

EDU-GATE

*Educational University GATeway to enhance innovative E-learning
capabilities, resilience and new best practices*

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Output 1

**Impact and diffusion of digital education in Higher Education
Institutions: a research on innovative solutions, methods, skills and
best practices to enhance the EU Digital Education Action Plan**

**Research on National Policies and Practices
in Latvia**

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TABLE OF CONTENTS

INTRODUCTION	4
METHODOLOGY	5
1. STATISTICS ABOUT THE COUNTRY	7
2. REGULATORY, LEGAL FRAMEWORK AND MAIN ACTORS	1 7
3. ORGANIZATIONAL ASPECTS	2 2
4. TECHNOLOGICAL ASPECTS	3 8
5. THE DIGITAL TRANSFORMATION OF LEARNING PROCESSES: NEEDS AND REQUIREMENTS	5 1
6. BEST PRACTICES IN THE COUNTRY	6 1
INFORMATION SOURCES	6 9



INTRODUCTION

This document aims to identify and collect the national aspects and peculiarities in the field of digital education for higher education institutions (HEIs) in Latvia (strategic frameworks, laws, regulations, implementations, specific requirements, organisational aspects, technical aspects, case studies, best practices, etc.).

The report is composed of six main sections and a methodology section. Each of them is designed to receive and analyse all data considered preparatory to the final filling of the national dossiers provided by the project and to prepare the teaching materials for the course aimed to create a consistent common level of digital competencies of online teaching experiences and digital educational programs of HEIs.

The first part of the document provides more general information about Latvia. It also provides the description and general statistics relevant to higher education. Furthermore, it reveals the dimensions and background of online teaching experiences and digital educational programs of HEIs.

The second section focuses mainly on the regulatory and legal aspects related to governance of the higher education field in Latvia. It describes the principal entities responsible for higher education and reveals weaknesses of the current legislation.

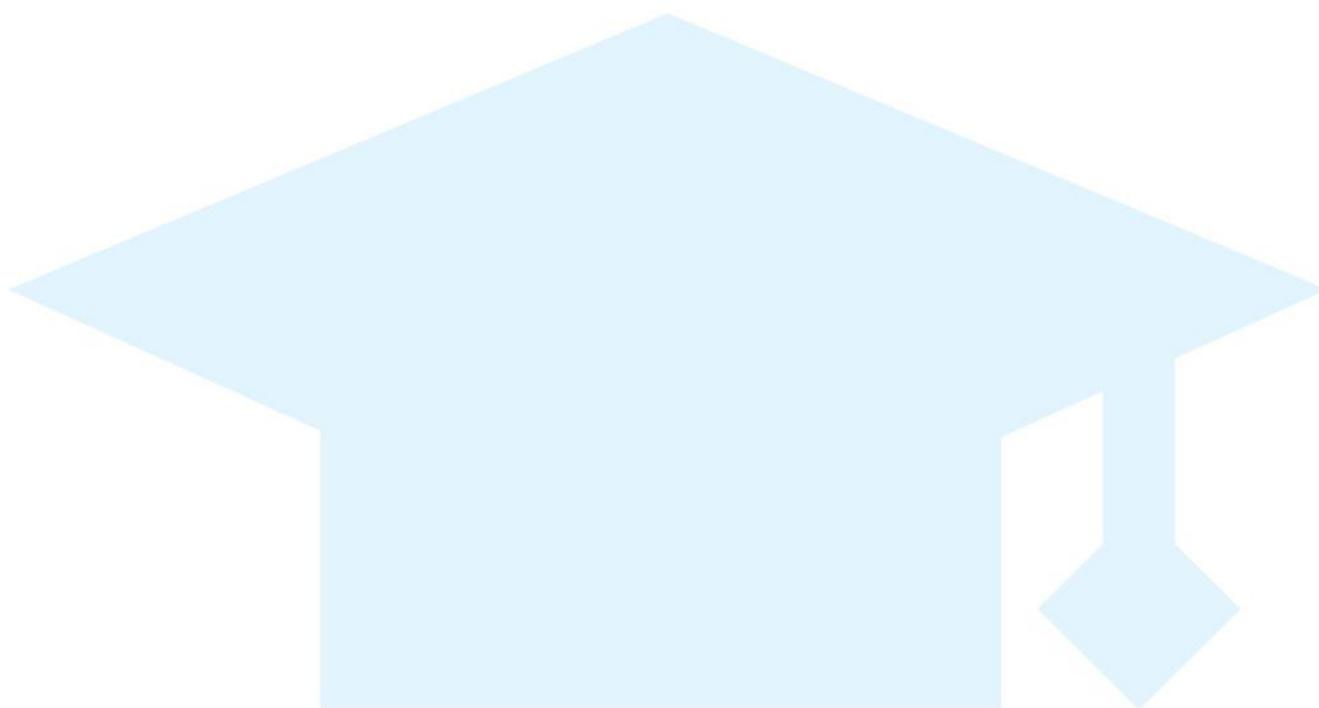
The third section focuses on the organisational aspects and their effects on HEIs, academic staff and students. In addition, the analysis of changes that the Covid-19 pandemic have produced together with some valuable issues and innovations is made. It also identifies study-related and organisational processes that undergo changes towards digital transformations and describes the accreditation process of Latvian HEIs, study directions, and licensing of study programs. In addition, current needs in digital education in terms of needed skills and competencies, needed effective teaching and interaction methods are identified and analysed, and evolution of digital interaction technologies and new methodological approaches are described in the context of Latvian HEIs.

The fourth section deals with the technological aspects, especially related to the use of e-learning environments, their features, the ways of developing and maintaining e-courses, and the interoperability of the content developed by the academic staff of Latvian HEIs. The section also provides information on the use of digital tools, especially during the emergency of Covid-19. Finally, at the end of the section, the analysis of technical skills needed for the academic and technical staff of Latvian HEIs is given.

The fifth section focuses on digital skills and competencies needed for the academic, technical and administrative staff of Latvian HEIs for the implementation of digital learning processes and analyses digital skills that need to be improved, in general, to form a digitally educated society, as well as provides several examples of carried out activities to achieve this goal. Further, various guidelines are analysed in the context of digital transformation of education

in Latvia to identify action directions for the provision of qualitative digital education, as well as needs for new multimedia technologies and main challenges regarding data processing are reviewed. Finally, at the end of the section, suggestions are proposed to support digital education.

The final section includes a detailed description of three success examples/ best practices in Latvia.



METHODOLOGY

The preparation of the current national report was organised in two main stages:

- systematic analysis of information sources published over the last three years (2018-2021) limited to the scope of the Latvian HEIs. The authors of the report made the exception extending the publication period to five years only in the cases of especially valuable sources of information in the context of the research;
- a survey of the technical staff of the Latvian HEIs.

During the first stage (July-September, 2021), the authors of the current report performed a systematic search and analysis of information sources in several languages (i.e., Latvian, English, and Russian) and identified the following information sources as being of interest for the current report:

- websites of the Latvian HEIs;
- publication repositories of the academic staff of Latvian HEIs;
- articles in the media, such as interviews with the HEI staff or administration;
- books on Latvian experience in the field of digital education;
- the website and materials published by the Ministry of Education and Science of the Republic of Latvia;
- statistical data published by Central Statistical Bureau of Latvia;
- materials published by Latvian student associations;
- project reports (on digitalisation, remote learning, distance learning, educational solutions for overcoming the Covid-19 crisis, and digital competence of academic staff);
- Latvian legal framework, decisions and policies adopted by the government;
- publications in scientific databases such as IEEE Xplore, Science Direct, SCOPUS, and Web of Science.

The report's authors used the following keywords to find materials and documents relevant to the current report: distance learning/studies/teaching, e-learning/studies, remote studies/learning/teaching, digitalisation, digital technological solutions, and education during the Covid-19 pandemic. 193 of them were used for the preparation of the current report. Some especially valuable research works were used quite intensively for the preparation of this report; thus, the authors of the report provide their detailed description here:

1. Results of a survey organised by the Student Union of Latvia in March 2020, in which 1 600 respondents participated (students of Latvian HEIs, their relatives, and HEI staff) representing 34 Latvian HEIs. The survey's main goal was to determine how the distance learning process was implemented during the Covid-19 pandemic. This research is described in (Latvijas studentu apvienība, 2020) and is referenced as *"Research of the Student Union"* further in the text of the current report.
2. The results from a survey and focus group discussions acquired within the project "Life with COVID-19: Evaluation of overcoming the coronavirus crisis in Latvia and

recommendations for societal resilience in the future” involving Rīga Stradiņš University, the University of Latvia, Rezekne Academy of Technology, Vidzeme University College, as well as Institute of Electronics and Computer Science. The online survey with 349 educators from 33 Latvian HEIs was conducted in October 2020 to find out their opinion and experience in the context of distance learning. In March 2020, 22 educators from 11 HEIs participated in the focus group discussions on the assessment and development of digital competencies of academic staff and the digitalisation aspects of higher education. This research is described in (Jansone-Ratinika et al., 2020) and is referenced as *“Research of the project “Life with COVID-19”* further in the text of the current report.

3. The results of a survey with academic staff and structured interviews with the technical staff of Latvian HEIs conducted in the framework of the project *“Provision of e-learning object creation, migration and deployment interoperability in cloud infrastructure”* undertaken by *“Datorzinību centrs”* Ltd. with the involvement of the representatives of Riga Technical University. In the online survey organised in October 2019, 68 teachers from seven Latvian HEIs shared their experience with e-learning. In the structured interviews, eight representatives of the technical staff from seven HEIs provided answers regarding the use of e-learning environments and their features. This research is described in (Anohina-Naumeca et al., 2019) and is referenced as *“Research of “Datorzinību centrs” Ltd.”* further in the text of the current report.

Within the second stage of the preparation of the current report, an online survey was conducted by the authors of the report. The survey was intended mainly for the technical staff and/or staff responsible for maintaining the e-learning infrastructure in Latvian HEIs to find out the current situation concerning the use of digital tools for the provision of online studies and the necessary competencies for the various groups of HEIs staff (administrative, academic, and technical). The survey included 20 questions and was conducted in August 2021. Representatives of 15 Latvian HEIs have participated in the research, among them eight respondents from public HEIs and seven representatives from private HEIs. This research is referenced as *“Research of the current report”* further in the text.

The current report omits from the consideration Latvian colleges. Moreover, information included in the report is based on the analysis of many publicly available documents. Although the authors of the report have very carefully selected the sources of information, they are not responsible for the correctness and truthfulness of information given in the sources.

1. STATISTICS ABOUT THE COUNTRY

The Republic of Latvia is a country in the Baltic region of Northern Europe that borders Estonia on the north, Lithuania on the south, Russia on the east, Belarus on the southeast, and shares a maritime border with Sweden on the west (Wikipedia, 2021). Latvia covers an area of 64 589 square kilometres in total (Wikipedia, 2021). The majority (68 %) of the Latvian population live in cities, almost half of this majority – in Riga, while the rest (32 %) are rural residents (Central Statistical Bureau of Latvia, 2020a). The Republic of Latvia has 76 cities in total; however, only seven are large enough to have their administrative bodies: Daugavpils, Jelgava, Jūrmala, Liepāja, Rēzekne, Ventspils, and the capital of Latvia – Riga (Central Statistical Bureau of Latvia, 2020a; Vides aizsardzības un reģionālās attīstības ministrija, 2021). All other cities are included in one of the 43 municipalities (Vides aizsardzības un reģionālās attīstības ministrija, 2021)). In terms of population, Latvia is the fifth smallest country in the European Union, with 1.9 million people in 2020 (Central Statistical Bureau of Latvia, 2020a). Moreover, the population of Latvia is decreasing, starting from 1990, it has dropped by 760 thousand people or by 29 % in the last 30 years (Central Statistical Bureau of Latvia, 2020a).

According to data from the Central Statistical Bureau (2020b), more than 89% of households in Latvia have had access to the Internet. Moreover, 98.7% of families with kids have some kind of Internet connection (Central Statistical Bureau, 2020b). At the same time, both basic digital skills and advanced digital skills levels in Latvia are much lower than the EU average: only 43% of the Latvian population have basic digital skills compared to 58% in the EU (Ministru kabinets, 2021a). Moreover, the gap between Latvia and other EU countries is even wider in terms of advanced digital skills. One of the causes might have been the ageing population. However, even young people aged 16 to 24 lack digital skills compared to the EU (Ministru kabinets, 2021a).

The education system in Latvia has four levels: pre-school education, basic education, secondary education, and higher education (Academic Information Centre, 2019). Early childhood education and care are offered to all children 1.5-7 years old, while it is compulsory for all five- and six-year-old children in Latvia (European Commission, 2021). General public education in Latvia lasts 12 years in total, where the first nine years are basic education (primary and lower secondary education as a single structure system) which is compulsory (Academic Information Centre, 2019). In addition, there is a possibility of continuing upper-secondary education in various vocational education programmes, which led to different qualification levels (European Commission, 2021). Higher education comprises both academic and professional study programs (Academic Information Centre, 2019). Furthermore, the Latvian higher education system is a part of the BOLOGNA process (Figure 1) and follows three cycles of higher education (State Education Development Agency, 2021):

- the 1st cycle includes short-cycle programmes and academic or professional Bachelor's degree programmes;
- the 2nd cycle includes academic or professional Master's degree programmes;



- the 3rd cycle includes Doctor's degree programmes.

To obtain a specific degree, students should fulfil certain requirements and collect a specified amount of credit points (Table 1). The credit point system is compatible with ECTS: 1 credit point = 1.5 ECTS = 1 week full-time study workload and one academic year = 40 Latvian credit points or 60 ECTS (State Education Development Agency, 2021).

HIGHER EDUCATION SYSTEM IN LATVIA

Universities and other higher education institutions offer both academic and professional study programmes.

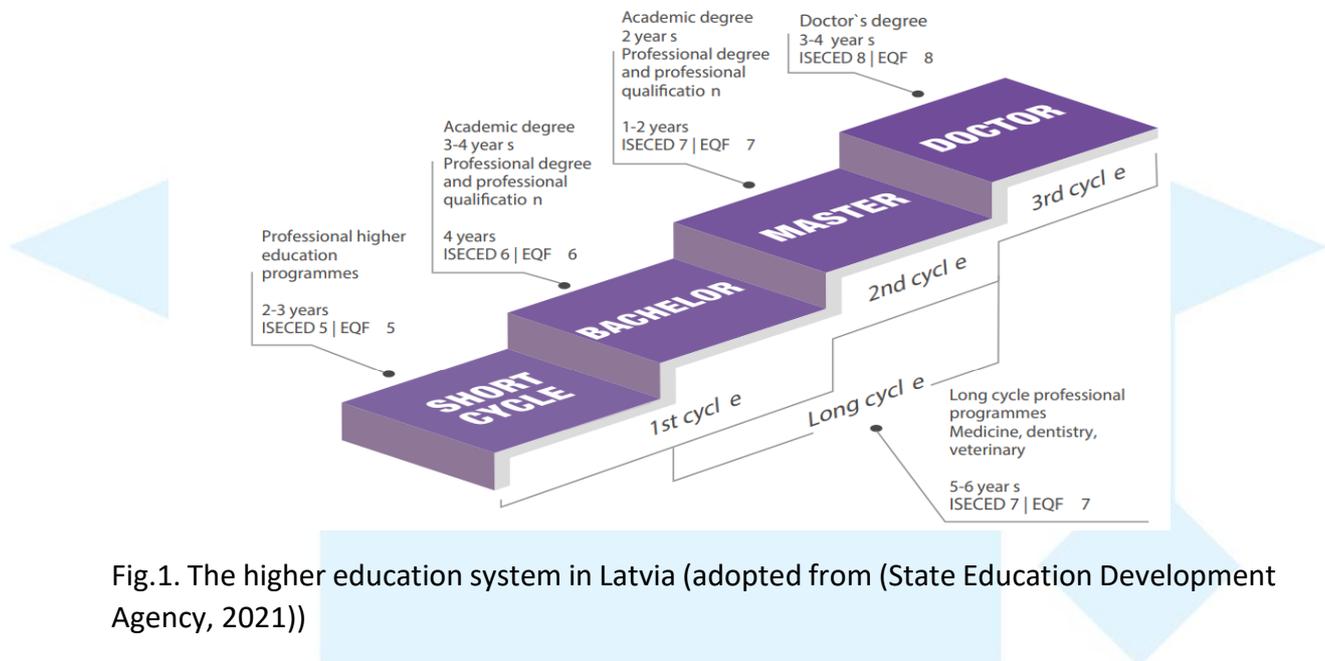


Fig.1. The higher education system in Latvia (adopted from (State Education Development Agency, 2021))

Table 1.

The value of degree programs in ECTS in Latvia (adopted from (State Education Development Agency, 2021))

Degree programme	Value in ECTS
Academic bachelor' degree	180–240 ECTS
Professional bachelor' degree	240 ECTS
Academic master' degree	120 ECTS

Professional master' degree	120 ECTS
Long cycle professional program	300-360 ECTS

There were 54 HEIs in total registered in Latvia in 2020: 29 universities (16 public, 11 private, and two branches of foreign HEIs) and 25 colleges (Izglītības un zinātnes ministrija, 2021b). Universities and colleges implement academic and professional higher education programs, as well as scientific activities, research, and artistic creativeness (Ministry of Education and Science, 2020b). At the same time, the colleges provide only the first-level professional higher education programmes. They can act as colleges established by HEIs or independent educational institutions (Ministry of Education and Science, 2020b). The number of HEIs has not changed since 2017. The majority of HEIs are located in the biggest cities of Latvia, but not all of them. Colleges are excluded from further research where possible. The complete list of HEIs is presented in Table 2.



Table 2.

Public and private HEIs registered in Latvia (adopted from (Izglītības un zinātnes ministrija, 2021b))

Nr.	Name of the HEI	Abbreviation	Web page
Public HEIs			
1	University of Latvia	LU	www.lu.lv
2	Riga Technical University	RTU	www.rtu.lv
3	Latvia University of Life Sciences and Technologies	LLU	www.llu.lv
4	Daugavpils University	DU	www.du.lv
5	Rīga Stradiņš University	RSU	www.rsu.lv
6	Liepāja University	LiepU	www.liepu.lv
7	Latvian Academy of Culture	LKA	www.lka.edu.lv
8	Art Academy of Latvia	LMA	www.lma.lv
9	Jāzeps Vītols Latvian Academy of Music	JVLMA	www.jvlma.lv
10	Latvian Academy of Sport Education	LSPA	www.lspa.lv
11	Latvian Maritime Academy	LJA	latja.lv
12	Rezekne Academy of Technologies	RTA	www.rta.lv
13	Ventspils University of Applied Sciences	VeA	www.venta.lv
14	Vidzeme University of Applied Sciences	ViA	www.va.lv
15	BA School of Business and Finance	BA	www.ba.lv
16	National Defence Academy of Latvia	LNAA	www.naa.mil.lv
Private HEIs			
1	RISEBA University of Applied Sciences	RISEBA	www.riseba.lv
2	Turība University	BAT	www.turiba.lv
3	Latvian Christian Academy	LKrA	www.kra.lv
4	Baltic International Academy	BSA	www.bsa.edu.lv

5	Riga Aeronautical Institute	RAI	www.rai.lv
6	ISMA University of Applied Sciences	ISMA	www.isma.lv
7	EKA University of Applied Sciences	EKA	www.eka.edu.lv
8	Transport and Telecommunication Institute	TSI	www.tsi.lv
9	Riga Graduate School of Law	RJA	www.rgsl.edu.lv
10	Stockholm School of Economics in Riga	REA/SSE Riga	www.sseriga.edu
11	The Academy of Luther	LA	www.luteraakademija.lv

Foreign University branches

1	Riga Higher Institute of Religious Sciences affiliated with the Pontifical Lateran University	RARZI	https://www.rarzi.lv/
2	Riga Institute of Theology affiliated with the Pontifical Lateran University	RTI	https://katolis.lv/organizacija/rigas-teologijas-instituts/

In total, 78.5 thousand students were enrolled in HEIs in the 2020/2021 study year, the major part was bachelor level students (55%), and the smallest share were doctoral students (2%) (Izglītības un zinātnes ministrija, 2021b). Moreover, out of all the students, 84% chose to study in public HEIs (Izglītības un zinātnes ministrija, 2021b). The largest public HEIs in terms of the number of students enrolled have been the University of Latvia, Riga Technical University, and Rīga Stradiņš University; the largest private HEIs have been Turība University un RISEBA University of Applied Sciences (Izglītības un zinātnes ministrija, 2021b). On average, 42% of students got state-financed places in HEIs, while 58% subsidised their studies from private savings (Izglītības un zinātnes ministrija, 2021b). The part of state-financed students in Master (46%) and Doctoral (79%) levels of education are higher. In comparison, 61% of Bachelor's degree students cover their study expenses on their own (Izglītības un zinātnes ministrija, 2021b). Those paying for their higher education are both in public and private HEIs; about a half (51%) of students in public HEIs should pay for their studies on their own (Izglītības un zinātnes ministrija, 2021b).

The analysis of the spread of students between different study fields allows concluding that the significant share (33%) of future professionals prefer the field "Social sciences, business and law", even though only 14% out of them got state-financed study places in HEIs (Izglītības un zinātnes ministrija, 2021b). The number of students in this field was even more significant back in 2011 (almost twice as big in the number of students) but steadily decreased ever since (Central Statistical Bureau, 2021). At the same time, the number of students in other fields of study remained on the same level during the past ten years (Izglītības un zinātnes ministrija, 2021b). The next preferred field is "Health care and social welfare" (17%), followed by

"Engineering, manufacturing and construction" (15%), and in these fields, the share of students enrolled in state-financed study places was 51% and 70% correspondingly (Izglītības un zinātnes ministrija, 2021b). The smallest number of students (combined about 2%) chose the fields "Agriculture, Forestry and Fisheries" and "Veterinary" (Izglītības un zinātnes ministrija, 2021b). There were about 12 thousand graduates from HEIs in 2020 (Central Statistical Bureau, 2021). The spread between their subject fields was similar to the interests of newly enrolled students: 37% graduated from the fields of "Social sciences, business and law", 19% - "Health care and social welfare", 12% - "Engineering, manufacturing and construction" (Izglītības un zinātnes ministrija, 2021b).

The share of international students in Latvian HEIs has been steadily growing since 2003 and up to 2019 from 1% to 14% (Izglītības un zinātnes ministrija, 2021b). However, the number of international students in 2020 decreased by 2%, most probably due to the Covid-19 pandemic. There is no data about the number of students enrolled in Latvian HEIs and studying remotely. The most significant number of international students in Latvian HEIs is from India, Uzbekistan, and Germany (Izglītības un zinātnes ministrija, 2021b). Overall, 32% of international students come from European Union member states. There were also about 2% of short-term mobility students in Latvia during the 2020/2021 study year (State Education Development Agency, 2021).

The gender split of the students enrolled in HEIs during the study year 2020/2021 was as follows: 57% were females, and 43% were males (Izglītības un zinātnes ministrija, 2021b). The gender gap is observed explicitly in such study fields as "Education" and "Health care and social welfare", where the share of female students was 91% and 80% correspondingly (Izglītības un zinātnes ministrija, 2021b). On the other hand, the only fields preferred by the male students were "Natural sciences, mathematics and information technologies" (aka STEM) and "Engineering, manufacturing and construction", where the share of male students was 77% and 72% correspondingly. However, most students of all genders still prefer the field "Social sciences, business and law" (Izglītības un zinātnes ministrija, 2021b).

The student split in terms of age groups was similar for both gender groups; most students (58%) have been 30 years old or younger, with the dominant group of 21-25 years old (Izglītības un zinātnes ministrija, 2021b). The number of older students steadily decreases in older age groups. However, considering the overall steady decrease in the number of students since 2016, the number of those older than 30 years increased by 17% in 2020 compared to 2016 (Izglītības un zinātnes ministrija, 2021b).

There were about five thousand employees from the academic staff working in public HEIs (including colleges) in the study year 2020/2021 (Izglītības un zinātnes ministrija, 2021b), of which 80% were elected to a position (Ministru kabinets, 2021a). Some people were employed at more than one place (but not more than two positions in one or two HEIs); in total, there were about six thousand academic positions in HEIs (Izglītības un zinātnes ministrija, 2021b). The following gradation exists within the academic position levels from top to bottom: professor, associate professor, lecturer, docent, senior researcher, researcher, and

assistant (Saiema, 1995a). In total, there were 611 professors and 558 associate professors in HEIs in 2020 (Izglītības un zinātnes ministrija, 2021b). The proportion of women in Latvian HEIs out of the total unique persons was 55% on average (Izglītības un zinātnes ministrija, 2021b). However, the split was slightly different on different academic levels. Thus, the most significant share of females in the position is among lecturers (67%) and the smallest share among professors (45%) (Izglītības un zinātnes ministrija, 2021b).

Out of those elected to the positions, only 4% were under 30 years of age (Ministru kabinets, 2021a), and in total, 27% were below 40 years old. There were 17% persons in the senior age group of 65 years or older (the retirement age has been steadily increased in Latvia from 62 years to reach 65 years by 2025 (Ministry of Welfare Republic of Latvia, 2020). In total, 225 persons of the professor level already passed the retirement age, which is a risk for the future sustainable operation of HEIs in Latvia (Izglītības un zinātnes ministrija, 2021b).

Distance learning in Latvia appeared more than 12 years ago (approximately in 2006), and it successfully existed on an experimental basis for improving the pedagogical skills of the Latvian HEIs teaching staff and preparing reports for international scientific conferences (Skvorcovs & Graurs, 2018). In 2018, in total, 11 HEIs were working with distance learning as a form of higher education in Latvia (Skvorcovs & Graurs, 2018). Considering the number of various distance and online education possibilities available in Latvia, we focus specifically on HEIs programs further in the text.

As in many other countries, distance and remote learning has been key to sustaining education in Latvia during the shutdown following the COVID-19 pandemic. During the last semester of the 2019/2020 study year, all HEIs were forced to urgently switch all the studies to some kind of distance learning option due to the limitations enforced by the State during the Covid-19 pandemic (Hačatrzjana, 2021). That was not always digital nor online education, strictly speaking. In Latvia, various forms of learning were implemented in the distance learning process during the pandemic; for example, teachers organised both online video lessons at a specified time (synchronously) and recorded videos with lesson content or videos with comments on frequently asked questions that students could watch at their preferred time (asynchronously), as well as gave students written or practical tasks (Hačatrzjana, 2021).

The study year 2020/2021 was completely remote for HEIs, and lots of digital education materials were produced to facilitate the studies during this period. A more detailed description of changes introduced during the Covid-19 pandemic will be given in the further chapters related to organisational and technological aspects. Despite the challenges raised by the sudden shift from in-person teaching to e-learning, distance learning has dramatically accelerated digital uptake in education, with effects that are likely to persist after the crisis (OECD, 2021).

At the beginning of the study year 2021/2022, when this research is composed, the HEIs only start to survey the faculty staff and students about their readiness to start the on-site studies by requesting to present the Covid-19 vaccination certificate. Moreover, the Cabinet of

Ministers of the Republic of Latvia has enforced the rules by which students and academic staff may participate in implementing the study program in person in HEIs. This includes having a valid Covid-19 certificate, which proves that its holder either completed the full vaccination course or has recovered from the SARS-CoV-2 infection (Ministry of Education and Science, 2021b). The semi-safe period from September 1, 2021, till October 10, 2021, was announced. During this period those students, who do not have the valid Covid-19 certificate may still participate in on-site studies, but they should present the negative results of the testing against Covid-19 not older than 48 hours. This means that students should perform tests at their own expense two or three times a week. Such regulations may restrict a considerable number of unvaccinated students from obtaining higher education. However, educational institutions are entitled to decide individually if they continue to offer some study modules or particular courses remotely (Džeriņš, 2021). HEIs may also decide if they allow students without valid Covid-19 certification to participate in studies during the upcoming study year by using the digital course materials, video lectures, and any other valid HEIs resources, which would ensure such students receive the education on the same level as all students. At the moment of this study, there are no accurate statistics on how many HEIs would sustain both remote and on-site studies, but some HEIs already proclaimed their willingness to support the education of all their enrolled students (Džeriņš, 2021).

In general, information about actual distance learning in HEIs, which is not a temporary solution to the Covid-19 situation, but an actual balanced distance program is sometimes hard to find and distinguish. Table 3 presents the major part of the full distance learning programs provided by HEIs on the Bachelor’s and Master’s study levels in Latvia during the study year 2021/2022.

Some information from the public HEIs has been misleading and could not lead to a definite conclusion on whether there is still a valid offering of distance learning programs. Private HEIs advertise the possibilities of online education much better. It might be connected to the fact that the largest Latvian HEIs seem to rather invest in the overall infrastructure of providing courses online on request, not on introducing and implementing separate online programs. Moreover, it may be concluded that the majority of offered distance learning programs are business and management and social studies. This is closely connected to the fact that such subject areas do not require practical training in laboratories and on-site activities similar to ones in technical or medical programs.

Table 3.

Distance learning programs in Latvia

Program title	HEI	Link
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(Table 1)



Bachelor programs

Theology and ministry	LA	http://www.luteraakademija.lv/?ct=uznemsana
Business and management	TSI	https://tsi.lv/lv/studijas/talmaciba/
Management Sciences	EKA	https://www.augstskola.lv/?parent=62&lng=lva
Business economics	EKA	https://www.augstskola.lv/?parent=62&lng=lva
Jurisprudence	EKA	https://www.augstskola.lv/?parent=62&lng=lva
Programming engineer	EKA	https://www.augstskola.lv/?parent=62&lng=lva
European economy and business	BSA	https://bsa.edu.lv/courses/eiropas-ekonomika-un-bizness/
Business Management	BSA	https://bsa.edu.lv/ru/courses/uznemejdarbiba/
Biblical art	KRA	https://kra.lv/studiju-programmas/studentu-uznemsana/
Theology	KRA	https://kra.lv/studiju-programmas/studentu-uznemsana/
Charitable social work	KRA	https://kra.lv/studiju-programmas/studentu-uznemsana/

Table 3 (continued).

Distance learning programs in Latvia

Program title	HEI	Link
Social work	KRA	https://kra.lv/studiju-programmas/studentu-uznemsana/
Jurisprudence	Turība	https://www.turiba.lv/lv/jaunumi/studijas-jebkura-laika-un-vieta
Management of tourism and hospitality companies	Turība	https://www.turiba.lv/lv/jaunumi/studijas-jebkura-laika-un-vieta
Business Management	Turība	https://www.turiba.lv/lv/jaunumi/studijas-jebkura-laika-un-vieta
Business psychology	RISEBA	https://www.riseba.lv/lv/talmaciba
Business Management	RISEBA	https://www.riseba.lv/lv/talmaciba

Business process management	BA	www.bpv.lv
Sociology of organisations and public administration	LLU	https://www.llu.lv/lv/e-studiju-programma

Master programs

Business and management	TSI	https://tsi.lv/lv/studijas/talmaciba/
Information systems management	TSI	https://tsi.lv/lv/studijas/talmaciba/
Business Management	EKA	https://www.augstskola.lv/?parent=62&lng=lva
Biblical art	KRA	https://kra.lv/studiju-programmas/studentu-uznemsana/
Theology	KRA	https://kra.lv/studiju-programmas/studentu-uznemsana/
Charitable social work	KRA	https://kra.lv/studiju-programmas/studentu-uznemsana/
Social business management	KRA	https://kra.lv/studiju-programmas/studentu-uznemsana/
Supervision	KRA	https://kra.lv/studiju-programmas/studentu-uznemsana/
Public administration	Turība	https://www.turiba.lv/lv/jaunumi/studijas-jebkura-laika-un-vieta
Jurisprudence	Turība	https://www.turiba.lv/lv/jaunumi/studijas-jebkura-laika-un-vieta
Business Management	Turība	https://www.turiba.lv/lv/jaunumi/studijas-jebkura-laika-un-vieta
Strategic business management	RISEBA	https://www.riseba.lv/lv/talmaciba
Business Management	RISEBA	https://www.riseba.lv/lv/talmaciba
Biostatistics	RSU	https://www.rsu.lv/aktualitates/rsu-bus-jauna-magistranturas-programma-biostatistika

The approach towards distance learning varies between institutions. Some list distance learning as one of the options in line with on-site part-time and full-time learning options. Thus, all programs share the same curriculum. At the same time, other HEIs specifically list the advantages of their distance learning programs and try to distinguish those from traditional learning. Among such advantages, they mention the possibility to learn at any place



and any time and the opportunity to enroll any time without the guidelines of any specific study semesters nor specific periods for the exam sessions (Biznesa augstskola "Turība", 2021). Overall, the information about the particularities of specific distance learning programs is limited. Still, it would be safe to conclude that HEIs provide students with various digital textbook materials, some video recordings, and audio recordings. The interaction with academic staff is either daily during the webinars and online lectures or can be limited to only the feedback sessions about the home tasks. However, not many interactive materials are provided, mainly those would be self-check or exam tests.

In general, according to the experience in the implementation of distance learning during the spread of the Covid-19, the academic staff of HEIs was increasingly accepting the technology-rich study process as a new normal (Rēzeknes Tehnoloģiju akadēmija et al., 2020). However, there are still differences in technical infrastructure and support as well as in the digital competencies of the academic staff in different HEIs. Digital literacy mainly depends on previous experience, study subject specifics, and demographic factors like age, etc. (Rēzeknes Tehnoloģiju akadēmija et al., 2020).

Not only for academic staff but also for many students the Covid-19 period was their first experience with distance learning (Hačātrjana, 2021). Students' ability to adapt to distance learning varies and depends on different aspects, including individual factors such as coping with new situations, solving problems, and managing their learning process. In Latvia, students have previously shown only average results in the ability to cope with non-standard situations (Hačātrjana, 2021).

The Ministry of Education and Science of Latvia prioritised the continuity of academic learning and support for teachers and students who lack online or independent study skills. Accordingly, the National Centre for Education developed guidelines for implementing distance learning, providing advice and guidebooks (OECD, 2021). To a large extent, this support was focused on providing information and guidance to secondary schools, but some practices and manuals were also produced for the use of HEI students. Overall, the transition to remote learning has made a significant contribution to the current challenge of making the whole study material available to students and further developing distance learning courses and even programs (Jansone-Ratinika et al., 2020). At the same time, the replacement of traditional teaching methods by various applications, messaging platforms and collaborative digital tools raised the issue of the digital skills of academic staff remarkably high, demanding a rapid and proactive response (Valtiņš et al., 2020).

On top of the HEIs listed before, there are 1473 organisations registered and functioning in Latvia, which provide education services (Lursoft, 2021). Those include various education programs, which cannot be associated with specific academic or professional education levels. The organisations provide academic consultations, courses for unsuccessful students, professional examination evaluation courses, language training and conversational skills training, computer training, religious training, rescue training, survival training, public speaking training, and speed reading training. Thus, it may be concluded that the list of

companies and services is relatively diverse, although they all are registered under one NACE code (EU Statistical Classification of Economic Activities) 85.59 – other unclassified education (Lursoft, 2021). There is no option to identify which of those organisations provide distance learning courses, especially considering the remaining restrictions due to Covid-19 regarding the organisation of remote learning.

There were numerous public and private companies providing formal and informal digital education services for the adult population in Latvia, especially during the introduction of the Covid-19 limitations. Those include various international training and certification services, as well as development of e-courses or e-learning materials. Examples include the following companies:

- “Baltijas Datoru Akadēmija” Ltd. (BDA, 2021a) is the biggest computer training center (a market leader in both the private and public sectors) in Baltic countries since 1994. Baltijas Datoru Akadēmija cooperates with the leading computer technology manufacturers, which have granted to Baltijas Datoru Akadēmija status of certified training partner. Since 2004, the Baltijas Datoru Akadēmija has been developing e-courses according to the client's individual needs. In the development of e-courses, both the existing learning materials of the costumers are used and completely new ones are created, as well as experts in the relevant field are attracted, who together with e-learning specialists develop high-quality products (BDA, 2021b). In December 2020, the Baltijas Datoru Akadēmija also won the Ministry of Education and Science's Adult Non-formal Education Travel Award "Sun Boat", which was established with the aim of emphasizing the importance of adult education and recognizing the best adult non-formal education provider of the year (BDA, 2020).
- Joint stock company Datorzinibu Centrs is one of the leading software development, e-learning and IT training companies in Latvia. The quality of services provided is confirmed by ISO 9001:2008 quality certification and the company is also the Microsoft Gold Certified Partner since 2000 (Datorzinibu centrs Ltd., 2021).
- “Novitus” is a company founded in 2007, focused on international cooperation. Company develops e-courses in more than 10 languages. The products are designed with an aim to ensure maximum interactivity allowing the training participants to remember as much information as possible. The company's main customers work in Sweden, Norway and UK. In Latvia, the company work with largest government and private sector organisations, for whom they do full cycle of custom-made e-learning and web developments (Novitus, 2021).
- "Fastercourse" was established in 2014 with the aim to offer interactive content using their developed templates for Articulate Storyline, Trivantis Lectora and Adobe Captivate to clients worldwide (Fastercourse, 2021). Templates are used by people who are neither programmers nor designers, but they have to teach a course and they want to do it in an interactive way. In total, around 2,000 templates are available. There are also templates for games, tests, and other possible interactive activities. Three types of clients can be distinguished for the company: e-learning agencies; large companies with thousands of people who create training courses for their employees; and individual clients who create a training course themselves. The templates they

offer are also bought by large universities. The working direction of this company can be considered unique, because only about five or six companies in the world work with e-learning content templates (Zoldnere, 2020).

- INTEA is the leading e-learning service provider in the Baltics and Europe. Company provides full-cycle e-learning production – from creating content and design to implementing trainings according to your business needs. INTEA provides custom e-learning courses that can range from static slides to highly interactive, gamified courses, as well as ready-made courses. In total, the company has implemented e-learning projects in 10 countries in more than 36 different languages (INTEA, 2019).

In addition, qualification raising seminars of various fields are organized (often provided by various interest groups like a club for mums by “Lietišķās kreativitātes grupa” Ltd. (Mamiņu klubs, 2021), webinars from professional associations like Latvian Project Management association or Riga TechGirls community (Riga TechGirls, 2021), professional courses by potential employers like Accenture Bootcamps (Bootcamp, 2021) and also webinars and courses from formal education institutions and training centres like IT ACADEMY by ISMA (ISMA, 2021), Riga Coding School, the University of Latvia are provided.

Moreover, several online programs were designed specifically for digital education, like Elements of AI¹ and UL Open Minded (FOLD, 2014). In addition, the impact of globalisation on education has been huge, and various free and paid international resources of digital education are fully available in Latvia (e.g. Coursera, Udemy, Codecademy, etc.) (Ābols, 2020).

One of the major governmental education programs called "Improvement of professional competence of employed persons" is also worth mentioning. It is intended for all employed persons aged 25 years and older (VIAA, 2020). However, each person might take part in this program only twice. Before the Covid-19 restrictions took place, the program was fully offline, but afterwards, it was adapted for online learning. In 2020, for the first time, the State Education Development Agency implemented adult education distance learning project, in which more than 11 000 learners applied to study remotely in one of the study courses or study modules. The majority (more than 80%) of adult applications were submitted for studies on information and communication technology, art, design and creative industries or logistics (VIAA, 2020; Vanadziņš et al., 2021b). Forty-seven institutions were offering their courses through this initiative remotely in 2021, including HEIs, professional schools, professional distance learning schools, training centres and others (VIAA, 2020).

¹ <https://www.elementsofai.lv/>



2. REGULATORY, LEGAL FRAMEWORK AND MAIN ACTORS

The education system in Latvia is administered at three levels - national, municipal and institutional (Ministry of Education and Science, 2020c). To ensure the efficient operations and international competitiveness of the higher education system, the cooperation of various state and public institutions is needed (Figure 2). The Parliament (Saeima), the Cabinet of Ministers and the Ministry of Education and Science are the main decision-making bodies at national level (Ministry of Education and Science, 2020c).

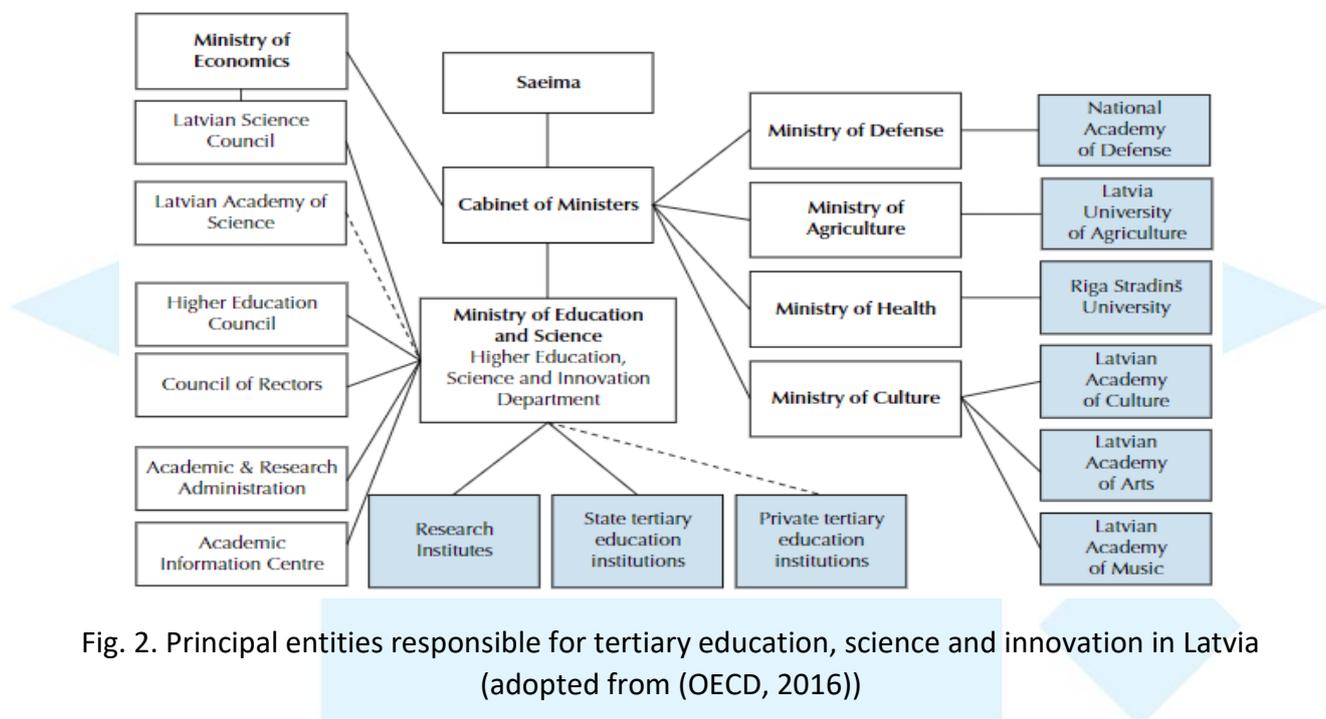


Fig. 2. Principal entities responsible for tertiary education, science and innovation in Latvia (adopted from (OECD, 2016))

The main public institutions involved in distance and remote education policies shaping, monitoring and enforcement are as follows:

1. The Parliament of the Republic of Latvia (Saeima) is the main body, who adopts the Education Law and other related legislation.
2. The President is as the main body, who proclaims the Education Law and other related legislation.
3. The Cabinet of Ministers issue and adopt various orders and acts related to HEIs needs.
4. The Ministry of Education and Science (The Ministry of Education and Science, 2021a) is responsible for education, science, sports, youth and state language policies in Latvia.
5. Academic Information Centre (AIC) (Academic information Centre, 2021) organises the accreditation of HEIs and study directions and licensing of study programmes.
6. Quality Agency for Higher Education (Quality Agency for Higher Education, 2019), also known as Higher Education Quality Commission – department of AIC, is established to

organise the accreditation of HEIs and study directions, licensing of study programmes, as well as the implementation of other tasks related to higher education quality assurance.

7. Terminology Commission of the Latvian Academy of Sciences (Latvijas Nacionālais terminoloģijas portāls, 2021) deals with the development, examination, and approval of terminology.
8. The State Data Inspectorate (Datu valsts inspekcija, 2021) exists to protect fundamental human rights and freedoms in the field of data protection.
9. Central Statistical Bureau (Central Statistical Bureau, 2020b) collects, analyses and provides statistics on such topics as Internet availability and usage, student quantities and other related information.

There is no one particular legislation on digital education as there is no separate document, which would cover all aspects of digital nor remote learning since digital learning is considered to be only one of the forms for formal education, which means that all legislation related to assessing the functions of HEIs also regulates distance learning. Therefore, the primary law is Education Law (Saeima, 1998b). It defines distance learning (in Latvian *tālmācība*) as *“the form of the acquisition of education in which a learner acquires the contents of an educational programme implemented by an educational institution independently and individually, using specially structured study materials offered by the educational institution, different technical and electronic means of communication. Achievements of the learner are assessed according to the requirements of the relevant educational programme”* (Saeima, 1998b). Thus, distance learning in HEIs is put on the one scale with full-time studies and extramural studies (Saeima, 1998b). Education law also mentions digital teaching aids and resources – *“electronic editions and resources which include the content necessary for the implementation of the educational programme”* (Saeima, 1998b) without regard to the form of education acquisition.

Recently a new definition was added to the mentioned law – remote learning. Remote learning is part of the full-time (on-site) education process *“in which the learners study, including the use of information and communication technologies, without being physically in the same room or place of study together with the teacher”* (Saeima, 1998b). This term is mainly used to describe education that appeared as a temporary solution during the restrictions connected to the Covid-19 pandemic. Moreover, there is a series of regulations and acts related to the Covid-19 pandemic and consequence management. Those determine the procedures for how the exams and lectures should be held in HEIs during the Covid-19 pandemic, who is allowed to attend on-site lectures and whether HEIs may continue to provide remote teaching to those who cannot attend the lectures and other related aspects. These regulations have been issued frequently (at least 1-2 times per study year) and do not regulate the performance of actual distance learning. Therefore, the presentation of all mentioned regulations in detail is omitted in this report.

In addition to Education Law, there is separate Law on Higher Education Institutions (Saeima, 1995a). This law *“regulates the cooperation of HEIs and State authorities to coordinate the autonomy of HEIs with the interests of society and the State”* (Saeima, 1995a). It applies to all HEIs in Latvia without regard to establishment or financing. It does not mention distance learning specifically, though. The Law on Budget and Financial Management (Saeima, 1994) *“prescribes the procedures for the formulation, approval and implementation of the State budget and local government budgets and the responsibility in the budget process.”* This Law also describes financial activities and rules which apply to funding the public HEIs, including the technical infrastructure provision. The Regulation on Pedagogues Work Remuneration (Ministru kabinets, 2016) regulates the minimal salaries of academic staff. Furthermore, it defines the systems of any additional payments based on key performance indicators or other criteria. One of the major regulations to be named would be Regulations Regarding Licensing of Study Programmes, which describes *“the procedures for licensing study programmes”*, including distance learning programmes and related conditions (Ministru kabinets, 2018a). Somewhat related to the previous one would be *“Regulations Regarding Opening and Accreditation of Study Fields”*. It prescribes the procedures for opening, accreditation, and assessing study fields, including distance learning studies (Ministru kabinets, 2018d). The Regulation on Requirements for Necessary Education and Professional Qualification, and Procedure of Continuing Professional Development of Pedagogues (Ministru kabinets, 2018c) defines the qualifications the academic staff should acquire to be able to perform teaching on different levels of educations.

All HEIs take into consideration in their internal processes the Personal Data Processing Law (Saeima, 2018), which is based on Article 4 of the Regulation (EU) 2016/679 of the European Parliament and of the Council of April 27, 2016, Directive 95/46/EC (General Data Protection Regulation). The purpose of this Law *“is to create legal preconditions for setting up of a system for the protection of personal data (hereinafter - the data) of a natural person at a national level by providing for the institutions necessary for such purpose, determining the competence and basic principles of operation thereof, as well as regulating the operation of data protection officers and provisions of data processing and free movement”*.

The Covid-19 pandemic introduced new challenges for HEIs. It became the most vivid examination of HEIs readiness to introduce digital and distance learning in Latvia. In response to the pandemic situation, the Cabinet of Ministers enforced the decision to temporarily terminate the full-time (on-premises) studies and learning process in all educational institutions since March 2020 (Vilks & Kipane, 2021). Thus, the traditional studies had to be transferred into an online environment where possible or switched to any other impersonal teaching. In the context of the announcement of an emergency and the transformation of the study process, amendments to the Education Law were adopted; that was the moment when the concept of remote learning was defined (Saeima, 1998b). Remote learning appeared to be a hybrid learning environment, where distance and online learning forms were supplemented with students' independent work (Vilks & Kipane, 2021). This experience proved that HEIs in Latvia were not ready for distance learning. Furthermore, it uncovered

new challenges, such as a lack of student motivation to participate in the study process (Vilks & Kipane, 2021).

The rise of digital skills for various society groups (by age and education levels) has been included in the National Development Plan for 2021-2027 (Saeima, 2020); for instance, through offering digital skill improving courses, on-job practical training and more accessible possibilities for the improvement of digital competence overall (Vanadziņš, 2021b). Moreover, the future development towards the knowledge society and more effective higher education is to be reached, among all, through digitalising the learning process according to this plan (Saeima, 2020).

Also, the Guidelines for the Development of Education 2021-2027 (Ministru kabinets, 2021a) suggest that all employees should be motivated to be involved in lifelong learning. One way to do that would be to offer various accessible possibilities for learning, which includes distance learning. What is more, higher education might become more efficient by integrating various digital learning methods according to this plan (for instance, personalised learning experience by utilising artificial intelligence, virtual reality usage for laboratory experiments, machine learning techniques for learning outcome forecasting) (Lubkina et al., 2020). However, to implement such innovative teaching approaches, the competency of academic staff should be increased first. Therefore, the development of academic staff's digital skills has been set as one of the closest priorities in the plan (Ministru kabinets, 2021b).

On July 5, 2018, the General Data Protection Regulation (GDPR) was enforced in Latvia (Saeima, 2018). GDPR provides the primary legislative framework for personal data protection in Latvia and other EU countries (OECD, 2021). The regulation did not generally change the principles (LV portals, 2018a) of personal data processing established by the Personal Data Protection Law (PDPL) (Saeima, 2000) 18 years ago. Adoption of the PDPL considered the GDPR and thus covered the basic principles of the OECD Privacy Guidelines Governing the Protection of Privacy and Transborder Flows of Personal Data (OECD, 2021). The purpose of PDPL is to create legal preconditions for setting up of a system for the protection of personal data of a natural person at a national level by providing for the institutions necessary for such purpose, determining the competence and basic principles of operation thereof, as well as regulating operation of data protection officers and provisions of data processing and free movement (Saeima, 2018). In Latvia, the Data State Inspectorate is designated as such a supervisory authority. The law also sets requirements for data protection specialists and their certification (LV portals, 2018a). Whether public or private, all organisers must comply with the requirements mentioned in the PDPL (OECD, 2021). Data processing has been an integral part of daily life and is not prohibited if carried out lawfully. As GDPR states, any personal data processing must have a legal basis: consent, the performance of a contract, legal obligation, public interest, protection of vital interests, or observance of legitimate interests (LV portals, 2018b). To protect the interests of the data subject, the data protection specialists must comply with the data processing principles set out by the GDPR: lawfulness, fairness and

transparency, purpose limitation, data minimisation, accuracy, storage limitation, integrity, confidentiality, and accountability (LV portals, 2018b).

According to the GDPR, all HEIs should follow strict rules when accessing, processing, and storing personal data. Institutions may choose the internal data protection procedures, but the information they relay to the public is somewhat similar. All institutions state they have an internal data protection specialist and private data management policy based on GDPR and related Latvian legislation. The main differences are in how specific the data protection policies are in informing the public on all the aspects. Some HEIs have more general formulations, while others state-specific contacts whom to contact, specific data storage periods, and describe how all the private data about themselves may be accessed.

Usually, consent on data access and processing is requested and received when signing any agreement with an HEI (study or employment agreements). Therefore, it is often lifted, and the data is deleted in cases when the agreement is no longer binding (students have not proceeded through the application process or staff was laid off) if the legislation does not state otherwise.

According to (OECD, 2021), there are many other laws, which govern data protection privacy and the processing of personal information in different fields in Latvia, including education. These Laws also allow managing HEIs efficiently in case of uncertainties. The most important ones are listed below:

- The Electronic Documents Law (Saeima, 2002) *"determines the legal status of an electronic document and an electronic signature and it applies to the provision of certification services following the requirements laid down in Regulation No 910/2014/EU."*
- The Electronic Communications Law (Saeima, 2004) exists to *"promote the provision of electronic communications networks and the development of electronic communications services"*. Furthermore, it directs the Data State Inspectorate to supervise personal data protection in the electronic communications sector.
- The Law on the Security of Information Technologies (Saeima, 2010) is created to improve the security of information technologies. It defines the most important requirements to guarantee security and instructs about the activities to conduct if the security was breached.
- The Administrative Procedure Law (Saeima, 2001) regulates all administrative procedures in institutions when other laws do not provide specific decisions.
- The Criminal Law (Saeima, 1998a) determines criminal liability regarding personal data breaches and other potentially illegal activities.
- The Procedures for the Preparation, Drawing Up, Storage and Circulation of Electronic Documents in State and Local Government Institutions, and the Procedures by which Electronic Documents are Circulated between State and Local Government Institutions, or Between These Institutions and Legal and Natural Persons (Ministru kabinets, 2005) and related documents prescribe technical and organisational measures for the protection of personal data in state institutions and when sharing the information



between such institutions. Therefore, some specifics apply to the public HEIs based on this regulation.

As described above, Latvian legislation does not have separate laws or regulations on distance learning specifically. However, such a form of education is formally recognised and defined. Therefore, all laws on education and HEIs are applicable also to distance learning, without any special adjustments. Unfortunately, this led to some drawbacks. According to (PwC Latvija, 2020), the weaknesses in legislation are mostly connected to particularities of digital learning, and the following changes and improvements should be implemented:

- To introduce micro-accreditation of distance study programs and courses. Current legislation in Latvia supports the practice "for the Recognition of Competencies Acquired Outside Formal Education or Professional Experience and Learning Outcomes Achieved in Previous Education" (Ministru kabinets, 2018b), and it works well for the acquisition of some professional qualifications. However, it is not currently applicable for recognising knowledge and skills gained through various Massive Open Online Courses (MOOC) like Coursera.org. HEIs should provide opportunities to facilitate the recognition of non-formal learning for pre-selected providers of digital learning resources.
- To review the definition and regulation of full-time studies in HEIs. Currently, full-time studies are considered a type of study that corresponds to 40 credit points per academic year and not less than 40 academic hours per week, limiting the possibilities to adapt the study program to the needs of students if state-financed study places are used. The new approach should revise the interval for the studies or review how the state funding is allocated.
- To review the list of forms of the acquisition of education and include hybrid study options in it. For example, there is currently no formal definition of semi-distance studies, even though some full-time study programs provide separate distance learning courses. Such practice might strengthen academic staff's digital skills and involvement of students in the study process, making it more efficient.
- To review the Regulations on the State Academic Education Standard (Ministru kabinets, 2014). Currently, study programs are not obliged to include such topics as IT and digital competencies in their curricula, which should be compulsory because of current worldwide trends. Moreover, this regulation does not mention distance learning at all.
- To enforce the creation of an e-account for each student compulsory for all HEIs, where complete information about the students and their academic achievements would be stored. This practice would make the process of statistical data composition from HEIs more transparent and comparable between institutions.
- To enforce the obligation for HEIs to define a motivation system of digital literacy improvements for academic staff and efficient application to study programs. Such a motivation system may include financial benefits and be based on qualitative key performance indicators (e.g. student evaluations). It is advised to apply the practices from abroad, for instance, by introducing the new academic position of Change

Management Agent (e.g. doctor degree students), who could help digitise current study programs.

- To review the Law on Higher Education Institutions (Saeima, 1995a), the clause on academic staff election and include digital competencies as one of the compulsory evaluation criteria.
- To review the regulation on degree dissertations publication, submission, and storage. There is a need to create a centralised database of all final research in digital form.
- To create and enforce the regulation on a database for digital study resources, digital study materials, and e-study platform usage in HEIs. Currently, some internal regulations exist in separate HEIs, but the government does not regulate those, and there is no information if such regulations are enforced in any specific institution.
- To create and enforce the regulation on centralised database (for theses and digital study materials) usage and support if such a database will be created and its maintenance will be transferred to HEIs.

In addition to the weaknesses stated above, there is a need to review the terminology used in legal and regulation articles. For instance, the legal articles in the Latvian language clearly distinguish between distance and remote learning. However, when analysing official translations into English, those terms are often mixed.

3. ORGANISATIONAL ASPECTS

Despite the problems caused by the Covid-19 pandemic, in general Latvian HEIs have been quite successful in reorienting to a fully remote study process in such a short time after the start of an emergency (Jansone-Ratinika et al., 2020; Lentjušenkova, 2021; Vilks & Kipane, 2021), especially taking into account that for several years public founded HEIs have received insufficient funding for the implementation of the face-to-face study process, not to mention the provision of remote studies (Latvijas studentu apvienība, 2020).

Most of the HEIs already before the start of the pandemic were using e-learning platforms (e.g., Moodle) to implement distance education and provide study materials, prepare assignments, and organise assessments (Ekonomikas un kultūras augstskola, 2020c; Pārresoru koordinācijas centrs, 2020; Rīgas Stradiņa universitāte, 2020a; Lentjušenkova, 2021). However, representatives of HEIs admit that the Covid-19 emergency introduced serious adjustments in the implementation of remote learning in Latvia (Vilks & Kipane, 2021); therefore, it was still challenging for HEIs to switch to remote studies and organise all study processes remotely just in few days (Ekonomikas un kultūras augstskola, 2020b; Jansone-Ratinika et al., 2020; Rīgas Stradiņa universitāte, 2020a; Latvijas Universitāte, 2021b). The main reasons for the challenges were the following (Vilks & Kipane, 2021):

1. the remote learning process was not based on the carefully planned development and implementation of distance learning solutions but an unplanned epidemiological situation;
2. educational institutions were generally neither technologically nor methodologically prepared for the rapid introduction of remote studies.

For students to be able to participate in the remote studies, academic staff was trained to work with e-learning systems before the start of remote studies, as well as technical improvements were made to the systems since remote format required that all students would use e-learning systems simultaneously (Daugavpils universitāte, 2020a; Ekonomikas un kultūras augstskola, 2020c; Jansone-Ratinika et al., 2020; Latvijas Universitāte, 2021b). According to the *Research of the current report*, several HEIs developed new distance programs and new e-learning courses. There were HEIs that introduced regulations to academic staff and students requiring them to visit the internal communication network at least once a day to obtain up-to-date information on epidemiological safety and changes in the implementation of related measures (Latvijas Lauksaimniecības universitāte, 2020b).

Administrative processes and activities, e.g., senate and faculty council's meetings, were also organised remotely (Latvijas studentu apvienība, 2020). As the positive aspect can be mentioned, the fact that the introduction of remote learning was regulated by the Latvian government, despite various possibilities for educational institutions to comply with the established regulations (Vilks & Kipane, 2021). The results of the *Research of the Student Union* showed that internal structures of HEIs were well-developed and thus they were able



to adapt to changes. The support from HEIs administrative and technical staff (e.g., personnel of IT departments) was coordinated and provided immediately, as well as due to their fast adaptation to the emergency, academic and other staff were able to work successfully from home (Banku augstskola, 2020a; Latvijas studentu apvienība, 2020; Latvijas Universitāte, 2021b).

Regarding the lesson planning, HEIs mainly tried to keep the schedule of lessons unchanged, making minimal changes to ensure complete mastering of the study program in the respective study year (Banku augstskola, 2020a). The main challenge emerged with the provision of practical training needed to be done in laboratories and the development and submission of final theses (Latvijas Universitāte, 2021b). Therefore, several HEIs postponed part of study courses involving practical components to a later time or the next semester, thus changing the duration of the study semester (Latvijas Universitāte, 2021b). If it was possible to ensure that study quality would not be affected during remote studies, then various technologies were introduced in the learning process to create simulations of practical work (Latvijas Universitāte, 2021b). In addition, several innovative solutions were created in the learning process to apply theoretical knowledge into practice. For example, in Rīga Stradiņš University, a set of special equipment (e.g., an injection simulator prototype, a prototype of digestive tract and trachea) was prepared for medical students to allow them to acquire 28 skills remotely at home (Rīgas Stradiņa universitāte, 2020b). In Riga Technical University, several digital stands were created for remote laboratory works with special equipment to master electrical engineering (Rīgas Tehniskā universitāte, 2020b).

Numerous technological solutions were adopted to implement remote studies. For the remote lectures, academic staff was using Zoom, MS Teams and other virtual meeting solutions (Banku augstskola, 2020a; Rīgas Stradiņa universitāte, 2020a; Latvijas Universitāte, 2021b). To organise final exams and tests, HEIs also used tools that reduced breaches of academic integrity (e.g., Respondus Monitor) (Rīgas Stradiņa universitāte, 2020a). The development and defence of study works and final theses (including PhD theses) took place remotely with the help of e-learning platforms (e.g., Moodle) and online video conferencing tools (e.g., Zoom, MS Teams, etc.) (Banku augstskola, 2020a; Daugavpils universitāte, 2020a; Ekonomikas un kultūras augstskola, 2020d; Ruskule, 2020; Latvijas Universitāte, 2021b). Furthermore, HEIs ensured that libraries allowed ordering and distribution of printed resources and enabled remote access to databases to support students in their studies and thesis preparation (Banku augstskola, 2020a).

Dissemination of information and news to HEIs students, academic and other staff was, in general, more frequent than before the Covid-19 pandemic. For the communication, various channels were used, such as e-mails, telephone, WhatsApp, etc. In addition, communication was maintained to provide answers to and hear suggestions from the students (Banku augstskola, 2020a; Latvijas studentu apvienība, 2020).

Regarding the impact of the Covid-19 pandemic on the daily life of Latvian students, several questionnaires and surveys were organised to find out how the Covid-19 pandemic affected their studies and what were the main challenges and advantages of the remote studies (Latvijas studentu apvienība, 2020; Ahrens et al., 2021; Dzenīte et al., 2021; Hačatrstjana, 2021). According to the results of *Research of the Student Union*, only 6% of Latvian HEIs students, who shared their experience about remote studies during the COVID-19 pandemic, admitted that everything was fine and there were no problems. Despite the low percentage of satisfied students in the *Research of the Student Union*, several positive aspects and advantages can still be identified from the analysis of surveys carried out by other researchers in Latvia.

In the implementation of distance studies, students mentioned such positive aspects as health safety, time savings, the opportunity to study from anywhere, to plan their own time, and prioritise their activities (Ruskule, 2020; Hačatrstjana, 2021). In a survey given in (Dzenīte et al., 2021), which was organised by the Department of Engineering Mathematics of Riga Technical University, participated 115 students and they highlighted the opportunity to sleep longer, not wasting time going to and from university, the silence during lectures, a study regime organised by themselves, and silence during the teaching and learning process as positive aspects. In a questionnaire organised by Rīga Stradiņš University (Kazuša, 2021), first-year students of medical chemistry course as an advantage of the remote learning mentioned opportunities to better plan their studies, comfort, as well as savings (both financial and time-wise) coming from non-attending classes in person. Similar advantages also mentioned students of several other Latvian HEIs (Rezekne Academy of Technologies, the University of Latvia and Daugavpils University) interviewed for a publication in a newspaper (Ruskule, 2020). Furthermore, they noted that distance learning had a more positive impact on those who were able to successfully study and work remotely, such as studying marketing, digital marketing or political sciences, because all the necessary academic literature and information resources were available in the HEIs e-environment or Internet resources. Students emphasised that the remote learning process taught them to think, see, and do more, which will significantly benefit the future labour market (Ruskule, 2020). Remote studies provided opportunities to acquire appropriate study courses for students living in remote regions of Riga and who did not always have the opportunity to participate in on-site classes (Ruskule, 2020; Vilks & Kipane, 2021). Remote learning also extended the study opportunities for young people with special needs, whose participation in face-to-face classes required help from assistants.

An important relief for students was recorded lectures, which, if necessary, students could watch when preferred (Ruskule, 2020). Students, in general, acquired new experience in using communication tools. Microsoft Teams gained the most popularity during the emergency, especially among ICT students; the use of Zoom increased several times, and the popularity of the Slack tool increased among non-ICT students (Avanesova, 2020).

Students appreciated teaching staff for their ability to change, create exciting and engaging classes in a virtual environment (Avanesova, 2020; Banku augstskola, 2020a; Banku Augstskola, 2020c;). In addition, students took the opportunity given to them to provide suggestions on skills that academic staff needed to improve (e.g., skills in using Zoom and Moodle) (Banku augstskola, 2020a). Moreover, administrative units of HEIs organised informative and explanatory communication with students (Jansone-Ratinika et al., 2020). and maintained communication with their outgoing and incoming Erasmus students, whose number decreased significantly during the COVID-19 pandemic (Banku augstskola, 2020a; Ministry of Education and Science, 2020a). Most students continued their mobility period learning online either in their respective home countries or in their mobility destination countries (Ministry of Education and Science, 2020a). HEIs informed students about the possibility of continuing remote studies and returning to their home countries (Banku augstskola, 2020a). Also, in cooperation with municipalities, the Ministry of Welfare offered support for incoming students currently staying in Latvia (Ministry of Education and Science, 2020a).

Besides, Riga Technical University and Vidzeme University College offered students consultations from psychologists. Furthermore, several Latvian HEIs supported students by creating individual study fee schedules, extending the deadlines for final theses (Puķe, 2021). Also, if necessary, providing premises, inventory, and equipment for remote work. Some HEIs (e.g., Latvian Academy of Culture) also continued to issue books in libraries without limiting the terms of use of the books and provided scanned materials by sending them to students' e-mails (Puķe, 2021).

Despite the benefits mentioned above and positive aspects, analysis of the survey results acquired during the *Research of the Student Union* allowed identifying several issues and challenges related to remote studies from students' perspective in Latvia. The main problem was related to organisational aspects, causing uncertainty about the study process since most of the students did not know how long the study semester is going to be (maybe it will be extended), and they lacked general information about the current and future organisation of the study process (Latvijas studentu apvienība, 2020). Students also encountered study-related issues. The main problems were attributed to the acquisition of practical skills that hindered them from reaching planned study outcomes, as well as it was unclear about internships, their organisation, and defence of theses, especially if the workplace was closed due to COVID-19 pandemic (Latvijas studentu apvienība, 2020; Ruskule, 2020). In addition, many students faced problems with the study materials. There were study courses that had digital study materials of insufficient quality or even did not have any study materials available electronically at all. Moreover, in the *Research of the Student Union*, students pointed to the problems related to academic staff, e.g., lack of digital skills in working with online tools, thus significantly affecting the quality of studies. Also, the academic staff's unavailability for consultations and explanations, lack of face-to-face support from academic staff were some of the challenges (Latvijas studentu apvienība, 2020; Dzenīte et al., 2021; Hačatrjana, 2021; Kazuša, 2021).

Although a significant effort was made to create online lessons and develop a flexible and student-oriented study environment, some students were not interested in active engagement and interaction (engagement of a passive student during remote lessons became even more challenging than in-person format) (Kazuša, 2021). Remote studies from home were problematic to many students since, for some of them, it was impossible to create a quiet, peaceful place suited for studying remotely, some did not have stable internet connection or electronic devices for studying (Latvijas studentu apvienība, 2020; Vilks & Kipane, 2021). In the study conducted using semi-structured interviews (Ahrens et al., 2021), students from Latvian HEIs pointed out that the transfer from studies in-person to the digital ones required more computers per family and space for taking part in online classes. If a family had a couple of children who study at school and/or at HEI, the classes usually were organised at the same time, and thus everyone, who learned or studied, required their own computer with the needed infrastructure as well as a separate room (Ahrens et al., 2021; Dzenīte et al., 2021). Since many people mostly worked from home, the Internet network was overloaded, and, consequently, the connection for the online classes was lost, even a couple of times per one class (Ahrens et al., 2021). Digital technologies available to students (computers, video cameras, software, etc.) were not always sufficiently modern (Vilks & Kipane, 2021). Buying a computer for each family member was a demanding task for the family budget, especially if some family members lost their jobs (Ahrens et al., 2021; Latvijas studentu apvienība, 2020).

In some cases, the digital skills of students also required improvements (Vilks & Kipane, 2021). The survey of (Dzenīte et al., 2021) showed that students quite often listened and participated in lectures through their smartphones that were not appropriate for such study directions as natural sciences, medicine, etc., where students were required to make notes, solve tasks and be fully involved in the process (Ruskule, 2020; Dzenīte et al., 2021). As a consequence, the results of students in remote education decreased in comparison with traditional classroom education, and, perhaps, there will be a "gap" in the current career development of students, as remote learning did not provide an individual approach to each student (Ruskule, 2020; Dzenīte et al., 2021). Furthermore, most students had problems developing final theses or course works due to a lack of necessary resources, closed laboratories, and libraries (Latvijas studentu apvienība, 2020; Kazuša, 2021). All these aspects caused students to think over the correspondence of study fees to the quality of provided remote studies, and there were even concerns that students would not be able to cover study fees (Latvijas studentu apvienība, 2020). In addition, many students were not able to find any job as many companies in the country were on lockdown, and many employees lost their jobs (Ahrens et al., 2021). Regarding international students, it should be noted that they preferred to study in person because, in many countries, there was no qualitative Internet or free access to libraries, which significantly hindered the full-fledged study process; therefore, during the COVID-19 pandemic, most HEIs experienced a reduction in the number of international students (Lentjušenkova, 2021).



Besides organisational and study-related problems, students also faced emotional and cognitive problems. It was a problem for them to maintain their academic performance, motivation to study and concentrate on the study process, self-organise and continue their education, and maintain psychological and physical well-being (Latvijas studentu apvienība, 2020; Dzenīte et al., 2021; Hačatrjana, 2021; Kazuša, 2021). For students, remote learning was also challenging since they were used to traditional study format and their study load increased from the moment when studies were organised remotely, especially in study programs related the engineering and life sciences (Latvijas Lauksaimniecības universitāte, 2020c; Latvijas studentu apvienība, 2020). This also caused stress to the students because they were not sure that they would manage to do all assignments on time (Hačatrjana, 2021). Many students failed to motivate themselves to cope with the set problems or failed to solve them without the presence of academic staff. As a result, study courses and their content had to be reviewed to adjust to the slower learning pace of students (Dzenīte et al., 2021). There was also a lack of social interaction since it was necessary to communicate with the help of technology and many students admitted that it was hard for them to study alone (Ruskule, 2020; Hačatrjana, 2021).

Besides the impact of the Covid-19 on students, several surveys and interviews with an academic staff of Latvian HEIs were carried out during the COVID-19 pandemic, e.g., in *Research of the project "Life with COVID-19"* (Vindača et al., 2021) or a questionnaire organised by the Department of Engineering Mathematics of Riga Technical University (Dzenīte et al., 2021) to clarify the attitude towards remote learning from educators' perspective, to find out advantages, disadvantages, and challenges they met.

The main advantages of remote learning were the valuable experience for both educators and students, promotion of professional and learning skills development and digital skills improvements (Vindača et al., 2021). During this time, academic staff received a lot of support from students who were very understanding, ready to advise, and, most importantly, actively studied in the new conditions as proved by higher attendance rates (Dzenīte et al., 2021). The professors also highlighted other positive aspects such as mastery of a new cooperation model with students in the learning process, learning to work on different platforms and tools, which they did not use before, thus improving their skills in technology (Dzenīte et al., 2021). Also, the quietness of working from home allowed them to work more productively (Dzenīte et al., 2021). To implement the learning process, academic staff used all available equipment: smartphones, laptops, graphic tablets, desktop computers, and different platforms supporting e-learning (e.g., Zoom, MS Teams, Moodle, Google tools) (Dzenīte et al., 2021). For communication with students, academic staff organised Zoom online consultations, used E-mail, WhatsApp, special tools on e-learning platforms, etc. (Dzenīte et al., 2021).

Most of HEIs recognised a lack of digital competencies for the academic staff and organised special study courses aimed to increase their knowledge and skills on the use of digital tools and platforms in the study process (Latvijas studentu apvienība, 2020; Jansone-Ratinika et al., 2020; Latvijas Universitāte, 2021b). According to the results of the *Research of the project "Life with COVID-19"*, academic staff highly appreciated the decisions and involvement of those administrative units of HEIs that have performed a large amount of organisational and technical support by offering to academic staff as much support as possible - specific IT tools and instructions, training on their use, materials regarding best practices, methods, and techniques in the provision of remote learning, as well as templates that academic staff can use and develop their study materials.

The main threats and issues, that academic staff identified regarding remote learning, included lower quality of the learning process compared to traditional studies, more complicated perception of student's emotions, low-quality communication, and lack of technical aids, as well as the more difficult organisation of the learning process in general (Vindača et al., 2021). Several problems were identical to the ones the students faced and which were already mentioned before. Also, academic staff encountered many problems, including technical ones, such as the availability of the necessary equipment (computers, tablets) for both students and academic staff, the absence of a good Internet connection at home, problems with old electronic devices (on which it was not possible to install all necessary software and applications, or they did not run smoothly), problems of choosing and mastering platforms for online teaching-learning, etc. (Dzenīte et al., 2021).

This time also forced HEIs academic staff to change their teaching approach and study materials and spend more time preparing the learning process (Latvijas Lauksaimniecības universitāte, 2020c). The main issue with switching to remote teaching was how to adapt the curriculum model of face-to-face teaching to an online format (Dzenīte et al., 2021). The work of the academic staff was also complicated by the fact that students were not used technological solutions in the study process to such a large proportion (Avanesova, 2020; Jansone-Ratinika et al., 2020). A challenging transition was for natural sciences such as mathematics, physics, chemistry, etc., as well as engineering courses where classroom or laboratory contact hours were essential (e.g., tutorials in mathematics and other natural sciences, laboratory work in chemistry, etc.) (Dzenīte et al., 2021). During the implementation of remote studies, the biggest challenge for the academic staff was to provide students with practical skills because, during the full-time studies, laboratories, simulations, mannequins, as well as other tools were used that were not available to students in the remote learning format (Jansone-Ratinika et al., 2020). Therefore, to deliver the best education to students in remote learning, academic staff spent lots of time on educational work, searched for new methods to achieve course outcomes, and considered various alternatives and solutions for the implementation of laboratory works and practical tasks remotely (Jansone-Ratinika et al., 2020; Latvijas Universitāte, 2021b).

Furthermore, most of the existing tasks were unsuitable for distance learning, and a large portion of study content had to be re-created for remote learning (Jansone-Ratinika et al., 2020). Besides, the increased amount of homework assignments solved by students led to the additional time professors needed for checking and grading (Jansone-Ratinika et al., 2020; Dzenīte et al., 2021). In addition to delivering learning content, academic staff also had to intensively motivate students, involve them, provide explanations, and monitor students' learning activities (Jansone-Ratinika et al., 2020). Therefore, teaching study courses in the synchronous and asynchronous form required intensive communication with students through various communication channels (Jansone-Ratinika et al., 2020). According to the results of *Research of the project "Life with COVID-19"*, the most significant proportion of employees who worked more than 10 hours a day during the Covid-19 emergency compared to the situation before Covid-19 was observed in the education sector. The increase was five times (from 4.3% to 20.9%). Also, a deterioration in the balance between work and private life manifested particularly among educators (Vanadzīņš et al., 2021a). Therefore, the potential benefit of saving on travel time to and from work was negated by the abnormal increase in the workload of academic staff, and most of the academic staff (even for professors coming from other cities) will be happy to return to traditional teaching mode (Jansone-Ratinika et al., 2020; Dzenīte et al., 2021).

Analysing changes in the HEIs internal organisational structure due to the Covid-19 pandemic, it can be concluded that the main changes in most HEIs were related to the setting of new obligations on existing staff. Departments or people responsible for information and communication technologies together with marketing and/or study departments were responsible for ensuring the information flow and communication to HEIs administration and individuals (both staff and local and international students) (Latvijas Lauksaimniecības universitāte, 2020b; Latvijas Lauksaimniecības universitāte, 2020d; Banku augstskola, 2021d). Marketing departments also worked together with departments responsible for infrastructure to prepare, reproduce and distribute informative materials in the buildings and premises of HEIs (Rīgas Stradiņa universitāte, 2021b). In addition, HEIs assigned departments or specific persons with new tasks, e.g., the assessment of the needs for face masks, face shields, protective barriers and floor markings (Rīgas Stradiņa universitāte, 2021b), the delivery and placement of informative materials, signs, instructions, restraining tapes, aids to limit direct contact, etc. (Latvijas Universitāte, 2020c). Besides, employees were hired who ensured communication with the Centre for Disease Prevention and Control of Latvia on the implementation of epidemiological safety measures at the HEIs, including the detection of Covid-19 cases, identification of contact persons and prevention of possible risks, as well as coordinated and advised the HEI's structural units in cases of Covid-19 risk (Latvijas Universitāte, 2020c). In addition, there were HEIs that set up special working groups responsible for decisions related to the organisation of the study process in a pandemic (Djakonova, 2020).

In the future, according to the information described in the report commissioned by the Ministry of Education and Science regarding the evaluation of digitalisation of HEIs in Latvia (PwC Latvija, 2020), the management of digitalisation in each HEI requires a clearly defined model for determining who is responsible for the digital transformation of HEIs. Currently, HEIs use various models; for example, Riga Technical University and the University of Latvia have deputy rectors for digitalisation. In turn, IT departments are responsible for digitalisation in Rīga Stradiņš University, Daugavpils University, and Turība University (PwC Latvija, 2020). As the responsible institution for the digital transformation of HEIs, the Ministry of Education and Science of Latvia must ensure that each HEI has a structural unit or a position responsible for digital transformation. In addition, the Ministry must monitor the development and implementation of policies for the security and protection of information, personal data, and intellectual property to protect digital content (PwC Latvija, 2020).

In most Latvian HEIs, e.g., the University of Latvia, Rīga Stradiņš University, and Liepāja University, there is no particular structural unit directly related to the implementation of distance learning or e-studies nor it is planned to create one; in most cases, monitoring, coordination, and decision making regarding distance learning are one of the responsibilities of study departments, study boards or study centres (Liepājas Universitāte, 2017; Latvia University of Life Sciences and Technologies, 2020; Latvijas Kristīgā akadēmija, 2021; Rīga Stradiņš University, n.d.; University of Latvia, n.d.). Only a few HEIs have special structural units that are fully responsible for the implementation of distance studies. In Riga Technical University, the structural unit called Distance Education Study Centre (RTU DESC) was established already in 1997 and allowed the university to participate in several EU projects related to the development and delivery of innovative distance and e-learning courses, thus gaining expertise in methodology and technology of distance and e-learning course development (Rīgas Tehniskā universitāte, n.d.). In the RISEBA University of Applied Sciences, the Study Quality Centre is the structural unit that ensures monitoring, provides information and advice on the distance learning study process to facilitate its promotion, recognition and attraction of students; in addition, the Study Quality Centre develops authentication procedures for the assessment of knowledge acquired via distance learning (RISEBA University of Applied Sciences, n.d.). In the Transport and Telecommunication Institute, the structural unit called Digital & Innovation Learning Center is responsible for providing distance learning (Transport and Telecommunication Institute, n.d.).

Regarding new institutional formations due to the Covid-19 pandemic, in several HEIs, either a new centre was opened, which provided filming of video lectures, video processing, etc. (Ventspils Augstskola, 2021b), or already existing departments related to multimedia took on new responsibilities and coordinated recording of video lectures, thus helping in the provision of remote studies and improving the quality and interactivity of the study content (Maškova & Bruģis, 2021). In the future, such structural units will contribute to more qualitative distance education in HEIs and serve as the technical support point for creating distance learning video content and digitalisation of study programs (Ventspils Augstskola,

2021b). For example, in Ventspils University of Applied Sciences, an interactive digital classroom was opened, offering students and academic staff the use of state-of-the-art technologies to conduct and listen to lectures from anywhere in the world (Ventspils Augstskola, 2020).

Several HEIs in Latvia introduce virtual laboratories in the study process. Such virtual laboratories are currently being developed as separate projects, and they are planned to be introduced or are already in the process of implementation at Rīga Stradiņš University, Latvia University of Life Sciences and Technologies, the University of Latvia (PwC Latvija, 2020). However, this is an evolving trend in higher education which in Latvia is only in the early stages of development. Therefore, virtual laboratories are not so commonly used in studies, and academic staff of HEIs lacks knowledge of these technologies (PwC Latvija, 2020).

In addition, Riga Technical University, together with the University of Latvia, participates in the EuroHPC project National Competence Centres in the framework of EuroHPC becoming a part of a network of high-performance computing competence centres in Europe (PwC Latvija, 2020). The main task of the Latvian Supercomputing Competency Centre established during the project will be to create a single support structure to promote the use of supercomputing opportunities in higher education, research, public administration, and industry (Institute of Numerical Modelling, 2021).

Besides the innovations mentioned above, it is also planned to establish a Competence Centre to manage science and higher education digital services. The centre's mission will be to create a reliable ecosystem for digital education and science: content, tools, services, competencies, and platforms (PwC Latvija, 2020). In the initial stage, the priority of the Center will be the development of data management and analysis capabilities, as well as the provision of data analysis services to HEIs (PwC Latvija, 2020).

In addition to changes in organisational structure, personnel and their responsibilities, e-learning environments, and networks, information logistics are also important (PwC Latvija, 2020) since it provides academic staff and students with information on potential collaboration opportunities. This information is usually published on the internal portals of HEIs and using internal notification services (PwC Latvija, 2020). It is recommended to actively use social networks to promote the attraction of students, the recognition of higher education, and the involvement of students in various learning and social activities. Social networks also help to attract international students and academic staff (PwC Latvija, 2020). It is recommended to integrate virtual assistants on social networks and websites (for example, so that a potential international student can ask a question of interest) (PwC Latvija, 2020).

Furthermore, the Covid-19 pandemic significantly accelerated several necessary and facilitating things, the implementation of which was relatively slow before the pandemic. This was the case, for example, with the use of eSignature (Baumanis, 2021). Since the beginning of the pandemic, HEIs have introduced the possibility of using electronic

signatures to apply for studies and sign study agreements. Thus, it is possible to enter HEIs without attending them (PwC Latvija, 2020; Rīgas Tehniskā universitāte, 2020a; Baumanis, 2021). Highly appreciated is also the practice started by several HEIs to share examples of good practices and experience stories in public, thus supporting and instructing others who are having difficulties with the provision of remote studies (Latvijas studentu apvienība, 2020). Another example of innovations in the field of the newly introduced methods and technologies for the acquisition of practical skills is digital stands created in Riga Technical University for laboratory works offering an opportunity for the students to apply acquired theoretical knowledge in practice. Furthermore, these stands allow remote measurements on real equipment and analysis of the obtained data, as well as the comparison and verification of results is automated, thus eliminating the possibility of cheating and saving teachers time on checking laboratory works (Rīgas Tehniskā universitāte, 2020b).

Several significant problems and mistakes affected studies during the Covid-19 pandemic. There were uncertainties about what and how HEIs will be allowed to function and when the study process will start. Unfortunately, education policymakers have learned little from these mistakes, and there are still many unclear and centrally unresolved issues. To start the new study year qualitatively, both the HEIs administration and the academic staff should be aware of the rules for starting the studies at the beginning of the summer (Baumanis, 2021).

In addition, academic integrity became essential during the COVID-19 pandemic in Latvian HEIs due to the increase of cheating opportunities from students during remote assessments (Dzenīte et al., 2021). In remote assessment, it is more difficult and sometimes even impossible to make sure that students take the tests independently, do not use unauthorised aids and the help of other people (Jansone-Ratinika et al., 2020). The academic staff noticed that previously weak students began to submit high-quality papers, while previously successful students began to get lower grades than they had during classroom tests. This made the professors reconsider the necessity of “blind” remote tests (i.e., tests without video invigilation) and apply stricter exam conditions for students (especially with debts who would try to cheat during exams) (Dzenīte et al., 2021). Online examination with strict video invigilation is exceptionally time-consuming, but the most responsible professors used only this kind of examination while waiting for the time when a traditional classroom examination will be possible again (Dzenīte et al., 2021). Regarding this issue, not all HEIs in Latvia reallocated sufficient financial resources to purchase programs and technically provide more complete monitoring of remote testing (Jansone-Ratinika et al., 2020). Representatives of HEIs who participated in the *Research of the project “Life with COVID-19”* and had such tools available indicated that they helped to monitor the progress of tests, but created a lot of additional workloads, as they can be circumvented and not always show accurate results, so time is needed to review and analyse all suspected cases as well as carry out additional control mechanisms (Jansone-Ratinika et al., 2020). Lecturers also identified the need to focus more on the Open-Book principle when students are allowed to use materials during the examination, thus minimising the potential for breaches of academic integrity (Jansone-Ratinika et al., 2020).

Despite issues encountered during the pandemic, it is considered that such a learning process, which combines face-to-face and online, will also be in demand after a pandemic providing an opportunity to make studies more efficient and of higher quality (Daugavpils universitāte, 2020a; Pārresoru koordinācijas centrs, 2020). This will encourage the convergence of Latvian higher education methods with practices of Western countries, when students independently get acquainted with the theory, read specific literature, and then meet in a class to discuss what they have read, exchange views and interpretations with the academic staff (Vasiļevska, 2020). Meeting seminars can also take place online. It is possible that in future, there will be study fields in which full-time classes are not necessary at all or only a limited number of lectures are required in person (Vasiļevska, 2020).

Several Latvian HEIs already before the beginning of the COVID-19 pandemic were working towards digitalisation of their basic organisational processes (e.g., admission of students, signing of study agreements, etc.), provision of distance and/or e-learning courses (study programs, courses, and study content), improvement of existing digital learning environments, modernisation of administrative processes (e.g., management of departments, personnel, information flow, etc.) (Rīgas Tehniskā universitāte, n.d.; Rīgas Tehniskā universitāte, 2019b; Daugavpils universitāte, 2020a; Latvijas Lauksaimniecības universitāte, 2020c; Rīgas Tehniskā universitāte, 2020a). For example, in 2018, Riga Technical University started to implement a large-scale digitalisation project of the study process, and, in 2019, the so-called "change agents" worked in each faculty on digital format and interactive teaching aids (Delfi, 2020). In this way, these agents gained experience that helped them and their colleagues who were facing challenges related to remote learning during the pandemic (Delfi, 2020). This was carried out to make courses more accessible to a wider range of students, including part-time students, and adapt courses according to the needs of specific faculties and the specifics of teaching (Rīgas Tehniskā universitāte, 2019b).

Latvia's higher education sector is currently modernising 300 STEM programs, including ICT programs. About EUR 70 000 will be spent on using ICTs to facilitate learning (OECD, 2021). In addition, the infrastructure used in ICT study programs will also be modernised (in four vocational programs, 13 bachelor-level programs, 13 master-level programs, and seven doctoral programs) (OECD, 2021). The government also plans to decrease fragmentation among study programs, and 14 HEIs are implementing projects funded by the European Social Fund to develop 5 ICT study programs, including programs in languages other than Latvian (OECD, 2021).

According to the results of an online questionnaire conducted in the *Research of the project "Life with COVID-19"*, academic staff of Latvian HEIs identified four different levels for the implementation of changes to improve distance learning in Latvia (Vindača et al., 2021):

1. on the individual level: to change thinking and attitudes, especially in regard to openness to cooperation, development, responsibility, and self-reflection of different skills (digital, time-management, self-organisation, communication, mutual trust, etc.);



2. at the educational institution level: to develop organisation strategy and operational plans, identify the digital tools to be used, provide security and support measures, develop precise criteria for the acquisition of the content, ensure the communication and cooperation involved, etc.;
3. at the local government level: to provide support for the development and implementation of developed strategy, operational plans, and documentation of the educational institutions, to develop high-skilled IT, social, and psychological support plans and coordinate the implementation, to provide the professional competence development according to the needs, etc.;
4. at State level: to provide a unique platform for digital and interactive learning resources for open access, determination of responsibilities and obligations, clearly indicated guidelines, development of recommendations for evaluating student's learning performance, revision of educator's workload, provision of various types of financial, social and psychological support, and coordination, etc.

Significant investments from EU Structural funds 2021-2027 are planned in higher education for wider integration of digital solutions and technologies in the study process (Ministru kabinets, 2021a). Systematic support measures for the development of digital solutions, such as a wide range of e-services in education (single application platform for studies for Latvian and foreign applicants, development of educational diploma register and electronic diploma itself, the introduction of e-student card, etc.), are planned and will be implemented following the Guidelines for Digital Transformation for 2021-2027 (Ministru kabinets, 2021b). Improving ICT education and e-skills is a core focus of the Guidelines for the Development of Information Society (OECD, 2021). Stronger administration of higher education will ensure improvements in the governance of HEIs during the period of guidelines. Most European HEIs move to a two-tier governance structure, where strategic and management tasks are separated - the senate deals with academic matters, and the council is responsible for long-term strategic decisions (Ministru kabinets, 2021a). The new governance model will strengthen the connection of educational institutions with society, listen to different opinions and implement the proposed solutions, assess the positive impact of the diversity of competencies, promote the institution's international recognition, and promote cooperation between educational institutions and the economy. The new governance model is planned to be implemented in Latvian HEIs by the end of 2022, but in HEIs, including HEIs of art and culture, by the end of 2023 (Ministru kabinets, 2021a). The transition to primarily electronic educational documents will ensure entirely digitalised processes in educational institutions, including application to an educational institution, digital accessibility of learning content (inter alia through language processing technology capabilities), automated learning processes and performance assessment of learners, and digital receipt of education certificate (Ministru kabinets, 2021a).

Changes will also be brought by the possibility of obtaining professional qualifications without a degree, which is currently being actively directed by the Ministry of Education and Science, the Department of Vocational and Adult Education (Lentjušenkova, 2021). This



means acquiring only professional courses and obtaining an appropriate professional qualification without a degree. This possibility will be an essential milestone in higher education in Latvia; however, the demand for bachelor's study programs will not be lost. Each program has its segment (Lentjušenkova, 2021). Bachelor's programs are more topical for young people who have not yet gained higher education, but vocational development programs are an opportunity to acquire additional occupations or receive retraining, thereby maintaining or promoting competitiveness in the labour market (Lentjušenkova, 2021).

People whose one of the most significant values is time and opportunity to organise their study process will prefer distance learning (Delfi, 2020). The potential existence of such a demand already makes Latvian HEIs think about changing the education format by developing and providing distance study programs and e-learning opportunities. Therefore, it will be necessary to work on changes in the study process not only by changing study format, but also changing study content, adapting this content to modern needs, as well as transforming this content into a format that is friendly to remote lectures, provides interactivity and requires constant student attention (Delfi, 2020). At present, the Ministry of Education and Science also acknowledges the possibility that part of the study courses could take place remotely even after the pandemic. About 15-20% of the curriculum could be implemented remotely, particularly part C courses, which are free electives, and students could select them at their convenience (Ruskule, 2020). This could open more opportunities for students, for example, to choose courses from another faculty, facilitating the movement from faculty to faculty, and master the course at a time and place convenient for him/her (Ruskule, 2020).

The development of the Latvian national quality assurance system was one of the first higher education reforms in independent Latvia, taking place at the end of the 1980s and the beginning of the 1990s (Kažoka et al., 2018). The reform aimed to obtain international recognition for the Latvian higher education system (Kažoka et al., 2018). During the last 30 years, the higher education system and the quality assurance system in Latvia have undergone massive transformations and developments in focus and the assessment object, for example, study directions (study program groups) (Kažoka et al., 2018). Currently, the quality assurance model in Latvia includes three stages— initial assessment (licensing) of all new study programs, cyclical accreditation of study directions (every two or six years), and accreditation of all HEIs for an indefinite term. The system relies heavily on the licensing procedure and the cyclical accreditation of study directions (Kažoka et al., 2018). Study directions can be accredited for two terms – 6 years (favourable decision) and two years (conditional decision, if substantial deficiency is detected but may be eliminated within the scope of the period of accreditation of the study direction) (Quality Agency for Higher Education, 2019). In case of an unfavourable decision, study direction is not accredited (Quality Agency for Higher Education, 2019). The accreditation of HEIs currently performs the gate-keeping function to ensure that only trusted HEIs are allowed to operate. Accreditation of HEIs is performed only for the newly established institutions or in extraordinary cases (Kažoka et al., 2018).

In 2014, it was decided that the AIC is the most relevant organisation for higher education quality assurance. After AIC selection and revision of existing regulations for accreditation, AIC established a substructure called AIKA (Quality Agency for Higher Education) to carry out the function of quality assurance in higher education (Quality Agency for Higher Education, 2019). AIKA has the competence to organise the accreditation of HEIs, colleges, study directions, licensing of study programs, and the implementation of other tasks related to the quality assurance of higher education (Quality Agency for Higher Education, 2019). Since July 2018, AIKA has been a full member of the European Association for Quality Assurance in Higher Education (ENQA). The decision of ENQA to grant AIKA full membership for the next five years assures that assessments of higher education organised by AIKA can be trusted both – locally and internationally (Quality Agency for Higher Education, 2019). In addition, to improve the quality assurance of Latvian education, in 2018, the AIKA also joined the European Quality Assurance Register for Higher Education for five years (OECD, 2021). As a result, the adopted decisions confirm that both Latvian and foreign HEIs, students, and other stakeholders can trust the quality assessments of higher education organised by AIKA, as well as that it is perceived as a reliable partner in the European higher education area (Quality Agency for Higher Education, 2019).

Currently, the only cyclical evaluation procedure is the accreditation of study directions, which does not provide a complete overview of the HEI (Baumanis, 2020; Ministru kabinets, 2021a). Accreditation of HEIs is an assessment of the quality of the institution's work organisation and resources, as a result of which the institution is recognised by the state and can issue state diplomas. An effective quality assurance system must be comprehensive, and its procedures must be consistent and streamlined (Ministru kabinets, 2021a). To change the system from quality control to quality improvement and to be able to introduce changes in it, it is necessary to review the quality assurance and evaluation system of Latvian higher education (Ministru kabinets, 2021a).

It is planned to introduce cyclical institutional accreditation of HEIs, thus continuing the reforms started in the previous period in improving the quality assessment process of higher education to strengthen the quality and competitiveness of HEIs (Ministru kabinets, 2021a). The accreditation cycle of study fields in 2020-2024 is important in this process because, for the first time, a systematic evaluation of all higher education study fields will take place under the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG), at the same time preparing for a gradual transition to the introduction of a cyclical institutional accreditation system (Ministru kabinets, 2021a). Several HEIs, especially those in the social sciences, also experienced a wave of accreditation during the pandemic (Lentjušenkova, 2021). A semi-remote accreditation process, in which foreign experts participated digitally, was a novelty introduced due to the Covid-19 pandemic that is likely to become a permanent practice even after a pandemic, as it saves significant time and money resources (Lentjušenkova, 2021).

In 2020, in cooperation with AIC within the EU Structural Reform Support Program, the Ministry of Education and Science started developing a concept for improving the higher education quality assurance system. This process envisages the preparation and submission of proposals regarding the implementation of cyclical institutional accreditation of HEIs and proposals for the regulatory framework (Ministru kabinets, 2021a). Its implementation as the primary quality assurance procedure is planned to be introduced from 2025 onwards. Its introduction will reduce duplication of existing quality assurance procedures, administrative burdens, and the costs of evaluation procedures (Ministru kabinets, 2021a).

Despite planned changes, Latvia still has an extended, expensive, and bureaucratically complex accreditation and licensing system of study programs, which is a big challenge for many educational institutions, and the preparation for this process should be started very timely (Baumanis, 2020; Lentjušenkova, 2021). The total cost of such an accreditation system is approximately 8 to 10 million euros, and these costs are covered from the funds that should be invested in the development of HEIs, promoting the quality and competitiveness of their activities (Baumanis, 2020). In comparison, the planned institutional accreditation of HEIs would cost approximately 2 to 3 million euros (Baumanis, 2020). Therefore, abandoning the current costly, cumbersome, and overly bureaucratic accreditation system and replacing it with a more modern one would allow investing more than 5 million euros in the development of higher education (Baumanis, 2020).

Despite the changes that are regularly made in the accreditation of study directions and programs in Latvia, remote studies will also contribute to the quality of higher education by encouraging HEIs to rethink and improve the content of study programs (Vasiļevska, 2020). If there are different online courses at a click-away that offer to acquire one or the other skills, HEIs must come with a high-quality offer so that the prospective student is ready to make a long-term commitment (Vasiļevska, 2020).

Regarding needed skills and competencies required for remote teaching, in the *Research of the project "Life with COVID-19"*, academic staff point out that they still lack specific high-level technical skills in design development, video editing, which affects both the content and visual quality of study materials, therefore encourages HEIs to form interdisciplinary teams for the development of multimedia study materials with academic staff. Such teams could include content specialists, experts of university pedagogy, experts of combined study pedagogical design, and technical specialists of digital study content development.

According to (Ministru kabinets, 2021b), it is planned to develop the following digital skills for academic staff of HEIs in Latvia:

- to improve the pedagogical-digital competence, digital knowledge, and skills for the excellence of HEIs academic staff, by preparing also the core of Latvian digitalisation educators in world-class content, pedagogies, and teaching technologies.

- to develop high-level digital skills as cross-cutting skills within vocational education and higher education content, including cybersecurity, big data, digital technology in the sector, public administration services, etc.
- to promote the closer cooperation of higher and vocational education institutions with employers and industry associations to prepare qualified ICT specialists following the requirements of the national economy, including the development of shorter pathways to professional qualifications and their development, e.g., by implementing a modular approach.

According to (Ministru kabinets, 2021b), changes needed in the digital transformation of education are following:

- fully digitised administrative processes (including higher education), including application to an educational institution, digital availability of study content (using also the possibilities of natural language processing technology), automated learning process and assessment of students' performance, as well as receipt of digital educational certificates;
- provision of the possibility to implement distance studies and Internet connection of appropriate quality to educational institutions, as well as sufficient availability of technologies for the students to ensure the learning process;
- introduction of data-based management of the education sector, including the provision of the educational process and quality monitoring and analysis, early warning processes, measurement of progress performance, forecasting of further education and career development opportunities;
- creation of simulated learning (education) environment primarily in those sectors where simulations reduce professional risks, including health, medicine, law, security, and home affairs;
- introduction of an artificial intelligence solution to support the acquisition and assessment of skills, for example, in the form of independent work or distance learning.

In the *Research of the Student Union*, good practices and recommendations regarding teaching methods for remote studies were summarised. The methods used in the study process must be diversified and combined; for example, online lectures should be supplemented with interactive tools for the submission of online questionnaires (e.g., Menti.com, Sli.do, etc.), online tests with game elements should be used to test and strengthen knowledge (for example, by using Kahoot.it). Students should be provided with theoretical materials explaining the terms and methods, which can be read before the lecture, as well as students are invited to prepare and present their homework digitally similarly like in front of the audience, finally receiving feedback from both the academic staff and classmates (Latvijas studentu apvienība, 2020; Rēzeknes Tehnoloģiju akadēmija et al. 2020). By diversifying learning methods and types of examinations, educators should try to individualise and adapt study tasks, eliminating opportunities and the need for students to seek unauthorised help, ensuring academic integrity (Latvijas studentu apvienība, 2020). In

addition, it is desirable to use materials that are available from a device of different types and ages (computer, telephone, tablet) so that the information is available to the student regardless of his/her material and technical possibilities. The study process and the course content must be as adaptable as possible to the needs of all students so that they can also fully participate in the study process remotely (Latvijas studentu apvienība, 2020).

Based on the *Research of the project "Life with COVID-19"*, when preparing digital learning materials, it is necessary to provide various types of tasks/activities in the learning process, such as reading, documenting, researching multimedia materials, giving consultations, audio/video lectures, taking notes in digital tools, online discussions, working with simulations or applications, completing tasks and tests, etc. to better retain the students' attention (Lubkina et al., 2020).

According to (Čeirane et al., 2021; Dzenīte et al., 2021), the majority of students prefer online lectures given on Zoom or another platform for video conferencing, where a professor writes and explains the theoretical material step by step and solves practical exercises, but does not show the pre-written in advance solutions or recorded video lectures, in which materials and practical exercises are written step by step with oral explanations. At the same time, a considerable number of students prefer a combined learning approach that incorporates online classes with independent tasks (Čeirane et al., 2021). Online classes, self-assessment tests in e-studies, submission of independent tasks, and interactive tools are regarded as the most efficient tools in remote learning (Čeirane et al., 2021). Since cooperation with a teacher facilitates course mastering, most students prefer to discuss homework during online classes rather than submit it in e-studies (Čeirane et al., 2021). Range of benefits of distance learning can be identified from the perspective of students, such as the easy use of technologies, a variety of digital tools available and simultaneous use of varied sources of information, self-paced learning, and a decrease in stress levels leading to increased psycho-emotional comfort (Čeirane et al., 2021).

At the same time, knowledge assessment poses problems because automated knowledge testing capabilities are more relevant to STEM sciences. It is desirable to organise the learning process in specific modules, not according to the principle of lectures (Rēzeknes Tehnoloģiju akadēmija et al. 2020). Adherence to academic integrity can be a significant problem, so academic staff need to seriously redesign ways to ensure that knowledge has been acquired (Rēzeknes Tehnoloģiju akadēmija et al. 2020).

Today, during the Covid-19 pandemic, people can adapt to new circumstances in a shorter period, solve problem situations and find new forms of education that society would not have imagined before (Ruskule, 2020). With the advent of the pandemic, society has become more mobile and able to do more, so this should also be maintained further (Ruskule, 2020). Students' motivation and involvement are essential, especially when lectures are organised remotely; the interesting and visually well-adapted content to the digital studies is significant (Diaz Redondo, 2020). The adaptation of teaching methodology by introducing novel teaching methods is also essential (Diaz Redondo, 2020).

New teaching methods and the use of advanced practices, e.g., micro-learning, practice-oriented teaching, and gamified learning, are important (Diaz Redondo, 2020). Knowledge, tools, and materials are available to significantly improve the learning experience and engagement and enhance the distance learning experience (PwC Latvija, 2020; Zdanovskis, 2021). Video-based and interactive digital teaching tutorials (e.g., interactive presentations with multiple-choice-based video simulations) can be a good platform for practical hands-on procedures under supervision (Kratovska, 2021). In distance learning, the time spent on various activities of the course (i.e., the involvement in activities) is more important than the ability to absorb the course content quickly, so pedagogical strategies should be chosen that motivate to dedicate more time on course content and materials, even though more relatively easy tasks are given to the students who already have mastered the content (Lubkina et al., 2020).

Analysis of the current situation in Latvia shows that distance education and e-learning studies in HEIs will not disappear. HEIs have concluded that there are study programs in which the form of remote learning can become a basic form or an essential element of studies (Daugavpils universitāte, 2020a; Izglītības un zinātnes ministrija, 2021a; Vilks & Kipane, 2021). In addition, such study approach will continue to be developed even after the end of the Covid-19 pandemic, combining remote studies with face-to-face classes, and allowing students to choose the most convenient way of acquiring knowledge (Delfi, 2020; Latvijas Lauksaimniecības universitāte, 2020c; Rīgas Tehniskā universitāte, 2020a; Lentjušenkova, 2021). We cannot forget that people are social beings, and the desire to meet and communicate in person is significant to reduce psycho-emotional problems, so the hybrid format of the study process (distance studies combined with face-to-face lectures) could be a solution (Lentjušenkova, 2021). Theoretical lectures can be listened in a remote format, but seminars, practical classes, creative workshops, and others – in person (Rēzeknes Tehnoloģiju akadēmija et al. 2020; Lentjušenkova, 2021). Also, a significant number of academic staff, who used technologies before the Covid-19 pandemic, consider that those new teaching solutions created during the emergency should be maintained even when the epidemiological situation in the country will stabilise (Jansone-Ratinika et al., 2020; Lentjušenkova, 2021). If students have access to the necessary technologies and appropriate e-learning materials, then specific study topics or even entire study courses can be mastered through distance learning combined with in-person classes (Rēzeknes Tehnoloģiju akadēmija et al. 2020). It is recommended to organise the study process in study modules when specific topics should be acquired, and the following lectures start only after mastering the previous study module (Rēzeknes Tehnoloģiju akadēmija et al. 2020). At the same time, it should also be taken into account that there are several technical and creative study programs, which cannot be implemented without face-to-face classes (Rēzeknes Tehnoloģiju akadēmija et al. 2020; Lentjušenkova, 2021). Moreover, an essential aspect of distance learning is knowledge assessment to ensure that students have acquired specific competencies and the goals of the study process have been achieved. It is recommended that knowledge assessment is



planned until automated solutions are developed at a level that allows for objective evaluation of different types of knowledge and ensures academic integrity (Rēzeknes Tehnoloģiju akadēmija et al. 2020).

To promote the provision of high-quality education in terms of the development of distance education, it would be desirable to address the following challenges in perspective (Ministru kabinets 2021b; Vilks & Kipane, 2021):

- an assessment of the positive elements (achievements) and shortcomings of the study programs and study courses implemented during the pandemic in hybrid and remote format, inter alia by conducting electronic surveys in the digital environment;
- an identification of the potential for the future use of digital technologies, taking into account the rapid development of appropriate tools and equipment and their compatibility with high-quality legal education resources;
- an education and training of academic staff, promoting the acquisition of stable and high-quality digital skills and competencies;
- a provision of classes for students in the development of digital skills and competencies, taking into account the technological and informative resources and opportunities of university and faculty;
- more extensive use of informative and educational resources of foreign educational institutions (lectures, presentations, research materials, etc.);
- research using digital technologies to promote high-quality legal education;
- addressing students' ratings and assessments, opinions, and participation in various projects.

HEIs are aware that remote learning is not cheaper than traditional studies and preparation requires much more staff's work - the material presented on the computer screen requires different structuring and specific content processing, as well as academic staff needs continuous digital literacy and knowledge on new teaching methods (Daugavpils universitāte, 2020a). However, the development of distance education possibilities in HEIs will enable them to become even more accessible to students who work and try to combine studies with work and also to those who do not live in Latvia but want to acquire education here (Delfi, 2020; Pārresoru koordinācijas centrs, 2020).

To summarise all the previously mentioned information, it must be concluded that although the Covid-19 pandemic caused problems in many sectors in Latvia, including education, in general, Latvian HEIs were able successfully to switch to fully remote studies in a very short period after the notification of the emergency. Furthermore, HEIs provided advanced technological solutions for the provision of remote studies, offered training to academic staff on using newly introduced tools and teaching online in general, and deepened their knowledge on existing e-learning platforms, e.g., Moodle. Communication between all involved parties in the educational process also was more active to provide information regarding changes in the study process in each HEI.

Due to these changes, both students and academic staff acquired skills in using new tools (e.g., Zoom or MS Teams) and more actively used existing technologies and e-learning solutions, especially Moodle. Despite advantages and benefits, both sides (students and academic staff) encountered the same problems, e.g., technical ones with the internet and lack of modern devices that can run the tools used or there was a lack of devices for all family members due to remote studies and work as well as a quiet place for carrying out these activities. The important challenge was the adaptation of course materials and activities to remote studies, causing an overload of academic staff and affecting the quality of study courses. The question of academic integrity became increasingly relevant in remote studies. Students also felt a lack of time and were often unable to finish assigned tasks, final theses, or complete internships. Emotional, social, and psychological problems were present during the Covid-19 pandemic among both academic staff and students. Students lost motivation to study and even terminated their studies.

Despite the problems faced during the remote studies, most HEIs recognise this study format as a perspective one allowing to improve recognition of Latvian HEIs also internationally. Several HEIs already work on introducing distance studies or improving the quality of existing digital study programs and their content with the help of modern e-learning tools, video recording technologies, and appropriately trained academic and technical staff. However, still, a lot of effort should be put into providing practical skills and implementing laboratory works. Therefore, there will be study programs and/or courses that will require face-to-face lectures to master practical skills, e.g., medicine, chemistry, etc. Also, the introduction of novel teaching methods and advanced practices, particularly for distance studies, should be ensured since distance education and e-learning in HEIs will remain one of the study forms either fully or in a hybrid format (i.e., in combination with face-to-face lectures). Besides the willingness of HEIs to move towards digitalisation of the learning process, lots of work should also be done from the side of the government and ministries in Latvia to develop appropriate legislation and introduce accreditation processes for the provision of qualitative digital study programs.

4. TECHNOLOGICAL ASPECTS

The digitalisation of higher education is one of the priority tasks of Latvia for 2021-2027, which is anchored in several policy planning documents like Guidelines for the Development of Education 2021 - 2027 (Ministru kabinets, 2021a), National Development Plan 2021 - 2027 (Saiema, 2020), Guidelines for Digital Transformation 2021 - 2027 (Ministru kabinets, 2021b) and National Industrial Policy Guidelines 2021-2027 (Ministru kabinets, 2021c). According to (PwC Latvija, 2020), the digitalisation goals set in the mentioned planning documents envisage that Latvian HEIs, among others, should actively use digital solutions both in studies (digital study platforms and the integration of technologies into the study content), research and streamlining of internal processes and improve the skills of both academic staff and researchers in the use of digital technologies. Furthermore, the same research emphasises that Latvian HEIs have the necessary technical equipment like screens, cameras, sound equipment for remote lectures, and Wi-fi networks to satisfy the basic needs for technological support of digitalisation.

Latvia maintains a state education information system, which purpose is to enter, create, obtain, store and process data that are necessary to ensure the implementation of the functions of the state, municipal and educational institutions in the field of education (Ministru kabinets, 2019; Izglītības un zinātnes ministrija, 2020). It includes the Register of Educational Institutions, the Register of Institutions specified in the Education Law, the Register of Child Supervision Service Providers, the Register of Teachers, the Register of Educational Programs, the National Unified Database of Children of Compulsory School Age, the Register of Psychologists, the Register of Students and Graduates, the Register of Educational Documents Issued Abroad and the Register of Academic Staff (Ministru kabinets, 2019). The state education information system is available at the link: <https://www.viis.gov.lv/>. The content stored in the system and issues of content updating, archiving, anonymisation, deletion, and aspects of system maintenance are stipulated in the Cabinet of Ministers Regulation No. 276 (Ministru kabinets, 2019). It is known that Latvian HEIs are currently implementing the integration of their internal systems with the state education information system (PwC Latvija, 2020).

According to *the Research of the Current Report*, almost 87% (n=13) of Latvian HEIs have indicated that they have a unified internal information system, and only around 13% (n=2) of institutions do not have it. Many Latvian HEIs offer students and staff access to the unified internal information portal/system that can offer many services like a career section, personal profiles of employees and students, study data, a database of internal regulations, and many others, for example, luis.lu.lv (the University of Latvia), ortus.rtu.lv (Riga Technical University), my.rsu.lv (Rīga Stradiņš University), bais.ba.lv (BA School of Business and Finance), my.riseba.lv (RISEBA University of Applied Sciences), and batis.turiba.lv (Turība University). At the same time, many HEIs, among them Liepāja University, Daugavpils University, Rezekne Academy of Technologies, Riga Graduate School of Law, Stockholm School of Economics in



Rīga, Vidzeme University of Applied Sciences, Jāzeps Vītols Latvian Academy of Music, Art Academy of Latvia, Ventspils University of Applied Sciences, Latvia University of Life Sciences and Technologies, and Latvian Academy of Culture use the so-called Latvian Higher Education Institutions Information System (abbreviated LAIS), which includes part of the functionality of the Information System of the University of Latvia (abbreviated LUIS) adapted to the needs of a particular HEI (LAIS, n.d.).

There is evidence that the majority (if not all) of the HEIs in Latvia use an e-learning environment. According to *the Research of the Current Report*, all 15 Latvian HEIs that participated in the survey indicated that they use an e-learning environment. Different sources of information provide evidence that Moodle is a common choice. This information is publicly provided on the websites of Latvian HEIs (see, for example, Baltijas Starptautiskā Akadēmija, n.d.; Rīgas Stradiņa universitāte, n.d.; Biznesa augstskola "Turība", 2020; Ekonomikas un kultūras augstskola, 2021, 2020b; Banku augstskola, 2021a, 2021b, 2020a, 2020b; Vidzemes augstskola, 2020; Daugavpils universitāte, 2020a; Informācijas sistēmu menedžmenta augstskola, 2021; Rīgas Aeronavigācijas institūts, n.d.; Transport and telecommunication institute, 2020; Jāzeps Vītols Latvijas Mūzikas Akadēmija, 2020; Latvijas Jūras Akadēmija, n.d.; Latvijas Kristīgā Akadēmija, n.d.; Rēzeknes Tehnoloģiju akadēmija, n.d.). *The Research of "Datorzinību centrs" Ltd.* completed in 2019 revealed that all seven Latvian HEIs that participated in the survey used Moodle e-learning environment. According to *the Research of the Current Report*, 93% (n=14) of institutions replied that they use Moodle, while 7% (n=1) of Latvian HEIs indicated the use of Canvas. Summarising all of the available information sources, it can be concluded that at least 25 out of 27 Latvian HEIs use Moodle (14 out of 16 are public institutions, and 10 out of 11 are private institutions). It is known that Moodle (Modular Object-Oriented Dynamic Learning Environment) is free, open-source software (Moodle, n.d.).

According to *the Research of the Current Report*, 80% (n=12) of Latvian HEIs indicated that the internal staff of the institution maintains the e-learning environment, and 20% (n=3) of Latvian HEIs pointed out that they use outsourcing services for this purpose. The same research also identified several ways of adding new technical capabilities to the e-learning environment: 60% (n=9) of institutions replied that there is a specific person or department that centrally collects and processes all requests from teachers, 40% (n=6) indicated that the teachers themselves add new features to their e-learning courses, 33% (n=5) pointed out that the maintainers of the environment offer new functionality and teaching staff has the opportunity to choose what to use in their e-learning courses, and 26% (n=4) of Latvian HEIs also indicated that academic staff has the opportunity to request new functionality from the maintainers. The research also revealed that 73% (n=11) of institutions consider the current functionality of the e-learning environment enough for satisfying the academic needs, 20% (n=3) that it is not enough, and the representative of one institution has indicated that he does not have relevant data.



The Research of "Datorzinību centrs" Ltd. found that the use of the e-learning environment was at least partially regulated in HEIs, setting either general minimum requirements for the content to be added to each e-learning course or strict requirements in those HEIs that implement distance learning. According to *the Research of the Current Report*, 66% (n=10) of Latvian HEIs replied that the use of the e-learning environment is regulated, and 20% (n=3) - that it is not.

In 2019, *the Research of "Datorzinību centrs" Ltd.* revealed that the number of e-learning courses per year in the major Latvian public HEIs could be measured by several thousand (for example, 2000, 3000, 3500, or 8000) while in private institutions the number of e-learning courses was smaller and measured in several hundred, such as 250, 350, or 500, noting that they mainly counted e-learning courses that are specifically designed for distance learning. Since the mentioned research was carried out a year before the Covid-19 pandemic, it is safe to say that the number of e-courses has increased many times in the last two years. Furthermore, the same research disclosed that, basically, the academic staff offered e-learning courses to students in the institution's e-learning environment (89%, n=59). However, there were also rare exceptions when e-learning courses were offered both in the institution's environment and other environments (10%, n=7) or only in other environments (3%, n=2).

The technical staff representatives of all HEIs that participated in *the Research of "Datorzinību centrs" Ltd.* indicated that their teachers added labels, files and URLs to their e-learning courses, created quizzes and assignment activities, add videos, sent messages to e-learning course participants and entered assignment grades. Representatives of six out of the seven Latvian HEIs also indicated that teachers created forums, folders, and surveys. It was also found that the teachers from three institutions offered study content to each student in an adaptive way, and teachers from two institutions also focused on data analytics. Figure 3 demonstrates the use of features of e-learning environments according to the answers given by the teachers in the same research. The teachers most often indicated the attachment of different types of files. However, adding labels, sending messages to course participants, URLs, grading, assignment activity, folders and quizzes were also often used. Offering study content to students in an adaptive way, data analytics and adding videos were the least used options. The use of forums was indicated by 38% (n=26) of teachers, and surveys were used by 41% (n=28) of respondents.

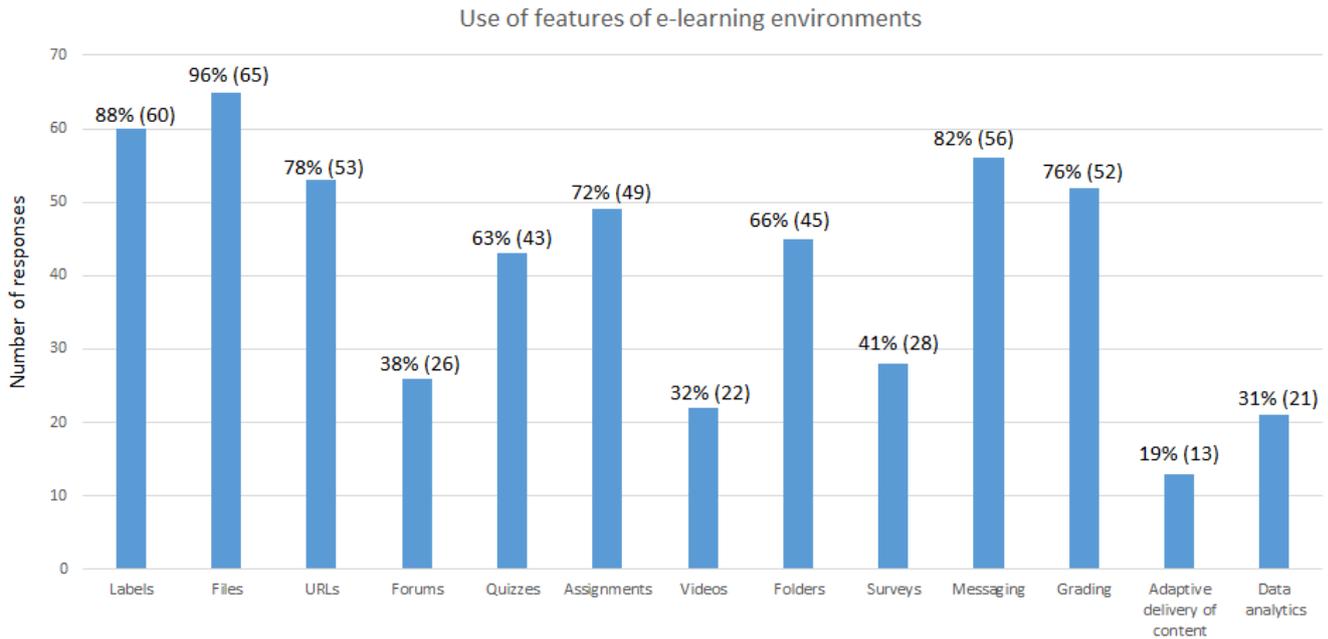


Fig.3. Use of e-learning environment features (teachers' answers in *the Research of "Datorzinību centrs" Ltd.*)

The Research of the Current Report asked a similar question about the use of e-learning environment features. As a result, it was revealed that Latvian HEIs take advantage of almost all of the main features offered by the e-learning environment (Figure 4). This could be due to the Covid-19 pandemic, during which many institutions had to switch to distance learning and look for solutions to make the study process more interactive and engaging and keep students informed. At the same time, both the use of data analytics and adaptive presentation of the content still were not widely used. The research made by PwC Latvija (2020) provides a recommendation to Latvian HEIs to start making full use of learning analytics to ensure the personalisation of studies, the understanding of which is currently relatively low among academic staff. Latvian HEIs do not currently use digital technologies to create fully customised courses, and they need to develop personalisation possibilities on e-learning platforms so that academic staff can use them more widely, as well as introduce or develop business intelligence and adaptive learning tools, which are also the basis for personalised learning (PwC Latvija, 2020).

Figure 4 demonstrates that video recordings are used quite intensively. The reason could be the Covid-19 pandemic that changed attitude towards the content needed to ensure an effective study process. Besides that, in the *Research of "Datorzinību centrs" Ltd.* completed in 2019, representatives of two HEIs indicated that in the coming years, the number of video recordings in e-learning courses might increase significantly, as appropriate actions for the preparation of video materials are being implemented in Latvian HEIs. For example, as reported by Rīga Stradiņš University since March 12, 2020, the university created more than

1000 video materials for students, including video recordings of simulations, lectures, medical manipulations, and others (Rīgas Stradiņa universitāte, 2020a). Furthermore, Riga Technical University is implementing an extensive digitalisation project of the study process, including the development of interactive teaching aids (Delfi, 2020). At the same time, the Latvia University of Life Sciences and Technologies emphasises that in 2020, the use of all activities and resources available in the e-learning environment increased, especially the use of such activities as "Assignment" (85% increase during the year), "Quiz" (90% increase during the year), and "Attendance" (225% increase per year) (Latvijas Lauksaimniecības universitāte, 2020a).

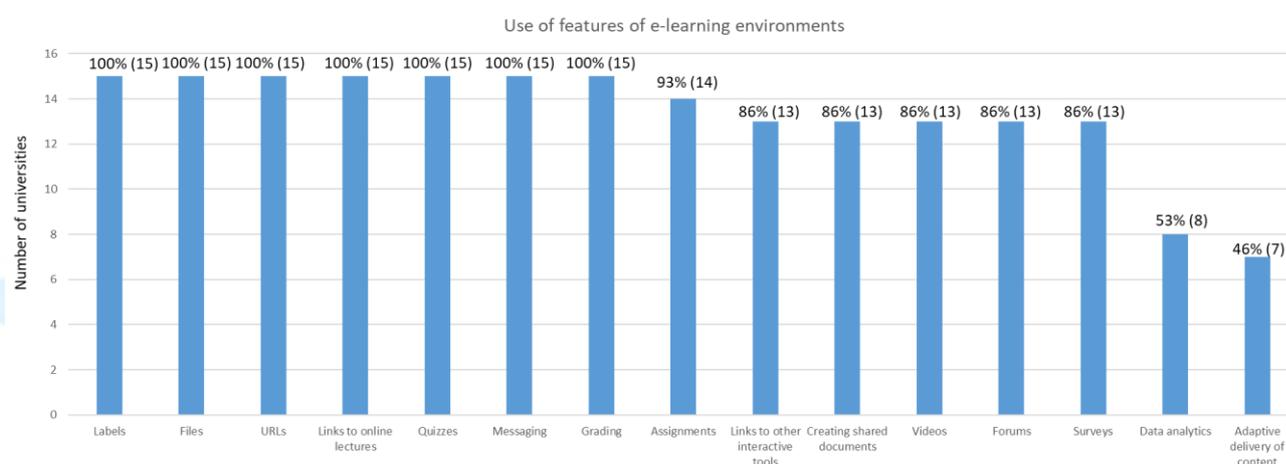


Fig.4. Use of e-learning environment features (technical staff answers in *the Research of the Current Report*)

According to *the Research of the Current Report*, 93% (n=14) of the Latvian HEIs replied that e-courses are created mainly by teaching staff with the support from technical staff/maintainer of the e-learning environment, 60% (n=9) of institutions indicated that the academic staff develops e-courses and 20% (n=3) of institutions have also selected the option "There is a separate staff (for example, methodologists) that creates and supplements e-learning courses at the request of the academic staff". Previously the representatives of the institutions' technical staff who participated in *the Research of "Datorzinību centrs" Ltd.* pointed out that the teachers mainly used software tools such as MS Word, MS PowerPoint and file converters in PDF format to create e-learning course content. In the same research, they mentioned the tools Panopto, iSpring, PhotoShop and Camtasia less often. On the other hand, the representatives of two Latvian HEIs considered that teachers could also use free tools available online but could not name specific tools. Moreover, the technical staff of all seven institutions that participated in the research indicated that the use of software tools is not regulated in Latvian HEIs. The teachers who participated in the same research mainly indicated the use of MS Word (75%, n=51), MS PowerPoint (76%, n=52), MS Excel (48%, n=33).

Some teachers mentioned general MS Office products (6%, n=4). Tools that allow obtaining PDF files were used less often (24%, n=16). Many tools were mentioned only once or twice, including Prezi, Jupyter Notebook, Google Form, Visual Studio, GIMP, Inkscape, Movavi Video Suite, Camtasia Studio, Audacity, Panopto, Slido, AutoCAD, Nearpod, Mentimeter, Quizizz, PhotoShop, MS Visio, Socrative, Go Formative, Matlab, or study course-specific software.

According to *the Research of the project "Life with COVID-19"*, most Latvian teachers currently develop their digital learning resources. A similar conclusion was made in *the Research of "Datorzinību centrs" Ltd.* in which the technical staff of all seven Latvian HEIs participated in the research, and the majority of teachers indicated that the institution's academic staff primarily developed the content of e-learning courses at their discretion, based on their experience and the needs of the study course. The course content is developed either by the teacher or other institutional staff like methodologists (in total 99%, n=67 respondents from the academic staff). *The Research of the project "Life with COVID-19"* indicated that open educational resources are used relatively less often. According to *the Research of the Current Report*, in 66% (n=10) of teachers in the HEIs create e-courses by themselves, all institutions (n=15) indicated that the teacher could also develop e-courses with the support from technical staff/system's maintainer if needed, 13% (n=2) pointed out that the institution has a separate staff that creates and supplements e-learning courses at the request of the academic staff (for example, methodologists).

According to *the Research of the Current Report*, all Latvian HEIs that participated in the research (n=15) indicated that students and academic staff use a combination of username and password to get access to the e-learning environment. In addition, two institutions have also pointed out that it is possible to use a mobile eSignature, and one institution - The Lightweight Directory Access Protocol.

This report previously emphasised that the Moodle e-learning environment is used by the majority of Latvian HEIs. This environment includes the possibility to import and export learning content that is SCORM compatible and thus to use the developed digital learning content in other environments/systems. SCORM is one of the most common standards for creating online learning content that can be shared across systems. However, in *the Research of "Datorzinību centrs" Ltd.*, the representative of the technical staff of only one HEI indicated that the academic staff creates the learning content following the SCORM standard using the iSpring software tool. A representative of another institution mentioned that its institution had had such an experience, but it is a rare case. Representatives of the technical staff indicated several reasons explaining why SCORM based learning content is not used: the lack of knowledge, the lack of a strong IT side of the academic staff, complicated development of such content for the academic staff, and the institution itself does not need to use such content. One representative mentioned that to ensure the use of the SCORM standard, the HEI should provide teachers with additional training. As an additional reason, it was also mentioned that there is no cooperation between HEIs to exchange study courses, or there was no demand for the purchase of study courses at a particular HEI. In the same research,

the majority of the teachers have answered that they are not aware that there is a SCORM standard for creating and sharing learning content in e-learning environments. Only 15% (n=10) of teachers had such knowledge, but only one had experience developing SCORM-compliant content. *The Research of the project "Life with COVID-19"* indicated that it was possible to reveal the tendency that a large proportion of teachers in Latvian HEIs in parallel develop digital learning resources that are similar in terms of content and could be shared.

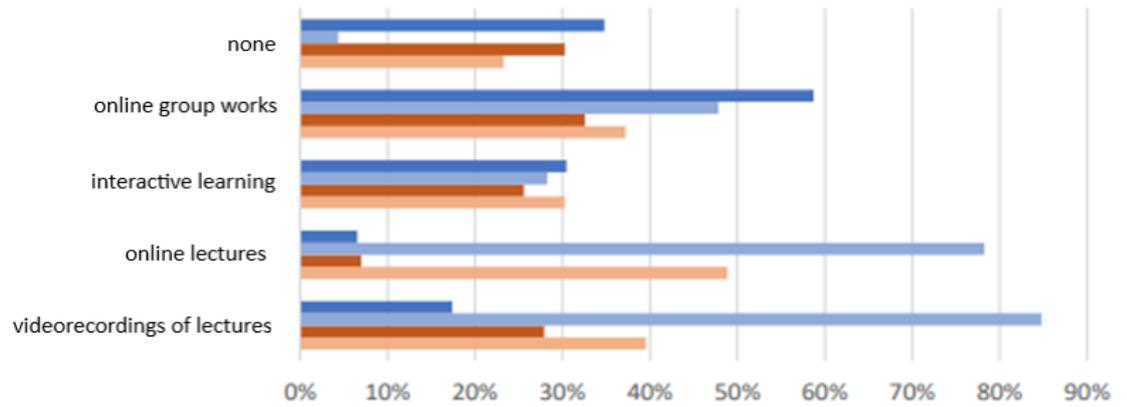
The use of digital tools for the support of the study process has increased during the Covid-19 pandemic. According to the research findings of Avanesova (2020), who surveyed 89 Latvian students (Figure 5):

- at least one-third of the ICT and non-ICT students did not use any digital tools in the study process before the emergency caused by the Covid-19 pandemic;
- almost an equal number of students used interactive learning aids during lectures;
- a third of non-ICT students and at least half of ICT students completed online group work with course members before and during the emergency;
- during the emergency, the number of online lectures increased sharply in both groups (non-ICT and ICT students), and students were also provided with a larger volume of video recordings of lectures.

In the same research of Avanesova (2020), it was revealed that the use of remote communication tools during the emergency in general increased, comparing how many different tools were used by each student on average (Figure 6):

- ICT students used 3.2 different tools for communication before the emergency and 3.9 during it.
- Non-ICT students used tools 2.5 and 2.9, respectively.

The use of MS Teams increased many times, especially among ICT students. There was also an increase in Zoom use, and the popularity of the Slack tool increased among non-ICT students during the emergency.



	videorecordings of lectures	online lectures	interactive learning	online group works	none
ICT Before	17%	7%	30%	59%	35%
ICT ES	85%	78%	28%	48%	4%
Others Before	28%	7%	26%	33%	30%
Others ES	40%	49%	30%	37%	23%

■ ICT-field students before the emergency situation
 ■ ICT-field students during the emergency situation
 ■ Students of other fields before the emergency situation
 ■ Students of other fields during the emergency situation

Fig. 5. Using of digital support tools in the study process before and during the emergency caused by the Covid-19 pandemic (adopted from (Avanesova, 2020))

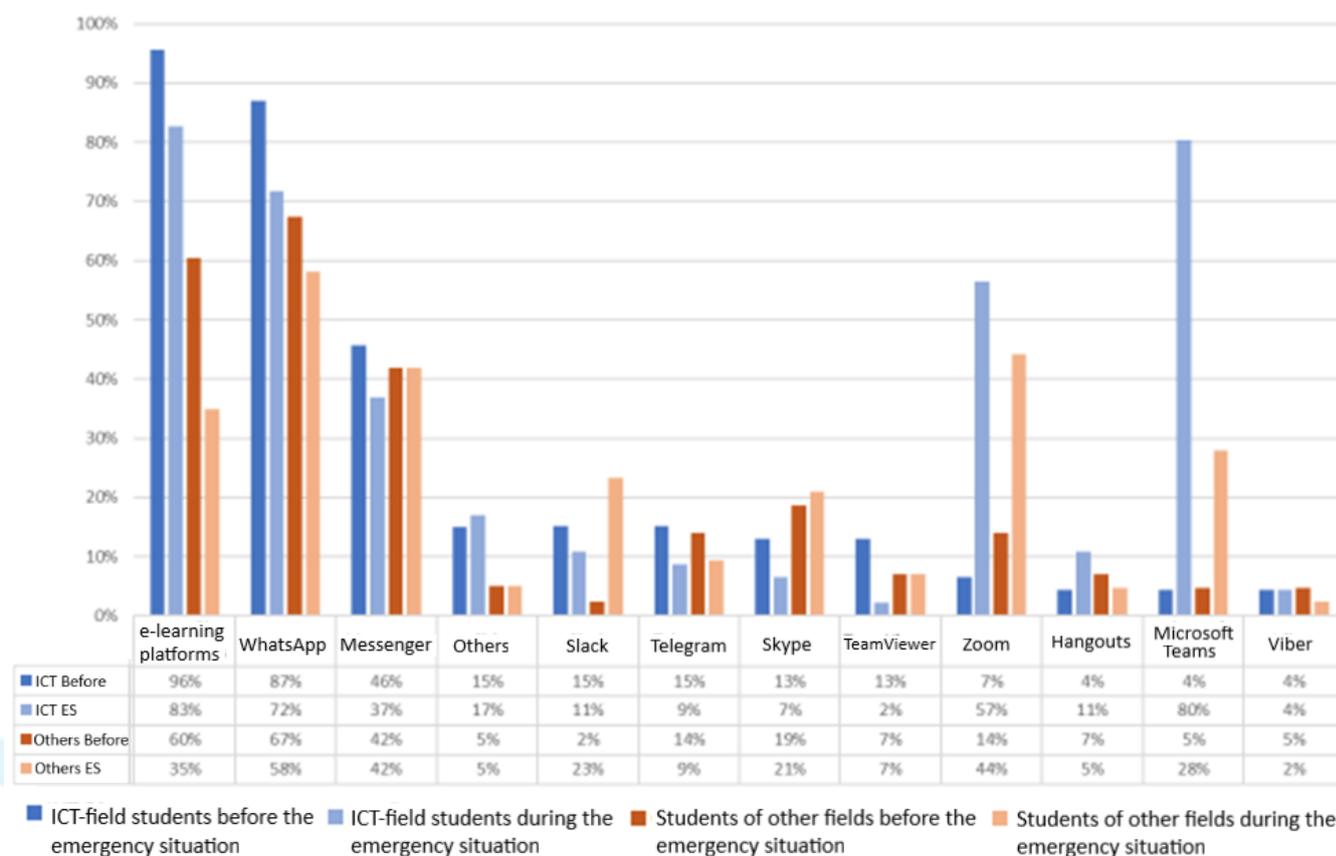


Fig. 6. Use of distance communication tools in the study process before and during the emergency caused by the Covid-19 pandemic (adopted from (Avanesova, 2020))

The websites of HEIs allowed getting more information about digital tools used by staff during the pandemic time:

- Webex (Biznesa augstskola "Turība", 2020; Latvijas Sporta Pedagoģijas Akadēmija, 2020; Vidzemes augstskola, 2020);
- Zoom (Banku augstskola, 2020a; Daugavpils universitāte, 2020a; Rīgas Stradiņa universitāte, 2020a; Stockholm School of Economic, 2020a, 2020b; Banku augstskola, 2021a, 2021b, 2020b; Latvijas Sporta Pedagoģijas Akadēmija, 2020);
- MS Teams (Vidzemes augstskola, 2020; Latvijas Sporta Pedagoģijas Akadēmija, 2020; Rēzeknes tehnoloģiju Akadēmija, 2020; Latvijas Universitāte, 2021b);
- MS Office 365 (Vidzemes augstskola, 2020; Banku augstskola, 2021a, 2021b, 2020b);
- Skype (Stockholm School of Economic, 2020a, 2020b; Latvijas Sporta Pedagoģijas Akadēmija, 2020; Rēzeknes tehnoloģiju Akadēmija, 2020);
- WhatsApp (Banku augstskola, 2020a; Latvijas Sporta Pedagoģijas Akadēmija, 2020; Rēzeknes tehnoloģiju Akadēmija, 2020);
- Some specific tools like Google Meet (Stockholm School of Economic, 2020a, 2020b), Respondus Monitor (Rīgas Stradiņa universitāte, 2020a, 2021), Respondus LockDown Browser (Rīgas Stradiņa universitāte, 2021a), Big Blue Button (Ekonomikas un kultūras augstskola, 2021; Latvijas Lauksaimniecības universitāte, 2020a), Vimeo (Latvijas Sporta

Pedagoģijas Akadēmija, 2020), Discord (Latvijas Sporta Pedagoģijas Akadēmija, 2020), AnyDesk (Vidzemes augstskola, 2020).

The Research of the project "Life with COVID-19" has identified many technologies and digital tools used by academic staff of Latvian HEIs in a combined and distance study process. They are presented in Table 4.

At the same time, the Latvian HEIs are also introducing new digital tools, laboratories and technological aids developed for a specific purpose of a particular institution:

- In March of 2019, EKA University of Applied Sciences opened a digLAB laboratory for game development and testing in the study programme "Computer Game Design and Graphics" to support students' practical activities. The laboratory has two MAC and two Windows computers, seven Android and iOS smart devices, Oculus Rift equipment for virtual reality projects, widescreen TV, and an audio system (Ekonomikas un kultūras augstskola, 2019).
- At the end of 2020, the EKA University of Applied Sciences student council developed the DISCORD EKA platform to support communication among all university students (Ekonomikas un kultūras augstskola, 2020a).
- In June of 2021, Ventspils University of Applied Sciences opened a video studio to create distance learning video content and digitise study programs. It includes a whiteboard, two camcorders, one SLR, professional-grade microphones, LED lights, and blackout curtains (Ventspils Augstskola, 2021a, 2021b)
- Ventspils University of Applied Sciences is developing a mobile application VeApp for lecture management, content management and communication, which will inform and remind students about various university events, including the lecture schedule. NFC and QR code technologies will provide an opportunity to record student lectures, classes, tests, and event attendance (Ventspils Augstskola, 2021c).
- The Faculty of Electrical and Environmental Engineering of Riga Technical University created several digital stands for laboratory work which allow students remotely to make measurements on real equipment and analyse the obtained data. The digital laboratory stands are equipped with sensors, command executives, webcams, and the Internet, as well as comparison and verification of results is automated (Rīgas Tehniskā universitāte, 2020b).



Category	Title
Video conferencing, online lesson tools	OWL, Zoom, MS Teams, Big Blue Button, Skype, Google Meeting, WebEx, BlueJeans, Miro, Nearpod, PlayPosit
Video and audio content streaming tools	YouTube, Panopto, MS Teams, Twitch, Podcast, Zoom
Audience feedback tools	Sli.do, Mentimeter
Tools for interactive group work	Miro, Google Jamboard, Mural, Padlet, OneNote
Survey tools	Survey Monkey, Google Forms
Video and audio production and processing tools	Panopto, Doodly, Loom, Actionrecorder, OBS Studio, H5P, Shotcut, CyberLinkPowerDirector, iMovie, Final Cut Pro, Squigl, Reaper, iRealPro,
Screen recording and video processing tools	Camtasia, ScreenCastOMatic, ScreenCastify, Adobe Creative Cloud
Infographics and other material creation tools	Adobe Spark, Infogram, Canva, DesignCup, Visme, Kartograph
Multimedia resource storage	Easel, Freepik, iStock, Snappa, Pexels, Unsplash, Pixabay, Venngage, PiktoChart, Microsoft Sway, Apple Keynote, Indesign, Prezi
Learning management systems	Moodle, Sakai, Blackboard, Canvas, Edmodo
Planning tools, calendars	Doodle, MS Teams Planner vai Tasks, Outlook
Virtual laboratories	LabXChange, PraxiLabs
Interactive question tools	Quizizz, Kahoot, Quizlet, Loquiz
Image processing tools	Inkscape, Photoshop, Adobe Creative Cloud, Gimp
Repositories of study materials	VirtualFieldTrips, Calibre, AMBOSS
Content originality checking tools	PlagScan, IThenticate, Turnitin

Online test security solutions	Respondus Monitor, ProctorU, Examus
Data analysis and visualisation tools	MatLab, Power BI, MS Excel, Tableau, JASP, RStudio
Mathematical calculations and their visualisation	Octave, Anaconda, Jupyter Notes, Symbolab

Table 4.

Technologies used by the academic staff in providing a combined and distance study process
 (adopted from *The Research of the project "Life with COVID-19"*)

There is evidence that the digital skills of the academic staff of Latvian HEIs have increased significantly during the Covid-19 pandemic. *The Research of the Student Union* concluded that teachers and students have already been/are trained and informed about the use of digital tools and platforms in the study process. According to *the Research of the project "Life with COVID-19"*, in general, the level of pedagogical digital competence of academic staff after the experience gained in the implementation of distance learning during COVID-19 has increased significantly. However, the technical support for implementing the technology-enriched study process and the level of pedagogical digital competence of academic staff varies between institutions and study program thematic fields depending on previous experience, course specifics, teachers' age, and other factors. Due to the replacement of traditional teaching and communication methods with digital tools, the skill level required from academics to keep up with the changes and demand for technology use is higher than ever before (Valtiņš et al., 2020). As a result, in the wake of the pandemic, the Latvian HEIs had invested and continue to invest resources in the training of academic staff, for example:

- In 2020, the University of Latvia offered its academic staff two study programs - "Development of Online Studies and Digitalization of Study Content" and "Innovations for Improving the Quality of the Study Process" (Latvijas universitāte, 2020a). In addition, nine more distance programs were introduced at the University of Latvia to develop technologically pedagogical skills for providing studies in the digital environment (Latvijas universitāte, 2021a).
- The EKA University of Applied Sciences trained its academic staff to work with the e-learning system on holidays before the first day when it was necessary to start studies remotely (Ekonomikas un kultūras augstskola, 2020c).
- For several consecutive years, Daugavpils University organised courses for academic staff regarding the development of study courses in an e-learning environment MOODLE. Such a practice was also continued during the COVID-19 pandemic (Daugavpils universitāte, 2018; 2019; 2020b).
- At the beginning of 2021, the BA School of Business and Finance implemented intensive training on the preparation and conducting of hybrid lectures, in which academic staff



extended their knowledge on such tools as Zoom, Miro, and Mentimeter, as well as on the development and processing of video content and principles of implementing distance learning (Banku augstskola, 2021c). In addition, at the beginning of the Covid-19 pandemic, academic staff already received training on using Zoom and learned new teaching methods suitable for remote teaching (Banku augstskola, 2020a).

- The University of Latvia offered a workshop "Use of Creative Commons license for research and education" explaining the meaning of the Creative Commons license and its practical use (Latvijas universitāte, 2020b).
- In the autumn of 2021, a new training program, "Development of Technological Pedagogical Skills for Ensuring Studies in the Digital Environment", will be offered to the academic staff of the University of Latvia. It includes topics such as "Types of Distance Learning", "Practical Recommendations for Working in the Digital Environment", "Pedagogical Approaches and Their Implementation in the Digital Environment", "General Interactive Solutions for Lesson Development", "Domain-Specific Interactive Solutions for Lesson Development", "Distance learning planning", "Learning e-environment MOODLE", "Mixed learning", and "Learning analytics" (Latvijas universitāte, 2021).

At the same time, the need to increase the level of digital competence of the academic staff is still relevant. To achieve the goals of education and science policy related to digitalisation, the Latvian HEIs need to prepare digitally skilled, technology-motivated academic staff who can use the digital solutions, platforms, and software available to the institutions, as well as know the technologies used in their professional field (PwC Latvija, 2020). In *the Research of the Student Union*, students pointed to the lack of teachers' digital skills in working with online learning platforms. Four Latvian HEIs that participated in *the Research of the Current Report* also mentioned the necessity to develop the general digital or e-skills/competencies of the academic staff. In contrast, one institution emphasised the necessity to develop skills to use computers by senior teachers. Another research claims that there could be a lack of digital skills for a particular part of the academic staff in general and specific tools, as well as challenges for using digital solutions in some specific study areas (Valtiņš et al., 2020). According to the Guidelines for the Digital Transformation for 2021-2027 (Ministru kabinets, 2021b), in the next seven years, it is necessary:

- To improve the pedagogically digital competence, digital knowledge and skills of the academic staff of Latvian higher education for excellence, including the preparation of the core of Latvian digitalisation teachers excellent in the development of world-class content, pedagogy and teaching technologies.
- To develop high-level digital skills as transversal skills within the framework of vocational education and higher education content, including cybersecurity, big data, mastering digital industry technologies, public administration services, etc.

According to (PwC Latvia, 2020), not only digital skills are essential, but also the strengthening of pedagogical skills to promote student involvement and effective development and implementation of new forms of digital education (for example, blended studies).

One of the fields where the academic staff has a critical missing of skills is implementing practical activities in the study process using digital tools to develop students' skills in a specific area. The distance learning process significantly complicates the implementation of practical classes, such as physiotherapy and exact study program courses, in which it is crucial to acquire knowledge directly in practice (Ruskule, 2020). Other research also indicates the problem with mathematics, physics, chemistry, and engineering courses, where practical activities are essential (Dzenīte et al., 2021). In *the Research of the Student Union*, 46% of students indicated that the lack of practical classes did not allow them to master the subject. Even though there were experiment videos and the teachers used an interactive whiteboard, students who considered distance learning as a disadvantage mentioned the inability to participate in laboratory works (Kazuša, 2021). *The Research of the project "Life with COVID-19"* revealed that the practical activities, such as medical manipulations, archaeological excavations, experiments, robotics activities, typically were postponed to the time when the institution will be able to return to on-site activities because during on-site study process the laboratories, simulation rooms, mugs and mannequins were typically used.

Virtual and augmented reality applications, virtual and remote laboratories are solutions that can help HEIs to implement practical activities at a distance. According to a survey of academic staff and students conducted in the research of PwC Latvija (2020), virtual laboratories are rarely used in studies (used by less than 20% of academic staff) because academic staff lack knowledge of these technologies and the Latvian HEIs do not have access to such technologies or they are only under development. In Latvia, basic technologies are primarily used in the study process (for example, collaborative document creation). PwC Latvija (2020) believes that Latvian HEIs should increase the use of innovative technologies in the study process, including high-performance computing, artificial intelligence, virtual worlds, virtual laboratories, virtual and augmented reality technologies. It is recommended to use such technology in the study process and integrate it into the study content by appropriately training the academic staff and the HEIs by purchasing the appropriate technologies (PwC Latvija, 2020).

The teachers need skills relevant to creating teaching materials and applying teaching methods in a digital environment. In *the Research of the Student Union*, 30% of students indicated that electronic materials were not of sufficient quality for use for at least one study course; one in four students noted that electronic materials were not available for at least one study course at all. According to (Daugavpils universitāte, 2020a), distance learning requires constant improvement of digital literacy and acquisition of new distance learning methods because the content presented on a computer screen requires different content creation and processing approaches. The Vice-Rector for Development of Riga Technical University has indicated that the future demand for distance learning already requires creating content suitable for distance learning, which ensures interactivity and requires constant student attention (Delfi, 2020). In *the Research of the project "Life with COVID-19"*,

the teachers indicated that they still lack specific high-level technical skills in design and video editing, which affects study materials' content and visual appearance. In *the Research of the Student Union*, students often pointed out that the teachers use the same monotonous teaching methods (like making notes from different sources or self-study from given notes). As a result, the research recommended improving teachers' teaching methods by diversifying and combining them, such as supplementing online lectures with online questioning tools (Menti.com, Sli.do, etc.) and online tests with game elements (for example, Kahoot.it). *The Research of the project "Life with COVID-19"* emphasised that when preparing digital learning materials, the teachers need to provide various types of activities in the study process, such as reading, documenting, exploring multimedia materials, consultations, audio/video lectures, taking notes in digital tools, online discussions, working with simulations or applications, completing tasks and tests, etc. to retain the learner's attention better.

A lack of skills and knowledge is also related to fields such as ensuring academic integrity in the digital environment (*the Research of the project "Life with COVID-19"*, Dzenīte et al., 2021), implementing knowledge assessment in an automated way and aspects related to correct students' data processing (*the Research of the project "Life with COVID-19"*). According to (PwC Latvija, 2020), as the use of learning technologies increases, it is vital to improve the skills of the academic staff to use technologies in the study process, with particular emphasis on the following common or "horizontal" themes:

1. learning technology, including audio-visual material, digital content preparation, test digitalisation;
2. use of open data in the study process and research, use of virtual laboratories, use of shared solutions;
3. digitalised gamification and obtaining of other feedback in study courses;
4. use of virtual and augmented reality in study courses;
5. data analytics, use of artificial intelligence in study courses;
6. use of learning analytics;
7. personal data protection requirements for higher education;
8. digital ethics in higher education;
9. cooperation with students in online studies to improve the efficiency of the study process, students' engagement techniques, moderation and group management skills in distance learning.

According to the Guidelines for the Development of Education for 2021-2027 (Ministru kabinets, 2021a), Latvia is planning to develop a new approach and methodology in certain study areas, promoting the sharing of resources, active use and integration of technologies (technology-enhanced learning) and digital solutions in the study process, among other things developing simulation-based education. Furthermore, the Guidelines for the Digital Transformation for 2021–2027 (Ministru kabinets, 2021b) emphasise that necessary action requires the creation of a simulated learning (education) environment primarily in those sectors where simulations reduce professional risks, including health, medicine, law, security

and home affairs and introduction of artificial intelligence solutions to support and assess the acquisition of skills, for example, in independent work or distance learning. This will definitely require developing teachers' competencies in complex areas like interactive, simulation-based and intelligent tools.

The Research of the Current Report has identified some expertise and technical needs for the technical staff of Latvian HEIs, although each suggestion was given only by one of the Latvian HEIs that participated in the research:

- to obtain a training certificate for the development and maintenance of e-courses on the specific e-learning platform. In the case of Moodle, it is the MCCC (Moodle Course Creator Certificate);
- to have skills in creating video lectures;
- to have skills in video filming techniques to assist in video development;
- to have skills of working in the e-learning environment and implementing the specific elements of e-courses.

Summarising the information given in this section, it is worth mentioning that:

- The Latvian HEIs have the necessary technical equipment to digitalise the study process and offer study programs at a distance.
- The Ministry of Education and Science of Latvia maintains the state education information system that stores and processes education-related data needed for the effective functioning of the state, municipal, and education institutions. The Latvian HEIs are currently integrating their internal information systems with the state education system.
- Many Latvian HEIs have unified internal information systems, although some outsource such a system.
- The majority of HEIs in Latvia have already introduced e-learning environments. However, the most common choice is the free, open-source software Moodle. The Latvian HEIs consider that the current functionality of the e-learning environments satisfies their academic needs.
- The e-learning environment is either maintained by the internal staff of a particular Latvian HEI or outsourced.
- The use of the e-learning environment is typically regulated in HEIs in the simplest case by setting general minimum requirements for the content to be added to each e-learning course.
- There is evidence that the number of e-learning courses developed in the e-learning environments of the Latvian HEIs grows each year. But, of course, the Covid-19 pandemic increased their number many times.
- The Latvian HEIs take advantage of almost all of the main features offered by the e-learning environment, like adding files, labels, URLs, folders, quizzes, forums, surveys and others. At the same time, the use of learning analytics and personalised studies based on adaptive learning tools is quite rare and should be increased in the future by training academic staff regarding the mentioned features.

- The number of video recordings available in the e-courses has been rising in recent years due to the Covid-19 pandemic and the actions purposefully implemented by the Latvian HEIs.
- The academic staff mainly creates the e-courses in the e-learning environments of the Latvian HEIs with support from the technical staff; however, sometimes, they can be developed by a targeted staff. In preparing e-courses, very simple tools like MS Office products are most often used for content creation. There is evidence that open educational resources and other standard-compatible content (for example, SCORM) are used rarely, and many digital learning resources created by the academic staff of Latvian HEIs can be similar in terms of content.
- The most common mechanism used to grant access to the e-learning environments of the Latvian HEIs is the combination of the username and password; however, few institutions use other solutions like eSignature or the Lightweight Directory Access Protocol.
- The use of digital tools of different sorts used to support the study process has increased during the Covid-19 pandemic, and there is evidence that the academic staff of Latvian HEIs uses a broad spectrum of video conferencing and online lessons tools, video and audio production and processing tools, multimedia resource storages, as well as tools of other categories like audience feedback tools, survey tools, infographics, and many others. At the same time, the Latvian HEIs are also introducing new digital tools intended for a specific purpose of a particular institution.
- The digital skills of the academic staff of the Latvian HEIs have increased significantly during the Covid-19 pandemic because the institutions had invested and continued to invest resources in the training of the academic staff through workshops and purposefully designed study programs covering topics relevant to the digitalisation of the study process and teaching at a distance. However, the need to develop digital competence and pedagogical competence of the academic staff still persists.
- In the context of this project, it can be concluded that teachers need to improve skills in the following areas relevant to digital education:
 - creation of digital learning resources (audio-visual material, interoperable standard-compliant, etc.);
 - teaching methods in a digital environment;
 - open educational resources and learning content sharing;
 - use of advanced learning technologies like virtual and augmented reality applications, virtual and remote laboratories, gamification solutions, simulation-based and intelligent tools;
 - digital academic integrity and ethics;
 - automated knowledge assessment;
 - personal data processing and protection requirements;
 - data and learning analytics;
 - personalised learning based on adaptive learning tools.



5. THE DIGITAL TRANSFORMATION OF LEARNING PROCESSES: NEEDS AND REQUIREMENTS

According to (PwC Latvija, 2020), students currently have better digital skills and more knowledge about the use of different solutions in the study process than the academic staff. This is the most critical challenge for successful digitalisation: HEIs need to change this proportion radically (PwC Latvija, 2020). The strategic foresight process highlights the point that in a digital, complex, and fast-changing world, there is an increasing need not only for "digital skills" such as data visualisation or use of artificial intelligence but also skills like creativity, problem-solving, adaptability, and critical thinking (OECD, 2021). Therefore, the second issue is related to the ability of HEI academic staff to teach students the skills mentioned above since they are crucial to the success of distance learning (PwC Latvija, 2020). In general, the Ministry of Education and Science of Latvia should be the institution that provides training for educators in such areas as distance learning methods, technological solutions for remote pedagogical work, time planning, stress management, and a safe and healthy work environment for remote studies (Vanadziņš et al., 2021b).

Analysis of existing studies with the participation of academic staff from HEIs of the Latvian regions (Mietule et al., 2021; Vanadziņš et al., 2021b) showed that the overall digital teaching competence of academic staff in Latvia should be developed. On the one hand, the HEIs academic staff has obtained an optimal level of competencies in media, equipment, and media literacy. On the other hand, academic staff requires specific professional knowledge in courses, didactics, instructional design, learning management systems, and e-moderation (Mietule et al., 2021). With the development of distance learning technologies and pedagogical approaches, educational institutions and educators must regularly learn and evaluate which approaches are important and should be acquired, as well as regularly update the readiness for potential changes in future learning models, including systematic implementation of the necessary technological support (Lubkina et al., 2020).

Results of the *Research of the project "Life with COVID-19"* showed that during the Covid-19 pandemic, academic staff lacked support on how to organise and manage remote learning, it was difficult to separate work and private life since preparations for the remote studies were done outside working hours and even on holidays, and new knowledge was needed on how to implement remote studies (Vanadziņš et al., 2021b). Support to academic staff can be provided through different solutions, e.g., the creation of digital education support centres, the introduction of a position for a digital education methodologist who provides online and face-to-face support and facilitates the acquisition of a specific tool/solution by providing individual consultations for the implementation of ideas (Rēzeknes Tehnoloģiju akadēmija et al. 2020). In addition, educational video platforms on various technological solutions could be developed in the Latvian language to exchange experience or acquire new skills, tools, etc. (Rēzeknes Tehnoloģiju akadēmija et al. 2020). However, according to the results acquired during the *Research of the current report*, only in a few HEIs exists a separate structural unit

or personnel which creates and supplements e-learning courses at the request of the teaching staff (for example, methodologists). In most cases, the academic staff created the digital content themselves; however, many representatives of academic staff used the provided support from the technical staff or the administrators of the e-learning platforms meaning that they lacked knowledge in using provided technologies.

The majority of academic staff whose education/occupation is not related to the IT field rated their content creation and digital safety competencies as low and preferred to improve them in the form of e-studies or full-time courses (Mietule et al., 2021). Among the IT-related educators, the lowest rating received their digital competence for security, and this group of the academic staff recognised the type of self-studies as one of the most engaging ones to improve their digital skills. They were not interested in developing digital competencies in the form of full-time courses and e-studies compared to non-IT people (Mietule et al., 2021).

Based on the analysis of results acquired in the *Research of the project "Life with COVID-19"* (Rubene et al., 2020; Łubkina et al., 2020) and the *Research of the current report*, the following competencies should be developed for the academic staff of HEIs to successfully design, maintain and manage their e-learning courses:

- the level of digital skills and computer literacy in general, particularly for the academic staff of the older generation;
- knowledge on methods of creating e-content (e.g., interactive videos or presentations) that enables students to participate either individually in the cognitively challenging learning process for the acquisition of theory and/or in group learning activities for solving tasks of higher complexity, as well as knowledge on methods that promote self-directed learning skills for students;
- knowledge on innovative solutions for enabling students to acquire practical skills, as well as to reflect on the experience and carry out experiments to master the study content and develop creative solutions fully;
- communication skills with students and providing feedback on the achieved learning outcomes and the learning process in general, using different tools, texting, rubrics, voice recording, etc. Skills to obtain and transfer information effectively at a distance will be increasingly important in the future, both in the daily labour market and in various emergencies, as well as in the context of globalisation and the inclusion of different groups in society;
- for more skilled academic staff who already successfully design, maintain and manage their e-learning courses, it would be helpful to acquire knowledge about more topical technologies and tools that can be used in addition to Moodle to facilitate the learning process;
- skills on assessing and obtaining evidence for the quality of the learning process.

It must be remembered that the preparation of digital materials is very time-consuming, especially if it is planned to record them or combine the lecture with various interactive tools (Łubkina et al., 2020). Moreover, it also requires video and audio editing experience and the ability to use all digital tools (Łubkina et al., 2020). Therefore, the development of pedagogical

digital competence of academic staff requires long-term support - not only by showing the possibilities of technologies and technological solutions and the basic principles of developing digital teaching aids but also by helping to implement pedagogical digital competence in everyday work (Rēzeknes Tehnoloģiju akadēmija et al. 2020).

In the *Research of the current report*, the representatives of Latvian HEIs were asked about competencies that should be improved by the technical staff so that they were able to successfully help in the digital content creation, maintain and manage their e-learning courses. According to the survey results, there are HEI representatives who are sure that there is no lack of specific competencies for their technical staff, but most of the representatives still mentioned competencies and skills that should be improved. The essential skills and knowledge are related to using existing information systems and e-learning platforms (e.g., Moodle) of HEIs.

In the *Research of the project "Life with COVID-19"*, academic staff pointed out that the technical staff needs to acquire a set of basic knowledge of pedagogy, which could help to better understand the needs of academic staff and the specifics of the study process. Teachers considered that a specialist, who possesses pedagogical and technical competence, could be the most appropriate for the needs of educators in HEIs; the skills to cooperate in a team are important as well (Jansone-Ratinika et al., 2020). According to the *Research of the current report*, communication skills are also important for technical staff to clearly and understandably present information to academic staff and other people.

Based on the *Research of the current report*, the range of required digital skills and competencies for the HEIs administrative staff is relatively narrow since most representatives of HEIs are sure that there is no lack of digital competencies. Those few required digital skills are following:

- general e-skills, good digital literacy to be able to perceive and understand the required information;
- understanding of technical possibilities and basic knowledge in the specifics of the industry/field;
- responsiveness;
- skills in using Moodle system, e.g., how to work in the system and how to implement specific actions;
- more information is needed for them on e-learning opportunities.

The digital transformation of the learning process requires both basic educational and multimedia skills and competencies (digital literacy; computing education; good knowledge and understanding of multimedia technologies and data treatment) and advanced digital skills, which could produce better digital specialists and also ensure effective digital learning programs (OECD, 2021). The development of digital inclusion policies and further improvements of distance learning after the COVID-19 pandemic are crucial for closing the digital divide (OECD, 2021). Developing a comprehensive national digital strategy with an

adequate level of resources can help Latvia further increase the usage of digital technologies by individuals, companies, government, and educational institutions (OECD, 2021). In Latvia, various activities for continuing ICT education and training are organised every year.

Since 2010, the Latvian government has aimed to raise awareness of the possibilities of ICTs through participation in European Digital week, which aims to inform the public of the benefits of improving their digital skills and the possibilities of training. In 2019, Digital Week was organised by the Latvian Information and Communication Technology Association and the Ministry of Environmental Protection and Regional Development, with over 500 events in 74 towns and cities in Latvia (OECD, 2021). Several programs also encourage women to pursue careers in ICT. In 2016, Riga TechGirls community was founded to encourage girls and women to develop digital skills, increase the visibility of women in the ICT sector, and establish a professional network of women in the ICT sector (OECD, 2021). For the second year in a row, Riga TechGirls has been organising the educational program "Introductory Technologies"² which allows learning about many up-to-date different technology options and IT help in any industry field. Google.org supports the program.

To encourage an interest in ICTs among students and persuade them to pursue a career in ICT, Riga Technical University and companies Accenture Latvia and MAK IT have formed the Start(it) Foundation. The foundation collaborates with Latvian National Centre for Education to offer teaching aids and learning materials through the online portal Start(IT)³ as well as training for teachers. According to the statistics, over 400 teachers use these materials in more than 300 schools, with over 15 000 people accessing the portal (OECD, 2021).

In the technological transformation of education, the most critical aspect is effective and timely available support for educators; therefore, the focus should be on involving digitally experienced people who can help the academic staff. According to the results of the *Research of the project "Life with COVID-19"*, an effective digital transformation of education requires (Lubkina et al., 2020):

- capable and educated leaders of educational transformation at both institutional and national levels;
- an additional time (both for learners and teachers) for the acquisition of newly introduced educational technologies both local and remote (for example, virtual reality, etc.) since the acquisition of new technologies together with new learning content affects the perception of learning content negatively;
- professional, accessible, and timely support for educators in solving problems of educational technologies and methodologies, as well as psychological issues and receiving recommendations. At the national level, it is essential to put in place a centralised support mechanism for educators, available online, where experts can answer urgent questions, educators can hear what problems others are solving and

² Riga TechGirls "Iepazīsti tehnoloģijas" (in Latvian) - <https://iepazistitehnologijas.lv/>

³ IT Izglītības fonds - start(it) - <https://startit.lv/>



what ideas are implemented, and share good practices, examples, and experiences. Such a centralised support system would reduce the total time spent by educators in solving problems and learning new technologies and methodologies, saving funds also for education;

- improved technical basis by assessing needs and priorities concerning contextual factors (geographical location, social situation);
- centralised rooms for distance learning that can be used by learners or teachers on a rotating basis as needed. Such a solution allowed saving money on technologies, ensured higher quality and allowed learners to join the lecture if they did not have an opportunity to connect to the classes due to different social circumstances.

The strategic goals of HEI digitalisation are defined in the Guidelines for Development of Education for 2021-2027 (Ministru kabinets, 2021a) and the Guidelines for Digital Transformation for 2021-2027 (Ministru kabinets, 2021b). The Guidelines for Development of Education in the context of digitalisation state that HEIs should actively use digital solutions in their studies, research and improvement of the efficiency of internal processes. In the Guidelines, the priority of the 2021-2027 period is the digitalisation of the learning process and learning environment. Therefore, digitalisation is planned as an essential pillar in implementing both the curriculum and the learning approach: learning tools and resources, learning platforms, governance and process management, etc. (Ministru kabinets, 2021a). In addition, HEIs should be those institutions that need to transfer new knowledge and new technologies to the population, i.e. people or entrepreneurs in the labour market who already have one or more higher education but lack knowledge of the latest trends (PwC Latvija, 2020).

The Guidelines for Digital Transformation for 2021-2027 state that by 2027, HEIs should improve the availability, management, quality of education and science, improve digital learning materials and accounting systems, as well as improve the quality and availability of research data and the digital literacy of researchers (PwC Latvija, 2020). Following the Guidelines (Ministru kabinets, 2021b), all changes in the direction of an action “Digitization of educational processes” can be divided into four main directions:

1. Digitalisation of the learning process.
2. Digitalisation of administrative (education management) processes.
3. Digital services (as proactive as possible) based on data analytics.
4. The openness of educational data.

The first direction “Digitization of the learning process” includes the following activities (Ministru kabinets, 2021b):

1. to improve the availability of digital teaching aids so that in the learning process outside the educational institution mainly digital teaching aids are used with various elements of interactivity;

2. to provide an opportunity in HEIs to participate in the learning process online, as well as record this process and create video recordings, by opening part of the study courses to open access and promoting them as examples of good practice that can be used for training academic staff;
3. to integrate digital solutions in the learning process by creating a modular architecture of an information system and using technology solutions in students' examinations, work assessment, personalisation of the learning process (computer simulations, simulation laboratories, chatbots, machine learning, machine translation, and its integration into curriculum content, voice synthesisers) and integration of students with special needs in the learning process, as well as using digital solutions (e.g., chatbots, etc.) for user training;
4. to use digital solutions in the knowledge assessment, restraining of plagiarism (automatic system for recognising plagiarism) integrated into the e-learning environment;
5. to use solutions for the integration of copyrighted content in the learning process and the development of open learning resources, which is a vital aspect of the digitalisation of the learning process;
6. to set the optical internet connection for each educational institution or its branch as a standard, so-called "computer libraries" should be available, and access to technologies for the provision of the learning process should be ensured;
7. to introduce electronic student files (agreement, applications, orders, transcripts, diplomas, etc.) and electronic data exchange between EU and EEA HEIs;
8. to include classification and assessment of skills to be acquired in educational documents;
9. to purchase and introduce tools for the analysis of learning process data (learning analytics);
10. to develop and improve competencies of academic staff in the context of simulation-based education.

The second direction "Digitization of administrative (education management) processes" includes the following activities (Ministru kabinets, 2021b):

1. to introduce the use of electronic documents as mandatory (at all stages of education) and make it compulsory to implement the education management process electronically;
2. to use unified authentication tools (digital accounts, passports, etc.), including secure authentication tools. Digital passports allow for the authentication and transfer of data between educational institutions (including educational institutions in different countries, primarily in higher education) and various digital platforms in education. Unified authentication solutions provide students with access to a wide range of digital learning content, also digital library resources;
3. to ensure that communication between educational institutions and the exchange of students' data, for example, on prior learning, occurs primarily electronically. Also, communication between educational institutions, municipalities, and state institutions (such as the State Education Quality Service and the Academic Information Center)

regarding the accreditation of educational programs and other questions take place electronically;

4. to introduce the digital structure of sectoral qualifications, supplementing the functionality of the State Education Information System;
5. to attract active digital coordinators in educational institutions, leading the development and management of digital educational solutions at the level of the institution's management and providing methodological and other support for users of digital solutions in educational institutions;
6. to improve resource (financial, personnel, premises, infrastructures, etc.) planning and management systems and introduce related data analytics solutions;
7. to introduce electronic student files (agreement, applications, orders, transcripts, diplomas, etc.) for electronic data exchange and include classification and assessment of skills in educational documents.

The third direction "Digital services (as proactive as possible) based on data analytics" includes the following activities (Ministru kabinets, 2021b):

1. to provide electronic application possibility for studies in HEIs through user-friendly e-services, such as the "Single application platform for studies in HEIs" where the service would be available to all study levels and all applicants including foreign applicants (both EU, EEA citizens and third-country citizens). This activity is related to the implementation of the Single Digital Gateway Regulation;
2. to develop a register of educational diplomas and issue documents certifying education primarily electronically (printed documents are available if necessary), including the issuance of electronic higher education diplomas, electronic centralised examination certificates, electronic issuance of certificates, electronic issuance of documents on the equivalence of qualifications acquired in non-formal education, circulation of mentioned documents in educational institutions. Data in the diploma register are available in the form of an e-service, as well as, if necessary, the data subject can distribute this data to third parties;
3. to introduce a European Student Card (EU Student Card Initiative), participation in Academic ID, and other digital initiatives for the exchange of data (e.g., EDUROAM) on students and academic staff to enable the use of digital services in other HEIs;
4. to introduce automatic procedures for recognising diplomas and data exchange between information systems in different EU countries, primarily by introducing changes in higher education, where there is greater learner mobility.

The fourth direction "The openness of educational data" includes the following activities (Ministru kabinets, 2021b):

1. to open education data sets for research and creation of new services for enterprises, data exchange between enterprise information systems and state information systems, promoting the achievement of the goals of the "Latvian Open Data Strategy";
2. to introduce solutions for the learning (study) process and the use of these solutions to provide support to students of different levels to prevent early education leaving, to

monitor the quality of education, and provide easily accessible information on educational institutions to the public;

3. to introduce digital passports in formal and non-formal education to allow for graduates profiling and planning of enterprise (economic) development;
4. to introduce common principles for the publication of bachelor's and master's theses in HEIs and promote the availability of metadata.

To implement changes in all the mentioned directions of action, changes in the regulatory enactments regulating education will be necessary, making them more flexible against the introduction of new technologies (Ministru kabinets, 2021b). Simultaneously with changes in regulatory enactments, it is necessary to develop modular and interoperable public, private information systems at the European and international levels. Integrating different information systems is a critical precondition for the digitalisation of education (Ministru kabinets, 2021b).

According to the information published in (PwC Latvija, 2020), HEIs have satisfied basic needs for digital technological support; for example, HEIs are equipped with screens, cameras, and sound equipment for remote lectures, and a wireless network is available on all HEIs premises. Furthermore, due to the Covid-19 pandemic, HEIs rapidly introduced virtual platforms for the study process (MS Teams, Zoom, etc.) that must be maintained and developed if the demand increases (PwC Latvija, 2020).

According to the results of the *Research of the project "Life with COVID-19"*, the technological resources and solutions that should be provided at least at the minimum level are the following (Rubene et al., 2020):

- technical solutions for synchronous and asynchronous distance learning, remote examination and assessment, as well as an online learning environment that ensures the integration of these solutions and the availability of digital learning materials for students;
- for synchronous distance learning, the necessary equipment for video streaming and recording should be provided, as well as software for synchronous online video and audio communication with screen sharing support (e.g., Zoom, Microsoft Teams, Cisco Webex, etc.);
- for asynchronous distance learning, the online learning environment (e.g., Moodle, Canvas, Sakai, Blackboard, etc.) should be introduced that serves as a practical platform for storing digital course content, providing information (information about study courses, organisational information, study materials, etc.), supporting communication between students and academic staff (forums, chat rooms, etc.) and ensuring knowledge assessment (through submission of independent works or completion of test activities) and provision of feedback;
- synchronous or asynchronous distance learning solutions that can be used for remote examinations, but they must be complemented with academic integrity monitoring tools such as content authentication tools (Turnitin, iThenticate, PlagScan, etc.) and online exam security solutions (ProctorU, Examus, Respondus, etc.).

The technological support that would allow students and academic staff to access specialised software and hardware remotely, outside of lectures, using a remote gateway to virtualised desktops is less developed. As the proportion of distance learning increases, this circumstance can create obstacles for acquiring the necessary software in the study process (PwC Latvija, 2020). Technologies that reduce barriers in communication are essential in distance learning. Priority should be given to providing the audio/video equipment of sufficient quality and a stable Internet connection since sound and image are the main modalities of communication available in distance learning; therefore, their quality is particularly important (Lubkina et al., 2020). The lack of video and audio editing experience can be reduced by equipping educators' working rooms with multimedia mixers capable of combining multiple image sources (face camera, computer screen, camera for documents viewed from above, etc.) with qualitative audio in real-time with a simple physical button making it immediately usable without video editing and allowing content to be delivered to learners in a more interactive way (Lubkina et al., 2020).

High-performance computing and artificial intelligence are important innovative technologies which HEIs already envisage to use in the implementation of the study process. So these technologies should potentially be developed primarily to be integrated into the study process (PwC Latvija, 2020). HEIs believe that artificial intelligence will be important in the digitalisation of the study process, but its practical application is currently being implemented experimentally in some research projects, including research on personalisation of study content and language processing (PwC Latvija, 2020).

In the digitalisation of Latvian higher education, by providing a wider range of technological opportunities in the study process and improving the international competitiveness of HEIs, one essential aspect should be considered - secure data processing (PwC Latvija, 2020). The processing of secure student personal data in HEIs means providing qualitative data (correct, timely and accessible following the law) to both students, academic staff, and regulatory institutions (PwC Latvija, 2020). Also, the introduction of an adapted study process and the use of various research methods (e.g., learning analytics) are related to the extensive use of personal data (PwC Latvija, 2020). Learning analytics is currently used at a basic level; however, introducing a personalised study process requires the use of learning analytics solutions that should be aligned with general data protection regulations (PwC Latvija, 2020). Therefore, academic staff must be trained to use learning analytics, and HEIs must implement data analysis solutions (PwC Latvija, 2020). Regarding training of HEIs staff, one of the tasks of digitalisation included in the Guidelines for Science, Technology Development and Innovation for 2021-

2027⁴ is directly related to data processing and envisages the development of digital skills and data management competencies of academic and administrative staff in HEIs (PwC Latvija, 2020).

Currently, the Ministry of Education and Science in Latvia should monitor each HEI and its processes in the context of the development and implementation of information security and personal data protection policies and intellectual property protection policies for the protection of digital content (PwC Latvija, 2020). However, according to (PwC Latvija, 2020), there is still a lack of understanding of the application of these requirements at both the national level and level of educational institutions. Additional challenges at the individual and institutional levels are identified within the *Research of the project "Life with COVID-19"*.

At the individual level, there is insufficient understanding of academic staff about the correct management of personal data. This creates the most significant risks in the implementation of correct data processing in the institution because academic staff creates requirements for study courses and works directly with students, as well as manages part of students' personal data in the IT systems (Jansone-Ratinika et al., 2020). Following the principle of academic freedom, academic staff independently plans and implements their study courses, determining the requirements and, consequently, the mandatory or optional solutions and environments to perform the tasks specified by the academic staff. Lecturers do not always identify situations in which they store and process personal data, thus creating risks for insecure storage of personal data without informing the person about it. Lecturers may unconsciously encourage students to use such IT tools where the secure processing and storage of students' personal data cannot be guaranteed (Jansone-Ratinika et al., 2020). Academic staff may not be aware of the risk of violation and may take actions that are not following the requirements, for example, with the desire to promote the availability of studies by recording an online session for its inclusion in e-studies, without coordinating such activity with all participants (Jansone-Ratinika et al., 2020). These are just a few examples where the staff's uninformed actions may result in a violation, so informing and educating academic staff about personal data processing is essential. A data specialist in the HEI can help develop centralised recommendations and guidelines for the correct processing of personal data at the level of the institution (Jansone-Ratinika et al., 2020).

However, insufficient support for the data protection function is not always the case at the institutional level. Even if a data specialist has been hired, it should also be taken into account that many people involved in the study process process personal data, thus creating a high risk of mistakes that cannot be monitored and controlled by one specialist in a larger institution (Jansone-Ratinika et al., 2020). Furthermore, it should be remembered that HEIs undergo many different processes, where personal data are collected, used, and stored

⁴ Guidelines for Science, Technology Development and Innovation for 2021-2027:

<https://likumi.lv/ta/id/322468-par-zinatnes-tehnologijas-attistibas-un-inovacijas-pamatnostadnem-20212027-gadam>



directly and indirectly to ensure the study process (Jansone-Ratinika et al., 2020). One of the challenges for a data specialist is to be able to perceive and go into all processes and activities (in the study process, science and laboratory work, library work, audit work, security, video surveillance systems, IT system security, data exchange between systems, etc.) to perform his/her functions in high quality (Jansone-Ratinika et al., 2020). As an additional burden on HEIs is the fact that several regulatory enactments are not adapted to the new data protection situation, thus complicating the work of the institution and performing tasks, for example, it is significantly more challenging to conduct research where personal data needs to be used (Jansone-Ratinika et al., 2020).

In general, it is already clear that the Covid-19 crisis will have a long-lasting impact on the provision of higher education, meaning that the role of digital education will continue to increase in the future. For HEIs, this means finding a good balance between the students' social inclusion through face-to-face teaching and adapting to the changing circumstances of remote studies (Dzenīte et al., 2021). It is important to develop new remote learning models that can help students find new learning modes and ensure that they do not lose motivation to study. When developing improvement methods, not only the opinions and experiences of teachers should be considered, but also the opinions of students are essential (Dzenīte et al., 2021). To develop solutions towards sustainable education in an e-learning environment, it is necessary to create technological and pedagogical solutions for the e-learning environment to support the effective acquisition of knowledge and skills (Kapenieks & Kapenieks, 2020). Personalisation of e-learning following the student's interest is a starting point for creating active curiosity to holistic comprehension and the desire for more profound knowledge (Kapenieks & Kapenieks, 2020).

Particular attention should also be paid to the training of educators, as the amount and intensity of their work increased during the Covid-19 emergency, which required new knowledge on how to teach at a distance, as well as specific knowledge in the field of ICT, e.g., on using digital learning management systems (Vanadžiņš et al., 2021b). The calculation of the proportion of pedagogical work should be streamlined, allowing academic staff to reflect different types of work in their workload, including time spent on learning new technological solutions and creating online learning content and working with colleagues to develop joint solutions (Rēzeknes Tehnoloģiju akadēmija et al., 2020). The thoughtful use of digital solutions could also free up time resources; for example, high-quality lecture recordings could be used, meaning that academic staff do not have to spend time reading lectures repeatedly for each group of participants but have the opportunity to pay more attention to other types of collaboration (Rēzeknes Tehnoloģiju akadēmija et al., 2020). An administration of HEI must demonstrate an understanding of the technical means necessary for the implementation of the distance learning process, the skills and competencies required for academic staff, support processes and competencies of support staff, time resources (Rubene et al., 2020). This understanding of the organisation, implementation, support, and quality assessment of distance learning should be reflected in HEIs processes and internal regulations and technical support and staff competencies (Rubene et al., 2020). HEIs must have an organised support

system in which academic staff and students can obtain pedagogical and technical support (Rubene et al., 2020). Therefore, there is a need for a structural unit, a contact point, that coordinates and implements the provision of pedagogical support for learning and teaching innovations, as well as there is a need for a structural unit which according to the needs of modernisation of the study process, provides IT resources and technical implementation of pedagogical needs (Rubene et al., 2020). An excellent example of this is UNESCO's Global Education Coalition platform for collaboration and exchange to protect the right to education during the Covid-19 emergency (UNESCO, 2021). In this platform, training is provided, MOOC courses are available, self-organised learning opportunities and external repositories of distance learning solutions are offered, including the European Commission's resources – a collection of online platforms for teachers and educators available in 23 EU languages (Vanadžiņš et al., 2021b).

A desire for a successful digital Latvia should be based on a smart approach to education and skills. This includes an adaptive and responsive education sector that fosters digital learning for all Latvians, both in the form of generic ICT skills (digital literacy and data literacy) and complementary skills such as information processing and problem-solving capacities (OECD, 2021). In Latvia, digital skills should not be considered in isolation but rather be closely connected to people's personal and professional ambitions and seen as a means to enhance the human capital of all citizens (OECD, 2021). Smart education would allow existing knowledge and expertise to spread and new partnerships to form and flourish, e.g., industry-university or ministry-university partnerships (OECD, 2021). There is potential for mutual benefit between HEIs and industry by developing and sharing digital knowledge and skills in innovative and impactful ways for Latvia's economy and society (OECD, 2021). HEIs are a key potential partner in digital transformation in the ministry-university partnership, bringing a necessary complement of independence, objectivity, accountability, in-depth analysis, and evidence to inform policy-making, decision making, and implementation on digital policy issues (OECD, 2021). To improve the normative base for the implementation of study programs in a remote format, the freedom of HEIs should be increased for a flexible combination of full-time and distance learning (Rubene et al., 2020). Currently, the strict regulation of study program licensing and accreditation of study fields limits the opportunities to develop new interdisciplinary study programs, including programs with a significant technological solution component and generally narrows the potential of HEIs to adapt to changing circumstances and find the most effective ways to achieve learning outcomes (Rubene et al., 2020). The regulation should be more focused on evaluating results rather than regulating the implementation of programs, allowing the use of distance learning methods in full-time study programs. Besides, the co-development and sharing of study materials between academic staff should be promoted while correctly respecting copyright and promoting academically fair practices (Rubene et al., 2020).

To summarise the information given in this section, it must be noted that despite already acquired knowledge and skills during the implementation of remote studies, the academic staff still lacks knowledge in digital pedagogy and teaching methods that enable the implementation of successful and qualitative distance education. Also, skills for developing interactive and qualitative digital course content that keeps students motivated and engaged in studies are required. Such expertise would minimise the workload of the academic staff that should be invested in getting familiar with unknown technologies and teaching methods. Therefore, training and materials provided by either HEIs or the Ministry of Education and Science are only welcomed.

The technical staff of HEIs requires knowledge of the platforms and systems used by each HEI and skills on the development of these technologies to keep them up-to-date. Besides, the academic staff considers that basic skills in pedagogy for the technical staff allowed them to understand the needs of v and improved their abilities to transfer technological knowledge to non-IT people. Also, skills related to e-content creation and video filming are needed by technical staff to enable them to provide support to academic staff. Regarding the academic staff, most of them are sure that they have enough competencies, and as the most essential skills are recognised general e-skills and understanding of available digital solutions for the provision of educational processes.

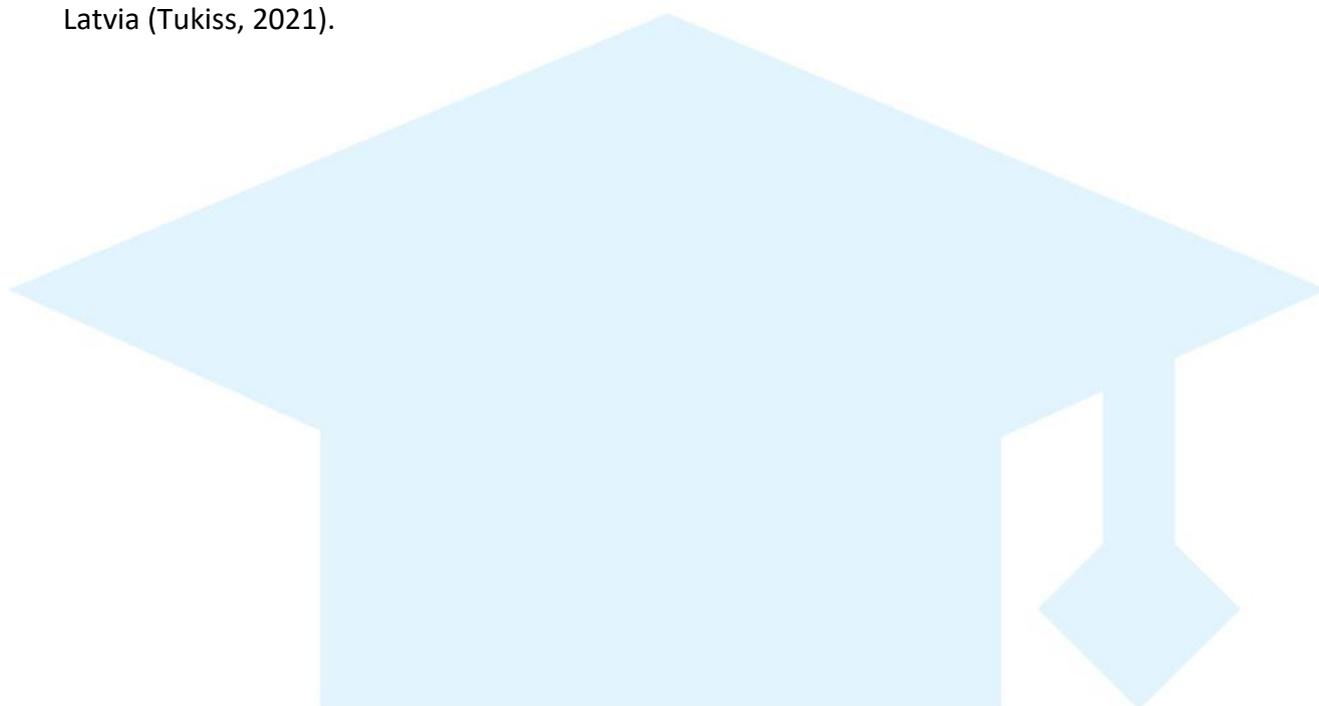
The development of digital literacy in Latvian society is an essential step towards the digital transformation of the educational sector and other areas; therefore, various ICT-related activities and training are organised with the involvement of Latvian HEIs, companies, and governmental entities and non-governmental institutions. Various guidelines are developed in Latvia, e.g., the Guidelines for Science, Technology Development and Innovation for 2021-2027, Guidelines for Development of Education for 2021-2027, and Guidelines for Digital Transformation for 2021-2027 that define numerous strategic goals for digitalisation of Latvian HEIs and include activities that should be carried out towards the achievement of these goals.

In addition, the digitalisation of HEIs processes is closely related to data processing, and special attention should be paid to the legislation that regulates the use of personal data at all levels - national, institutional, and individual. Currently, academic staff lack knowledge on data processing, and their uninformed actions may result in a violation, so it is important to inform and educate academic staff about personal data processing. HEIs also require data specialists who can help create recommendations and guidelines for the correct processing of personal data at both individual and institutional levels. However, it should be remembered that many people are involved in the organisational and study processes and deal with personal data (both personnel and students); therefore, one data specialist will not always be able to monitor and control the use and processing of personal data in a larger institution.

6. BEST PRACTICES IN THE COUNTRY

University of Latvia (UL) Open Minded

UL Open Minded is an education initiative (face-to-face and online education project) designed in collaboration with the University of Latvia and launched in January 2014 with three online courses on nationalism, Buddhism, and astronomy in the Latvian language (TVNET, 2014a; Birziņa, 2015; Latvijas Universitātes Kvalitātes vadības un audita departaments, 2015). UL Open Minded can be considered as the first MOOC (massive open online courses) project in Latvia (Figure 7), created in collaboration with the University of Latvia (Tukiss, 2021).





Pieslēgties

LU OPEN MINDED

SADARBĪBA AR
LATVIJAS
UNIVERSITĀTE

AKTUĀLIE KURSI PASTĀVĪGIE KURSI UZŅĒMUMIEM DEMO KURSS GADA ABONEMENTS KONTAKTI

ATGRIEZIES UNIVERSITĀTĒ!

Apgūt LU Open Minded lekciju kursus ir aicināts ikviens bez izņēmuma, taču mūsu kursi radīti, pirmkārt domājot par tiem, kas jau pirms vairākiem gadiem beiguši savas studijas un šobrīd vēlas atgriezties universitātē pavisam jaunā kvalitātē – lai patiesi izbaudītu studiju procesu paša priekam un izaugsmei, sevis un pasaules izpētei. Ikviens no mūsu lekciju kursiem klausāms un uztverams bez priekšzināšanām, lai koncentrētā, kompetentā un vienlaikus vienkāršā veidā iepazītos ar aktuālām un nozīmīgām attiecīgo tēmu atziņām. Mūsu pasniedzēji ir Latvijā vadošie savu jomu eksperti – akadēmiķi un praktiķi, kas veltījuši daudzus gadus savu tēmu izziņai, sekojot līdzi pasaules aktuālajām tendencēm. Liela daļa mūsu klātienē kursu noris Latvijas Universitātes telpās, atgriešanos universitātes solā padarot par taustāmu pieredzi. Laipni aicinām to piedzīvot!

Studijas LU Open Minded izvēlas:

Latvenergo Swedbank MAXIMA if... VIDZEMES AUGSTSKOLA ERGO

Fig. 7. The interface of the UL Open Minded platform in Latvian

It should be noted that the University of Latvia is the primary partner and co-founder of UL Open Minded, but UL Open Minded is not a structural unit of the University of Latvia, and UL Open Minded courses do not provide the opportunity to receive study credit points (LU Open Minded, 2021a). The mission of UL Open Minded is to provide academic knowledge at Bachelor's level, which is traditionally provided at universities, available in the Latvian language, electronically, and free of charge or for voluntary donations (FOLD, 2014; TVNET, 2014a; Birziņa, 2015; Latvijas Universitātes Kvalitātes vadības un audita departaments, 2015). In the Latvian educational system, UL Open Minded was considered a novelty since BA-level education in the Latvian language online and for free was available for the first time (Birziņa,

2015;). This is particularly important in the light of global educational trends, with more and more leading universities publishing their teaching materials online, thus fundamentally changing the principles of knowledge transfer and learning opportunities in Latvia (TVNET, 2014b). Although UL Open Minded lecturers are Latvia's leading academics and experts in their fields, who have spent many years researching their topics, following the current world trends (LU Open Minded, 2021b), the offered courses are not formal education. These courses are primarily created for personal growth, self-education, and the joy of studies returning back to the university bench - in person or virtually (Sazanova, 2020; LU Open Minded, 2021a). In the first year (2014), UL Open Minded already had lots of listeners – around 5000 people were registered for the lecture courses, lectures published in YouTube were viewed over 70000 times, 350 full-time and online listeners completed the course and received a certificate (FOLD, 2014; Birziņa, 2015). Currently, from January 1, 2020, until September 21, 2021, already 16854 people have registered for studies in one of the courses offered by UL Open Minded⁵. The number of platform users is growing every day, and it is updated automatically, taking into account the registered people in the database.

In general, there are two ways for using the studying possibilities offered by UL Open Minded (FOLD, 2014; Providus, 2014; Birziņa, 2015):

1. by attending the lectures and discussions at Birojnica and the University of Latvia face-to-face once a week. Birojnica is a meeting and co-working space with free internet access, LETA and LURSOFT databases, books, and magazines. It constantly hosts speakers from private businesses, governmental and non-profit institutions, as well as HEIs;
2. by following the lecture courses online.

UL Open Minded courses are mainly concentrated on topics explored by leading experts in their fields (primarily representatives of Latvian HEIs) in Latvia. The topics are presented in an easy-to-understand form and a language perceived by a broad audience. The chosen course topics are those that the platform creators and maintainers consider relevant and demanded by the audience, where a balance between a high level of supply and audience demand is possible (LU Open Minded, 2021a). Anyone who is an expert in his/her field with a reputable education and/or experience and has a topic in mind that could be of interest to a broader audience can become a lecturer at UL Open Minded courses (LU Open Minded, 2021a).

In general, each course consists of four to 12 lectures, literature, regular reading assignments, an examination test at the end of the course, and a course completion certificate (Birziņa, 2015; Latvijas Universitātes Tukuma filiāle, 2021). UL Open Minded online lectures do not occur live (except for specific courses where specifically indicated). According to the course schedule, course participants receive access to course lecture videos and additional materials after completing the application (LIZDA, 2020). Application for the courses can be made by

⁵ Number of users in LU Open Minded platform on September 21, 2021 - <https://openminded.lv/>

filling in the application form and paying for the course with a payment card if the chosen course is for a fee. There are currently 12 free online lectures on rhetorical techniques, proper writing language, online communication, children's media habits, history, space, politics, health, sport, etc. (Satori, 2020; LU Open Minded, 2021c). On the learning platform, lecture videos can be viewed at any time and are available for six months from the start of the course (unless otherwise specified). Also, during the course, it is possible to ask questions to the course teacher and receive answers (LU Open Minded, 2021b). At the end of the course, learners have an opportunity to take the final test. If at least 70% of the questions are answered correctly, then learners automatically receive an electronic confirmation of completion of the course (LU Open Minded, 2021b).

In general, two types of courses are offered: current and regular ones. The current courses on the UL Open Minded platform usually have a specific start and end date. Along with the final lecture, the user receives access to the final test of the course, upon successful completion, of which he/she receives an electronic confirmation of mastering the course. In total, it is currently possible to apply for three current courses on the platform (LU Open Minded, 2021d):

- Perfect public relations (10 online lectures)
- How to prevent and resolve conflicts? Awareness-based approach (8 online lectures)
- Digital childhood: tips for educating the digital generation (6 online lectures)

There is no specific start date for regular courses. Therefore, when applying for the regular course, the learner immediately gets access to all course lectures and additional materials and can receive an electronic confirmation of mastering the course. At present, 15 regular courses are available, consisting mainly of 8 online lectures (with some exceptions) for viewing at any time (LU Open Minded, 2021e):

- Financial anthropology. Lectures on the importance of money (only four lectures)
- The world's most outstanding composers
- Social psychology. Illusions, thinking about yourself and others
- Correct and modern written language - proof-reader tips
- Etiquette and communication skills in real and virtual environments
- Willpower
- Generations X, Y, Z, and A: Challenges for employers, parents, and educators
- Awareness in the workplace. How to work in a more balanced way?
- Zero waste approach to a greener life (only four lectures)
- Mind and thinking from the perspective of cognitive sciences
- Prevent burnout. Lectures for a balanced daily life
- Lectures on sexuality
- Physical activity for health and joy of life
- Happiness is a skill (only three lectures)
- Critical thinking and information analysis

Everyone without exception is invited to take UL Open Minded courses; however, they are designed primarily for those who have already completed their studies and now want to return to the university in a brand-new quality - to truly enjoy the study process for their pleasure and growth, self and world exploration (Sazanova, 2020). Many UL Open Minded full-time courses take place on the premises of the University of Latvia, making a return to the university bench a real experience (LU Open Minded, 2021f). Each of the courses can be listened to and perceived without prior knowledge to get acquainted with current and significant knowledge of the respective topics in a concentrated and, at the same time, simple way (LU Open Minded, 2021a).

Latvian employers also highly value UL Open Minded courses and the issued certificates for mastering the courses. UL Open Minded provides an excellent opportunity to improve the knowledge of employers and their employees and increase work efficiency through a variety of distance learning courses (LU Open Minded, 2021g). With the help of UL Open Minded courses, it is possible to acquire immediately relevant, practical knowledge from excellent lecturers (Sprūdža, 2021).

Such Latvian companies as State Revenue Service, Saeima (the Parliament) of the Republic of Latvia, Constitutional Court of the Republic of Latvia, Latvenergo, Citrus Solutions, Altum, Swedbank, Rimi, Maxima, Vidzeme University College, If, Ergo, and others have already chosen studies at UL Open Minded (LU Open Minded, 2021f; LU Open Minded, 2021g). Furthermore, the certificate of mastering UL Open Minded courses can serve as a significant bonus in the eyes of employers, showing that the employee is open to new skills and knowledge, interested and development-oriented. These are often cited as key features that increase competitiveness in today's job market (LU Open Minded, 2021a).

To organise online studies for the company's employees in one of UL Open Minded courses, the company must apply for at least ten participants. The fee for one person to participate in the UL Open Minded course is, on average, 25 EUR per employee (LU Open Minded, 2021g). Training courses take place by a separate agreement, taking into account the company's needs, according to an individually chosen schedule. Lectures are not webinars and are not live. Instead, the lectures are filmed and carefully produced and can be viewed at any time and place together with additional rich materials (LU Open Minded, 2021g).

In addition, during the Covid-19 pandemic, the State Employment Agency of the Republic of Latvia offered to the registered unemployed persons and job seekers the opportunity to acquire new or improve existing knowledge by learning free of charge using UL Open Minded as one of the learning platforms (Nodarbinātības valsts aģentūra, 2020; Preiļu novada dome, 2020). A total of 878 people who lost their jobs as a result of the Covid-19 crisis applied to the UL Open Minded platform (Nodarbinātības valsts aģentūra, 2020).

In addition, there is also an opportunity to purchase an annual subscription for 189 EUR that will allow access to the content of any UL Open Minded course for one year from the date of purchase. This applies to the regular and current courses, which are updated every month (LU



Open Minded, 2021h). Thus, during the year, learners with the subscription will have at least 30 lecture courses with more than 200 lectures given by the best lecturers in Latvia. The total value of these courses, if purchased separately, would exceed 700 EUR (LU Open Minded, 2021h).

eSignature at Riga Technical University

The integration of the eSignature into Riga Technical University's administrative processes can be considered a successful example of introducing innovative technologies in the Latvian HEIs. At the end of 2020, the university's project "Introduction of electronic document circulation and eSignature at Riga Technical University" became one of the finalists of the special award "The most successful eSignature integration solution" acknowledged by the annual award "Platinum Mouse 2020" established in the information and communication field in Latvia (LA.LV, 2020; LIKTA, 2020). Furthermore, at the beginning of 2021, The Latvian State Radio and Television Center awarded Riga Technical University the honourable title of "eSignature Champion 2020" (Rīgas Tehniskā universitāte, 2021).

The university signs electronically about 700 documents per month, including correspondence, letters, internal orders, and various agreements (LA.LV, 2020). In 2018, the university's graduates were the first in Latvia who received diploma supplements in electronic form and signed using a secure eSignature (Rīgas Tehniskā universitāte, 2021). In 2019, the university already allowed students to sign study agreements electronically when starting studies at the university. In the same year, in addition to the registration for studies, applicants of Riga Technical University had the opportunity to obtain the mobile eSignature application called "eParaksts mobile" free of charge and sign study agreements with a secure electronic signature (Rīgas Tehniskā universitāte, 2019a). The "eParaksts mobile" is a digital tool for iOS and Android smartphones that Latvian inhabitants can start using from the age of 14 free of charge to get the possibility to sign documents electronically, enter into contracts, receive services from authorities and merchants remotely (eParaksts, n.d.). It validates a person's identity in a digital environment (Rīgas Tehniskā universitāte, 2019a). In 2019, a quarter of first-year students of Riga Technical University signed study agreements electronically, but in 2020, more than half of the new students used this opportunity (LA.LV, 2020). In 2020, the university's internal communication portal ORTUS was the third most popular, in which users logged in using eSignature identification (eParaksts, 2021; Rīgas Tehniskā universitāte, 2021).

Figure 8 represents that users (both students and academic staff) of the ORTUS portal of Riga Technical University can use both the username and password and "eParaksts mobile" for the authentication. The process of authentication in the ORTUS portal has the following main steps:

1. The user selects the option "eParaksts mobile" to authenticate (Figure 8).
2. The user enters his/her user number of "eParaksts mobile" and presses the button "Confirm" (Figure 9).



3. The message is sent to the “eParaksts mobile” application installed on the user's smartphone, and the user needs to verify his/her identity in the application by entering the PIN.
4. In the end, the user must agree that his/her data will be sent to the recipient (Riga Technical University). Eventually, the main window of the ORTUS portal will open.

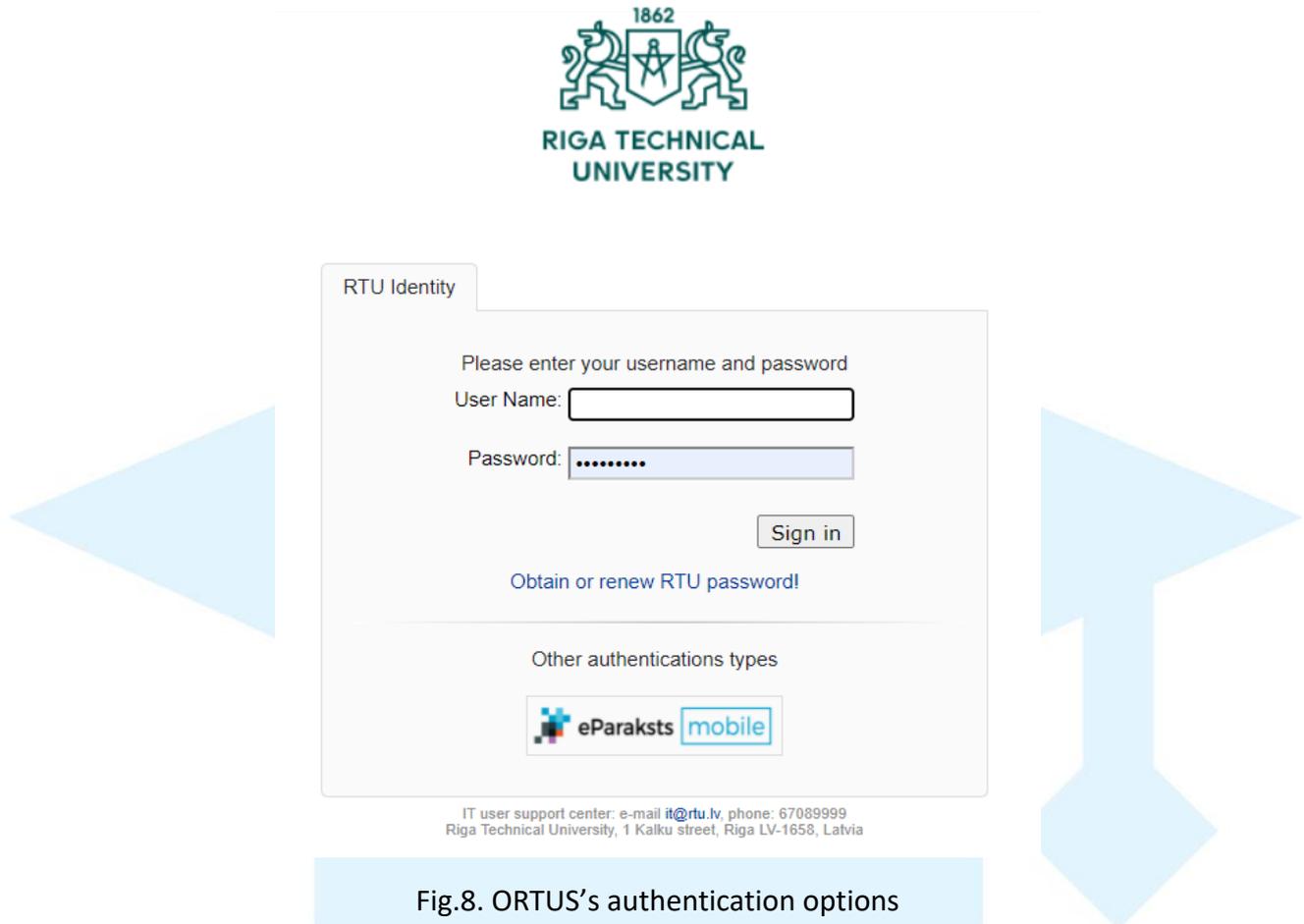


Fig.8. ORTUS’s authentication options

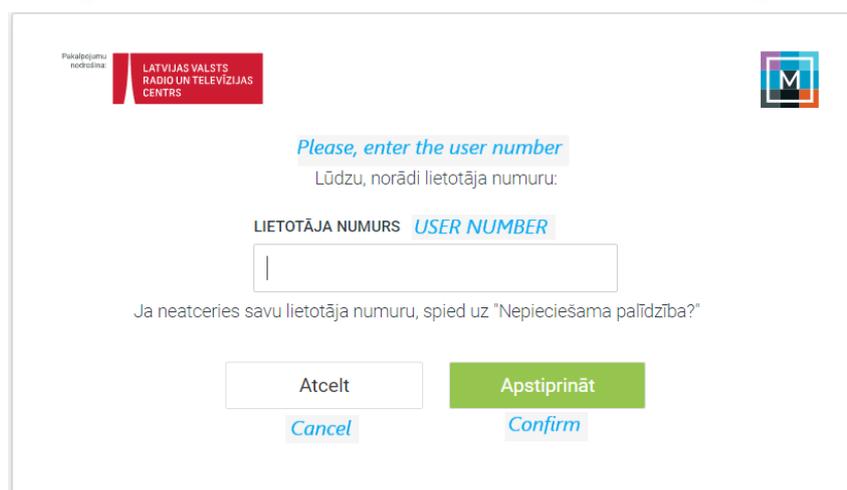


Fig.9. Entering the user number of the “eParaksts Mobile”

Therefore, the university students can use the eSignature to remotely put in order all the processes associated with admission to the university, sign the agreement and various documents related to the study process, and receive electronically signed diploma supplements. Thus, Riga Technical University is the first Latvian HEI whose students started signing documents electronically (Rīgas Tehniskā universitāte, 2019a).

DigiKlase

DigiKlase is a project implemented by the Faculty of Pedagogy, Psychology and Art of the University of Latvia with the financial support of the University of Latvia. The project team has developed a digital platform for collecting and classifying diverse digital teaching materials (DigiKlase.lv, 2021). The platform was opened in 2021, and currently, it is offered in Latvian. The platform includes more than 700 digital teaching materials and tools developed in Latvia and other countries worldwide to promote and support education professionals in implementing the technology-enriched learning process (Skola2030, 2021).

The teaching materials available in the platform are divided into seven categories (DigiKlase.lv, 2021):

- Tool - repository/collaboration platform: Widely available software used for learning, collaborating, gathering information, exchanging information, storing materials, and collaborating on task completion.
- Tool - for communication and distance learning organisation: It enables the teacher and student video/audio/text communication and allows the user to create video conferences, group work, individual video consultations, and includes "chat room" and screen sharing functionality.
- Tool for creating learning content: A tool for creating digital interactive learning content, such as online presentations, quizzes, tests, games, and various tasks with automatic feedback.
- Learning management systems (with or without content creation capabilities): They provide the ability to manage, date, and organise the learning process in a digital environment and provide the following capabilities: virtual classrooms or groups, document exchange, content adding and structuring, assessment and adding comments, setting deadlines for completing tasks, sending specific tasks to a class/group, chat functionality, analysing progress for classes or individually.
- Electronic teaching aid (without interactivity): It includes the content necessary to implement the educational program. These tutorials do not provide user feedback. It is based on the passive reception of information. It can be in the form of a file - PDF, Word, PowerPoint, audio or video file.
- Digital teaching aid (with interactivity): An interactive online learning tool that includes the content needed to implement the curriculum (tasks, schemes, worksheets,



examples of activities, etc.). The user is provided with a limited degree of feedback/response.

- Learning platform (with interactive learning content): It is a digital, interactive online learning and methodological tool that includes the content needed to implement the curriculum, theoretical materials, learning tasks, tests and immediate feedback to the user.

The search filtering option available on the DigiKlase platform allows the user to select the collected materials and tools according to the level of education: pre-school, basic, secondary, vocational, higher and teacher education. In addition, a search can be made based on material category (see above), subject, class, language, fee (free, partially free, paid), registration (with or without registration), user manual (Available or Not) and methodological recommendations (Available or Not).

For each learning material, the platform provides not only information about when the material was created, who created it, what age of learners and what subject content it is related to, but also the evaluated content and usage aspects of the material in four categories (DigiKlase.lv, 2021):

- The extent of functionality - how wide the functionality is.
- The adaptability of the material to devices/browsers - the criterion considers both the full operation of the learning material in the most popular browsers and its adaptation to the screen size, as well as whether the material is compatible with other digital tools and platforms.
- User support - whether user manuals and/or methodological tools are available.
- Design - whether the graphic design of the learning material and the use of illustrative material in the design is easy to understand and does not complicate the perception of the learning content, and the buttons and toolbars facilitate the learning experience.

Figure 10 and Figure 11 show examples of the added materials.

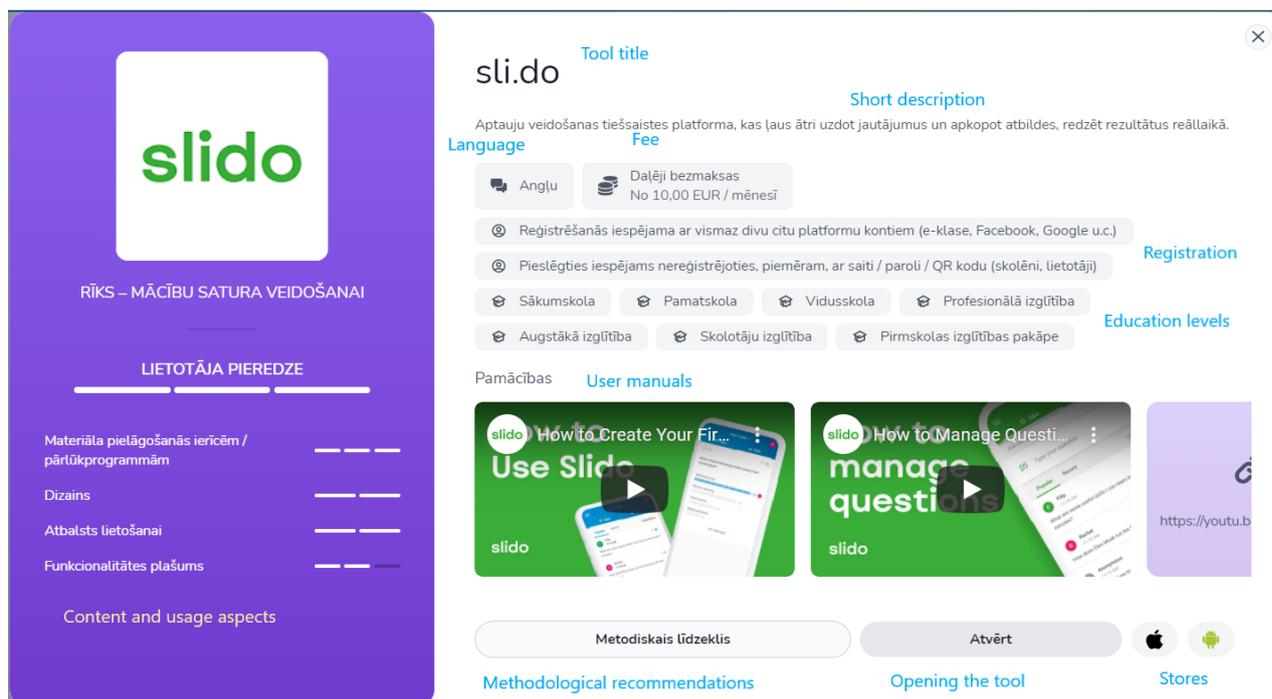


Fig.10. An example of the material from the category “Tool for creating learning content”

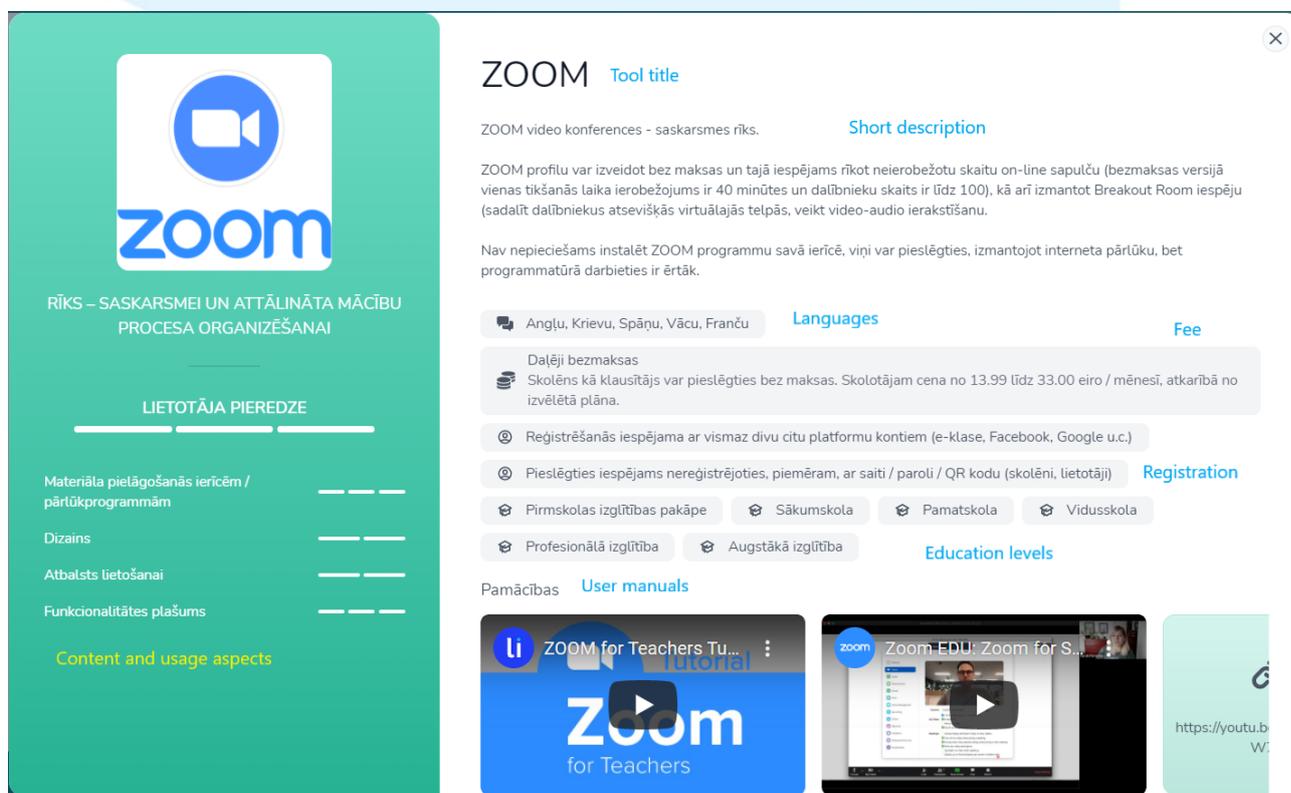
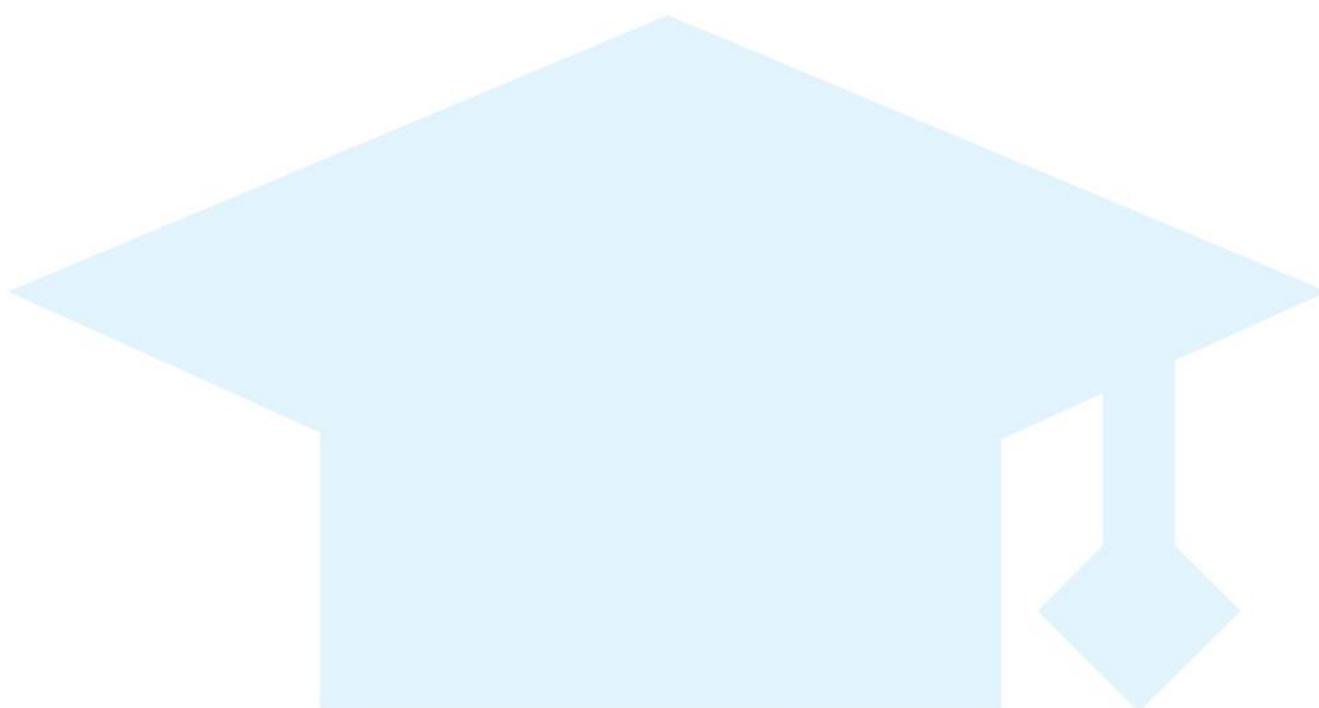


Fig.11. An example of the material from the category "Tool - for communication and distance learning organisation"

It is worth noting that the project has sustainability, as the DigiKlase team will continue to cooperate with Latvian teachers and faculty students, supplementing the repository of materials and tools (DigiKlase.lv, 2021). It is also planned to offer methodological recommendations in the form of video instructions for working with various educational and content development tools in the future (Skola2030, 2021).



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