

# Chapter 11

## Report on ICT in Education in the Republic of Lithuania



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### 11.1 Overview of the Country

#### 11.1.1 *History and Geography*

Lithuania is a European country located in the Baltic region. It is situated along the southeastern shore of the Baltic Sea, to the east of Sweden and Denmark. Lithuania covers an area of 65,200 km<sup>2</sup>. It has around 99 km of sandy Baltic Sea coastline. Along with it Lithuania has a major warm-water port in the city of Klaipėda.

For centuries, various Baltic tribes inhabited the southeastern shores of the Baltic Sea. In the 1230s, Grand Duke Mindaugas united Lithuanian lands. During the fourteenth century, the Grand Duchy of Lithuania was the largest country in Europe. On March 11, 1990, a year before the formal dissolution of the Soviet Union, Lithuania became the first Baltic state to declare itself independent, resulting in the restoration of an independent State of Lithuania. Today Lithuania is a member of the European Union, the Council of Europe, Eurozone, Schengen Agreement, NATO, and OECD. The United Nations Human Development Index lists Lithuania as a “very high human development” country.<sup>1</sup>

#### 11.1.2 *Population*

The population in Lithuania has been steadily decreasing for the last 25 years. In 2018, there were 2.8 million inhabitants, then 1990—3.7 million. Lithuania undergoes the

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<sup>1</sup>Wikipedia (2019).

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process of the population aging. In 2005, the average population age was 39 years, while in 2018 it was 43 years (39 years for men and 47 years for women).

According to the 2011 census, the ethnic composition of Lithuania's population was Lithuanians (84.1%), Poles (6.6%), Russians (5.8%), Belarusians (1.2%), and people of other ethnicities (1.8%). There is no state religion in Lithuania. State educational establishments are secular.

### ***11.1.3 The Political System***

Lithuania is an independent democratic republic. The Parliament of the Republic of Lithuania (Seimas), the President, the Government, and the Judiciary execute the state power. The scope of the power of each branch is limited by the Constitution. The territory of Lithuania currently comprises 60 municipalities. The municipality has the right to self-governance.

### ***11.1.4 Current Situation of Economic Development***

Lithuania has an open and mixed economy that is classified as a high-income economy by the World Bank. According to data from 2016, the three largest sectors in the Lithuanian economy are—services (68.3% of GDP), industry (28.5%), and agriculture (3.3%). World Economic Forum's Global Competitiveness Report ranks Lithuania 41st (of 137 ranked countries).

According to data from 2017, Lithuanian main exports go to Latvia (11%), Russia (11%), Germany (7.3%), main import goes from Germany (12%), Russia (12%), Poland (10%). China is currently ranked 19th among export partners (1%) and 12th in terms of exports to China (3.2%).<sup>2</sup>

Long-term emigration and economy growth have resulted in noticeable shortages in the labor market. The unemployment rate in 2018 was 5.9%. As of the third quarter of 2018, the average gross (pre-tax) monthly salary in Lithuania is 935 euros.

The data above shows that though labor force in Lithuania is aging and shrinking, it is becoming more highly qualified. According to the CEDEFOP, by 2025, the share of Lithuania's labor force with high-level qualifications should rise to 53.9% compared to 30.6% in 2005.<sup>3</sup>

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<sup>2</sup>OEC (2019).

<sup>3</sup>CEDEFOP (2015).

### ***11.1.5 The Status Quo of Sciences and Technologies***

Lasers and biotechnology are flagship fields of the Lithuanian science and high tech industry. Twelve percent of Lithuanian laser exports go to China.

Lithuania is a cooperating state with European Space Agency, Associated Member State of CERN. Lithuania has a well-developed communications infrastructure. The country has 2.8 million citizens and 5 million SIM cards. The largest LTE (4G) mobile network covers 97% of Lithuania's territory. In 2017, Lithuania was top 30 in the world by average mobile broadband speeds and top 20 by average fixed broadband speeds.

Long-term project (2005–2013)—Development of Rural Areas Broadband Network (RAIN) was started with the objective to provide residents, state and municipal authorities, and businesses with fiber-optic broadband access in rural areas.

Information technology production is growing in the country, reaching 1.9 billion euros in 2016. FinTech companies came to Lithuania—a result of Lithuanian government and Bank of Lithuania simplified procedures for obtaining licenses for the activities of e-money and payment institutions. Europe's first international Blockchain Center launched in Vilnius in 2018.<sup>4</sup>

Based on the data from the survey on the use of IT in households, in 2018, 76% of households had personal computers, 78%—Internet access at home. In 2018, out of all persons aged 16–74, 80% were using the Internet. At the beginning of 2018, computers and broadband internet connections were used by all enterprises, mobile broadband connection—by 86.1% of enterprises.<sup>5</sup>

### ***11.1.6 The Status Quo of Social and Cultural Development***

The official state language, Lithuanian, along with Latvian, is one of the only two living languages in the Baltic branch of the Indo-European language family.

According to the Lithuanian population census of 2011, about 85% of the country's population speak Lithuanian as their native language, 7.2% are native speakers of Russian, and 5.3% of Polish. About 39% of Lithuanian citizens speak Russian as a foreign language, 20% English, 9% German, 6% Polish, 3% French. Favorable conditions have been created for recognized national minorities to teach their children in their native language, develop their culture, and profess their religion.<sup>6</sup>

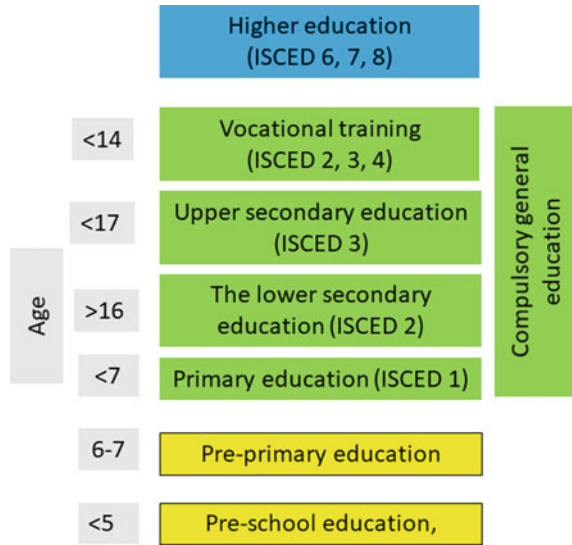
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<sup>4</sup>Wikipedia (2019).

<sup>5</sup>Statistics Lithuania (2018a).

<sup>6</sup>Wikipedia (2019).

**Fig. 11.1** Structure of the Lithuanian education system



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

Lithuania has desires in cooperating with China in the fields of port development, industry capacity, agriculture, and others sector. In 2015 Klaipeda port and, China Merchants Holdings Company Limited signed the memorandum of understanding on long-term cooperation.<sup>7</sup> On May 25, 2018, in Vilnius, Lithuania has organized the first-ever forum within the 16 + 1 framework Forum hosted ministers of agriculture from China and 16 Central and Eastern European countries.<sup>8</sup>

## 11.2 Overview of the Educational Development

### 11.2.1 Education System and Policy

The system of education (Fig. 11.1) in Lithuania includes:

- Formal education (primary, lower secondary, and upper secondary education, formal vocational education and training and higher education);

<sup>7</sup>Klaipėdos uostas stiprina bendradarbiavimą su Kinija, Klaipėdos-uostas. <http://www.portofklaipeda.lt/news/14430/575/Klaipėdos-uostas-stiprina-bendradarbiavima-su-Kinija/d.archyve>. Accessed 24 Apr 2019.

<sup>8</sup>Lithuania hosts 16 + 1 forum of China-CEE agriculture ministers, The Baltic Course. <http://www.baltic-course.com/eng/forums/?doc=140323>. Accessed 24 Apr 2019.

- Non-formal education (preschool education, pre-primary education, and other non-formal education of children and adults, including education complementary to formal education);
- Self-education;
- Educational assistance (vocational guidance, informational, psychological, socio-pedagogical, special pedagogical and special assistance of education, healthcare at school, consultation, in-service training of teachers, and other assistance).

Compulsory general education (primary education, lower secondary education, vocational general education) start in the calendar year when children turn seven years of age and end at the age of 16. Public sector general schools are free of charge. Primary schools, pro-gymnasiums, lower secondary schools (basic education schools), upper secondary schools, gymnasiums, and vocational schools deliver the compulsory education curriculum.

- The primary education (ISCED 1) curriculum covers four-year education. The purpose of primary education programs is the development of a healthy, active, and creative child who has acquired elementary literacy, social, informational, and cognitive skills;
- The lower secondary education (ISCED 2) curriculum covers six-year. The purpose of the basic education program is to provide an individual with the basics of moral, sociocultural, and civic maturity, general literacy and the basics of technological literacy, to cultivate national consciousness, to foster an intent and ability to make decisions and choices, and to continue learning;
- Upper secondary education (ISCED 3) is implemented by gymnasiums and other schools for persons aged from 17 to 19 years. The purpose of secondary education is to assist a person in the acquisition of general academic, sociocultural and technological literacy, moral, national, and civic maturity. Upon completion of the upper secondary curriculum and passing of mature examinations, the upper secondary education level is attained;
- Vocational training (ISCED 2, 3, 4) is provided by vocational schools. Vocational training is provided to individuals aged over 14. Students who have not yet acquired secondary education are provided conditions to follow the secondary education curriculum. Upon completion of a formal vocational education and training curriculum and (or) obtaining the required assessment of the skills acquired students are granted the appropriate level of qualification;
- Higher education (ISCED 6, 7, 8) comprises two types of institutions: universities and colleges. Studies may be of three cycles: the first cycle comprises professional bachelor's (in colleges) and bachelor's degree studies (ISCED 6, usually last 3 or 4 academic years, in universities), the second cycle master's degree studies (ISCED 7, usually last 2 academic years), and the third cycle doctoral studies (ISCED 8).<sup>9</sup>

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<sup>9</sup>Ministry of Education and Science of the Republic of Lithuania (2010).

Key national strategic documents (Lithuania's Progress Strategy "Lithuania 2030," National Progress Program 2014–2020 and State Education Strategy 2013–2022) set out goals for the national education system. The strategic goal is to turn the education system in Lithuania into a sustainable foundation for the development of national welfare and to raise a young independent and innovative generation that will lead the country.

The current reform initiatives in the field of education were directed to further increase the quality of pre-primary, general, and vocational education, to promote accessibility and international competitiveness of higher education and to develop vocational training programs to better respond to the labor market needs. The main challenge faced by the education system is the decline in the number of pupils. According to the data of the Department of Statistics of Lithuania, the number of pupils studying in general education schools decreased by 45.2% between 2000/01 and 2016/17 school years (from 603,824 to 330,869 pupils).

Other key challenges for the education system is to reduce the share of 15-year-olds with low achievement in reading, math, and science, reduce the differences in student achievement between rural and urban schools.<sup>10</sup>

## ***11.2.2 Students and Teachers' Profile***

### **11.2.2.1 Primary Education**

During 2017/18, academic year in elementary education studied 121,000 students (49% girls). Instructional language for 91% of student were Lithuanian, 5% Russian, 4% Polish. An average number of students in the classroom was 19 students. Students were touched more than 5 thousand primary teachers.

Students have the following subjects: languages (mother, foreign), mathematics, a perception of the world, arts, physical education, and moral education (religion or ethics). First foreign language for 99.06% of students was English. The grading system is not used at this stage.

### **11.2.2.2 Secondary Education**

During 2017/18 academic year in secondary education studied 2435 thousand students. Students were taught in two types of schools: general schools—201.4 thousand students (49% girls), vocational schools—42.1 thousand students (42% girls). An average number of student in the classroom of lower general education schools—20 students, in the classroom of upper general education schools—24 students. Instruction language for 91.7% of students was Lithuanian, 4.5% Russian, 3.4% Polish, 0.5 others.

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<sup>10</sup>OECD (2017a).

**Table 11.1** Higher education (student, 2017/18 academic year)

Institution	Student (thousand)	Female student (percent)	State financed (percent)	Average age	Foreign students (percent)
Universities	82.3	57.4	54.8	23.9	9
Colleges	35.4	24.1	50.4	24.4	1.6

Source Statistical department. Statistics Lithuania (2018b)

In 2017, general schools had 28.4 thousand teachers (89% women), vocational schools had 3.3 thousand teachers (69.1% women). Most teachers (98.1%) had high education diploma, 91.4% of teachers had a pedagogical qualification.

The core of the secondary program consists of the following subjects: languages, mathematics, social education (history, geography), natural sciences (biology, physics, chemistry), arts, information technologies, technologies, physical education, moral education. As the first foreign language, 99% of students choose English. 49.6% of students study two foreign languages, in this case, the second language was 80% Russian, 13% German, 4% French. Moral education choices were 56.3% religion and 41.7% ethics. The programs offered by vocational education schools combine secondary curriculum and vocational training. Most popular vocational programs were: Business and Administration, Engineering and Engineering Trades, Personal Services, Architecture and Construction.

In the year 2017, 23.9 thousand students graduated from secondary education. The successful completion rate for secondary education was 95%. Notably, 0.4% of students repeated the grade, as education is mandatory.<sup>11</sup>

### 11.2.2.3 Higher Education

Lithuania has two types of higher education institutions: 21 universities and 22 colleges (of which 7 universities and 10 colleges are private). At the beginning of the 2017/18 academic year, there were 117.7 thousand students in higher education, of whom 82.3 thousand studied in universities and 35.4 thousand studied in colleges (see more data in Table 11.1).

Instruction language for 98% of students was Lithuanian, 1.7% English, and 0.3% Russian.

In the year 2017, 8 thousand teachers (53% female) were working in universities and 2.6 thousand (66% female) were working in colleges.

Most popular programs were: Business and Administration, Health, Engineering and Engineering Trades, Social and Behaviors, Law, Information and Communication Technologies, Education.

<sup>11</sup> Statistics Lithuania (2018b).

**Table 11.2** Enrollment rate

	2012		2015		2017	
	Gross	Net	Gross	Net	Gross	Net
Early childhood	98.7	81.9	104.9	87.0	110.1	88.2
Primary	101.8	98.9	102.9	100.0	104.3	102.5
Lower secondary	104.5	97.3	104.8	98.3	106.2	100.0
Upper secondary	120.4	85.0	114.0	85.2	113.5	88.1
Post-secondary	17.5	6.1	29.7	7.4	29.8	6.5
Bachelor's and masters	61.1	44.8	56.9	40.9	58.7	41.4
Doctoral studies	1.7	0.8	1.7	0.7	1.8	0.6

Source Statistical department. Ibid

In the year 2017, a professional bachelor's degree was obtained by 8.3 thousand graduates in colleges and 11.2 thousand—bachelor's, 7.2 thousand—master's, 0.3 thousand—Ph.D. degree graduates in universities.<sup>12</sup>

### 11.2.3 Enrollment Rate

Enrollment rate in education present in Table 11.2.

### 11.2.4 Government Expenditure on Education

In 2017, the funds of education total 1731 million EUR and accounted for 4.1% of GDP (Table 11.3).

### 11.2.5 Education Research

#### 11.2.5.1 Education Research Institutions

The public sector is predominant in Lithuania's research and development and innovation (RDI) landscape, the private sector still plays a relatively minor role, even if the share of innovative firms is increasing: 40.7% of firms introduced innovations over 2014, compared to 30% in 2010–2012.

Government agency MOSTA distinguishes biotechnology organizations “Sicor Biotech” and “Valentis” as pharmaceutical companies, engaged in the manufacture

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<sup>12</sup>Ibid.



**Table 11.3** Expenditure in education, 2017 year

	Total expenditures (mill. Eur.)	Expenditures on education, compared to GDP (%)	Expenditure per student (thousand. euro)
Preschool education	303.9	0.7	2.3
Pre-primary, primary, secondary education	829.9	2.0	2.4
Vocational education	106.6	0.3	2.1
High education	239.8	0.6	Colleges—0.9 University—1.9
Non-formal education	155.8	0.4	1.7

*Source* Statistical department. Ibid

of pharmaceutical preparations and laser technology companies: “Northcliffe Lighting” and “Artlux NMF” engaged in lighting equipment production and “Šviesos Conversion”—Creating Laser Technologies.<sup>13</sup>

Today, in teacher education the main actors are three centers: Vilnius, Šiauliai, and Kaunas Vytauto Magnus universities. Many researches in informatics and ICT implementation in education are doing Vilnius Universities, Kaunas Technology University, Vytautas Magnus University.

### 11.2.5.2 Education Research Programs

The main strategic objective in the National Program for the Development of Studies, Scientific Research and Experimental Development for 2013–2020 is to encourage the sustainable development of people and society, which improves the country’s competitiveness and creates conditions for innovation by developing studies.

In 2017, R&D expenditure amounted to EUR 371.7 million, total R&D expenditure accounted for 0.89% of GDP.<sup>14</sup>

## 11.2.6 Teacher’s Professional Development

### 11.2.6.1 Teachers’ Education and Training Systems

In Lithuania, teachers are trained in higher education institutions. The prospective teachers’ study according to preschool education, primary education, or concrete subject study programs.

<sup>13</sup>MOSTA (2017).

<sup>14</sup>Paliokaitė et al. (2018).

Teachers' conditions of service entitle them to continue professional development (CPD). The founder of the school ensures that teachers and other staff engaged in the process of education receive remuneration for their CPD for at least five days per year.

CPD providers charge fees for their services. The greater part of the costs related to professional development activities are covered from the state, municipal, or schools' budgets and some costs are covered by individual teachers themselves. Funds for professional development in the school budget depend on the number of pupils enrolled (the pupil's basket).

The teacher education centers regularly provide information about the plans for continuing professional development programs, seminars, and other events.

### **11.2.6.2 Teachers' Education and Training Programs**

There are various forms of initial teacher education study programs. Bachelor's pedagogical studies last for 4 years (240 ECTS), while Professional Bachelor's pedagogical studies last for 3 years (210 ECTS). A study module on pedagogy comprises 60 ECTS. These study credits are usually distributed throughout one year.

CPD programs are prepared by teacher education centers or other providers. It can be found in Registry of the program in the AIKOS website.<sup>15</sup> The importance of teacher digital literacy is recognized. According to the Requirements for Qualification of Qualified Teachers (2014), teachers must acquire digital competencies by participating in digital literacy programs. Requirements for teachers' digital literacy programs include the following areas: information management, communication, content creation, security, solving digital literacy problems. The requirements are in line with the EU DigCompEdu Framework.<sup>16</sup>

## **11.3 New Progress of ICT in Education**

### ***11.3.1 Infrastructure***

#### **11.3.1.1 Campus Network Access**

Today 95% of schools have an internet connection. Main network operator for education institutions is Lithuanian Research and Education Network (LITNET). LITNET connects all R&D institutions in Lithuania, including 15 universities and 40 research institutes, and serves 537 education organizations. The overall customer base of LITNET is about 400,000 end users. For all institutions, which are connected to this

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<sup>15</sup>Aikos. <https://www.aikos.smm.lt/>. Accessed Apr 24, 2019.

<sup>16</sup>Digital Competence Framework for Educators (DigCompEdu), European Commission. <https://ec.europa.eu/jrc/en/digcompedu>. Accessed Apr 24, 2019.

**Table 11.4** The internet for learning purposes

Indicator	2010	2012	2015	2016	2017
The percentage share of the population who use the internet for learning purposes	8	12	17	18	21

Source <http://statistika.ivpk.lt/ivp-programa/15068>

**Table 11.5** Computer in schools (general education)

Year	Older than 4 years (PC percent)	OS win (PC percent)	Wi-Fi network (percent of schools)	Virtual learning environment (percent of schools)	Percent of computerizing teacher's workplace	Total computers per 100 student
2016	63.1	93.4	89.1	23.0	52.0	27.0
2017	62.9	92.9	93.1	25.2	54.0	28.0
2018	58.9	91.8	96.5	29.9	59.0	30.0

Source [www.svis.smm.lt](http://www.svis.smm.lt)

network, digital data transmission services are provided as well as other innovated solutions in computer network technology and its services. LITNET is a part of the European academic network GEANT and provides the possibility to participate in different projects, which are executed in some other international computer network organizations (TERENA, CERT, etc.).<sup>17</sup>

Some education institutions, are using a private operator such as broadband, cable TV, etc.

### 11.3.1.2 ICT Development Indicators

One of the National Information Society Development Program for 2014–2020 “Digital Agenda for the Republic of Lithuania” task is providing more favorable conditions for teaching and learning, based on modern ICT. As the main indicator for measurement of this task is “percentage of the population who uses the Internet for learning purposes,” achievement of 21% (Table 11.4) in 2017 shows that the Program task was successfully implemented (goals was 20% until 2020).

Another important indicator for monitoring ICT implementation in general education is “Percent of computerized teachers’ workplace” (goal is 75% until 2020) (Table 11.5). As well as statistical indicators for every year, in general schools are using other indicators (Table 11.5):

- Type of computer (percent of computers) (general education);
- Schools, which have a Wi-Fi network, virtual learning environment (VLE) (percent of schools);

<sup>17</sup>LITNET. [www.litnet.lt](http://www.litnet.lt). Accessed Apr 24, 2019.

**Table 11.6** Computers in schools (2017 09 01)

	Total PC	Total PC with access to the internet	Total PC used for teaching purpose	Number of PC used for teaching purpose per 100 student
General schools	90,110	85,017	63,140	19.4
Vocational schools	12,250	11,380	8721	20.7
Colleges	9506	9255	7048	19.9
Universities	24,358	22,854	14,257	17.3

Source Statistical department. Statistics Lithuania (2018b)

- Total computer per 100 students in general schools.

### 11.3.1.3 Computer-Student Ratio

For international comparison, Lithuania used data from Eurostat, PISA 2012,<sup>18</sup> PISA 2015,<sup>19</sup> TIMSS research, Europeans Commissions researches.

Main for all levels computer/student ratio is “The computer used for teaching purpose per 100 students (2017 09 01)” (Table 11.6).

## 11.3.2 Educational Resources

### 11.3.2.1 Digital Educational Resources

There is no special policy document on digital learning resources (DLR) in Lithuania. The Ministry of Education and Science has been investing in the development of digital media for more than twenty years. In conformity with the Ministerial legal acts, DLR purchase for primary and secondary schools can be funded either by European structural funds or by “student basket” (funding per pupil) or other funds. Businesses actively offer a variety of e-resources besides textbooks.

DLR is systemized and stored into several repositories:

- The main repository of recommended digital learning resources is the Educational Development Center website Ugdymo sodas<sup>20</sup>;
- Schools can use the European Learning Resource Exchange service for schools<sup>21</sup>—LRE is a joint initiative of European Ministries of Education managed

<sup>18</sup>PISA Digital Skills, Compare your country. <http://www.compareyourcountry.org/pisa-digital>. Accessed Apr 24, 2019.

<sup>19</sup>OECD (2016).

<sup>20</sup>Ugdymo SODAS. <https://sodas.ugdome.lt/mokymo-priemones>. Accessed Apr 24, 2019.

<sup>21</sup>Learning Resource Exchange. <http://lreforschools.eun.org/>. Accessed Apr 24, 2019.

by European Schoolnet. Currently, there are over 220,000 OER from over 30 providers in LRE;

- Vocational training resources are also available on the dedicated vocational school website<sup>22</sup>;
- In higher education exists two LieDM networks: association<sup>23</sup> and consortium,<sup>24</sup> as well The Lithuanian Academic Electronic Library (eLABa);
- Adult education resources are dedicated to a separate information system.<sup>25</sup>

### 11.3.2.2 Open Educational Resources (OER)

All materials created with the support of government funding, are free for all Lithuanian users. Research on OER for Primary and Secondary Schools was performed in Lithuania in 2012. One of the main conclusions is that currently there is a lack of a higher interactivity level of DLR in Lithuania. The majority of DLR with a higher level of interactivity is not free for use in Lithuanian primary and secondary schools, schools need to buy it from publishing companies, while most schools have a limited budget.<sup>26</sup>

Main challenges for using OER are teachers' competencies, language barriers/cultural differences (most OER is in English), the need to find new "business" models in dealing with business to make their content more open to school.

The OpenDOAR portal lists 12 Open Access (OA) repositories for Lithuania.<sup>27</sup> One of the National OA repository is the Lithuanian Academic Electronic Library (eLABa). The main goals of eLABa creation were the development of the environment and tools, allowing preparation, collection, long-term preservation, and permitting access to research and study e-documents, created in Lithuania. Functioning of the eLABa is based on the usage of the Fedora repository software and infrastructure. eLABa consists of 6 science and study e-document collections: ETD (bachelor and master theses, doctoral dissertations, and their summaries); Journals (periodic or one-time reviewed scientific and popular journals and other publications); Books (monographs, manuals, teaching books, their parts and others issues of science and studies); Proceedings (reports at scientific or methodological conferences, seminars, and other scientific and educational events); Working Papers (research, development activities and project reports, and other research and study materials, prepared in e-form); Empirical Data<sup>28</sup> (empirical data of research in humanitarian and social

<sup>22</sup>KPMPC. <http://www.kpmpc.lt/kpmpc/profesinis-mokymai-3/programos-iristikiai/mokymo-mokymo-istikiai>. Accessed Apr 24, 2019.

<sup>23</sup>Apie, LieDM asociacija. <http://liedm.net/apie/>. Accessed Apr 24, 2019.

<sup>24</sup>Apie LieDM. <https://vma.liedm.lt/apie>. Accessed Apr 24, 2019.

<sup>25</sup>Suaugusiųjų mokymosi informacinė sistema. <https://www.smis.lt/>. Accessed Apr 24, 2019.

<sup>26</sup>European Schoolnet (2017).

<sup>27</sup>Browse by Country and Region, OpenDOAR. [http://v2.sherpa.ac.uk/view/repository\\_by\\_country/lt.html](http://v2.sherpa.ac.uk/view/repository_by_country/lt.html). Accessed Apr 24, 2019.

<sup>28</sup>Naujienos, eLABa. <https://www.elaba.lt>. Accessed Apr 24, 2019.

sciences). Higher education institutions also implement various projects for the application of OER. For example, Kaunas University of Technology portal<sup>29</sup> provides Massive Open Online Course (MOOC) to the public on information technology, management; Vytautas Magnus University scientists perform various studies in the field of application of OER.<sup>30</sup>

### 11.3.3 *Learning and Teaching*

#### 11.3.3.1 **Information Technology-Assisted Teaching**

In the National Curriculum for Primary, Primary and Secondary Education (2015) information communication technologies (computers, tablets, interactive boards, mobile phones, cameras, laboratory equipment, etc.) are offered as a source of content, as a tool for exploration, and knowledge creation, as a teaching and learning organization tool, for teamwork and networking, assessment and self-assessment.

The Ministry of Education and Science initiates various activities to encourage teachers to use active technology in schools: annual exhibition “School,”<sup>31</sup> a database of methodological works,<sup>32</sup> recommendation, education advisers team on the mobile device,<sup>33</sup> etc.

It can be mentioned in various business initiatives such as “Samsung for the Future,” events of Non-Governmental Organizations (Computer Union Conference Computer Days,<sup>34</sup> annual conferences of the National Distance Learning Association ALTA<sup>35</sup> and others).

In 2014, “Action Plan for ICT Implementation in General and Vocational Education for 2014–2016” approved by ministry confirmed that:

- the majority (68%) of teachers learned to apply ICT during the lessons;
- the large part (40%) of teachers’ workplaces are computerized;
- Teachers and students can use educational portal E-mokykla, a majority of schools (80%) use e-diaries;
- over 60% of students (grade 8) use their own computers and mobile phones for learning;

<sup>29</sup>KTU atvirieji mokymai. <https://open.ktu.edu/>. Accessed Apr 24, 2019.

<sup>30</sup>Innovative Studies Institute, Vytautas Magnus University. <http://studyonline.lt/en/study-of-innovation/open-educational-resources/>. Accessed Apr 24, 2019.

<sup>31</sup>School 2018. <https://www.litexpo.lt/en/exhibitions/school-2018>. Accessed Apr 24, 2019.

<sup>32</sup>Ugdymo plėtotės centras. <https://www.upc.smm.lt/expert/mddb/>. Accessed Apr 24, 2019.

<sup>33</sup>Ugdymo plėtotės centras. <https://www.upc.smm.lt/expertising/patarejai/rengimas.php>. Accessed Apr 24, 2019.

<sup>34</sup>APIE LIETUVOS KOMPIUTERININKŲ SAJUNGĄ. <https://www.liks.lt>. Accessed Apr 24, 2019.

<sup>35</sup>ALTA-NDMA. <https://ndma.lt/alta/>. Accessed Apr 24, 2019.

- Lithuania's Internet network is sufficiently developed, and computerization of the economy is growing.
- There is still low teachers' motivation to use ICT and only a minority of schools (32%) use virtual information systems for learning.<sup>36</sup>

The European Commission launched the second Survey of Schools: ICT in Education, the result<sup>37</sup> shows that 49% of Lithuanian students use a computer at least once a week (ISCED 2). Quite popular idea “Bring your own device”—more than 70% of Lithuanian students are using their own equipment for learning purposes during lessons (at least once a week) (ISCED 2).

### 11.3.3.2 Courses About Information Technology

Information Technology as a subject is teaching in compulsory lower secondary schools (grade 5–10). IT subject includes five areas: information; digital technologies; algorithms and programming; virtual communication; security, ethics, and legal principles. At the upper secondary level (grade 11–12), IT is an elective subject offered in basic and advanced modes. The advanced course includes electronic publishing, database design and management, and programming.<sup>38</sup>

Vocational schools provided some courses on programming (example: Java programmer, web developer), maintains of computer and other.

In higher education were 93 Informatics programs (aikos.smm.lt) with 4 sub-directions: information system, informatics, informatics engineering, and application systems. Programs can be found in different names, for example: Bioinformatics, Internet of Things Engineering, Electronic Business Technologies, Financial Technologies, and others.

## 11.3.4 ICT Integration into Practices

### 11.3.4.1 The Ability for Faculty to Use ICT to Teach

Teacher's self-evaluation data (2016/2017 academic year) shows that approximately 93% general schools teachers use ICT for the subject they teach, but only 26% teachers share experience in virtual communities (Fig. 11.2).

According to the International Computer and Information Literacy Study (ICILS 2013) teachers using different ICT tools for teaching (Fig. 11.3). Most popular are Computer-based Information Resources (32%) and Word Processors or Presentation Software (29%). In class lessons, digital technologies are mostly used in

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<sup>36</sup>Švietimo ir mokslo ministerija (2014).

<sup>37</sup>European Commission (2019).

<sup>38</sup>Dagiene and Stupuriene (2016).

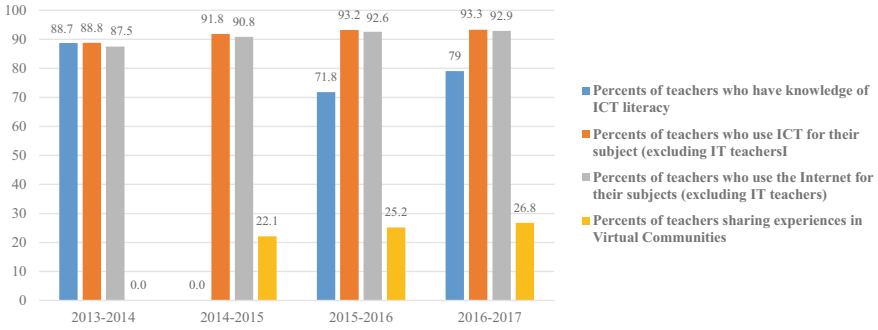


Fig. 11.2 Teacher’s self-evaluation data. Data source [www.svis.smm.lt](http://www.svis.smm.lt)

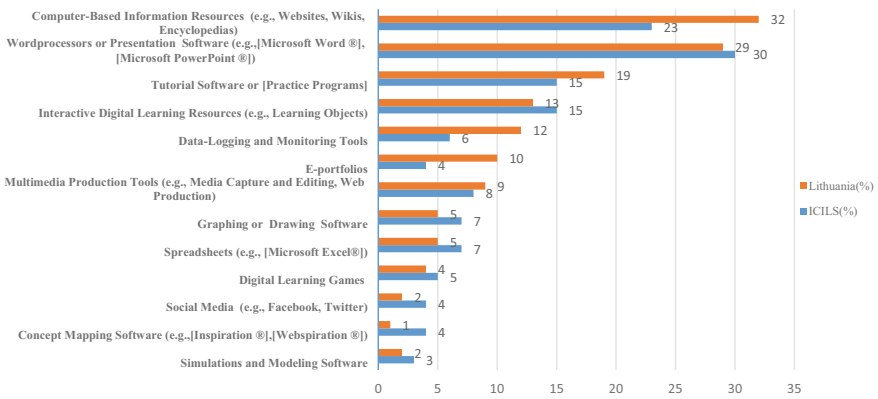


Fig. 11.3 Percentages of teachers using ICT tools for teaching in most lessons. Source ICILS (2013)

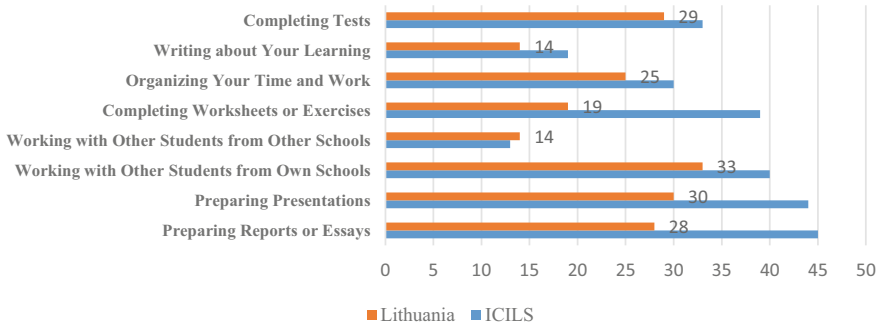
social sciences—21% teachers (international average—20%), the least—arts—8% (international average—11%) and foreign languages 14% teachers (international average—18%). Compared to the international context, Lithuanian teachers are very active in training—43% of teachers improve their digital qualification. Overall, teachers appeared to be using ICT most frequently for relatively simple tasks and less often for more complex tasks.<sup>39</sup>

### 11.3.4.2 The Ability for Students to Use ICT to Solve Problems

According to ICILS, 2013, in Lithuania, 55% of students use computers at school (54% international average) and 95% Lithuanian use them at home (international average 87%).

<sup>39</sup>Švietimo informacinių technologijų centras (2014).





**Fig. 11.4** Percentages of students using computers for study purposes at least once a month. *Source* ICILS (2013)

Lithuanian pupils’ information and computer literacy (CIL) is similar to their peers abroad: the basic level—in Lithuania reaches 30% (international average—23%), second level—39% (International average—38%), third level—15% (International average—21%), the highest fourth level reaches 1% (international average—2%) Lithuanian students. Significant positive associations with CILs were: students’ gender (female compared to male), students’ expected educational attainment, parental educational attainment, parental occupational status, number of books at home, and ICT home resources. From data, we can see that Lithuanian pupils have basic skills but less successfully in performing creative tasks.

Mainly students are using computers in communication with other students from their own schools (33%), preparation of presentation (30%) and reports or essays (28%) (Fig. 11.4).<sup>40</sup>

PISA 2015 assessed students’ performance in collaborative problem-solving; as well students were asked to report on the extent to which they use ICT at school and their self-perceived comfort with ICT. Students who use ICT most in their school score 29 points are lower in collaborative problem-solving, on average, than students who use ICT the least. In Lithuania, this gap is over 50 score points. PISA 2015 researchers considered that dependence on ICT may reduce the time students spend interacting and cooperating with each other, and thus may reduce their opportunities to learn how to collaborate. To other hands, the relationship between ICT use and performance in collaborative problem-solving is not necessarily one of cause and effect.<sup>41</sup>

Students’ self-reported ICT competence is found to be positively related to performance in collaborative problem-solving. Students who rank in their country’s top quarter of self-reported ICT competence score 11 points higher in collaborative problem-solving than students who rank in their country’s bottom quarter, on average across OECD countries. In Lithuania, the difference is more than 40 score points.<sup>42</sup>

<sup>40</sup>Švietimo informacinių technologijų centras (2014).

<sup>41</sup>OECD (2017b).

<sup>42</sup>Ibid.

## 11.4 Policy and Strategy of ICT

General school's computerization campaign started in Lithuania more than thirty years ago (1986), coincided with the appearance of the subject of informatics. In 1996, the State prepared a first computerization project for general education, vocational and higher schools, with a total value of 6 million USD. Later Lithuania had four strategies/programs/plans for ICT implementation in education: 2000–2004; 2005–2007; 2008–2012; 2014–2016.

Last "Action Plan for ICT Implementation in General and Vocational Education for 2014–2016"<sup>43</sup> seeks that after few years:

- Teachers will actively (50%) participate in virtual forums, exchange experience, distance learning (e.g., MOOC);
- All students will learn in virtual environments and have possibilities to self-assess their own learning outcomes. Assessment information will be available to teachers and principals to make decisions;
- Open content and other resources will be accessible by all schools in safe wireless networks. Students will use their own mobile devices for learning both at school and home (BYOD);
- Updated IT subject curriculum will be attractive to students, and it will offer both in a formal and informal way. About 15% of students will choose optional IT subjects in secondary schools. Students will be acquainted with IT possibilities already at primary classes.

In 2017/2018 the implementation activities were started with the following project in line:

- Development and implementation of digital education content;
- Creating a safe electronic space for children;
- Digitalization of student assessment/exam system;
- Improving the competencies of school's staff, which coordinate ICT activities;
- Transferring Information Technology subject to primary classes;
- Improving the monitoring of general educations;
- Development of vocational training and lifelong information systems and registers.

In the high education, the Government pushed activities to create integrated Lithuanian science and study information space. The program "Information Technologies for Higher Education and Science (2001–2006)" (ITMiS) included three main subprograms: Lithuanian Science and Higher Education Information System (LieMSIS), Lithuanian Academic Libraries Network (LABT), and Lithuanian Distance Education Network (LieDM). Today national action plans for infrastructure LITMIS 2017–2020<sup>44</sup> are working in the same three pillars: the Information system

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<sup>43</sup>Švietimo ir mokslo ministerija (2014).

<sup>44</sup>LITMIS. <https://www.litmis.lt>. Accessed Apr 24, 2019.

for science and studies administration (EDINA<sup>45</sup>), Lithuanian Electronic Library Information System (eLABa<sup>46</sup>), and Electronic Study Information System (ESIS). In addition, several new common information infrastructures have been created: The National Open Access Research Data Archive (MIDAS<sup>47</sup>), Student and Graduate Career Management Information Systems (karjera.lt), and other information systems.

Other higher education infrastructure program LITNET 2017–2021<sup>48</sup> is planning update computer networks for research, study and education institutions.

ICT implementation finance is going from different sources: State budget, European structural fund, Municipalities or schools own resource (it is a small amount in “student basket”). Some initiatives with cooperation in the EU level can be financed with support from EU funds through Horizon, Erasmus, or other programs.

## References

- CEDEFOP. (2015). *Lithuania: Skills forecasts up to 2025*. Retrieved February 16, 2019 from <http://www.cedefop.europa.eu/printpdf/publications-and-resources/country-reports/lithuania-skills-forecasts-2025>.
- Dagiene, V., & Stupuriene, G. (2016). Informatics concepts and computational thinking in K-12 education: A Lithuanian perspective. *Journal of Information Processing*, 24(4), 732–739.
- European Commission. (2019). *2nd survey of schools: ICT in education*. <https://doi.org/10.2759/23401>.
- European Schoolnet. (2017). *Lithuania. Country report on ICT in education*. <http://www.eun.org>. Accessed Feb 16, 2019.
- Ministry of Education and Science of the Republic of Lithuania. (2010). *Education in Lithuania*. Retrieved February 16, 2019 from [https://www.sac.smm.lt/wp-content/uploads/2016/02/Education\\_2010\\_eurosh.pdf](https://www.sac.smm.lt/wp-content/uploads/2016/02/Education_2010_eurosh.pdf).
- MOSTA. (2017). *Lietuvos mokslo, studijų ir inovacijų būklės apžvalga*. <https://mosta.lt/images/leidiniai/bukle2017.pdf>. Accessed Feb 16, 2019.
- OECD. (2016). *PISA 2015 results (volume II): Policies and practices for successful schools*. Paris: PISA, OECD Publishing. <https://doi.org/10.1787/9789264267510-en>. Accessed Apr 24, 2019.
- OECD. (2017a). *Education in Lithuania, reviews of national policies for education*. Paris: OECD Publishing. <https://doi.org/10.1787/9789264281486-en>. Accessed 24 Apr 2019.
- OECD. (2017b). *PISA 2015 results (volume V): Collaborative problem solving*. Paris: PISA, OECD Publishing. <https://doi.org/10.1787/9789264285521-en>. Accessed Apr 24, 2019.
- OECD. (2019). *Where does Lithuania export to? (2016)*. Retrieved February 16, 2019 from [https://atlas.media.mit.edu/en/visualize/tree\\_map/hs92/export/ltu/show/all/2016/](https://atlas.media.mit.edu/en/visualize/tree_map/hs92/export/ltu/show/all/2016/).
- Paliokaitė, A., Petraitė, M., & Gonzalez Verdesoto, E. (2018). *RIO country report 2017: Lithuania, EUR 29159 EN*. Luxembourg: Publications Office of the European Union. <https://doi.org/10.2760/11127>. <https://rio.jrc.ec.europa.eu/en/file/12239/download?token=8BfAhKXg>. Accessed Feb 16, 2019.
- Statistics Lithuania. (2018a). *Statistical yearbook of Lithuania*. Retrieved February 16, 2019 from <https://osp.stat.gov.lt/services-portlet/pub-edition-file?id=31620>.

<sup>45</sup>EDINA. <https://www.edina.lt>. Accessed Apr 24, 2019.

<sup>46</sup>Naujienos-eLABa. <https://www.elaba.lt>. Accessed Apr 24, 2019.

<sup>47</sup>MIDAS. <https://www.midas.lt>. Accessed Apr 24, 2019.

<sup>48</sup>LITNET. <https://www.litnet.lt>. Accessed Apr 24, 2019.

- Statistics Lithuania. (2018b). *2017 education*. <https://osp.stat.gov.lt/services-portlet/pub-edition-file?id=30220>. Accessed Feb 16, 2019.
- Švietimo informacinių technologijų centras. (2014). *IEA Tarptautinio kompiuterinio ir informacinio raštingumo tyrimo ICILS 2013 ataskaita*. [https://www.itc.smm.lt/wp-content/uploads/2011/12/ICILS2013\\_ataskaita.pdf](https://www.itc.smm.lt/wp-content/uploads/2011/12/ICILS2013_ataskaita.pdf). Accessed Feb 16, 2019.
- Švietimo ir mokslo ministerija. (2014). *Informacinių ir komunikacinių technologijų diegimo į bendrąjį ugdymą ir profesinį mokymą 2014–2016 metų veiksmų planas*. <https://www.e-tar.lt/portal/lt/legalAct/e5ee5450e0de11e388bee944977d73d2>. Accessed Feb 16, 2019.
- Wikipedia. (2019). *Lithuania*. <https://en.wikipedia.org/wiki/Lithuania>.