu/SearchResult.aspx?q=563/2004%20&typeLaw=zakon&what=Cislo_zakona_smlouvy

Altmanová, J., Berki, J., Brdička, B, ... & Zmrzlík, B. (2011). *Gramotnosti ve vzdělávání. Soubor studií* [Literacy in education. A set of studies]. Výzkumný ústav pedagogický v Praze.

Bell, D. (1973). *The coming of post-industrial society: A venture in social forecasting*. Basic books.

Berend, I. T. (2009). *From the Soviet Bloc to the European Union*. Cambridge University Press.

Beznoska, A. (2019). *Kontrolní závěr z kontrolní akce 18/18. Podpora rozvoje digitalizace vzdělávání v České republice* [Audit conclusion from audit action 18/18. Support for the development of digitalization of education in the Czech Republic]. Nejvyšší kontrolní úřad [Czech Republic Supreme Audit Office]. https://nku.cz/assets/kon-zavery/k18018.pdf

Caha, Z. (1986). Elektronizace ve výchově a vzdělávání [Electronization in education]. *Pedagogika, 36*(2), 133–136.

Český statistický úřad [Czech Statistical Office]. (2014, February 27). Náboženská víra obyvatel podle výsledků sčítání lidu 2011 [Religious faith of the population according to the results of the census 2011]. https://www.czso.cz/csu/czso/nabozenska-vira-obyvatel-podle-vysledku-scitani-lidu-2011-61wegp46fl

Český statistický úřad [Czech Statistical Office]. (2020a, March 24). *Informační společnost v číslech-2020* [Information society in numbers-2020]. https://www.czso.cz/csu/czso/informacni-spolecnost-v-cislech-2020

Český statistický úřad [Czech Statistical Office]. (2020b, April 16). *Česko v číslech-2019* [Czechia in numbers-2019]. https://www.czso.cz/csu/czso/ceska-republika-v-cislech-2019

Český statistický úřad [Czech Statistical Office]. (2020c, November 30). *Statistical yearbook of the Czech Republic – 2020*. https://www.czso.cz/csu/czso/statistical-yearbook-of-the-czech-republic-2020

Český statistický úřad [Czech Statistical Office]. (2021, February 22). *Czech Republic in international comparison (Selected indicators) – 2020*. https://www.czso.cz/csu/czso/czech-republic-in-international-comparison-selected-indicators-2020

Conrads, J., Rasmussen, M., Winters, N., Geniet, A., & Langer, L. (2017). *Digital education policies in Europe and beyond: Key design principles for more effective policies*. *Publications Office of the European Union.* https://doi.org/10.2760/462941

Coyette, C., Fiasse, I., Johansson, A., Mantaigne, F., & Srandell, H. (2015). *Being young in Europe today*. *Publications Office of the European Union.* https://doi.org/10.2785/59267

Delrio, C., & Dondi, C. (2008). ICT and educational policy in the European region. In J. Voogt & G. Knezek (Eds.), *International handbook of information technology in primary and secondary education* (pp. 1097–1108). Springer.

Dudová, R. (2007). *Souvislosti proměn pracovního trhu a soukromého, rodinného a partnerského života* [The relationship between changes in the labour market and private, family and partner life]. Sociologický ústav AVČR.

Elmore, R. (2004). *School reform from the inside out: Policy, practice, and performance*. Harvard Education Press.

European Commission. (2020a). *Digital Economy and Society Index (DESI) 2020: Czechia*. https://ec.europa.eu/digital-single-market/en/scoreboard/czech-republic

European Commission. (2020b, December 18). *Digital Economy and Society Index (DESI): DESI 2020*. https://ec.europa.eu/digital-single-market/en/desi

European Commission. (n.d.). *The DigCompEdu framework*. https://ec.europa.eu/jrc/en/digcompedu/supporting-materials

European Union. (2020, May 14). *Czechia: Overview*.. https://europa.eu/european-union/about-eu/countries/member-countries/czechia_en

Eurydice. (2001). *ICT@Europe.edu: Information and communication technology in European education systems*. Eurydice European Union.

Eurydice. (2019). *Digital education at school in Europe*. Publications Office of the European Union.

Eurydice. (n.d.). *Česká republika: Overview* [Czech Repubic: Overview]. https://eacea.ec.europa.eu/national-policies/eurydice/content/czech-republic_cs

Fawn, R. (2000). *The Czech Republic: A nation of velvet*. Harwood Academic Publishers.

Government of the Czech Republic. (n.d.). *Digitální Česko v.2.0: Cesta k digitální ekonomice* [Digital Czech Republic v.2.0: The Way to the Digital Economy]. https://www.vlada.cz/assets/media-centrum/aktualne/Digitalni-Cesko-v%2D%2D2-0_120320.pdf

Jošt, J. (1986). Místo a úloha televize ve vyučování [The place and role of television in teaching]. *Peagogika, 54*(2), 155–164.

Kotásek, J. (Ed.). (2001). *National programme for the development of education in the Czech Republic: White paper*. https://planipolis.iiep.unesco.org/en/2001/national-programme-development-education-czech-republic-white-paper-5687

Kouba, L. (1985). *Výzkum tvorby a využití materiálních didaktických prostředků pro školy základní a střední: sborník (1. díl)* [Research of the creation and use of material didactic aids for primary and secondary schools: proceedings (part 1)]. Státní pedagogické nakladatelství.

Kouba, L. (1986). *Výzkum tvorby a využití materiálních didaktických prostředků pro školy základní a střední (2. díl)* [Research of the creation and use of material didactic aids for primary and secondary schools: proceedings (part 2)]. Státní pedagogické nakladatelství.

Kozma, R. B., & Voogt, J. (2003). *Technology, innovation, and educational change: A global perspective. A report of the second information technology in education study module 2*. International Society for Technology in Education.

Kulič, V. (1963). Experimentální analýza procesu programového učení a některých jeho principů [Experimental analysis of the program learning process and some of its principles]. *Pedagogika., 13*(6), 645–669.

Kulič, V. (1986). Od programovaného učení a vyučovacích strojů k počítačům a druhé gramotnosti [From programmed learning and teaching machines to computers and second literacy]. *Pedagogika, 36*(4), 409–428.

Lacinová, L., Ježek, S., & Macek, P. (2016). *Cesty do dospělosti: Psychologické a sociální charakteristiky dnešních dvacátníků* [Paths to Adulthood: Psychological and social characteristics of current vicenarians]. Masarykova univerzita.

Lauda, J. (1962). Školská televize, její pojetí a využití [School television, its concept and use]. *Pedagogika, 12*(4), 471–481.

Lessner, D. (2019, May 17). *Hodnocení SDV k 17. 5. 2019* [Evaluation Digital education strategy until 17.5.2019]. http://digivzdelavani.jsi.cz/aktuality/hodnocenisdvk1752019.

Macek, Z. (1987). Výzkum pedagogické účinnosti výukových videoprogramů [Research into the pedagogical effectiveness of educational video programs]. *Pedagogika, 37*(6), 659–669.

Mareš, J. (1976). Využití televizní techniky při přípravě učitelů [Use of television technology in teacher training]. *Pedagogika, 26*(4), 443–453.

Matějů, P., Straková, J., & Basl, J. (Eds.). (2006). *(Ne)rovné šance na vzdělání: Vzdělanostní nerovnosti v České republice* [(In) equal opportunities for education: Educational inequalities in the Czech Republic]. Academia.

McDermott, K. (2015). *Communist Czechoslovakia, 1945-89: A political and social history*. Macmillan Education.

Mitter, W. (2003). A decade of transformation: Educational policies in Central and Eastern Europe. *International Review of Education, 49*(1–2), 75–96.

Ministry of Education. (2000). *Koncepce státní informační politiky ve vzdělávání* [The Concept of State Information Policy in Education]. http://www.msmt.cz/file/36102_1_1

Ministry of Education. (2004). *Metodický pokyn k projektům v rámci realizace Státní informační politiky ve vzdělávání* [State information and communication policy]. https://www.msmt.cz/file/38071_1_1/

Ministry of Education. (2007). *Framework educational programme for basic education*. https://www.msmt.cz/vzdelavani/zakladni-vzdelavani/framework-education-programme-for-basic-education

Ministry of Education. (2008). *Návrh koncepce rozvoje informačních a komunikačních technologií ve vzdělávání v období 2009–2013* [Proposal of the concept of development of information and communication technologies in education in the period 2009–2013]. http://www.vzdelavani2020.cz/koncepce-rozvoje-informacnich-a-komunikacnich-technologii-ve-vzdelavani.html

Ministry of Education. (2009a). *Akční plán pro realizaci Koncepce rozvoje informačních a komunikačních technologií ve vzdělávání pro období 2009–2013* [Action plan for the implementation of the concept of the development of information and communication technologies in education for the period 2009–2013]. https://www.msmt.cz/ict

Ministry of Education. (2009b). *Zpráva o vývoji českého regionálního školství od listopadu 1989* [Report on the development of Czech regional education since November 1989]. http://www.msmt.cz/uploads/soubory/tiskove_zpravy/Zprava_o_vyvoji_ceskeho_regionalniho_skolstvi.pdf

Ministry of Education. (2017). *Rámcový vzdělávací program pro základní vzdělávání* [Framework educational programme for basic education]. https://www.msmt.cz/file/41216/

Ministry of Education. (2019). *Průběžné hodnocení implementace Strategie digitálního vzdělávání do roku 2020* [Ongoing evaluation of the implementation of the Digital Education Strategy 2020]. https://www.msmt.cz/vzdelavani/skolstvi-v-cr/postup-realizace-strategie

Ministry of Education. (2020). *Strategie vzdělávací politiky ČR do roku 2030+* [Strategy of educational policy of the Czech Republic until 2030+]. https://www.msmt.cz/vzdelavani/skolstvi-v-cr/strategie-2030

Ministry of Education. (n.d.). *Strategie digitálního vzdělávání do roku 2020* [Digital education strategy 2020]. https://www.msmt.cz/uploads/DigiStrategie.pdf

Ministry of Labour and Social Affairs. (2015). *Strategie digitální gramotnosti ČR naobdobí 2015 až 2020* [Digital literacy strategy of the Czech Republic for the period 2015 to 2020]. https://www.mpsv.cz/strategie-digitalni-gramotnosti-cr-na-obdobi-2015-2020

Naumann, F. (2009). *Dějiny informatiky: od abaku k internetu* [History of computer science: From abacus to the internet.]. Academia.

OECD. (2019). *Education at a glance 2019: OECD indicators*. OECD Publishing. https://www.oecd-ilibrary.org/education/education-at-a-glance-2019_f8d7880d-en

Rambousek, V. (1989). *Technické výukové prostředky*. Státní pedagogické nakladatelství.

Richta, R. (1969). *Civilizace na rozcestí: společenské a lidské souvislosti vědeckotechnické revoluce* [Civilization at a crossroads: Social and human contexts of the scientific and technological revolution]. Svoboda

Saxonberg, S. (2001). *The fall: A comparative study of the end of communism in Czechoslovakia, East Germany, Hungary and Poland*. Harwood Academic Publishers.

Semerák, V., & Švejnar, J. (2019). *Bilance české ekonomiky od roku 1989* [Balance of the Czech economy since 1989]. CERGE-EI.. https://idea.cerge-ei.cz/zpravy/bilance-ceske-ekonomiky-od-roku-1989

Šímová, J., Joachimsthaler, J., & Chaloupková, E. (1969). Náročnost programované výuky ve výsledcích některých fyziologických šetření [Difficulty of programmed teaching in the results of some physiological surveys]. *Pedagogika, 19*(6), 851–858.

The World Bank. (n.d.). *GDP per capita (current US$). Czech Republic*. https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CZ

Tollingerová, D. (1977). Výpočetní technika ve výchovně vzdělávacím procesu a její výzkum ve státním plánu badatelských prací v 6. Pětiletce [Computer technology in the educational process and its research in the state plan of research work in the 6th five-year plan.]. *Pedagogika, 27*(2), 219–221.

Vaněk, M., & Mücke, P. (2016). *Velvet revolutions: An oral history of Czech Society*. Oxford University Press.

Vláda České republiky [Government of the Czech Republic]. (n.d.). *Státní informační politika-Cesta k informační společnosti* [State information policy-The way to the information society]. https://www.vlada.cz/cz/clenove-vlady/historie-minulych-vlad/statni-informacni-politika%2D%2D-cesta-k-informacni-spolecnosti%2D%2D-dokument-2089/

von Kopp, B. (1992). The Eastern European revolution and education in Czechoslovakia. *Comparative Education Review., 36*(1), 101–113.

Walterová, E. (2004). *Úloha školy v rozvoji vzdělanosti (1. Díl)* [The role of school in the development of education (Part 1)]. Paido.

Zelený, J., & Mannová B. (2006). *Historie výpočetní techniky* [History of computer technology]. SCIENTIA.

Zounek, J. (2006). *ICT v životě základních škol* [ICT in the life of primary schools.]. Triton.

Zounek, J., & Šeďová, K. (2009). *Učitelé a technologie: mezi tradičním a moderním pojetím*. [Teachers and technology: Between traditional and modern concepts]. Paido.

Zounek, J., Šimáně, M., & Knotová, D. (2017). "You have betrayed us for a little dirty money!" The Prague Spring as seen by primary school teachers. *Paedagogica Historica, 54*(3), 320–337. https://doi.org/10.1080/00309230.2017.1394884

Zounek, J., Knotová, D., & Šimáně, M. (2018a). Život Karla – příběh učitele v socialistickém Československu. [Karel's Life – The Story of a Teacher in Socialist Czechoslovakia]. *Orbis Scholae, 11*(2), 31–52. https://doi.org/10.14712/23363177.2018.56

Zounek, J., Záleská, K., Juhaňák, L., Bárta, O., & Vlčková, K. (2018b). Czech Republic and Norway on their path to digital education. *Studia Paedagogica, 23*(4), 11–48. https://doi.org/10.5817/SP2018-4-2