

Chapter 5

Report on ICT in Education in the Republic of Croatia



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5.1 Overview of the Country

5.1.1 Geography

The name Croatia is derived from the Croats, a Slavic tribe who migrated to the current country area in seventh century A.D. Croatia is geographically positioned in Southeastern Europe and has a land border with the following countries: Bosnia and Herzegovina, Slovenia, Hungary, Serbia, and Montenegro. Croatia is 56,594 km² in size and has direct access to 5835 km of coastline of the Adriatic Sea, out of which 4058 km is island coastline, comprised of more than 1200 islands, islets, ridges, and rocks. Due to the diverse territory configuration including flat plains, hills, mountains, coastline, and islands, the climate in Croatia is also diverse mainly being Mediterranean and continental.

5.1.2 The Political System

Croatia gained its independence in 1991 following the collapse of the communist state of Yugoslavia. Since then Croatia is a parliamentary democracy and has worked its way toward the NATO membership in 2009 and the EU membership in 2013 which required a significant adjustment of national laws and to the EU laws. Croatia relies politically, legally, and economically on the EU.

Croatia is a parliamentary representative democratic republic, in which executive political power is exercised by the government and the president of Croatia. Prime

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minister is the head of government in a multi-party political system. The judiciary is independent of the executive and the legislature.

5.1.3 Current Situation of Economic Development

After a period of a roughly 6-year-long recession, Croatia returned to economic growth in 2015 but is still overwhelmed with large state and corporate debts, fairly high employment rate, overly bureaucratic investment regulation, and a possible large black economy due to different modes of tax evasion. Nevertheless, GDP growth recovered in 2017 to around 3%, which is expected to continue in 2018. The GDP estimated GDP composition is 4%—agriculture, 26.5%—industry, and 69.5%—services (UNESCO Institute for Statistics, 2018).

5.1.4 Population

The population of Croatia is 4,292,095 people (2011 census, 2017 estimation is similar to the figure). The population growth rate is -4.0 per 1000 population with the life expectancy being 78 years (2012). The decline in population is mainly due to the aging population and out-migration (Croatian Bureau of Statistics, 2018).

5.1.5 The Status Quo of Social and Cultural Development

Croatia's social and cultural development is deeply rooted in long history and tradition since Croatian people have been inhabiting the current area for around 14 centuries. Since Croats are predominantly Christian Catholic (more than 86% according to the 2011 census), traditional values and family are of great importance. Geographical heterogeneity and rich history are reflected in diverse art, architecture styles, and cuisine styles. Croatian people take pride in their fairly small country's great sports successes.

5.1.6 The Status Quo of Information Communication Technologies

Although Croatia is a developing economy, quite a few ICT systems to support both administrative and educational processes have been developed in the last decade, such as e-Registries or online repositories for educational content. Nevertheless,

the question of aligning these systems and novel pedagogies with the educational system is still a challenge, especially due to a lack of focus on teacher development and individual school on-site equipment. Croatia was recently successful in acquiring a large-scale EU-funded initiative e-Schools (e-Škole in Croatian). E-Schools is a concept overarching the implementation of digital infrastructure and e-services in schools for both administrative and educational purposes as well as in the daily use of digital technologies and resources for better quality in teaching and learning. The project establishes a comprehensive platform for ICT in educational development in the decade to follow and has recently been highlighted as a model for digitalizing schools on a national scale by the European Commission (Publications Office of the European Union, 2017), as well as shortlisted for the UNESCO ICT in Education Award as one of the 12 best projects in the world in 2017 (UNESCO, 2018).

5.1.7 The Relationship with China Under the “16 + 1” Cooperation Framework

In 2019, Croatia will host the next annual “16 + 1” Summit. Croatia takes it as an important opportunity to present itself as an active participant in the “16 + 1” framework and an interested partner to attract Chinese investment. The “16 + 1” initiative was designed to increase cooperation of China with the Central, Eastern, and Southeastern European countries. The increased cooperation between the two countries not only continues to be seen in tourism-related subjects but also beyond. There have been increasing investments by Chinese companies in Croatian infrastructure and more interest in the technology and food industries. China and Croatia also cooperate in other fields such as education and sport, where there is an ongoing exchange of students, coaches, professionals, and knowledge. In terms of sport, there a decade-long exchange and cooperation which continues today in various sports, such as basketball.

5.2 Overview of the Educational Development

5.2.1 Education System and Policy

5.2.1.1 Education System

The education system in Croatia is organized into four main levels: kindergarten/pre-primary (0.5–6 years old), primary (7–14 years old), secondary (15–18 years old), and tertiary levels (typically 19–23 years old, but varies). Compulsory education lasts 8 years from age 7 to age 14. There are three strands at the secondary educational

system level: (1) grammar high schools, (2) 3-year vocational programs, and (3) 4–5-year vocational programs. The tertiary level has two strands: (1) bachelor (3 years of duration) and master (2 years of duration) university levels and (2) vocational levels (2–5 years of duration) (Publications Office of the European Union, 2018).

5.2.1.2 Education Policy

Despite successfully adjusting the educational sector to new national and existing EU legislation, policies, and programs, the Croatian educational system structure, organization, and innovation are slowly adjusting to allow for innovations. Since 2014, the most notable policy document is the strategy of education, science, and technology. This comprehensive document, drafted in the period from 2012 to 2014 by more than 130 experts outlined goals and objectives in the following areas: Early pre-school, Primary and secondary upbringing and education, Higher education, Adult education, Lifelong learning, Science and Technology (Croatian Parliament, 2014). One of the major measures was a comprehensive curricular reform, which was initiated energetically in February 2015, starting with the introduction of informatics as a mandatory subject in the fifth and the sixth grades in the school year 2018/2019, as well as with the experimental implementation of new curricula in the same year (Ministry of Science Education and Sports, 2016).

5.2.2 Government Expenditure on Education

The total education investment in Croatia in 2017 is 4.8% of the GDP (equal to 4.8% of GDP in 2014), which is similar to the EU average (4.9% in 2014 and 4.7% in 2017). However, it is to be noted that the expenditure per pupil in basic education and in upper secondary education is the lowest in the EU in terms of purchasing power parity (3495.00 €). Expenditure per student in secondary education is fourth lowest (3342.00 €) and in tertiary education third lowest (7999.00 €) in the EU in terms of GDP per capita (Publications Office of the European Union, 2018).

5.2.3 Enrollment Rate and Retention Rate

Croatia has high gross enrolment rates at the primary education level (95.40% in 2016) and the secondary education level (97.76% in 2016). Rates for the pre-primary education and tertiary levels are somewhat lower, 63.45% and 67.48% in 2016, respectively. Croatia has very low early school leaving rates, among the lowest in the EU (Publications Office of the European Union, 2018).

5.2.4 Education Research

Croatia has participated in TIMSS 2015 (Trends in International Mathematics and Science Education Study), PISA 2012 and 2015 (Programme for International Student Assessment), PIRLS 2011 (Progress in International Reading Literacy Study), ESLC 2011 (European Survey on Language Competences), and ICILS 2013 surveys. Although the presented survey data is at the time of writing of this report at least 4 years old, trends show that Croatian students have around average language competences (in ESLC 2011 just below average in the first target language and just above average in the second target language; in PISA 2015 slightly below-average reading skills; and in PIRLS 2011 well above average), below-average science and mathematics skills (PISA 2015) and below-average computer and information competence (ICILS 2013). According to ICILS, students' computer and information literacy (CIL) refers to the "students' ability to use computers to investigate, create and communicate in order to participate effectively at home, at school, in the workplace, and in the community." The 2013 ICILS cycle collects data from the student population at their eighth year of formal schooling (usually Grade 8, with the average student age being 13.5 years). The ICILS 2013 survey in Croatia was performed on a sample of 3533 students and 2736 students from 180 primary schools with the participant response rate of 82.4%. Among 21 countries included, Croatia is positioned as 14th on the list, just slightly above the average score (which was set to 500). One percent of Croatian students were in the highest literacy level, 21% in the second, 42% in the thirds, and 11% in the fourth literacy level (NCVVO, 2012, 2014; Programme for International Student Assessment (PISA), 2018; TIMSS, 2015).

ICILS 2013 research data gathered from the school principals shows that teachers attend ICT in education courses organized by the school they work in, with the majority of teachers participating in professional development courses on generic software and internet usage, which was seen by the teachers as a key limitation in the intended study. Less than 45% of teachers have participated in a course covering ICT use in education within a period of 2 years prior to the surveying date. Less than 20% of teachers participated in software or courses on the use of multimedia equipment used in their specific course, online discussions or forums on the topics of learning and teaching (IEA—The International Association for the Evaluation of Educational Achievement, 2014; Pović, Veleglavac, Čarapina, Jaguš, & Botički, 2015).

5.3 New Progress of ICT in Education

5.3.1 Infrastructure

The overarching reform of school curricula in Croatia was criticized by some on a number of accounts: for distancing Croatia from the Middle-European school system, for the curricular approach focusing on learning outcomes which was claimed to

be abandoned by other forward-thinking educational systems, for disregarding the national identity and STEM content, for insufficient emphasis on the upbringing component, etc. On a related hand, Croatia ranks poorly on the DESI measurements (European Commission, 2017), with its Human Capital being below the EU average and has an acute problem with high low skill levels as well as the relevance of skills acquired through vocational and higher education. The EU also states that “basic skills have declined and are below the EU average. There are differences in performance linked to socioeconomic status, but the quality of curricula and teaching appears to be the main driver of Croatia’s poor performance.” Education focused on skill development, digital skills being the vital skills for the twenty-first-century society, is tackled not only through the Strategy of Education, Science, and Technology but also through other activities and strategic documents.

The Croatian educational arena has been rather conservative in accepting the digital transformation. Some of it is due to the lack of funds, which is being alleviated with the constant increase of the EU funding. Other important factors include a strong conservative strain in Croatian politics and consequently educational policy, opposing quick changes and leaps the young country could make based on the experience of more mature systems. Throughout the last decade there and prior to the implementation of the e-Schools project, there have been no major pushes for digitalization of the school system. Similarly, prior to the curricular reform, there have been no major pushes for the modernization of the curricula or teaching methods used in Croatian schools.

Croatian schools one computer is used by 26 students which is much lower than the ratio in most of the participating countries (NCVVO, 2014). Main national information systems as of 2018 are as follows: (1) e-Registry (national information system containing data about every student, program, and school at the primary and secondary level in Croatia), (2) e-Class Register, (3) e-Enrollment (national information system for application and enrollment at secondary schools), (4) National information system for application to higher education institutions, and (5) Information system for subsidized nourishment.

5.3.2 Educational Resources

The digital resource market in Croatia has so far remained rather conservative, both for schools and higher education, in terms of the digital transformation. Although there have been projects providing digital resources for teaching and learning, there has been no large-scale implementation of digital learning materials in the Croatian educational community. Publishers dealing in textbooks and educational materials have mostly focused their digitalization efforts on supplementing the printed textbooks with multimedia, although some offer advanced systems with a combination of content, classroom management system and educational applications and multimedia. An example of a state-run initiative with that goal is the distance

learning portal Nikola Tesla¹ offering advanced interactive digital materials for STEM subjects and English for secondary schools. Other state-run projects resulted in websites with digital education materials such as eLektire² (a portal with mandatory readings for K-12, well accepted by the students and ICILS 2013 data shows that less than 10% of teachers use digital learning content on regular basis, and less than 5% use multimedia, digital games, collaborative or interactive resources.

5.3.3 *ICT Integration into Practices*

Croatian teachers' attitudes toward the use of ICT in education are less positive than the other teacher-participants, with only 54% of teachers believing that ICT increases student learning results. What is more, over 60% of teachers believe that ICT negatively impacts writing or social skills, with 51% believing that ICT only stimulates copy-pasting information from other sources. On the other hand, teachers have an affinity toward the use of technology solutions in education for administrative purposes. For example, 87% prefer using the electronic attendance and grading system registers compared to paper-based registers due to practicality, speed, 24/7 availability, and a better overview of data. Ninety-nine percent of teachers use desktop computers, tablets, or smartphones in their teaching, with 60% using desktop computers almost every day, while tablet computer and smartphones were not often used in teaching.

ICILS 2013 surveyed Croatian students to determine their experience in computer use as well as the level of self-esteem in using computers. Ninety-eight percent of Croatian students have computers at home and 97% an internet connection with 95% of students using the computer at home at least once per week and 61% of students using computers in the school at least once per week. Computers are mostly used by the students for editing documents, communication, and social networks and in leisure activities such as playing games. In Croatia, 24% of students use computers at least once per month for schoolwork like writing reports or essays, 41% for creating presentations, and 33% for group work with other students from the school. Computers are most used at the Informatics non-compulsory subject (70%), with only 10% of students using them in science or social subjects. Only 5% of students use computers in language subjects and 6% in mathematics subjects. According to the new Informatics curriculum for primary and secondary schools in Croatia that was put into force in 2018, the topics include use of information and communication technology in education, problem-solving using a programming language, development of computational thinking, abstraction, logic, data analysis, formulating problems for the digital tools use, problem-solving generalization, creativity and innovation by creating digital artifacts and algorithms, digital literacy and decision-making, ethical issues, digital communication, and digital citizenship.

¹Nikola Tesla. <https://tesla.carnet.hr/> Accessed March 29, 2019.

²E-Lektire. <http://lektire.skole.hr/> Accessed March 29, 2019.

The EU-funded e-Schools project plays an important part in equipping the schools and promoting the use of digital educational resources and pushing both the users and the market toward the possibility of entirely digital educational resources (CARNet, 2017). It includes a series of activities covering the entire span of the e-Schools concept and will support primary and secondary schools in the process of growing their institutional digital maturity. As a significant component of e-Schools, a number of ICT systems are developed to supplement or add to the existing solutions in Croatia. One prominent example is the national digital educational content repository that will be used as a central place to store and manage current and future digital resources of all the previously mentioned initiatives and projects.³ The repository will promote both OER and licensed use of the materials published. The same project is developing another, an alternative form of digital educational resources—teaching and learning scenarios—providing teachers with innovative methods, tools, applications, and advice on how to use them with modern teaching methods such as problem-solving and learning through experimentation.

The Ministry of Education and Science in Croatia in its latest mandate has been a strong advocate of the digital revolution. It is pushing for the introduction of mandatory computer science in primary and secondary schools, as well as the introduction of a new curriculum in alignment with the strategy of education, science, and technology in all other subjects, supported primarily by digital educational resources, rendering them equal to the print and pushing both the public institutions and the market to support more digital educational resources.

5.3.4 Pressing Issues

One of the pressing issues in the Croatian educational system is digital competences of teachers and professors and their readiness to accept new technologies, not only as tools but as a means of changing the way of teaching. After several decades of unsuccessful attempts of modernization of the education system, teacher motivation and confidence in changes are challenged. Introducing significant changes through new curricula and ICT in teaching at the same time is both an opportunity and a threat since there is a risk that sustained teacher professional development gets neglected. Even if in-service training and lifelong learning are focused on digital competences of teachers already in the schools, new teachers that are coming out of the higher educational teacher training institutions would lack these competences. Since changes in the education system are highly dependent on teachers carrying them out, teacher competences and motivation remain the issues Croatia will have to deal with.

³The Digital Contents Repository, Edutorij. <https://edutorij.e-skole.hr/share/page/home-page> Accessed March 29, 2019.

5.4 Policy and Strategy of ICT

5.4.1 ICT Financing Resource

School equipment in Croatia, including ICT infrastructure, is to be funded by school founders, which are mainly local government units. The central government, in principle, should not participate in this funding, but usually helps due to the notorious lack of budget in some communities. Investment in ICT infrastructure in schools at a national level has been at best sporadic since the 1990s. On the contrary, the country has been systematically and continuously building national networking infrastructure and information systems for educational institutions. In 1991 the Croatian Academic and Research Network—CARNet was established as a project of the Ministry of Science and Technology of the Republic of Croatia. Both local and central government bodies have funded periodic, but not frequent, procurement of computers as the main tools for teaching informatics in schools, which worsened with the economic crisis in 2008, so the infrastructure in many schools is less than satisfactory.

By joining the EU, Croatia has gained access to significant funding through the EU structural and investment (ESI) funds, most importantly for the education and research arena—ERDF and ESF funds (European Commission, 2018). To facilitate that, in May 2017, the e-Croatia 2020 Strategy (Ministry of Public Administration (Croatia), 2017) was adopted as one of the strategic documents necessary to take advantage of the ESI funds. Croatia is also involved in the European Digital Single Market strategy (European Commission, 2018), adopted in 2015 as one of the priorities of the European Union. One of the key prerequisites for the development of digital single markets is the digital skills required to consume, among other things, public e-services, including education services.

5.4.2 Policies Related Educational Informationalization

Croatia was encouraged by the EU to follow up by developing a separate strategy ensuring the development of digital skills in four user groups (Education and Training being one of them). The development of this strategy is currently underway and is expected to be further supported by the establishment of the National Digital Skills and Jobs Coalition in 2018, coordinated by the Croatian Central State Office for the Development of the Digital Society. Perhaps the most significant development in terms of policy is the national development strategy Croatia 2030 (Ministry of Regional Development and EU Funds, 2018), an umbrella strategy initiated in 2018, which should overarch all the areas relevant for the development of the country (as well as all the other strategies), including digital society as one of the key thematic areas, and science, education, and human resource development as key horizontal topics.

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