VOCATIONAL EDUCATION AND TRAINING FOR THE FUTURE OF WORK

LATVIA

CEDEFOP REFERNET THEMATIC PERSPECTIVES
Vocational education and training for the future of work: Latvia

Policy strategies and initiatives to prepare vocational education and training (VET) systems for digitalisation and future of work technologies
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Content

CHAPTER 1. INTRODUCTION ................................................................. 4
CHAPTER 2. DIGITAL STRATEGY ....................................................... 7
CHAPTER 3. VET 4.0 INITIATIVES/REFORMS ................................. 10
   3.1. At national level ................................................................. 10
   3.2. At school level ................................................................. 12
CHAPTER 4. 4.0 INTELLIGENCE FOR VET ................................. 14
   4.1. Pilot study using online job advertisements to identify skills requirements in the labour market ........................................ 14
   4.2. Development of interactive tool for the use of labour market forecasts 15
CHAPTER 5. VET 4.0 LEARNING PRACTICES ............................... 18
   5.1. At national level ................................................................. 18
   5.2. At school level ................................................................. 19
CHAPTER 6. ADAPTING TO AI AND AUTOMATION ....................... 21
   6.1. AI strategy ................................................................. 21
   6.2. National training programmes ........................................... 21
   6.3. Job displacement due to automation .................................... 22
CHAPTER 7. CONCLUSION .............................................................. 25
ABBREVIATIONS AND ACRONYMS ............................................. 26
BIBLIOGRAPHY ................................................................. 27
CHAPTER 1. 
Introduction

In business society industrial revolution 4.0 (i.4.0) is perceived as a chance of a breakthrough in Latvia (1). Development of ICT industry is swift – in ten years the export of IT services has doubled and service centres and businesses in the start-up sector have made themselves known in the field (2).

Data analysis and artificial intelligence are already well-developed. The internet infrastructure is well-established, ensuring easily accessible internet, which has been ranked as one of the best in the world (3).

However, the lack of qualified ICT specialists – both programmers and project managers – as well as of ICT service salespersons and other ICT-related posts represents a challenge for Latvia. According to the forecasts of the Ministry of Economics, a shortage up to 20 000 science, ICT and engineering specialists may be expected in Latvia by 2020. Therefore, continuing actively promoting the interest of learners in the acquisition of mathematics, computing, physics and other science related subjects is essential. Similarly, raising the level of ICT education and e-skills is necessary for Latvia’s successful integration into the European single digital market.

On 1st September 2015, a pilot project was launched in several general basic (integrated primary and lower secondary education nationally) schools for pupils to acquire computer and programming skills. In order to promote the IT sector among learners as a forward-looking employment and increase the number of learners particularly involved in programming, IT Education Foundation has been established by Accenture Latvia – one of the largest IT companies in Latvia (4). To ensure competence (rather than subject) based general basic education, including that pupils acquire skills not only those of IT users, but also of software creators, extensive discussions have taken place in recent years with the development of a new state basic education standard. As the result, in November 2018 Cabinet of Ministers approved state basic education standard stipulating that computer

(4) http://www.db.lv/zinas/ikt-attistiba-iekaros-virsotnes-463213
Science is to be taught from the first grade (Cabinet of Ministers, 2018a). The regulations will come into force on 1st September 2020.

Industrial Revolution 4.0 has also become a topic for other national debates. For example, debates on the impact of digitisation on employment have been carried out by Free Trade Union Confederation of Latvia in the last two years (5). The purpose of this discussion was to identify the impact of digitisation in three respects: employment and labour relations, the functioning of companies and their organisation of work, and data security. IT technologies for trade unions offer new opportunities to address, communicate and bring employees together in a virtual environment. Collective agreement is an effective instrument where employers and employees can regulate issues related to the effects of digitisation by developing solutions tailored to the profession, production and service concerned.

Comprehensive reforms in vocational education took place in recent years, which are reflected in the concentration of resources and reorganisation of school network (Point 3.1.2), content reform of vocational education (Point 3.1.1) and development of competences for vocational education teachers (Point 3.1.3).

Regarding development of vocational education, Ministry of Education and Science [Izglītības un zinātņes ministrija] in cooperation with UNESCO National Commission of Latvia in 2018 has started organising cycle of regional expert debates (6). Discussions were attended by heads of vocational education schools and colleges, employers, representatives of higher education institutions, employees of State and local government institutions and other experts. Main topics of discussions were: different thinking, different skills, development and succession and other cooperation to promote innovation and sustainable development in vocational education. Lessons learned from the discussion will be taken into account in building a future vision on innovation and sustainability issues in the development of vocational education in Latvia – what are the preconditions for vocational education institutions to encourage innovation, how to promote cooperation between vocational and higher education institutions and what support is needed from the public sector, including local governments. Conclusions were drawn that vocational education is a perfect platform for innovation, consisting of a logical base and a combination of skills and knowledge. New education programmes should be developed, and cooperation between higher and

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vocational education institutions is highly encouraged. Some specific examples for successful cooperation between vocational and higher education institutions may be already observed (Point 3.2.2).
CHAPTER 2.
Digital strategy

Currently there are no dedicated industrial revolution 4.0 (I.4.0) strategies for vocational education on national level, but a policy document has been approved to emphasise digitalisation on national level.

The Ministry of Environmental Protection and Regional Development [Vides aizsardzības un reģionālās attīstības ministrija] (VARAM) ‘Information society development guidelines 2014-20’ (Cabinet of Ministers Order, 2013) are a mid-term development planning document, developed by a working group under the guidance of the VARAM for a period of seven years. The Guidelines describe the directions of action and tasks of their implementation.

The aim of the guidelines is to enable everyone to use the opportunities offered by ICT, to build a knowledge-based economy and improve the overall quality of life by contributing to the efficiency of public administration, national competitiveness, economic growth and job creation.

Developed information literacy is one of the guiding principles in the information society: to create, support and promote strategies, tools and methodologies for developing skills and competences for the use of information and ICT in all sectors and all social groups at all levels of formal and non-formal learning, offering the opportunities provided by different information management models.

First direction of action in the Guidelines ‘ICT education and e-skills’ is mostly focused on necessary changes in the education system and included measures mainly cover all forms of education: general, vocational and higher education, as well as adult education.

The Guidelines highlight several key actions to be implemented:
(a) acquisition of ICT skills, similar to reading, for all learners;
(b) promotion of algorithmic thinking;
(c) development of meaningful modular ICT education programmes for adults with clearly defined learning outcomes for educating different target groups;
(d) development and evaluation (monitoring) of teachers’ ICT skills;
(e) training of ICT security specialists provided by higher education institutions;
(f) the development of new ICT-related occupational standards should be fostered and special measures should be provided (practice, summer school, etc.).
(g) modernisation of curriculum and promotion of digital literacy among both students and teachers;

(h) integration of the learning of information literacy into general, vocational and higher education by developing appropriate learning tools and including information skills developing tasks in curriculum;

(i) training of teachers in the development of digital learning materials.

Furthermore, in vocational education, the aim of guidelines highlights developing the practical skills of teachers and practitioners involved in vocational education (including ICT skills), as well as ‘introduction of a system of reforming the labour market’ (7) is emphasised to allow more efficient use of labour market forecasting data.

The informative report ‘Information society development guidelines 2014-20’ (Informative report, 2017), providing interim evaluation of guidelines, highlighted the most pressing issues in order to make real changes with the introduction of Guidelines: including the educating teachers in IT and new technologies, the developing workers’ e-skills, algorithmic thinking and awareness-raising in school programmes.

According to the report, the development of today's digital environment, which will also require educational changes, should be taken into account when developing the new skills-based education model. The development of the digital environment will require new, educational needs and skills in the future. Increasing critical and algorithmic thinking and continuing actively promoting students’ interest in learning math, computing, physics and other science related subjects is essential. Further work is needed on awareness-raising activities and the development of e-skills for citizens and entrepreneurs.

The informative report also pointed out the directions of action to be considered when developing a policy planning document in the form of Guidelines for the next planning period, i.e. the development of cloud computing, big data (e.g. research platform for economic data analysis) (8), data re-use and data retrieval. The question remains how efficiently and how much the state needs to store its data in clouds or hybrids. The question of what data is needed to be stored and for how long is also very topical. Important factor in big data market is the quality and processing of the data. Considering that the necessary infrastructure for the use of the big data is already available, developing further the utilisation of the big data is important. The informative report outlines potential future data issues, which will

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become increasingly urgent and will require ever more involvement of public administration in defining issues and building a position. If most of the VARAM's digital strategy goals were achieved in form of development of cloud computing, big data, data re-use and data retrieval, Latvia could highly improve its position in digital market.
CHAPTER 3.
VET 4.0 initiatives/reforms

Initiatives and reforms concerning digitalisation in Latvia are rapidly developed and implemented at both national and school level. While no national projects that are specifically targeted at digital reforms and initiatives are implemented, some projects partly aim at digitalisation in development of new technologies.

3.1. At national level

3.1.1. Vocational education content reform for learning skills flexibly
National Centre for Education [Valsts izglītības satura centrs] (VISC) ESF project ‘Improving the sectoral qualifications system for the development and quality assurance of vocational education’ (9) (2016-21) goal is to reform vocational education content. The direct aim of the project is to develop vocational education content regarding the requirements of labour market and ensure the compliance of vocational education with the European Qualifications Framework. The development of Sectoral Qualifications Frameworks, occupational standards and modular vocational education programmes is carried out in cooperation with employers. Employers and sectoral experts appreciate the flexibility of modular programmes in vocational education, because schools can respond quickly to the entry of new technologies into the working environment and the acquisition of new skills.

Two of the project main activities are aimed at digitalisation and improvement of digital tools:
(a) Elaboration and implementation of modular vocational education programmes, supporting the provision of lifelong learning and programmes for developing specific professional competences, including components, e.g. ‘initiative and business’, ‘information and communication technologies’, in each modular vocational education programme, or to be integrated into vocational education content.
Implementation of modular vocational education programmes promotes acquisition of competences included in occupational standards and new emerging competences (e.g. 3D printing) in a flexible way, which enables

adapting to changing needs of the labour market. As of October 2019, 81 out of 184 modular vocational education programmes are developed.

(b) Development, acquisition and publication of learning aids (including digital learning aids) and methodical materials, as well as evaluation materials necessary for implementation of programmes, including apprenticeship type schemes. Acquisition of simulation equipment (information technology programs, specially designed equipment for replacement of specific activities). Within the project, several vocational schools were already provided with such programs and equipment such as: Soldomatic Augmented Reality Trainer, CNC workbench simulator, computer program 'Marine Training Software (CBT)', interactive 3D layout (МЭ0141) – demarcation of repair sites and barriers during train movements, etc. As of October 2019, 115 pieces of simulation equipment have been delivered to 29 vocational schools and 38 out of 80 learning aids have been developed.

3.1.2. Modernisation of vocational education schools
Modernisation of vocational education schools started in 2009. The optimisation of the vocational education school network has been completed by reducing number of the small schools and concentrating the implementation of programmes in vocation education competence centres (VECC). Development of infrastructure and modernisation took place in these schools from 2009 to 2015.

Modernisation of vocational education schools continues through operational programme ‘growth and employment’ specific support objective ‘increase the number of modernised vocational education institutions’ (Cabinet of Ministers, 2016b). Aim of the project is to modernise vocational education institutions by ensuring the relevance of the training environment to the development of economic sectors and improving access to vocational education.

Sectoral expert councils evaluated in which vocational education programme groups further modernisation of equipment is necessary. As the result, the equipment was purchased for vocational education institutions to provide 17 priority education programme groups. Support of European Regional Development Fund (ERDF) projects is given to 19 schools, which are implementing these projects from 2017 to 2020. During the projects:

(a) development of infrastructure for vocational schools, to implement new regional economic development-based vocational secondary education or vocational education programmes;

(b) upgraded equipment and technical devices to implement priority vocational education programmes;
(c) the introduction of ICT solutions and the purchase of equipment in the training process of a vocational education institution; including the costs of establishing a wireless or optical Internet connection and the costs of purchasing equipment and software necessary to ensure the training process;
(d) placement of vocational education institutions for natural sciences (physics, chemistry, biology) and maths offices or setting up new offices for the implementation of general secondary education programmes, etc.

All of above mention activities will allow to implement vocational education reformed content and programmes.

3.1.3. Digital development courses for vocational education teachers
Within the ESF project ‘Effective management of vocational education institutions and the development of staff competences’ (10) (2016-22) implemented by VISC (Cabinet of Ministers, 2016c) digital literacy courses are organised for vocational education teachers. Content of the courses is developed in cooperation with Riga Technical University. The goal of these courses is to make lessons more interesting by teaching the use of modern technologies in the lessons (e.g., learners could use mobile phones during lessons to actively participate by voting and expressing their opinion through applications or websites), or how to develop IT resources (e.g., videos, databases, etc.). Within this project, VISC in cooperation with Baltic Computer Academy is developing courses (to be launched in 2019) which will teach how to use and create learning materials and courses in digital environment. Learning aids developed in ESF project ‘Improving the sectoral qualifications system for the development and quality assurance of vocational education’ will be used as a base for learning materials (Point 3.1.1).

3.2. At school level

3.2.1. Vocational education programme ‘Civil protection and security’
In Saldus Technical School a new vocational education programme ‘Civil protection and security’ with qualification ‘Cyber security technician’ was introduced in September 2018. Currently this is the only vocational school in Latvia where such a programme is available.

The main goal of the programme is to prepare specialists with cyber security skills, for them to be able to defend the country, enterprises, energy companies, telecommunications etc. from cyber-attacks. In addition to the general educational

content, cyber security professionals also acquire vocational subjects such as radio communication theory and basic training in field of communication.

Saldus Technical School has a special cyber-polygon available for training where learners can test their technical knowledge. During their training, learners attempt to hack different systems to understand the process and know how to better repel cyber-attacks.

The content of the vocational education programme ‘Civil protection and security’ was created by Saldus Technical School in cooperation with Ministry of Defence and National armed forces.

In addition to the mentioned vocational programme, Saldus Technical School offers extra-curriculum activity – Cybersecurity Group for other learners of this school.

3.2.2. Development of new digital learning courses for teachers

Ogre Technical School in collaboration with partners from Hungary, Spain, Germany and Lithuania implements Erasmus+ project ‘Vocational online collaboration for active learning’ (11). VOCAL (2016-18) aims to promote cooperation between teachers of higher and vocational education institutions to develop online collaborative learning activities and training courses for different target groups.

During the project six online learning courses and three training materials were developed. Following learning materials were developed (each material consists of 20 to 30 hours of learning):

(a) training material on digitalisation of quality learning resources;
(b) training material on designing online collaborative learning activities;
(c) training material on tutoring diverse learner groups.

Following learning courses were developed:

(a) digital pedagogy;
(b) students' readiness;
(c) intercultural competence;
(d) digital assessment;
(e) contemporary education;
(f) audio-visual materials in the learning process.

Learning materials (in English) are currently available on website http://lms.vocalerasmus.eu.

(11) http://lms.vocalerasmus.eu/
CHAPTER 4.
4.0 intelligence for VET

4.1. Pilot study using online job advertisements to identify skills requirements in the labour market

The non-governmental organisation’s New Entrepreneurs Center ‘Jobs & Society’ (in partnership with Estonian Business School and Spanish private company ‘IN&S Comunicación e innovación sostenible’) project ‘Youth BIZ Skillset’ – ‘Skills required in the labour market: using job advertisements to identify skills requirements in the labour market’ (12) (2017-19) used big data analysis principles to extract information from job advertisements.

The aim of the study was to reveal skills needs in today’s world of work and to find out methodological limitations and benefits of using content of job advertisement within such analyses.

The dataset contained job advertisements placed on online job portals www.cv.lv in Latvia and www.cv.ee in Estonia in November 2017. In total 2 439 job advertisements in Latvia and 1 529 in Estonia were extracted. Coding, grouping and clustering of job advertisements were provided manually as pilot study had limited time and financial resources for creating special data analysis programmes. All job requirements were classified in the thematic groups: basic skills, language skills, computer skills, communication and interaction skills, technical skills and knowledge, personal skills and personality, education level and field, specific skills and knowledge, and other requirements. The professions/jobs were classified according to the Classification of Occupations used in Latvia (which is based on the International Standard Classification of Occupations (ISCO-08) and, therefore, also could be used in the analysis of Estonian data). The obtained education requirements were classified according to the International Standard Classification of Education (ISCED–F 2013). The collection and analysis of other information was carried out through a two-step coding procedure – firstly coding in detail each of the skills requirements, then grouping them in thematic groups. Based on coded skills, abilities and knowledge an in-depth analysis of skillset in particular professional groups and certain professions were conducted. Additionally, cluster analysis was conducted, analysing what skill combinations are most commonly required in job advertisements.

The most frequently mentioned thematic group of skills in job advertisements are those related to personal skills and personality. The study report includes opinions of Latvian and Estonian experts on the results of the study. Experts say that using job vacancies to identify labour market required skills is an unusual approach for Latvia. Interesting and surprising fact is the advertisements have so much emphasis on personal qualities and character traits, thus, social skills become as equal as or more important than specific work-related skills and experience. Yet the results of the study confirm the tendency in the past 5 to 10 years according to which employers are looking more for right type of people that suit their organisational culture. The clear focus on more 'soft' skills should be taken into account in developing curricula in the school system and universities and more emphasis should be placed on interpersonal communication and collaboration skills, creativity and analytical thinking (including design thinking). For young people these data provide an indication where the job market moves and the profession alone and the prior work experience do not guarantee a job.

4.2. Development of interactive tool for the use of labour market forecasts

State Employment Agency's (in cooperation with Ministry of Economics) ESF project ‘Development of labour market forecasting system’ (13) (2016-21) is aimed at creating a job pre-emptive labour market reforms, in order to make informed decisions appropriate for economic needs to provide development and implementation of the policy. During the project, an interactive online tool will be created for reflecting labour market forecasts, which would be easy to use tool for policy planners and general public. This will allow policy makers, education institutions, career planning and professional development centres, graduates who plan to continue their studies and interact with other stakeholders to get acquainted with and analyse the current trends in the future of the labour market in an interactive way, thereby gaining a wider insight into the prospects for future professional development. Market transformation pre-emptive system will provide the public with regular information on developments in labour market. The development of the technical specification will be based on previous approaches, forecasting methods and models developed during the programming period of the EU funds.

(13) http://www.esfondi.lv/es-fondu-projektu-mekletajs/project?number=7.1.2.2%2F16%2FI%2F001
A study (\(^{(14)}\)) carried out on the possibilities of setting up a system of reforming labour market and linking labour market forecasts to policies was published in 2019. The study report lists recommendations for the development of interactive online tool intended as easy to use system for stakeholders in order to promote their cooperation, which would link occupations and education. Within the study, 'Guidelines for the interpretation and use of medium- and long-term labour market forecasts' were elaborated. The purpose of the guidelines is to provide information and guidance on understanding, interpreting and taking into account medium- and long-term labour market forecasts included in the Ministry of Economics report and its annexes. Creating skills in such a forecasting tool is novelty as well as the tool itself. The medium- and long-term labour market forecasts are currently based mainly on the figures of the Labour Force Sample Survey conducted by the Central Statistical Bureau, but this study proposes integration of data from different registers (including the State Revenue Service and the State Employment Agency into the forecast model).

During the implementation of the project, the following activities will be implemented between August 2016 and December 2021:

(a) short-term labour market forecasting methodology is improved, including the preparation of short-term forecasts in terms of skills and developed guidelines for users of the methodology;

(b) annual employer surveys are carried out to renew short-term labour market forecasts. The report 'Short-term labour market forecasts for 2019: employer survey' states that three out of five employer surveys are concluded and according to the survey, the number of jobs will continue to grow during 2019. The difference between jobs to be created and job losses (balance sheet) for 2019 is positive. Job vacancies are expected to increase, combined with a general shortage of labour and skilled labour (\(^{(15)}\)).

(c) a technical specification for the development of the labour supply and demand forecasting platform (including medium and long-term forecast analysis tool and visual solution (prototype)) is developed. The development of technical specifications will use the approaches, forecasting methods and system dynamics model developed during the previous EU funds programming period;

(d) information and training activities are implemented for staff and officials of the institutions involved in the development and implementation of employment policies.


\(^{(15)}\) https://www.nva.gov.lv/docs/31_5ca4bc35e9db8.82035019.pdf
The pre-emptive system of labour market changes will provide easy and transparent information on skills and professions demanded in both short, as well as and medium and long-term, as well as information on learning opportunities, which will facilitate future career choices of users.
CHAPTER 5.
VET 4.0 learning practices

At national level different digital aids are available to create learners’ interest in vocational education and labour market, while at school level various activities are organised to promote the use of digital tools and inform about digitalisation in general.

5.1. At national level

5.1.1. Interactive website ‘Occupation world’

‘Occupation world’ is an interactive website (http://www.profesijupasaule.lv) developed by State Education Development Agency that provides descriptions, videos and useful links about different occupations.

Aim of the ‘Occupation world’ is to expand learners’ perception of diversity for different occupations, and to provide information about work content and requirements that people working in these positions are expected to have, as well as to create an interest and willingness in learners to study in depth the world of work and explore the opportunities of their personal careers.

‘Occupation world’ is created as a virtual city, which consists of objects – enterprises, where occupations related to that enterprise can be found. Each occupation has a description, interview with someone working in that occupation, photo gallery and opportunities for acquiring the occupation concerned.

To create occupational structure and occupation descriptions in ‘Occupation world’ information from ‘Occupation classification’ (developed by the Ministry of Welfare), sectoral descriptions and Sectoral Qualifications Frameworks designed by Sectoral Expert Councils and consultations with industry associations and industry-based companies were used.

Virtual map of ‘Occupation world’ is accessible at:

5.1.2. Virtual practice

Website https://www.prakse.lv (Virtual practice) offers interactive tool that allows participants to explore different occupations and test their knowledge to see if they are fit for a position in a specific company. Participants are asked to answer number of questions (total number of questions depends on company and position) by selecting one out of several possible answers. At the end of the test, they can
see how many questions they answered correctly. After the test they have an
option to submit their practice application to that company (tests can only be
completed if applicant has logged into Prakse.lv system with their account).
Currently Prakse.lv contains list of 311 occupations in various companies.

5.1.3. Digital skills for future work 2019
In August 2019, event ‘Digital skills for future work 2019’ (16) was organised by
Latvian Information and Communications Technology Association, Microsoft
Latvia and Latvian IT Cluster where young people developed projects in various
future digital occupations. They could participate in one of the following possible
career development directions: machine learning engineer, robot trainer, virtual
reality creator, artificial intelligence developer, 3D engineer, 5G highway manager,
influencer, cloud architect, data detective and smart home designer. Young people
had to choose the most appropriate topic for them, develop and present a digital
vision of the occupation’s responsibilities, required qualities and skills, and day-to-
day work.

5.1.4. Career Week
In October 2019, the event ‘Career Week’, organised by VIAA, this year focused
on career choices and future occupations, highlighting the role of artificial
intelligence and technology in the future labour market. The event included
discussions with industry professionals, interactive classes, workshops, open days
and creative workshops. In total, more than 137 000 young people in 83 cities
participated in various events across Latvia. ‘Career Week’ is an annual series of
events that give young people the opportunity to learn about their possible future
occupations, meet with representatives of labour market, visit enterprises and
receive career advice.

5.2. At school level

5.2.1. Cycle of events ‘Me – future entrepreneur’ and ‘Industrialisation 4.0
and initiative’
Vocational education competence centre (VECC) ‘Liepaja State Technical School’
within ESF project ‘Career support for learners in general and vocational education
institutions’ (2016-20) organised cycle of different events, for example, trips to
countries, technology exhibitions, meetings with industry representatives, etc.

In the context of i.4.0, some of events organised by school are: ‘Me – future entrepreneur’ and ‘Industrialisation 4.0 and initiative’ (autumn, 2018), which have already taken place. They focus on challenges of the new division of labour and modern business Industrialisation 4.0 during which the professional development trainer encouraged thinking and looking for a way to develop participants' business skills, in line with the new challenges in the division of the labour market, as well to explore entrepreneurial success stories through experience that serves as a motivation for career decision-making. Novelty is the context of i.4.0, which encourages thinking and modern work practices.

5.2.2. School robotics competition ‘Sigulda Cup 2018’
On 24 February 2018 in Sigulda sports centre Latvian school robotics competition ‘Sigulda Cup 2018’ took place. Competition was organised by VECC Daugavpils Technical School in cooperation with Sigulda Municipality Innovation Centre, Accenture Latvia, Latvian Electrical Engineering and Electronics Industry Association and Riga Technical University Robotics Club.

Participants were learners from general and vocational education institutions. Participants not only had to build the robots they were going to use for the competition but also program them.

5.2.3. Seminar ‘Come with us: IT professionals’
To explore IT opportunities more closely, VECC Daugavpils Technical School within ESF project ‘Career support for students in general and vocational education institutions’ (2016-20) organised seminar and practical activities ‘Come with us: IT Professionals’ presented by ‘Binitex’ Ltd (one of the largest IT companies in Daugavpils).

The event was attended by VECC Daugavpils Technical School third year computer system technicians. The learners had a two-part event consisting of a workshop and a practice session. During the seminar, students learned about working conditions, working culture, specialisation and career opportunities in the IT sector, the errors of young professionals in job search, the cooperation of specialties between programming technicians and computer system technicians, the trends in the IT sector and the most popular self-training methods of employees. During practice sessions, some students had the opportunity to try themselves in a real recruitment process.
CHAPTER 6. Adapting to AI and automation

6.1. AI strategy

Currently Latvia has no AI strategy, but in order to continue the dynamical move forward in the efficient use of state-owned data, VARAM is currently developing the ‘Open Data Strategy of Latvia’, as well as the ‘Artificial Intelligence Strategy of Latvia’ (17). Since the elaboration of these documents was initiated recently, no further information is available yet.

6.2. National training programmes

In terms of national education system, multiple education opportunities are available for young people and adults to improve their digital skills.

State Education Development Agency [Valsts izglītības attīstības aģentūra] (VIAA) in cooperation with schools offers vocational education programmes for adults within ESF project ‘Competence development of employed persons’ (2017-22). The programmes are designed for the employed and self-employed persons over 25 years of age. Many of these programmes aims at improving digital competences.

The most notable programmes ensured by VIAA related to digitalisation are:

- 3D printing and modelling;
- 3D visualisation – AutoCad programme for the manufacture of textiles, clothing, leather and leather products;
- Cybersecurity;
- Digital skills required for work;
- Data analysis;
- IT security in the enterprise;
- Use of information technology programmes in electric power.

Participation in these vocational education programmes requires 10% co-payment from the participant. Length varies by the programme.

Higher education institutions provide such study programmes as big data analysis, internet of things, cyber security engineering, virtual reality and mobile technologies, intelligent robotic systems, automation and computer engineering, and many more.

(17) http://www.varam.gov.lv/lat/aktual/preses_relizes/?doc=27553
Besides the project implemented by VIAA, higher education institutions, vocational schools and centres provide short professional development programmes, e.g.:

- Creating e-learning courses;
- Facebook marketing for specialists;
- Google AdWords Advanced;
- Interactive online services for classroom work;
- Information and communication technologies for professional work in the field of education.

6.3. Job displacement due to automation

Contrary to the popular belief that people will lose jobs due to digitalisation, often opposite tendency may be observed in Latvia. For example, in discussions (18) organised by the Free Trade Union Confederation of Latvia on 30 October 2017, representative of Latvijas Finieris (leading plywood and its products manufacturer in the Baltic states) noted that the added value of automation is enormous in terms of customer and employee confidence, knowledge development, higher qualifications, higher pay, traceability and transparency of the work process, efficiency, and better working conditions for the employee. The physical work of employees is reduced and, thus, their sustainability in company increases. In addition, largest award in ICT named ‘Platinum Mouse 2018’ (19), organised by Latvian Information and Communications Technology Association, was awarded to Latvijas Finieris in category ‘Digital transformation of the enterprise’ for their project ‘Digitalisation of company production tracking and planning processes’. In the discussion, a representative from LMT (mobile operator in Latvia) emphasised that digitalisation also brings new jobs. For example, cybersecurity specialist and smart TV content selection specialist positions have been introduced in the LMT.

On 26 October 2018, another annual discussion (20) was organised by Free Trade Union Confederation of Latvia which was focused on the impact of digitalisation on employment: changes in employment relationships, the emergence of new forms of employment, work in platforms, robotisation, automation and the impact of artificial intelligence on business and manufacturing process. During the discussion, a representative of the Ministry of Welfare noted that the number of

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(19) https://www.chamber.lv/lv/content/jaunumi/3695
(20) http://www.lbas.lv/news/1711
Jobs in agriculture, public administration and manufacturing are expected to decrease, followed by demand for new specialists in support sectors (for example, to monitor robots). Meanwhile, a representative of Lattelecom (mobile operator) talked about the impact of robotisation on employment relationships, since with the introduction of new technologies the world has changed in the past 20 years. A representative of business technology platform ‘BiSMART’ highlighted the future vision where digital transformation is already taking place and for employee and employer understanding the development of these processes is difficult. Similar to the representative of Lattelecom, he also emphasised that robotics, process automation, augmented reality, internet of things, 3D print are already today’s reality.

News portal Delfi conducts analytical research series. One of the research (21) was focused on technologies challenging labour market. Conclusion was drawn that automation would soon take over from the fields of creativity and social intelligence. Automation was less likely in workplaces that required higher education, as well as in workplaces where employees needed to collaborate with each other. People would still be superior in technology in areas where they needed to be able to navigate difficult situations, respond to non-standard challenges and deal with unprecedented challenges. According to the article, in Latvia there are already several notable instances where AI is used, for example, machine translation and programmes which reply to simple customer questions.

Latvian Information and Communications Technology Association organises campaign ‘Smart Latvia’ (22) (2018-present) which aims to educate heads of small and medium sized enterprises about latest IT solutions and encourage implementing them in their enterprises. During the campaign, a survey of business associations of Latvia was carried out, which allowed to conclude that enterprises in Latvia are not ready yet for digital transformation. Half of the surveyed associations admitted that most companies had implemented some basic IT solutions, but noted that the most advanced IT technologies were still under development. Financial and knowledge gaps were identified as the main barriers. In the survey only 8% heads of associations admitted that their industry has undergone a complete digital transformation.

In 2019, Latvian Chamber of Commerce and Industry organised business forum ‘Human – success factor’ (23) which was focused on availability of labour supply. During the discussions one of the participants emphasised that digital

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(22) https://likta.lv/gudra-latvija/
(23) https://www.chamber.lv/lv/content/jaunumi/3795
transformation is also a tool to address labour shortages, as automation can substitute certain activities in manual labour.
CHAPTER 7.
Conclusion

Latvian vocational education system has to cope with challenges brought by digitalisation and industrial revolution 4.0 (i.4.0) which are mostly related to developing digital skills of vocational education teachers. One of the issues is the fact that courses provided by VISC are mostly attended by those teachers who already have an experience with digital technologies. The challenge is involving other teachers in learning, which may be mostly caused by their disinterest or fear of mistakes in learning new technologies.

Another challenge involves promoting sectoral responsibility for the development of vocational education students’ digital skills and vocational education graduates’ expectations as regards employment. Current regulatory framework envisages the involvement of Sectoral Expert Councils in the operation of the entire vocational education system: from the definition of a priority vocational education programmes, the development of occupational standards, programmes and examination content to the delegation of representatives for qualification exam commission. Yet the activities of Sectoral Expert Councils remain heterogeneous and sometimes formal, because the State does not provide funding for their activities.

Although there are some distinctive examples of digitalisation in vocational education, the third challenge is the lack national strategy for the improvement of digital skills in vocational education. In this context, new Education and Skills Development Guidelines 2021-27 are expected to be elaborated by the end of the 2020 by the Ministry of Education and Science [Izglītības un zinātņes ministrija] in collaboration with the Organisation for Economic Co-operation and Development (OECD). The guidelines would support the development of a strategic approach to digital skills. The national strategy would ensure a broad perspective on skills with the view to highlight the development of vocational education in digitalisation and i.4.0 technologies; thus, promoting the role of vocational education schools as centres of excellence.
## Abbreviations and acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AI</td>
<td>artificial intelligence</td>
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<tr>
<td>ERDF</td>
<td>European Regional Development Fund</td>
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<tr>
<td>ESF</td>
<td>European Social Fund</td>
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<tr>
<td>i.4.0</td>
<td>Industrial Revolution 4.0</td>
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<tr>
<td>ICT</td>
<td>information and communication technologies</td>
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<tr>
<td>ISCED</td>
<td>International Standard Classification of Education</td>
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<tr>
<td>ISCO</td>
<td>International Standard Classification of Occupations</td>
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<tr>
<td>IT</td>
<td>information technologies</td>
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<tr>
<td>IZM</td>
<td>Izglītības un zinātnes ministrija [Ministry of Education and Science]</td>
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<tr>
<td>VARAM</td>
<td>Vides aizsardzības un reģionālās attīstības ministrija [Ministry of Environmental Protection and Regional Development]</td>
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<tr>
<td>VECC</td>
<td>vocational education competence centre</td>
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<tr>
<td>VET</td>
<td>vocational education and training</td>
</tr>
<tr>
<td>VIAA</td>
<td>Valsts izglītības attīstības aģentūra [State Education Development Agency]</td>
</tr>
<tr>
<td>VISC</td>
<td>Valsts izglītības satura centrs [National Centre for Education]</td>
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<tr>
<td>VOCAL</td>
<td>Vocational online collaboration for active learning</td>
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Cabinet of Ministers (2016a). *Ministru kabineta noteikumi Nr. 126 „Darbības programmas „Izaugsme un nodarbinātība” 7.1.2. specifiskā atbalsta mērķa „Izveidot darba tirgus apsteidzošo pārkārtojumu sistēmu, nodrošinot tās sasaistī ar Nodarbinātības barometru” 7.1.2.2. pasākuma „Darba tirgus apsteidzošo pārkārtojumu sistēmas ieviešana” īstenošanas noteikumi".* [Cabinet of Ministers Regulations No 126 ‘Operational programme ‘Growth and employment’ 7.1.2. Specific Support Objective ‘To establish a system of aging labour market reform, to ensure its linkage with the Employment Barometer’ 7.1.2.2. activity ‘Introduction of a system of reforming the labour market’ implementing rules’ Regulation No 128]. https://likumi.lv/ta/id/281827-darbibas-programmas-izaugsme-un-nodarbinatiba-8-1-3-specifiska-atbalsta-merka-palielinat-modernizeto-profesionalas-izglitibas


Cabinet of Ministers (2016d). *Ministru kabineta noteikumi Nr. 280 „Darbības programmas „Izaugsme un nodarbinātība” 8.5.3. specifiskā atbalsta mērķa „Nodrošināt profesionālās izglītības iestāžu efektīvu pārvaldību un iesaistītā personāla profesionālās kompetences pilnveidi” īstenošanas noteikumi"* [Cabinet of Ministers regulations No 280 ‘Operational programme ‘Growth and employment’ 8.1.3. Specific Support Objective ‘Effective management of vocational education institutions and the development of staff competences’ implementing rules’]. https://likumi.lv/ta/id/282024-darbibas-programmas-
izaugsme-un-nodarbinatiba-8-5-3-specifiska-atbalsta-merka-nodrosinat-profesionalas-izglitibas-iestazu


