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CZECH REPUBLIC AND NORWAY ON THEIR PATH TO DIGITAL EDUCATION

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Abstract

Digital technologies are a common feature of present society and people's lives. They have made a significant entry into education as well. Information and communication technologies (ICTs) therefore become an important political issue as early as the last decades of the 20th century, when this topic was reflected in the priorities and goals of educational policies. In the present study, the authors focus on the history and transformations of educational policies regarding ICTs in two European countries with distinct geographies, economies, and politics. These countries nevertheless share several features concerning integrating ICTs into education. The authors use a qualitative comparative study of the two countries to approach the two countries as cases, thus enabling relatively detailed insight into the issue, including its contexts. The goals of the study are to describe the cultural, historical, and political context of ICTs implementation in education and explore the development and transformations of Czech and Norwegian educational policies regarding ICTs since their start in the two educational systems. The authors explore the approaches the two countries chose to integrate ICTs into their respective education systems. The study concludes by comparing the states of affairs of implementation of digital technologies in education in four specific areas.

Keywords

implementation of ICTs in education, educational policies, Czech Republic, Norway, comparative study

Introduction

The dynamic development of information and communication technologies (ICTs; e.g., portable digital devices; cloud computing; learning management systems; social networks such as Facebook, YouTube, and Twitter; artificial intelligence)¹ in recent decades has been the cause (and consequence) of much crucial change across all spheres of social life, including in the economy, culture, and social relationships. Digital technologies have gradually become an integral part of most people's personal and professional lives, influencing the ways they communicate, their approaches to entertainment and leisure time, and, naturally, also education. ICTs thus became an important political issue as early as the last decades of the 20th century, when ICTs became a topic addressed in pedagogical discussions and also discussions on the priorities and goals of educational policies. These debates resulted in, among other things, the drafting of strategic documents, such as eEurope 2005 (Commission of the European Communities, 2002), which declared explicitly the importance of and need for implementing new technologies in education. The economic, social, political, and cultural situations and history differ across countries, which was one of the causes of the differing strategies for implementing ICTs in schools. Notwithstanding all such differences, several key goals prioritized by the great majority of national policies can be identified. To give an example, an analysis of policies employed by 30 European countries² carried out in 2000 and 2001 by the Eurydice network identified four priority areas emphasized in European countries' educational policies (Eurydice, 2001). The first area focused on improving and modernizing equipment at schools and other educational institutions. Teacher training and continuing education for teachers was the second priority area, and integrating ICTs into school curricula the third. The last area identified was so-called specific support activities.³ This research yielded the important finding that

¹ ICT can be briefly characterized as all technologies and tools enabling the use of digital data or information, especially creating, transmitting, sharing, storing, displaying, or exchanging information (for more details, see UNESCO, 2013; Zounek & Šedřová, 2009). This study treats the terms digital technologies, information and communication technologies, and modern/new technologies as synonymous.

² The sample consisted of 15 EU countries, 3 EFTA/EEA countries (one of which was Norway), and 12 countries that were candidates to become EU member states (at that time).

³ These activities included, for instance, establishing centres to assist schools in implementing ICT in their teaching, in some countries also with the task of researching or evaluating the process of integrating ICT into schools.

already by the turn of the millennium modern technologies were more or less integrated within the educational systems of European countries. Although ICTs in education and educational policies have typically been associated with the present and future of education, the research mentioned above brings evidence that the issue has a history of its own. Recent visions and priorities for educational policies have included, for instance, requirements for equipping schools with technologies and developing digital learning content (Commission of the European Communities, 2002e). Requirements for teacher training and continuing education for teachers have also been specified. Developments in and transformations of educational policies concerning digital technologies have therefore had a significant impact on the current situation regarding the use of digital technologies in education. Analyses of educational policies can thus not only reveal visions being presented and their justifications but also map how these visions are being turned into reality and map their transformations over time or the reasons for this change.

For the Czech Republic, no analysis of the history of educational policies with respect to ICTs or deep or systematic comparison of the situations in the Czech Republic and abroad has yet been made available. The topic can thus be studied only using Eurydice Network (Eurydice, 2001, 2011) or European Schoolnet (e.g., European Schoolnet, 2015a, 2015b, 2015c) summary reports. Another option is using the results of international comparative studies such as *Survey of Schools: ICT in Education, Benchmark Access, Use and Attitudes to Technology in Europe's Schools* (European Commission, 2013) and the *Study of the Impact of Technology in Primary Schools – STEPS* (Balanskat, 2009). Most of these reports or surveys, however, do not present detailed analyses of educational policies and the cross-country comparisons of educational policies they contain are largely descriptive.

Our study is therefore going to focus on the history and transformations of educational policies concerning ICTs in two European countries, the Czech Republic and Norway. Although these countries are relatively disparate in terms of their geographies, economies, and politics, several shared features concerning the integration of ICTs into education can be found.

The goal of our study is to explore and describe the history and transformations of Czech and Norwegian educational policies concerning ICTs.⁴ We are interested in what approaches the two countries chose to formulate their visions and priorities in the area under investigation. The study also

⁴ See the Methodology section for the justification for choosing those two countries.

attempts to identify the key phases for integrating ICTs into education. The last goal of this study is to compare the real-life situations regarding the integration of digital technologies into education through the examples of four key areas, namely facilities and equipment in schools, teacher training and continuing education for teachers, ICT integration in the curricula, and specific support activities. Our main focus is primary schools, ISCED levels 1–2 (ČSÚ, 2013). The first part of the study addresses the methodology and data collection techniques. It then analyses the history of educational policies in the two countries from 1980s (when discussion about technology use in education started in both countries) through the present. This part presents the milestones, topics, and processes in educational policies yielded by the analysis. The next part presents the results of the comparison of selected areas, focusing on both analogical and differing data reflecting the situations in the countries being analysed, and interprets them in the respective national context and within an international comparison.

Methodology

Czech educational policies started to consider digital technologies relatively late compared with other European countries (Fryč, 2008; Mudrák, 2005). In similar situations, it is inspiring to look at the international context, where a variety of approaches and inspirations can be identified as well as methods for dealing with analogical problems. Experience from other societies can thus alert one to possible difficulties in one's own environment and be a help in understanding the situation in one's own country (Rys, 2004; Clasen, 1999; Meglitsch, 1985). Selecting countries for a comparative qualitative study is of key importance and must not be done randomly.

Research design

The world is becoming more and more globalized. One of the impacts of globalization is that many countries have to deal with the same or similar problems or topics in various spheres. We can definitely consider the use of ICTs in education as one such topic. Given that different countries choose different methods for dealing with this topic, it is useful to look into the policies of another country (which is successful in certain areas). For this, there are comparative studies, which allow us to get to know another context and show us how other countries deal with the problems we are or could soon be dealing with. In this sense, comparative studies in general are inspiring for the home situation and are also good for questioning stable situations in the home country (Rys, 2004). In this regard, the present study could be useful for both the Czech and Norwegian environments.

In light of the above, we chose to conduct a study the design of which can be described as a qualitative comparison of two countries (Lor, 2011). The goals of the study are to describe the cultural and historical-political context of ICT implementation in education and explore the development and transformations of Czech and Norwegian educational policies regarding ICTs since their start in the two educational systems.

Lor (2011) and Ragin (1987) claimed that qualitative comparative studies of two countries tend to approach the countries as cases, providing in-depth insights within both contexts with regard to the phenomenon under investigation. This is the way we approach the two countries in the study presented below, attempting to use in-depth analysis of the historical and political context to understand the current situation of ICT implementation in education. We have also been inspired by a study comparing ICTs in education in the USA and China (Wu, Yu, Rao, & Yu, 2016) and another study analysing the policies of several countries with a focus on teachers' ICT capacity-building (Zhao, Yao, & Kong, 2016).

Sample selection

The choice of countries to be compared in specific studies is a matter of careful choice (Ragin 1987, p. 15). It is evident that it is not easy to compare entities so different that they share no common features. On the other hand, comparing entities so similar that there is no difference with respect to the phenomenon under study would be pointless. Sartori (1991, p. 246) claimed that the entities to be compared should have identical as well as different qualities. In other words, they should be both “similar” and “dissimilar”.

To choose the country to compare with the Czech Republic, we followed Lor (2011, p. 14), who stated that the first step should be narrowing down the choice to countries in a specific geographical area or other category (demographic or other). Our study is, in this respect, based on the aforementioned analysis of 30 European countries (Eurydice, 2001), which we sought to update and deepen in a specific way.⁵ For this reason, we

⁵ It is evident that a single study cannot present a detailed analysis of the educational policies in 30 European countries. The focus on two European countries enables us to achieve a deeper analysis and a more detailed comparison of the selected countries. The choice fell on Norway not only for objective/methodological reasons but also the fact that three of the authors of this study studied in Norway and cooperate with Norwegian colleagues. In addition, one of the authors (K. Záleská) has a degree in Norwegian studies from the Faculty of Arts, Masaryk University, so the authors could work with primary documents in Norwegian, enabling relatively detailed insights into the history of Norwegian educational policies.

shortlisted advanced European democracies. Lor also recommended defining what features of the systems are shared with respect to cultural, contextual, and structural contexts as the second step. Subsequently, the researcher should address the differences, identifying and explaining them. In the Czech Republic, computers in education began to be studied with more intensity approximately in the 1980s, i.e. still under the totalitarian regime (for more details, see Zounek & Šedřová, 2009). It is worth noting that similar activities started in Norway at approximately the same time. This was one of the reasons we chose to focus on this country. Another reason was that Norway is currently regarded as technologically very advanced in Europe; Norwegian students perform very well in terms of digital literacy (Ottestad, 2014; Fraillon, Schulz, & Ainley, 2013).

We follow Lor (2011), who recommended keeping track of the countries' identical or similar features, the criteria for comparison not being fixed but to be chosen by the researcher in connection with the phenomenon to be studied. The following table presents the areas of difference between the two countries.

Table 1
Differences in the studied systems

	Czech Republic	Norway
State organization	Parliamentary republic	Constitutional monarchy
Compulsory school attendance	9 years	10 years
Accountability for implementation of ICTs in education	Ministry of Education, Youth and Sports Regional level	Ministry of Education and Research, Directorate of Education National Centre for ICT in Education Governmental and non-governmental organizations
ICTs as a standalone area in education at the given level (ISCED 1-2)	Yes ⁶	No
ICT research and projects in schools	Rarely, rather within international surveys	Frequently, especially by the National Centre for ICT in Education
Regular evaluations of success of ICT implementation at national level	Occasionally Annual reports on topic areas, etc. (Czech School Inspectorate)	Regularly Annual topic reports and evaluations of specific projects (ITU Monitor)

⁶ In primary schools within the ICT educational area (MŠMT, 2016b).

Despite considerable differences, the selected contexts also share some similarities, especially the time when the debate on the importance of ICTs in education started and the identical goals for ICTs in education, as Table 2 shows.

Table 2
Similarities in the studied systems

	Czech Republic and Norway
First mentions of need for ICTs in education	1980s
Goal of ICTs in education	Respond to knowledge society through ICTs in schools (MŠMT, 2016b, p. 38; Utdanningsdirektoratet, 2006, p. 9)
ICTs as a priority of Ministry of Education ⁷	Yes
Training teachers in ICTs as a priority in strategic documents	Yes

To use the terminology of Lor (2011), Tables 1 and 2 show that this study is going to compare two mostly different systems which, however, coincide in the basic parameters of the phenomenon under study: the duration of integrating ICTs into the country's educational policies, the focus (goal) of this integration, the priority of ICT implementation in education, and an emphasis on teacher training and education.

Data collection technique

The approach we chose for collecting data was qualitative content-level analysis of strategic documents (in educational policies). The analysis emphasizes not only the texts' explicit meaning but also their latent (contextual) meanings (Budd, Thorp, & Donohew, 1967; Lindkvist, 1981; McTavish & Pirro, 1990; Tesch, 1990). In other words, in addition to the main framework of the text and its explicit content, the analysis also looks at implicit meanings hidden between the lines (Plichtová, 1996; Morse & Field, 1995; Babbie, 1992; Catanzaro, 1988; Holsti, 1969). There are several potential approaches to qualitative content-level analysis. Considering the nature of the phenomenon being studied and the goal of the study, we opted for summary content-level analysis (Hsieh & Shannon, 2005). Compared with other types of analysis, content-level analysis takes a set of keywords to be identified in the text as

⁷ European Schoolnet (2015a, p. 33).

its starting point. It is, therefore, a deductive analytical approach to codes in qualitative content (Mayring, 2000). At the onset of our study, we collected a range of Czech and Norwegian educational policy documents (the total sum we collected included 8 Czech and 25 Norwegian documents).⁸ Our analysis considered 8 Czech and 10 Norwegian documents.⁹ The keywords searched for were the following: ICT, ICT implementation, education for teachers, computers in schools, internet, technologies, digital technologies, information literacy, digital literacy/competence.

Data analysis: four-step comparison

There is a general consensus that methods for comparison vary (Rabušicová & Záleská, 2016; Phillips & Schweisfurth, 2008; Chabbott & Elliot, 2001). This may be one of the reasons why comparative studies are criticized for insufficient methodological grounding and excessive descriptiveness as well as a lack of explanation and proposals for solutions (e.g., Vlček, 2015). Seeking to avoid this criticism, we opted for (in addition to continuous analysis and synthesis) a method used by one of the classics of comparative pedagogy which can still be put to good use. It is the Bereday four-step comparison model (Bereday, 1964; Rabušicová & Záleská, 2016; Vlček, 2015). The first step is description; we have already undertaken this step in providing a basic description of the phenomenon under study and explaining ICTs in education within the European framework. The second step is interpretation. It requires a parallel, more detailed description of the phenomenon in its environments considering the historical, political, economic and social contexts. In view of the scope of the study, we will focus on the historical and political context of ICT implementation in education (Bereday, 1964; Phillips, 2006), while the economic and social contexts will be presented only in brief. The analysis has shown that in both countries development regarding the implementation of ICTs in education can be divided into four phases (1980–1989, 1990–1999, 2000–2009, 2010–2017),¹⁰ which we will use

⁸ The difference in the number of documents collected is due to the differing approach in the two countries to the adoption of strategic documents. For more on this topic, see the last part of this study.

⁹ We did not consider documents with content outside the scope of the phenomenon this study sought to explore – those which treated ICT in schools only marginally or not at all.

¹⁰ It is evident that identifying a strict temporal point (such as 2009) would be an oversimplification. This is not, however, to the detriment of the accuracy or professionalism of the study; the time frame is only a theoretical framework enabling us to understand the issue under study.

as the framework to present our results. The third step is juxtaposition, or an outline of the similarities and dissimilarities based on the above data, to be followed by the fourth step, comparison of the four topic areas (technologies in schools, teacher training and continuing education for teachers, integration of ICTs in school curricula, specific support activities).

History and transformations of educational policies with respect to ICTs in the Czech Republic

Primary education in the Czech Republic is compulsory for all children and young people from 6 to 15 years of age. Its scope is defined by curricular documents at two levels: framework educational programmes (FEPs; general curricula) at the national level and school educational programmes (SEPs; school curricula) developed by individual schools within the limits set by the FEPs. The introduction of the two-level curriculum was at the core of the fundamental reform of the educational system adopted in 2004.¹¹ In an FEP, educational content is divided into areas of education elaborated at two levels: by specifying the learning content and by defining the outputs expected from students. ICTs are one of the nine basic educational areas at the first and second level of primary schools, intending to enable all students to reach a basic level of computer literacy (MŠMT, 2016b, p. 38).¹²

First steps (1980s)

It is now common knowledge that the countries of the Eastern Bloc (including then Czechoslovakia) lagged behind advanced countries rather significantly as far as computer technologies were concerned. As early as the beginning of the 1960s, this computer technology gap amounted to approximately 10 years of development (Zelený & Mannová, 2006). The situation was made harder by the impossibility of importing advanced computers from western countries, and contacts with international institutions with top-quality research and development was close to impossible as well. Despite all these handicaps, Czechoslovakia was at the cutting edge of the socialist bloc

¹¹ Until then, the national curricula for each subject defined the content of education.

¹² This means acquiring elementary skills in the use of computers and other ICTs, orientation in the world of information, creative work with information, and apply such information in both further education and practical life; the acquired skills are a prerequisite for both the information society in the labour market and the effective development of professional and extracurricular activities (MŠMT, 2016b, p. 38).

(Naumann, 2009). Technologies and computers in education were regarded as rather important, which can be evidenced by the fact that research in computer technologies was on the list of research tasks for 1976–1980 (Tollingerová, 1977). There were discussions on such issues as whether the division of labour between man and the machine was possible, whether teachers could be replaced by technologies, and what elements of teachers' work could be replaced by machines and how.

The integration of technologies into education in 1980s Czechoslovakia was captured in the document “Long-term comprehensive programme for digitalizing education and upbringing in formal education,” adopted by the government in 1985 (to provide guidelines up to 1995). Its implementation was broken into several tasks. The first was to equip schools with computer technologies and “electronic aids” (to use the period terminology). Another task was to implement “electronics and computer technology” in general and subject curricula. The expectation was also that a large number of teachers would be trained, teaching/learning software would be designed, and computers would be used to teach individual subjects. This whole programme was to be complemented by pedagogical research (Caha, 1986).

Post-revolution hesitation (1990s)

The implementation of this relatively ambitious programme, however, did not succeed as the Velvet Revolution of 1989 marked an end to most activities of this kind. This fact might perhaps even be regarded as one of the negative consequences of this sociopolitical turning point because the effort to cleanse education of totalitarian practices and create modern democratic schools led to neglect of existing valuable and useful results from research and development (Zounek & Šedřová, 2009). Another explanation for this discontinuity may be the fact that the opening of the borders with the incredible boom in technologies and their penetration into all areas of life in the 1990s was perceived as an entirely new stage in history having little to do with the history of the 1980s. At the beginning of the 1990s, the PC market opened up and the latest technologies began to be imported without any limitations whatsoever, which may be regarded as one of the important triggers of further expansion of ICTs into social life. Other key events include Czechoslovakia connecting to the internet (1992) and its subsequent (commercial) spread around 1995.

Despite this boom in technological development, the educational policies of the 1990s did not have any national plan or long-term vision. The implementation of ICTs into schools in the 1990s was thus more or less left up to individual schools.

Implementation phase (2000–2009)

Czech educational policy documents included the issue of modern technologies only at the very end of the 1990s and the beginning of the 21st century.¹³ While the White Book naturally used very general formulations (emphasizing the use of ICTs in the classroom in order to modify or innovate teaching), the “National information policy in education” (SIPVZ), developed as a part of “The concept of national information policy in education” (MŠMT, 2000), set out two basic strategic areas of focus. Among other things, the SIPVZ set as its goal for ICTs to be used on an everyday basis by 75% of teachers in primary and secondary schools. The whole phase was subdivided into three main programmes, which also reflected the priority of integrating ICTs into the education system in specific ways. These programmes consisted of teacher training, developing educational programmes and building information resources, and equipping schools with technologies.

The process of SIPVZ implementation from 2001 was beset with many misunderstandings, a lack of clarity, mistakes, and hesitation (e.g., even the schedule for meeting specific goals was altered, including the deadline being prolonged by one year). The project was initially oriented around equipping schools, and pedagogical goals as such were regarded as only secondary (Punar, 2008). The dominating technological orientation is evidenced by the fact that teacher training was launched only two years after the beginning of implementation, and specialized trainings (including didactic use of ICTs in individual teaching subjects) were launched a year later. One of the weaknesses was that the project did not envision specific training for school leaders in ICTs. Those who were crucial for making decisions concerning the implementation of modern technologies in schools (in planning, vision-making, and realization) were thus not well trained (or not trained at all). People who were to encourage teachers and create environments in schools for modern technologies to be implemented were not adequately trained. Despite this, headmasters were expected and required to comply with these tasks. During the same period, similar weaknesses could be found in other European countries’ national strategies (Eurydice, 2001). In addition, the SIPVZ (MŠMT, 2000) did not conceive of training teachers-to-be to use the ICTs available at most schools in their classes. Another of the weaknesses of the SIPVZ implementation phase was a lack of pedagogical research or a systematic pedagogical evaluation of the project.

¹³ The Czech Republic was among the last countries in Europe to approve documents of this kind (Eurydice, 2001, p. 1).

Despite all of the problems suggested above, activities were gradually implemented within all three prioritized areas. By 2006, schools were equipped with modern technologies, were able to buy software or other electronic teaching materials, could train their teachers to control some ICT tools, and so on. One of the important measures in supporting the integration of digital technologies into the life of schools was the legal establishment of the post of a school ICT methodology expert (also called the “ICT coordinator”) in 2005.¹⁴ The tasks for ICT methodology experts included being of methodological assistance to colleagues in integrating ICTs into most teaching subjects, recommending and coordinating further ICT training for teaching staff, coordinating ICT purchasing and updates, and coordinating the operation of the school’s information system.

ICT implementation in schools experienced a surprising turning point in 2006 and 2007, when the SIVPZ was more or less discontinued (without apparent reason). The Ministry of Education department coordinating it was dissolved and the item in the budget draft for 2007–2010 meant that funding for the planned activities was eliminated. There was no major change with some programmes (e.g., facilities and equipment purchases) as the goals had more or less been achieved, while other specific projects were stopped during their implementation.

In 2008, activities aimed at developing a new concept for integrating ICTs into education were launched. In September 2008, a document by the Ministry of Education called “Developmental Strategy on ICT in Education for 2009–2013” was created. By spring 2009, a Ministry of Education expert group had developed an action plan for the implementation of the strategy (MŠMT, 2009). However, it turned out that the Strategy on ICT in Education would not be implemented on the planned scale, especially in view of the funding capacity and situation in the Ministry of Education, Youth and Sports.¹⁵ Despite this, some of the goals were implemented, such as the establishment of a methodology portal (RVP.CZ).¹⁶ On the other hand, regional school centres

¹⁴ The ICT coordinator position is a state-recognized qualification achieved by finishing an accredited study and obtaining a certificate. For more details, see *Vyhláška č. 412/2006 Sb., o dalším vzdělávání pedagogických pracovníků, akreditační komisi a kariérním systému pedagogických pracovníků* (Regulation No. 412/2006 Sb., on continuing education for pedagogical staff and accreditation committees and a career system for pedagogical staff).

¹⁵ At that time, not only the Czech Republic but all of Europe was undergoing an economic crisis. This may have been one of the reasons for this support being discontinued (a more detailed analysis of this issue exceeds the scope of our study).

¹⁶ The methodology portal RVP.CZ (<https://rvp.cz/>) was created as the principal methodology support available to teachers and to support the introduction of FEPS

to serve as local methodology (support) centres for nearby schools and support the sharing of good practices were not established.

A new start (2010–2017)

A gap of several years with no national vision or activity to guide ICT use in education followed. The latest document called “Digital Education Strategy until 2020” breaks down the priority areas for the Strategy for Education Policy of the Czech Republic until 2020,¹⁷ where the key concept is digital education, defined as “education using digital technologies to support teaching and learning effectively, ... developing digital literacy in students and preparing them to be a contribution to society and to succeed on the labour market with its growing requirements for knowledge and skills in information technologies” (MŠMT, 2014a, p. 3). The Digital Education Strategy until 2020 formulates three priority objectives: 1. opening up education to new teaching methods and techniques through the use of digital technologies, 2. improving student competences in working with information and digital technologies, and 3. developing computational thinking among students (MŠMT, 2014b, p. 15). Computational thinking is one of the topical issues and its potential for curriculum reform is perceived in the Czech Republic as being considerable.

It is clear at the time of writing that the implementation of some measures is lagging behind schedule, quite significantly in some cases (MŠMT, 2016a). The Digital Education Strategy until 2020 is, however, being subjected to revisions and updates, this being a relatively new feature in Czech educational policy, signalling efforts to keep the strategy itself as well as its implementation up-to-date and to respond flexibly to changing situations and technological development. Another new feature is that the strategy includes a requirement for systematic collection of data on ICT implementation and envisions pedagogical research in this area. The strategy also envisions a publicity campaign focusing mainly on parents to increase their awareness of the benefits and also drawbacks of using digital technologies in education.

(curricular reform) in schools. The portal presents an environment for teachers to inspire one another and share their experiences. It employs a number of online tools – blogs, videos, e-portfolios, wikis, webinars, etc. It displays learning materials developed by teachers, articles, and current curricular documents.

¹⁷ The national Strategy for Education Policy of the Czech Republic until 2020 contains three key priorities: reducing inequality in education, supporting high-quality teaching and teachers (and teacher training), and governing the system in a responsible and efficient manner (MŠMT, 2014a, p. 3).

Our analysis indicates that “computers” were paid considerable attention in the Czech Republic (socialist Czechoslovakia) as early as the 1980s while still under the totalitarian regime, which was an effective obstacle to free research and development as well as a hindrance to keeping in touch with Western Europe. Despite this, the use of technologies in education was informed by relatively innovative ideas, although the technologies themselves lagged behind state-of-the-art developments elsewhere in the world.

After the Velvet Revolution of 1989, Czech educational policies experienced two periods of discontinuity, of which especially the post-revolution stagnation (1990s) was paradoxical considering the newly acquired freedom. Our research also shows that priority areas for ICT educational policies gradually evolved from providing the technological basis for developments in teacher training and support to research and evaluation of the impact of ICT use in education.

Table 3

Important documents and strategies in the Czech Republic concerning ICT implementation in education

Year	Document (strategy) title	Basic characteristics/goals:
1985	Long-term comprehensive programme for digitalizing education and upbringing in formal education	<ul style="list-style-type: none"> – equip schools with computer technologies – integrate computer technologies in subject and school curricula – focus on teacher training
1999	State information policy ¹⁸ (governmental document)	<ul style="list-style-type: none"> – build and develop the information society – create prerequisites for improving quality of life – make state administration and self-governance more efficient – create prerequisites for mastering information processing using modern ICTs at all types of schools – develop a moral code for information processing
2000	The concept of national information policy in education (Ministry of Education document)	<ul style="list-style-type: none"> – make digital technologies (infrastructure) available to all people participating in (lifelong) education – support integrating digital technologies in instruction at all school levels

¹⁸ This document focused primarily on education, expressing the period priorities for the country in the area of ICT.

2001	National Programme for the Development of Education in the Czech Republic White Paper (Ministry of Education document)	<ul style="list-style-type: none"> – develop the ICT competences of students at all school levels – support schools in creating conditions for ICT use to modernize methods and forms of teaching – support development of competences in teachers
2004	State information policy for education (governmental document)	<ul style="list-style-type: none"> – provide institutions with infrastructure (complete connecting all educational institutions to the internet, keep increasing connection speed) – increase information literacy among staff in educational institutions – increase schools' ability to use ICTs and educational software (elearning)
2005	Regional education reform (based on legislation) ¹⁹	<ul style="list-style-type: none"> – include ICTs within communicative competence – ICTs as a self-standing educational area of curricula
2008	Developmental Strategy on ICT in Education for 2009–2013 (Ministry of Education document)	<ul style="list-style-type: none"> – mediating standard use of digital technologies in most teaching subjects – use ICTs as a standard information and communication tool for teachers, students and parents – support the availability of digital technologies in schools – support teachers and school leaders in training in ICT use
2013	Digital Czech Republic v. 2.0 – The Way to the Digital Economy (governmental document)	<ul style="list-style-type: none"> – increase digital literacy – develop and expand lifelong learning
2014	Digital Education Strategy until 2020 (Ministry of Education document)	<ul style="list-style-type: none"> – open up education to new methods and ways of learning based on digital technologies – improve student competences in information and ICT use – develop students' thinking in terms of ICTs

¹⁹ *Zákon č. 561/2004 Sb., o předškolním, základním, středním, vyšším odborném a jiném vzdělávání: školský zákon* (Act No. 561/2004 Sb., on pre-school, primary school, secondary, higher professional and other education: the School Act) and *Zákon č. 563/2004 Sb., o pedagogických pracovnících a o změně některých zákonů* (Act No. 563/2004 Sb., on pedagogical staff and amendments to certain acts).

History and transformations of educational policies with respect to ICTs in Norway

Primary and lower secondary education is compulsory for all children from 6 to 16 years of age; all decision-making concerning curricula for the compulsory 10 years of school is the responsibility of the Ministry of Education and Research.²⁰ Curricula for individual subjects include competences to be acquired by students by the end of each individual year. Teachers are free to select teaching methods and textbooks. ICTs are taught as a separate subject only in secondary schools; they are included in all subjects in each year in primary school. Digital competence goals to be achieved in each individual subject in a particular year are specified (see also Erstad & Quale, 2009).²¹ The path to the current situation will be shown in the following sections.

The early beginnings or the experimental phase (1980s)

Norway was an active participant in early European discussions on implementing technologies in schools, although computers were used in Norwegian schools only by geek teachers and several experimental schools from the 1960s until the end of the 1970s. But technologies were becoming an increasingly important part of society and had acquired key importance for Norwegian schools by the beginning of the 1980s. Educational policies immediately responded to this by envisioning the introduction of computers into schools as their use was to become a common part of primary and lower secondary school curricula. Implementing these intentions required the allocation of considerable funds, which was responded to by the government with relative flexibility. The allocated funds included also research and evaluation (Røsvik, 2014).

²⁰ The ministry is responsible for administering and implementing educational policies. Its executive body is the Norwegian Directorate for Education and Training (*Utdanningsdirektoratet*), which takes care of compulsory and secondary education. Norway is divided into 19 administrative areas called *fylke* (analogical to regions in the Czech Republic), whose representatives, called *fylkesman*, are to make sure that schools provide children and young people with quality education consistent with the goals of national policies. Schools are governed by *kommune* (analogous to municipalities in the Czech Republic) responsible for providing schools with educational materials, ICT infrastructure, and access to digital educational resources. Kommune are also responsible for continuing education for pedagogical staff in ICT.

²¹ ITU defines digital competences as the skills, knowledge, creative behaviour, and attitudes necessary for using digital media in order to learn and understand social life in an information society (ITU, 2005, p. 7).

The experimental phase included several events important for the further direction of ICTs in Norwegian education. One of these was the drafting of White Paper No. 39 (*St. meld. nr. 39*, 1984), an action programme envisioning the implementation of computers in schools based on experiments undertaken in selected parts of Norway.²² The goal of these experiments was to gain knowledge about which application would enable schools to create environments favourable for introducing modern technologies into classroom instruction across Norway (Røsvik, 2014). The urgency of this goal seemed so strong and the expectations associated with modern technologies were so huge that even before the results of the first experiments were available, ICTs were made a part of each teaching subject at the first and second levels of primary schools.²³ The M85 guideline (1985), and especially its revised M87 version (1987), officially labelled ICTs as a compulsory part of school curricula.²⁴ The same document includes the first mention of the concept of an information society, pointing out that the emerging information society must respond flexibly especially within education. In addition to these key documents, the 1980s were marked by the establishment of the Working Group (under the auspices of the Ministry of Education and Research), which administered a wide range of activities in connection with the implementation of technologies in schools until the end of the 1980s (Røsvik, 2014).²⁵

Norway had big ambitions at the end of the 1980s. The key factor was the Working Group, which was charged with implementing computers in schools by the end of the 1980s (Røsvik, 2014) and which at the same time started

²² School participation was optional.

²³ This has been covered by the preliminary edition of the revised M85 curricular guideline concerning curricula for compulsory schools (1985). The final version was approved by parliament only in 1987 (i.e. one year before the conclusion of the experimental programmes and publication of the evaluation reports on the entire project).

²⁴ Note that in the 1980s, ICTs were called electronic data management (EDB) and mainly involved computers and programming languages as computer science. In the national curriculum from 1987, they were treated as a cross-disciplinary issue called EDB/Medier. In the 1990s, the term information technologies (ITs) was used. The term ICTs as such was introduced in Norway in 1999.

²⁵ White Paper No. 37 at the end of 1980s (*St. meld. nr. 37*, 1988) suggested that the Working Group carry on its work in the 1990s and strengthen it by establishing a DATOPP department (within the Working Group) and spread the experience gained by experimental schools through national councils and regional administration bodies. The proposal was not, however, approved by the parliament and the ministry had to work through existing organizations; the staff of the former Working Group continued to work under the ministry (Røsvik, 2014).

developing software (competing with Microsoft) for schools. These efforts ended unsuccessfully, which caused a large scandal in the Norwegian parliament and the Minister of Education had to step down. The consequence was that issues regarding computers, the internet, and digital technologies were not a priority.²⁶

From experiment to implementation (1990s)

The 1990s in Norway were marked by a second unsuccessful referendum on entering the EU.²⁷ Norway nevertheless remains a member of the European Economic Area and is thus significantly influenced by the EU's goals in its educational policies. As for ICTs in Norwegian education, the 1990s were an implementation phase. The parliament was presented with a number of white papers addressing technologies in education in general but also discussing specific strategies for implementing technologies in schools.²⁸

The implementation phase was conceived of at the turn of the decade (around 1990) when research projects were exploring the use of computers in schools, simultaneously with the first evaluation of the national policy for ICTs in education. The latter focused mainly on the work of the Working Group. The evaluation labelled the educational ICT policy as inefficient, which led to the dismantling of the Working Group. Its tasks were all delegated to the Ministry of Education and Research.

The Ministry of Education and Research (to this point relatively resistant to hearing out the voices of external institutions and experts in developing its plans, visions, and strategies) changed its attitude towards developing new strategies for ICTs in education at the beginning of the 1990s (*St. meld. nr. 24*, 1994). It announced that it intended to launch an open process for new strategy development and was ready to listen to experts (e.g., from the Norwegian Educational Computer Society and the Norwegian Computer Society), who were then invited to participate. And so ICTs in education again became an important topic in political debates in the mid-1990s with a new division of the Ministry of Education and Research focusing specifically on digital

²⁶ This changed in the mid-1990s with a new division in the Ministry of Education targeting specifically digital technologies (see the next section).

²⁷ It was close to a draw; 52% of voters did not support entry into the EU.

²⁸ Considering the scope of this study, we provide no comments on them. They included *St. meld. nr. 14* (1989): *Informasjonsteknologi i skole og oppl ring* (Information technologies in school and in the classroom); *St. meld. nr. 24* (1994): *Om informasjonsteknologi i utdanningen. Rapport fra handlingsprogrammet 1990–93 og strategi for videre arbeid* (On information technologies in education. Report on the 1990–93 Action Plan and the Strategy for Further Activities).

technologies. Since then, Norway has followed 5-year action plans.²⁹ One of the goals of educational policies was increasing the amount of computer technologies in schools, causing a complicated discussion about funding. As an outcome of the negotiations, the Ministry of Education and Research announced a “normalization of situation” regarding ICTs in education. This meant that schools were no longer able to get any money dedicated specifically to ICT implementation and development as had previously been common (*St. meld. nr. 24*, 1994). ICTs therefore started “competing” with other budget items: “Work concerning IT in education was to be financed according to the ordinary administrative levels” (Røsvik, 2014, p. 79). In addition, this change was accompanied by people primarily in charge of ICTs in education in the ministry, thus slowing down the development of software for education, to that point governed by the Ministry of Education and Research.

Despite this rather radical change, perceived by many as a step backwards, the ministry and the parliament were in agreement that ICTs in education must be paid increased attention continuously, checking whether there were sufficient responses to current social and technological developments. In this respect, the priorities were clear. What was less clear was the specific ways to achieve the goals considering the funds available and the strategic plans. Schools were not happy about the normalization. They openly criticized the change regarding the allocation of funds and demanded bigger budgets to innovate and spread experience and knowledge in favour of integrating modern technologies into the educational environment successfully and meet the goals of educational policies (Røsvik, 2014).

The period of great change (2000–2009)

In the first decade of the new millennium, Norway emphasized the international dimension in education and the importance of developing digital competences was justified in terms of the future adaptation of students to their study and personal lives. At the level of ICTs in education, the school reform of 2006 characterizes the third phase.

²⁹ The first for 1996–2000 focused on access and use of digital technologies; the second for 2000–2004 focused on whole-school change related to the implementation and use of digital technologies; and the third for 2004–2009 focused on digital competence, which also manifested in the national curriculum of 2006. In 2009, the Ministry of Education stated that there would be no more action plans. Since then, it was up to the each municipality (for primary and lower secondary schools) and region/fylke (for upper secondary schools) to train and develop schools in using digital technologies).

The reform was preceded by two documents of key importance. The first, from 2002 (“From an idea to a value-oriented action plan”),³⁰ formulated the aim of making Norway a society able to respond to changes in the labour market, which are considerably influenced by developments in digital technologies. The document thus underscored the need for a change in educational policies in favour of innovation tendencies and the ability to respond flexibly to the needs of the labour market. In its second document, from 2004 (Digital Competences Programme),³¹ the Ministry of Education and Research showed it regarded digital competences as of key importance because there are digital competences that interconnect with further competences (readership, communicative,³² and mathematical competences and competences needed for the creative and critical use of new digital tools). It is not without interest that the document regarded insufficient use of ICTs by teachers as one of the biggest issues in the implementation of digital technologies in education.

The sum of all discussions during the new millennium led to a reform of the compulsory education curriculum in 2006 (OECD, 2009). Its goal was to improve learning outcomes for all students (Dale & Øzerk, 2009), and the most radical change was introducing five basic competences to be developed in each subject in every school year (the aforementioned competences: digital, readership, mathematical, and communicative [oral and written]), the goals being specified for each year separately (2006 National Education Plan: LK06).³³ Digital technologies are therefore not taught in Norwegian schools at present as a separate subject, but developing digital competences is a part of individual teaching subjects.³⁴ By virtue of this reform, Norway became the first European country to develop a national

³⁰ *Fra idé til verdi-aksjonsprogrammet* (Nærings- og handelsdepartementet, 2002)

³¹ *Program for Digital kompetanse* (Utdannings- og forskningsdepartementet, 2004)

³² In Norway, oral competence and writing competence have been singled out. We use the umbrella term communicative competence.

³³ Digital competences have been defined in the *Framework for Basic Skills* and by the curricula for individual subjects. This is associated with the creation of the IKT Plan, which states digital competence goals for each school grade and suggests how they might be implemented in each teaching subject. The document is available online: <http://www.skolenett.no/Sider/iktplan.aspx>.

³⁴ General ICT goals for compulsory education: 1) all students being able to use ICTs in ethical, safe, and creative ways to develop their knowledge needed to participate in an information society; 2) providing teaching and ICT use for all students so that the goals of the document are met; and 3) using ICTs as a tool for communication with students and their parents. The document states that the fundamental prerequisites for meeting the goals are the availability of proper equipment in schools and the possession of the respective competences in teachers.

curriculum regarding the digital competence as a basic competence (Krumsvik, 2011; OECD, 2009).

Several years later, the Norwegian government formulated an ambitious goal – to make the Norwegian educational system one of the top ones in the world in terms of the pedagogical use of ICTs (Moderniseringsdepartementet, 2009). Available research suggests that this path may indeed lead to the goal as, for instance, the results of European Survey of Schools from 2013 indicated that Norway is at the top of the ladder as far as ICT infrastructure and its use in schools are concerned (Søby, 2013).

Current situation and further change (2010–2017)

Norwegian society has recently faced several challenges. The environmental protection debate has been increasingly important and population ageing is also a hot issue. The country is following a path of responding to social change due to growing digitalization. In education, the recent decade has been characterized by another reform, this time concerning teacher training.

The principal goals of the 2010 reform were to establish unified top-quality teacher training (Aasen, 2010) and train teachers well-equipped with digital skills for work in schools (Krumsvik, 2011). Despite these goals and the long-lasting discussion on the need for training teachers in ICT use, digital competences are mentioned only vaguely in the new teacher-training curricula (NIFU, 2013).

Another important milestone in the recent decade has been the establishment of the Norwegian Centre for ICT in Education³⁵ in 2010 as a result of the efforts of the Ministry of Education and Research to contribute to the development of ICTs in education. The centre's primary goal is to implement specific measures fulfill the long-term goals of educational policies, especially by cooperating with relevant public and private institutions, participating in international cooperation in ICTs in education, and offering a range of services and products (software for schools, methodologies for teachers, training courses for teachers, etc.; Senter for IKT i utdanningen, n.d.).³⁶ The centre is also to undertake surveys and publish monitoring reports and also prepare and test a variety of tools for schools (evaluation activities, testing students in ICTs).³⁷ Another important entity is the national organization

³⁵ *Senter for IKT i utdanningen*, see <https://iktsenteret.no/english>

³⁶ The Norwegian Centre for ICT in Education

³⁷ For instance: skolementor.no (a self-evaluation tool for school headmasters concerning digital competences), larermentor.no (a self-evaluation tool for teachers developed in cooperation with school mentors), national digital skills evaluation tests. The centre develops online manuals for teachers, information sheets covering a range of topics such as the use of blogs and websites in education, cooperation between schools, and schools and families.

STATPED,³⁸ which focuses on the use of digital technologies by children with special educational needs.

The current goal for ICTs in education is to contribute to better use of digital technologies in schools and assist schools by helping them to make the entire society better through the proper use of digital technologies. This is why modern technologies are to become an inseparable part of the everyday lives of all students, with an emphasis on supporting students in their use of ICTs not only at school but also beyond (Kunnskapsdepartementet, 2017).

Our analysis shows that although Norway set out on its journey to implementing ICTs in schools relatively early, systematically, and with considerable ambition, it also had to face times of discontinuity. When the obstacles had been overcome, the new goals were even more ambitious – creating an education system with the best use of ICTs in the world. It is also worth noting the attention given to the use of digital technologies in educating children with special educational needs and the recent emphasis on improving teacher training in the use of modern technologies.

Table 4

Key documents and strategies in Norway concerning ICT implementation in education

Year	Document title	Basic characteristics/goals:
1985 až 1990	Curriculum guidelines for compulsory education in Norway M85 and M87 (<i>Monsterplanen for grunnskolen, M85, M87</i>)	<ul style="list-style-type: none"> – ICTs officially approved as a part of school curricula – education system must respond flexibly to the needs of information society – create a stable range of experiments and developmental work in the area of ICTs in schools and a system for disseminating its results – emphasize developing teacher competences relevant to ICTs
2006	National Education Plan: LK06 (<i>Kunnskapsløftet, LK06</i>)	<ul style="list-style-type: none"> – digital competences and ICT use are newly regarded as basic competences and so are central to all subjects taught – explain in each educational area the digital competences goal to be achieved by students³⁹

³⁸ STATPED (Statlig spesialpedagogisk tjeneste) = National special education service.

³⁹ The related document *Læreplanverket for Kunnskapsløfte* (Utdanningsdirektoratet, 2006) lists specific steps in using digital tools as one of the five key competences which may provide a guideline or inspiration for teachers.

2011	ICT plan (<i>IKTplan</i>)	<ul style="list-style-type: none"> – open free-access website for all people addressing digital skills in education – manual addressing how the national ICT plan is to be transferred to the regional and school levels; standardizes what should be taught and how within digital competences in individual subjects
2012 až 2013	White Paper No. 20 (<i>St. meld. nr. 20, 2013</i>): On the right path. Quality and variety in unified schools (<i>Stortingsmeldingen 20: På rett vei. Kvalitet og mangfold i fellesskolen</i>)	<ul style="list-style-type: none"> – emphasize that digital competence is a basic skill – point out the existence of huge differences among schools in the extent to which this competence is built systematically
2017	Digitalization strategy for compulsory education: future, modernization and digitalization 2017–2021. (<i>Framtid, fornyelse og digitalisering (...)</i> 2017–2021)	<ul style="list-style-type: none"> – present a new strategy for school digitalization, to date developed with the help of the Norwegian Centre for ICT in Education – speed up work on developing digital skills in the education sector systematically

Looking for overlaps

Looking at ICT development in both contexts from a distance, one may see that both countries set out on a similar journey at approximately the same time, in the 1980s. The 1990s in the Czech Republic were, rather paradoxically, a period of stagnation. But both countries have shared the goal of implementing digital technologies in education – flexibly responding to technological developments and the burgeoning information or knowledge society. The most pressing issue in both countries has been funding activities connected with integrating ICT into education, requiring the allocation of considerable funds from the state budget and also a change in educational policies. The following table summarizes the key events in both countries in the periods under investigation.

Table 5

Summary of key events during the periods analysed

period	Czech Republic	Norway
1980s	Long-term comprehensive programme for digitalizing education and upbringing in formal education	Experimental schools – introducing computers to schools ”Information society” as a concept first mentioned Working Group created
1990s	Cleansing education of totalitarian practices Stagnation in ICTs, no systemic support ICT equipment is responsibility of schools	Evaluation of activities of educational policies Working Group dissolved Equipping schools with computers – normalization of ICT activity funding
2000–2009	Equipping schools Teacher training Curricular reform	Curricular reform Be among the best in ICTs in education
2010–2017	Education is to respond to social change	Teacher training reform Norwegian Centre for ICT in Education established

Digital technologies in compulsory schools in the Czech Republic and Norway

The last step in this comparative study is the comparison itself based on preset criteria (Bereday, 1964). We will therefore take the above historical and political developments and the characteristics of the contexts in the two countries as the starting point and supplement this point with up-to-date available data on the four areas perceived in implementation of ICTs in education as being of key importance from the European perspective. They are specifically: the availability of technologies in schools, teacher training and continuing education for teachers, the integration of ICT into curricula, and specific activities in support of ICT.

Availability of technologies in schools

The basic prerequisite for ICT use in education is adequate technological infrastructure in schools. This is why introducing technologies into schools has almost always been one of the first implementation steps. The European Commission has divided schools into three levels by their digital equipment (European Schoolnet, 2013, p. 51).⁴⁰ According to an EU survey, most students in grade 8 (nearly 90%) attended the second type of school (partly equipped

with digital technologies), while schools that were best-equipped with digital technologies were attended by approximately 8% of students who responded to the survey (European Schoolnet, 2013, p. 52).

So despite the fact that according to a Czech School Inspectorate report from 2006 (ČŠI, 2006, p. 5–6) all primary schools were equipped with computers as early as in 2005 and 98% of them were connected to the internet, increasing the quality of technological equipment in schools is still a hot issue. In addition to equipping schools with computers, the implementation of interactive boards (according to a survey by the Czech School Inspectorate from 2009 [ČŠI, 2009], there was one interactive board per school on average) and tablets and the quality of internet access have also become important topics. These issues seem to have already been dealt with in Norway. Most schools there are well-equipped with digital technologies (ITU, 2016), and according to STATPED (2017) there is an interactive board nearly in every classroom and nearly all schools are connected to the internet. This does not, however, mean that the implementation of ICTs in Norwegian schools has been completed. Quite to the contrary, it is still topical, but the emphasis has shifted to increasing the speed of internet connections, introducing wireless connections, and modernizing technologies (ITU, 2016, 2005).

The explanation for the difference between the two countries in terms of the scope and quality of digital equipment in schools can be found, firstly, in the differing histories of digital technology implementation (in Norway, for instance, there was no long period of stagnation as happened in the Czech Republic in the 1990s) and, secondly, in the economic situations, with the Norwegian education system having at its disposal a budget three times as high (OECD, 2017). Another reason may be the division of responsibility for coordinating the ICT-related goals of educational policies. In the Czech Republic, it is the responsibility of the Ministry of Education, Youth and Sports and partly of the regional bodies. In Norway, in addition to the two analogous agencies, the implementation of educational policy goals is also up to other ministries and non-profit and other educational institutions, which, among other things, support implementation activities through funding (Eurydice, 2011, p. 29). The implementation of digital technologies in Norwegian schools is, moreover, overseen by the Norwegian Centre for

⁴⁰ Type 1: highly digital-equipped schools, relatively high levels of equipment (fast broadband internet connections); Type 2: less ideally digital-equipped schools, not so good equipment as type 1 (slow internet connections, below 10 Mbps); Type 3: same as type 2 but without any internet connection.

ICT in Education, an institution which is charged with, in addition to the implementation of technologies, regular monitoring and evaluating of activities. There is not any such body in the Czech environment yet and the (general) annual evaluation of ICT in schools is provided only by the Czech School Inspectorate (Eurydice, 2011, p. 28). These surveys cannot compare to systematic expert evaluation or research. The question therefore is what data has been used as the basis for developing the strategy in the Czech Republic or making key decisions at the level of the national education system, or what the basis is for the allocation of funds. The non-existence of quality data may turn out to be costly (unrealistic projects and expenditures are planned), or may cause implementation to be slow (mistakes get repeated, funds are used inefficiently, etc.).

Teacher training and further education for teachers

Teacher training and the need for reforming it have been given great emphasis in European countries in recent years. It is clear that if teachers are to respond to social transformations effectively, they need proper training in key areas, ICTs being undoubtedly among them. In the two countries under analysis, teacher training in ICT has been given differing attention. The ways teachers-to-be are prepared for working with ICTs in the respective contexts differ. It is also necessary to bear in mind that for a number of practising teachers, working with technologies in practice may be new, something they themselves have not experienced as pupils or students. All this may come across as a barrier. Teachers in the field are therefore an important target group. The latest Czech strategic document, Digital Education Strategy until 2020 (MŠMT, 2014b), regards training teachers-to-be in ICTs as a priority, observing that the current situation is unsatisfactory. It argues especially that digital technologies have not become a part of the training of teachers-to-be at faculties of education or other faculties preparing future teachers. Emphasis is often placed on students' technical skills rather than training in the didactic use of digital technologies in class or the integration of technologies into the didactics of individual subjects. Despite ICTs being a part of the curriculum for compulsory schooling since 2004, this has not been reflected in the existing curricula of faculties of education (European Schoolnet, 2015b, p. 18). A survey by the European Commission (2006) nevertheless showed that the intensity of ICT use in Czech schools is above the European average and that there are hardly any differences in ICT use depending on teacher age.

The discussion about teacher training and developing ICT competences in Norway started as early as the 1980s as computers began being introduced into schools. The argument was that it was not enough to have computers in schools but teachers also needed to be trained in using them (Røsvik, 2014 p. 74). But this need drew a response in a significant way only in the school

reform of 2010, where the revised framework for teacher training curricula contained several points concerning the development of digital competences in teacher trainees. The situation is nevertheless rather dissatisfactory even today. The Nordic Institute for Studies in Innovation, Research and Education (NIFU) evaluated ICT implementation in training for teachers-to-be in 2013. The results suggested that (despite the discussion having been ongoing for many years) ICTs had not been implemented sufficiently in teacher training. It turned out that among teachers-to-be insufficient readiness to use ICTs manifests when they start working at schools. Headmasters in compulsory education are of the opinion that novice teachers often lack the ICT competences required for their work (NIFU, 2013). Interestingly, according to the survey “Benchmarking access and use of ICT in European schools” (European Commission, 2006, p. 50), most Czech (85.5%) and Norwegian (90.9%) teachers regarded themselves as digitally competent.

The above data allow us to say that the duration of the discussion on the need for high-quality and more systematic training of existing teachers and teachers-to-be does not play an important role in the contexts examined. The current situation is rather similar in the two countries examined. Our analyses seem to point relatively clearly to the fact that teacher training relating to the use of ICTs in the classroom is a priority at the level of national strategic documents but that this priority has not yet manifested in implementation steps and the reality does not reflect the vision. What is problematic in both countries is especially training teachers-to-be, who are not yet getting adequate training in teaching with the support of digital technologies. Despite this, Norway is providing support to teachers who are already teaching. The Norwegian Centre for ICT in Education is providing teachers who have expressed an interest with a mentor to help them to map their own digital competences in a systematic way and increase these competences based on discussions and intensive cooperation with the mentor. The mentors also give the teachers tips on how to further develop their digital competences (European Schoolnet, 2015c, p. 10). It must be stated that teachers in the Czech Republic require proper support from methodology experts in implementing digital technologies in their teaching. However, hardly any relevant data on the reality of this role is available in the Czech Republic.

Integration of ICTs into school curricula

As far as integrating ICTs into curricula for compulsory education, the Czech Republic and Norway have chosen two different paths. Both countries have been under the influence of curricular reform undertaken in the first decade of the new millennium. In the Czech environment, this was the reform of 2004, based on which ICTs have become one of the principal educational

areas. As has already been stated, the position of ICTs in the curriculum has been defined as a standalone teaching subject for primary schools and also as a problem-solving tool and a tool for quality and efficient communication with the outer world within the communicative competence. Primary schools are obliged to implement the area of ICTs in school instruction in the scope of at least one teaching unit per week. As the Czech School Inspectorate stated (ČŠI, 2015, p. 16), no educational standards have yet been made available to specify the expected ICT learning outputs in more detail.⁴¹ In addition, the FEP (curriculum) for primary schools (MŠMT, 2016b) is rather brief with respect to ICTs compared with how it treats other educational areas and does not define digital competence separately (ČŠI, 2015).⁴² In 2014, the FEP was revised, with the revision including ICTs, but the changes have not yet been implemented (European Schoolnet, 2015b, p. 8), which has been a subject of criticism in the ICILS report (ČŠI, 2015).

Norway, in contrast, was the first country in Europe to speak at the national level of the need for developing students' digital competences, which it did within the curricular reform of 2006. Since then, ICTs have been integrated into compulsory education by formulating goals for digital competences, which have been defined for each school grade separately. A description of the progress to be made by students is presented in the document "Framework for basic skills" (Utdanningsdirektoratet, 2013). The description does not consist of individual steps to be taken to achieve this progress but rather a general basis for teachers, who are then free to choose methods to achieve the goals. The document presents four categories within which teachers are to develop digital competences in their students. These are: information searching and processing, creating one's own texts and documents, ICT-mediated communication, and digital judgment.⁴³

⁴¹ The outputs for the second level of primary school are defined at a very general level as follows: information searching and communication and processing and using information.

⁴² As far as the safe use of information is concerned, the FEP (MŠMT, 2016b) mentions intellectual property protection, copyright, and information ethics; other issues relating to safety on the internet and related topics such as passwords, antivirus software, misuse of personal information, etc., are left out completely. The FEP (MŠMT, 2016b, p. 38) also leaves out content concerning sharing information through email, social networks, websites, etc. The description of the target area only mentions that it develops the student's "ability to formulate their requirements and use algorithmic thought in interacting with the computer".

⁴³ "Digital judgment" refers to students' ability to use digital tools/media responsibly and awareness of the rules of privacy protection and ethical issues relating to their internet presence (Utdanningsdirektoratet, 2013, p. 12).

The differing Czech and Norwegian approaches to implementing ICT in the curricula reflects the different setups of the two educational systems and their priorities. Although ICTs are among the priorities for educational policies in the Czech Republic, the goals often remain at the level of statements and their implementation in the lives of schools is only slow and partial. To give one example, the time taken to revise the area of digital technologies in the curriculum is long. This area has remained unchanged since 2004 (European Schoolnet, 2015b; ČŠI, 2015). In contrast, Norway seeks to be one of the top countries in terms of ICT education and thus modern technologies are a clear priority to which learning content is adjusted. Digital technologies are a separate teaching subject and their integration into all subjects is intended to facilitate more natural and faster achievement of the ambitious goal.

Specific support services

Specific support activities play important roles in the process of equipping schools with technologies, in improving teachers' digital competences, and with respect to the possibility of discussing ways to implement ICT in the curricula. Their roles consist primarily of research and/or evaluation activities, development of training courses, and funding schools. Such activities exist, to some extent and in some forms, in both educational contexts.

The European Schoolnet report (2015b, p. 4) indicated that support activities in the Czech Republic are non-systemic and irregular. There were several national projects supported by the European Social Fund (ESF), concerning especially continuing education for teachers, ICT methodology experts, and headmasters, aiming to strengthen their competences in using ICTs (e.g., Call 51).⁴⁴ The ESF also supported purchasing technologies for schools (e.g., within the Education for Competitiveness Operational Programme). It is worth mentioning international projects the goals of which included sharing good practices for the didactic use of ICTs (e.g., the SPICE project, which focused on the use of ICTs in mathematics and natural sciences). Massive open online courses (MOOCs), relatively widespread elsewhere in Europe (catering to the needs of teachers-to-be), are not so widespread in the Czech Republic. Nevertheless there are institutions offering these courses (such as Palacký University Olomouc and the Centre for International Cooperation in Education⁴⁵). In addition to national and

⁴⁴ This call is part of the Education for Competitiveness Operational Programme, in which other individual projects supporting continuing education for pedagogical staff have been submitted.

⁴⁵ This institution is a public-benefit organization operating under the Ministry of Education, see <http://www.dzs.cz/en/>.

international projects, which are rather rare, smaller projects are undertaken in regions and schools (e.g., Škola na dotek [School at a Touch] and Vzděláváme pro budoucnost [Educating for the Future]).⁴⁶ More advanced European countries usually also focus on facilitating ICT use for disadvantaged groups of students. In the Czech environment, there have not yet been any national activities regarding ICT as a tool for inclusion,⁴⁷ even though there are smaller projects focusing on partial aspects of ICTs and inclusion (such as iSEN).⁴⁸

The existence of national support activities is not typical of the Norwegian environment (with some exceptions).⁴⁹ Common support practices are based in the regional level (European Schoolnet, 2015c, p. 3–4). Many towns and villages develop local activities and projects, aiming to achieve good education integrating ICTs (Trondheim and Bærum are often quoted as examples of good practices).⁵⁰ Other projects concern students with special educational needs.

In the Czech Republic, research projects relating to ICTs in schools are missing (with some rare exceptions);⁵¹ expert or systematic project evaluations are rare as well. In contrast, thanks to regular evaluation activities, the Norwegian educational system responds flexibly to the efficiency or inefficiency of undertaken activities. Plans and visions are based on research with a specific focus or evaluations of undertaken activities and projects. The difference can be ascribed to the existence of the Norwegian Centre for ICT in Education, which has no analogy in the Czech environment to date. The evaluation efforts can also be explained by the general attitude of the social state, where the state has more control over the operation of society.

⁴⁶ There might be a number of regional or local projects, but information on them is difficult to collect.

⁴⁷ For example, the report *Informační a komunikační technologie pro inkluzi* (ICT for Inclusion) (European Agency, 2013) is not so generally known in the Czech Republic. See https://www.european-agency.org/sites/default/files/ICT_for_Inclusion-CS.pdf (in Czech).

⁴⁸ The goal of iSEN is developing communication in children who cannot communicate orally and developing a community of parents, teachers, therapists, and other people sharing information on how these tools could be used in working with children with special educational needs (for more details, see <http://www.i-sen.cz/home>).

⁴⁹ Examples: *Program for Digital kompetanse* (Programme for Digital Competence) undertaken in 2004–2008; *Program for skoleutvikling* (School Development Programme), 2005–2009; and *Den digitale skole* (Digital School). These projects focused on testing outcomes and evaluating teaching methods based on the use of technologies.

⁵⁰ Trondheim regularly purchases tablets for all students at the higher level of compulsory education and increases their numbers at the first level of compulsory school (European Schoolnet, 2015c).

⁵¹ There have been several studies written by the authors of the present study (see, e.g., Hrtoňová, Kohout, Rohlíková, & Zounek, 2015; Zounek, 2006; Zounek & Šedřová, 2009).

Conclusion

The use of digital technologies in education is nowadays a frequently discussed topic. Modern technologies are also an important topic within educational policies – not merely an invention of recent years because formulating educational policies with respect to ICT development has a relatively rich history of its own. The recent development and transformations of the implementation of technologies in education have had an immediate influence on the current status and roles of technologies in educational systems and past decisions and strategies influence even the steps to be taken in future. It is therefore important to be knowledgeable about the evolution of the area as well as the implementation steps taken and the real-life situation regarding the use of ICTs in education. These analyses are rare in the Czech Republic; reports by international institutions are more available. There are no comparative studies which might provide important information on identical and different processes in ICT implementation in education, which might also help to bring awareness of the strengths and weaknesses for the area in any given country. This was the reason that led us to undertake the qualitative comparative study of two countries the differing contexts of which, however, share some features.

The method chosen naturally has strengths and weaknesses of its own. The weaknesses include the impossibility of generalizing the results beyond the cases under analysis. This, however, could not and has not been our goal. We are rather utilizing the benefits of the method, which enables a detailed understanding of the systems/cases, revealing even the slight nuances of the explored phenomenon. On the other hand, implementation of digital technologies is so wide an area that even when the scope of our study is narrowed we cannot fully capture the situation in the two countries and stay away from certain oversimplification. We attempted to eliminate this danger by studying many sources with different characteristics. We had to tackle an interesting problem in the process – there was only a limited pool of relevant sources for the Czech Republic, while we had to considerably narrow the selection of sources for Norway.⁵² This brings us to one of the results of this study: although attention has been paid to ICTs in the Czech environment, there are few documents or expert resources related to educational policy (see, e.g., Zounek & Tůma, 2014). In Norway, on the other hand, many materials with varying characteristics can be studied and reach relatively far into the past.

⁵² From the abundance of available documents, we have chosen those most essential for the examined topic.

This anticipates another of our conclusions, namely that Norwegian educational policies have paid attention to ICTs relatively consistently, over the long run and in a stable manner, the policies being based on data from research or other expert sources. In the Czech Republic, especially in the past, educational policymakers could not rely on the support of good sources and data. It might even be said that they did not feel the need to, either. No strategy or vision declared the need for the research or evaluation of national projects. It was only the most recent Digital Education Strategy until 2020 (MŠMT, 2014b) which presented evaluation and research as important components of implementing ICT in education. The lack of quality sources might be the reason why national projects, such as the SIPVZ (MŠMT, 2000), have not succeeded. One might therefore agree with Elmore (2004) that Czech educational policies bear traces of “symbolic policies,” aiming primarily to demonstrate interest in the area symbolically (by adopting various conceptions and strategies) to score politically, this being a virtual end to the declared interest. Subsequent implementation steps including funding and evaluation then remained out of the field of interest. The author quoted here spoke of a “parallel game,” with headmasters and teachers turning these symbolic policies into life by implementing the changes only superficially, without any impact on teaching quality or the principles of teaching with the support of digital technologies. They are playing a kind of “pretence game of change and innovation.” Where there is no feedback and such a game can go on and on. The same mistakes can be repeated. Regular evaluations have led to relatively fast and flexible adjustments or the updating of strategies and the implementation of educational strategies in Norway.

The process of implementation has more participants including funding participants – organizations and institutions – in Norway than in the Czech Republic, where outside the Ministry of Education and school governance bodies there are only partial projects and funds through which even organizations beyond the official education sector contribute to the process of ICT implementation in education.

It is worth mentioning ICT use in educating students with specific educational needs, an area where digital technologies can be employed with great effect. In Norway, the organization STATPED supports activities in this very area. No significant activities at the national or regional level have been recorded in the Czech Republic.

Teacher training in both countries is an interesting topic. Debates have been led for a long time without any satisfactory result as yet. A systematic treatment of the issue has not even yet been attempted in the Czech Republic, although interpretations of the teaching profession have often been addressed by debates in many venues. Training teachers has been a great challenge in both countries.

An ever-returning topic is funding for the integration of ICTs into education. Each country has been dealing with somewhat different problems in very different contexts but disputes and a lack of clarity about funding exist in both countries. This suggests that funding digital technologies requires searching for new funding models as the budget item covers several areas with differing needs and dynamics (funding for infrastructure and relatively frequent updates to it is rather different from funding for teacher training and support measures).

Funding seems to be connected to the trend surfacing in the transformations of the educational policies of both countries (and elsewhere on an international scale). This is a change in priorities from an emphasis on equipping schools with technologies to using the potential of ICTs in teaching and learning. Funding technological structures requires approaches different from those for funding support services or providing safe and available wireless internet.

When studying educational policies and the current situation regarding the integration of digital technologies into the system of education in the Czech Republic and comparing it with Norway, it is important to be aware of several significant circumstances. Debates on the use of technologies commenced at the same time in both countries, which can be regarded as something very positive in the former Czech Republic in the context of the very limited opportunities due to totalitarianism. Unfortunately, the post-revolution period and the transformation of the education in the 1990s lacked a unified approach: no vision for the future was formulated and the state provided no systematic support. In Norway, the development was continuous and despite some small problems the approach of the state to the issue has been largely consistent. The onset of state-controlled and -supported implementation of technologies in schools in the Czech Republic took place much later, which may be one of the main causes for the differing results and, most of all, different approaches to the implementation of digital technologies in education. The process of implementing the latest strategy in the Czech Republic has also been lagging behind in many respects. The ICT curriculum is being updated very slowly, with periods of stagnation, and it may be said that it is lagging behind current trends in using technologies around the world. Our study has shown this (omnipresent) lag and symbolic policies as factors covertly but all the more significantly influencing the integration of technologies into education.

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