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SELECTION OF COMPANIES FOR STUDENT INVOLVEMENT IN WORK-BASED LEARNING

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Abstract
Work-based learning takes place in education of competitive employees with required professional qualifications, skills, competence in Latvia. Researchers in many countries in different parts of the globe in their academic research are investigating factors influencing work-based learning. In successful work-based learning all involved stakeholders are important and influential: vocational education institution and its teaching staff and management of this vocation education institution, company where students spend part of their education and skills development process. There are several important aspects recognised as very significant and valuable for consideration in involvement of students in work-based learning analysed in scientific research and reflected in respective scientific internationally peer-reviewed publications as well as taken into account in creation of legislative frame for work-based learning and practical implementation of work-based learning with optimal solutions in many countries on the globe and also in the Republic of Latvia. The aim of the research is to analyse aspects of student involvement in work-based learning process. Research methods applied: analysis of scientific peer-reviewed publications, analysis of statistical data related to analysis of tendency of number of vocational education establishments with trend analysis and case studies on work-based learning. Results indicate that there are many requirements for companies to involve students in work-based learning.
Key words: work-based learning, company, vocational education.

Introduction

Work-based learning takes place in education of competitive employees in Latvia which has been realised already for several years and respective legislative regulations are prepared and implemented. There are several important aspects for involvement of students in work-based learning analysed in scientific research as well as taken into account in creation of legislative frame and practical implementation of work-based learning. Work-based learning takes place in education of competitive employees with required professional qualifications, skills, competence in Latvia. Researchers in many countries in different parts of the globe in their academic research are investigating factors influencing work-based learning. In successful work-based learning all involved stakeholders are important and influential: vocational education institution and its teaching staff and management of this vocation education institution, company where students spend part of their education and skills development process. There are several important aspects recognised as very significant and valuable for consideration in involvement of students in work-based learning analysed in scientific research and reflected in respective scientific internationally peer-reviewed publications as well as taken into account in creation of legislative frame for work-based learning and practical implementation of work-based learning with optimal solutions in many countries on the globe and also in the Republic of Latvia. The aim of the research is to analyse aspects of student involvement in work-based learning process. Research methods: investigation of scientific peer-reviewed publications, analysis of statistical data related to vocational education establishment number analysis with trend analysis and case studies on work-based learning.

Materials and Methods

Materials and empirical research methods used: analysis based on results reflected in scientific peer-reviewed publications, analysis of tendency of number of vocational education establishment analysis with trend analysis and case studies on work-based learning. For statistical data on analysis on tendency, the following is used: the total number of vocational schools (programmes of vocational education and professional secondary education can be acquired) in the Republic of Latvia. From the CSB report 'Vocational Education Institution' data are obtained on the activities of vocational education institution (foreign language acquisition by students, foreign teachers and funding of a vocational education institution). Data collection on vocational schools in Latvia - data on the operation of a vocational education institution (number of enrollments by educational programs and school years, numbers and shares of enrolled students by age and by sex, number of teachers) are obtained from State Education Information System of the Ministry of Education and Science of Republic of Latvia. Information on vocational school entrants and graduates of the vocational education is collected annually from October 1 till September 30 as on October 1 all agreements for involvement in vocational education have to be signed by vocational education institution

and by the student at respective vocational education institution (Official Statistics portal, 2022). For time series of vocational education establishment empirical data is applied to the trend analysis of statistical data and case studies of vocational education organisation, and practical realisation on work-based learning involving all stakeholders (vocational education teaching staff, employers and entrepreneurs, public administration representatives and vocational education students) in the organisation and realisation of work-based learning.

Theoretical Findings

Researchers in many countries on several aspects of work-based learning in academic research are analysed from different angles with many important findings for possible practical use – like application and practical exploration of domains and elements of integrated training competency model through work-based learning (Ciptono *et al*., 2021) including important part of pedagogical aspects of inter-professional workplace learning with analysis (Baerheim & Raaheim, 2020; Smith, 2010; Sergejeva & Aboltins, 2020; Romanova *et al*., 2018) of different case studies indicating importance of student views, organisation of vocational education and vocational education school management attitude. Work-based learning has been chosen by many researchers as the field of deeper study (Gibbs, 2011; Salisbury & Jephcote, 2010) and has been covered by many researchers world-wide. The contribution of professional education to entrepreneurship innovation and competitiveness (Brante & Sloka, 2021a) is analysed on importance of aspects influencing entrepreneurship of work-based learning (Brante & Sloka, 2021b) and several aspects for realisation of competitive vocational education experience of Latvia already taking place for several years. Researchers (Cangialosi, Odoardi, & Battistelli, 2020) have investigated the three-way interaction model of innovative behaviour useful for organisation of vocational education, task-related learning, and job characteristics as they are recognised as an important part of work-based learning for several firm size and differences of work-based learning processes realisation in different sectors (Bishop, 2020; Sergejeva, Aboltins, & Atslega, 2021) stressing that different sector needs and specifics are important for respective sector and have to be considered also for vocational education organisation and realisation. Researchers (Sauli, Wenger, & Berger, 2021) recognise the aspects on supporting apprentices integration of vocational school and work-based learning in different countries with remarkable results in Swiss initial vocational education and training which could be studied and considered also in other countries. Requirements for discipliniarity and work (Fergusson & van der Laan, 2021) which are very important for work-based learning realised as an emergeng transdisciplinary mode of study and getting increasing importance for sustaining work-based learning (Namjoshi *et al*., 2021) what has been confirmed also during the special requirements for work-based learning in Covid-19 pandemic conditions. Program coherence and integration of vocational education school and work-based learning in different countries with special attention to the Icelandic dual vocational education and training (VET) system (Namjoshi *et al*., 2021) analysis by researchers also on pedagogical aspects (Burke *et al*., 2009) and practical experience and recommendations could be useful for other countries. Self-design project based learning as part of work-based learning and alternative learning model for vocational education (Hamdani & Suherman, 2021) has been recognised for consideration. Different countries have different experience. First successful realisation of work-based learning was conducted in the Netherlands where a very deep analysis of work-based learning in Dutch vocational education experience by their considerable experience in connecting learning places, learning content and learning processes (Onstenk, 2017; Onstenk & Blokhuis, 2007) has indicated important aspects in organisation of work-based learning especially by connecting school with companies and application of gained knowledge, skills and competence in the best possible way. Also, researchers have investigated experience of work-based learning in Spain (López Fogués, 2017) and in Germany analysing the areas of learning and several aspects of the shift towards work and competence orientation within the school-based vocational education has already been well-known for a long time as well as analysed German dual apprenticeship system (Gessler, 2017; Gessler & Howe, 2015) in detail, and made comparisons of practical findings in different countries (Pilz, 2007) with practical findings useful also for other countries. Sweden vocational education has also valuable experience discussed in academic research (Fjellström & Kristmansson, 2016) whose findings are practically usable for policy development. Employability aspects of graduates from vocational education schools (Mishra, Alseddiqi, & Pislaru, 2009) are on researchers agenda. Efficiency of realisation of college and career readiness program (Detgen *et al*., 2021) in work-based learning has been recognised as valuable bridge to employment and competitiveness in labour market and scaling of competitive workforce development by using MOOCs to reduce several costs by different stakeholders and narrow the skills gap required by entrepreneurs (Rosendale & Wilkie, 2021; Seimuskane, Vilka, & Brekis, 2017) as an important part of vocational education organisation and realisation in compliance

of labour market needs. Researchers in investigation of mediating effects of school engagement between high school on-time completion which sometimes is a problem, career development and technical education realisation (Xing & Gordon, 2021; Batraga *et al*., 2019; Esmond & Atkins, 2020) stressing the importance of work-based learning where public administration attitude is important (Savrina & Seimuskane, 2018), on analysis of matching vocational training and labour market demands with investigation of the opinion of public administrations on different levels – state and municipality (Buligina & Sloka, 2013), importance of marketing tools (Salkovska *et al*., 2020; Kalkis, Graveris, & Roja, 2021) and ergonomic aspects (Kalkis, Andza, & Roja, 2021) and perceptions and practical realisation on the role of practical and simulated learning in promoting successful entrepreneurship start and realisation (Lose, 2021) having importance also in work-based learning.

Results and Discussion

The number of vocational schools in Latvia is reducing almost every year in recent decades – see data in Figure 1.

Data indicate that the number of vocation schools in Latvia reduced on average by 4.4 schools annually, it indicates that vocational education is becoming more concentrated in best vocational education establishments transferred in well-equipped education centers where work-based learning is organised with significant involvement of entrepreneurs in education process.

More and more attention is paid in vocational education schools to work-based learning with good results in realisation of this education.

Involvement of students in WBL, company selection takes place:

1. Based on the company's request. A company representative conducts a job interview. During the interview, the student justifies his / her choice to study in the chosen profession, his / her current experience related to the chosen profession.

2. A vocational education institution offers a student a WBL internship place from its database, taking into account the company's compliance with WBL implementation.

3. The student chooses the place of WBL practice, taking into account the company's compliance with WBL implementation.

It should be noted that students differ in their character traits, interest in learning a profession, work ability, attitudes towards studies and work. All companies want to involve very good students into practice, not so much in terms of their level of knowledge, but in terms of their attitude towards work and their responsibilities, integrity, dedication and punctuality.

Companies in the realisation of work-based learning are involved on a voluntary basis. In order to involve a company in the successful implementation of work-based learning, it is necessary to carry out:

1. great explanatory work, which takes place both individually and in cooperation with professional organizations and local governments in the field:

1.1. business seminars organized by the local government;

1.2. seminars organized by sectoral professional organizations;

1.3. events organized in vocational education institutions, meeting with entrepreneurs in the sector;

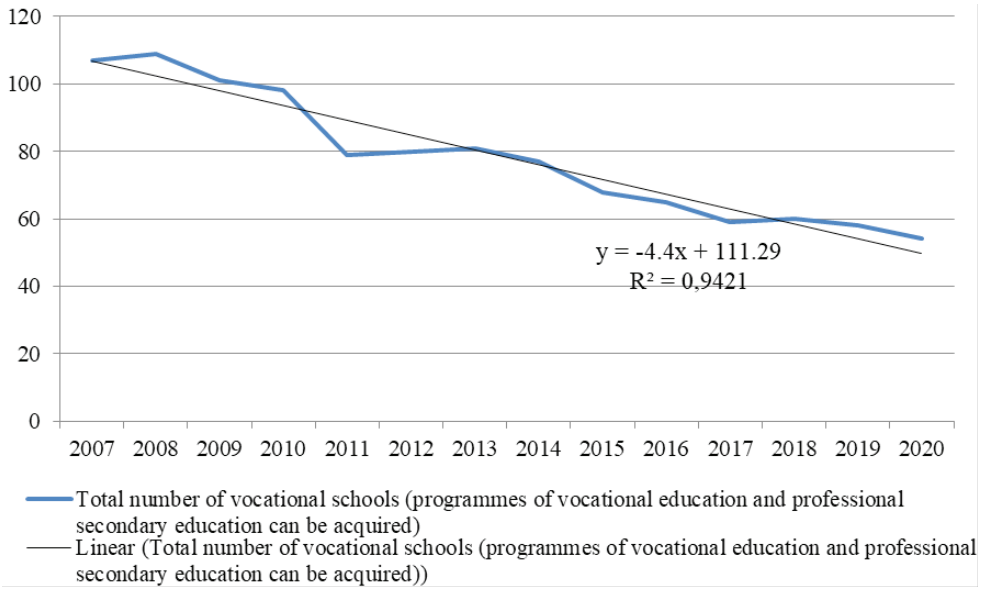

Figure 1. Number of vocational schools in Latvia in 2007-2020.

Source: Author's construction and calculation based on Official Statistics database IPP010.

1.4. events organized in companies, student study tours in companies;

1.5. the vocational education institution meets individually with entrepreneurs.

2. preparation of informative material, presentation on the benefits of the company in implementing WBL;

3. Establishment of a database of companies that meet the requirements for WBL provision.

Requirements for each WBL participant are now set at a national level.

When concluding a cooperation agreement with a company on the implementation of WBL, a vocational education institution fulfills several conditions:

1) In close and well-designed co-operation with the enterprise, develops and approves an individual plan for the implementation of WBL for each student, determining the accepted before proportion of the theory and practice of the professional content needed for the respective specialisation of the educational program in the respective vocational education institution and respective enterprise;

2) Provide or approve a company selected by the student for the implementation of the individual plan for each student;

3) Evaluates and makes a decision on the company's compliance with the implementation of the individual studies and training plan;

4) Ensures the conclusion of a training contract of each student after the approval of the individual plan of studies and work;

5) Introduces each student to:

5.a) The objectives, tasks as well as content of the individual plan for each student;

5.b) The basic principles of the implementation of the content of the individual plan for studies/work and the assessment on regular basis of the student's learning and work achievements;

5.c) Indicates each student rights as well as obligations during the implementation of the individual plan of each student;

6) If necessary, provides the student with support for transport and service hotels during the implementation of the individual plan for each student and could cover the related transportation and accommodation expenses;

7) Determines the responsible coordinating person for work-based learning implementation in the vocational education institution and the selected and accepted enterprise;

8) Provides necessary methodological support to realisation of the work-based learning manager in the respective company who supervises and manages the implementation of the vocational education student's accepted individual plan;

9) Ensures that the lesson record is completed on the basis of the accepted content of the student's individual plan and assessment on regular basis of the student's knowledge, professional skills and competences agreed with the selected company during the implementation of the student's individual plan;

10) Performs the evaluation of the student's knowledge, student's level of professional skills and professional abilities, observing the accepted main principles and realisation procedures for the evaluation of vocational secondary education with work-based learning and competitive vocational education taking into account the accepted regulatory framework regarding the state vocational secondary education standard;

11) Ensures the insurance of the student's possible accidents during the implementation of the accepted student's individual plan, determining in the insurance student's life, student's health and student's physical condition of the student as the object of respective insurance;

12) Implements co-operation on regular basis with the sectoral expert councils involving employers regarding the promotion of the vocational education quality, efficiency of vocational education and compliance of the implementation of vocational education in the relevant sector with the respective requirements of the labor market in realisation of work-based learning.

The vocational education institution is among the most important stakeholder in realisation of a system for work-based learning management and establishes:

1. Structure of work-based learning participants involving

1.1) Deputy Director of vocational education institution for Education and Practical Training responsible for work-based learning training in general;

1.2) Head of the study department of the vocational education institution who is responsible for the realisation of the study schedule in the vocational education institution and respective company involved in work-based learning;

1.3) Head of the Department of Educational Programs who is responsible for the development and practical implementation of the content of the internship program for successful vocational education and implementation of the student's individual plan;

1.4) Supervisor from the vocational education institution responsible for practical placement or practice in close co-operation with the practice supervisor from the company on the work-based learning process in accordance with the accepted student's individual plan.

2. Prepared and accepted document by vocation education institution - order on the responsibilities of each participant involved in work-based learning.

The company involved in realisation of work-based learning fulfills several conditions in the preparation

of the agreement with the respective vocational education institution on the implementation of work-based learning:

1) Ensures that a WBL practice manager is assigned to the company;

2) At the beginning of WBL, provides instruction to the student on labor protection issues and introduces the company's rules of procedure;

3) Ensures the implementation of WBL for each student in accordance with the accepted individual plan of each student respecting the respective company's internal regulations, labor protection aspects, required fire safety and electrical safety realisation as well as respecting sanitary and hygienic norms of each company;

4) Provides with individual labor protection means for each student during the realisation of the individual plan in accordance with the regulations in the company related to labor protection requirements, using personal protective equipment;

5) Supervises the student in the company during the realisation of the accepted individual plan;

6) Determines the number of students accepted to one work-based learning supervisor in the company;

7) Submits to the educational institution the evaluation of the student's knowledge, student's professional skills and student's abilities regarding the realisation of the accepted student's individual plan;

8) Enters into the employment contract of the student or his or her legal representative aspects related to legal relations of employment or an agreement regarding the award of a work-based scholarship (as there could be several possibilities);

9) Implements co-operation with the respective sectoral expert councils on the promotion of the quality of respective vocational education program, efficiency of the respective program and compliance of the implementation of vocational education in the relevant sector corresponding with the requirements of the labor market needs in the situation of realisation of work-based learning;

10) Ensures the student's civil liability insurance during the realisation of the accepted student's individual plan in accordance with the accepted student's study contract.

In order to ensure the quality of WBL implementation, several requirements are set for the WBL practice manager in the company:

1. The WBL practice manager must have pedagogical competence in the company. The WBL practice manager in the company has several opportunities to prove his / her pedagogical competence:

1.a) The head of the WBL practice has the professional qualification as the involved teacher;

1.b) The head of WBL practice needs to have pedagogical knowledge and competence which are requested in the program for the improvement of teachers' professional competence improvement qualification courses in the amount of at least 72 academic hours;

1.c) The head or so called supervisor of WBL practice has pedagogical knowledge and skills obtained by acquiring the educational program for WBL managers in the amount of not less than 32 academic hours.

2. The WBL practice manager in the company must have the following professional knowledge:

2.a) The head of WBL practice in the company has the qualification of recognised experienced and certified craftsman recognised by the Latvian Chamber of Crafts and with an official certificate on relevant master practice;

2.b) The WBL internship manager in the company has officially recognised professional education in the respective industry;

2.c) The WBL internship manager has at least three years of professional work experience in the respective industry.

3. WBL practice manager in the company is able to ensure and guarantee the realisation of the accepted student's individual plan in the respective company and prepare the student's assessment realisation and preparation of relevant documentation;

4. The head of WBL practice in the company complies or corresponds with the agreed requirements specified in Section number 72 of the Law on the Protection of the Rights of the Child (if the student has reached certain age when he/she is an adult and can make his/her decisions).

Conclusions

1. Number of vocational education establishments is reducing during the last decade and the vocational education is concentrated in best equipped vocational education schools and many of them are involved in work-based learning.
2. Work-based learning is important in educating professionals for competitive labour market and includes finding of common language and co-operation with employers, with public administrations and education institution management to organise part of education at work place.
3. Big challenges for optimal organisation of work-based learning is to educate practice managers at work-place to comply with requirements for pedagogical skills and ability to teach students as most of them are excellent professionals and not so skilled in teaching.
4. Management of municipalities have different attitude for involvement in work-based learning with excellent results when all stakeholders are interested in co-operation.

5. Research results indicate that there are many requirements for companies to involve students in work-based learning.

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References

Baerheim, A., & Raaheim, A. (2020). Pedagogical aspects of interprofessional workplace learning: a case study. *Journal of Interprofessional Care*, 34(1), 59–65. DOI: 10.1080/13561820.2019.1621805.

Batraga, A., Salkovska, J., Braslina, L., Legzdina, A., & Kalkis, H. (2019). New innovation identification approach development matrix**.** *Advances in Intelligent Systems and Computing*, 783, 261–273. DOI: 10.1007/978-3-319-94709-9_26.

Bishop, D. (2020). Firm size and workplace learning processes: a study of the restaurant sector. *European Journal of Training and Development*, 44(2-3), 305–320. DOI: 10.1108/EJTD-08-2019-0139.

Brante, I., & Sloka, B. (2021a). The Contribution of Professional Education to Entrepreneurship Innovation and Competitiveness. *Regional Formation and Development Studies*, 2(34), 18–25. DOI: 10.15181/rfds.v34i2.2241.

Brante, I., & Sloka, B. (2021b). Work-based Learning – Challenge for Competitive Vocational Education Experience of Latvia. *Journal of Service, Innovation and Sustainable Development*, 2(1), 62–71. DOI: 10.33168/SISD.2021.0105.

Buligina, I., & Sloka, B. (2013). Matching vocational training and labour market demands – The opinion of public administrations. *Economic Research*, 26, 299–310. DOI: 10.1080/1331677X.2013.11517653.

Burke, L., Marks-Maran, D.J., Ooms, A., Webb, M., & Cooper, D. (2009). Towards a pedagogy of work-based learning: Perceptions of work-based learning in foundation degrees. *Journal of Vocational Education and Training*, 61(1), 15–33. DOI: 10.1080/13636820902819917.

Cangialosi, N., Odoardi, C., & Battistelli, A. (2020). Three-way Interaction Model of Innovative Behavior, Task-Related Learning, and Job Characteristics. *Performance Improvement Quarterly*, 33(2), 153–172. DOI: 10.1002/piq.21322.

Ciptono, A., Abd Samad, N., Hassan, R., Muslim, S., & Ismail, A. (2021). Exploration of domains and elements of integrated training competency model through work-based learning (Wbl). *Journal of Technical Education and Training,* 13(3), 201–212. DOI: 10.30880/jtet.2021.13.03.020.

Detgen, A., Fernandez, F., McMahon, A., Johnson, L., & Dailey, C.R. (2021). Efficacy of a College and Career Readiness Program: Bridge to Employment. *Career Development Quarterly*, 69(3), 231–247. DOI: 10.1002/cdq.12270.

Eiríksdóttir, E. (2020). Program coherence and integration of school-and work-based learning in the Icelandic dual vocational education and training (Vet) system. *Education Sciences*, 10(11), 1–17. DOI: 10.3390/educsci10110314.

Esmond, B., & Atkins, L. (2020). VET Realignment and the Development of Technical Elites: Learning at Work in England. *International Journal for Research in Vocational Education and Training*, 7(2), 193–213. DOI: 10.13152/IJRVET.7.2.4.

Fergusson, L., & van der Laan, L. (2021). Disciplinarity and Work: Work-Based Learning as an Emergent Transdisciplinary Mode of Study. *World Futures*, 77(7), 508–531. DOI: 10.1080/02604027.2021.1984158.

Fjellström, M., & Kristmansson, P. (2016). Learning as an apprentice in Sweden: A comparative study on affordances for vocational learning in school and work life apprentice education. Education and Training, 58(6), 629–642. DOI: 10.1108/ET-12-2015-0113.

Gessler, M. (2017). Areas of learning: The shift towards work and competence orientation within the school-based vocational education in the German dual apprenticeship system. *Technical and Vocational Education and Training*, 23, 695–717. DOI: 10.1007/978-3-319-41713-4_32.

Gessler, M., & Howe, F. (2015). From the reality of work to grounded work-based learning in German vocational education and training: Background, concept and tools. *International Journal for Research in Vocational Education and Training*, 2(3), 214–238.

Gibbs, P. (2011). Work-based learning as a field of study. *Professional and Practice-based Learning*, 4, 11–22. DOI: 10.1007/978-90-481-3933-0_2.

Hamdani, A., & Suherman, A. (2021). Self-design project based learning: An alternative learning model for vocational education. *Journal of Technical Education and Training*, 13(3), 67–78. DOI: 10.30880/jtet.2021.13.03.007.

Kalkis, H., Andza, K., & Roja, Z. (2020). Physical Load and Preventive Measures in Metal Manufacturing Industry. *Advances in Intelligent Systems and Computing*, 1215, 48–55. DOI: 10.1007/978-3-030-51549-2_7.

Kalkis, H., Graveris, I., & Roja, Z. (2021). Ergonomic Indicators and Physical Workload Risks in Food Production and Possibilities for Risk Prevention. *Lecture Notes in Networks and Systems*, 273, 47–53. DOI: 10.1007/978-3-030-80713-9_7.

López Fogués, A. (2017). Addressing mismatch in Spain: A concern and proposal beyond the economic sphere. Technical and Vocational Education and Training, 24, 355–368. DOI: 10.1007/978-3-319-47856-2_19.

Lose, T. (2021). Perceptions on the role of practical and simulated learning in promoting successful entrepreneurship. *Knowledge and Performance Management*, 5(1), 29–37. DOI: 10.21511/kpm.05(1).2021.03.

Mishra, R., Alseddiqi, M., & Pislaru, C. (2009). An improved employability skills model and its compliance through vocational educational system in Bahrain. *International Journal of Learning,* 16(9), 699–718. DOI: 10.18848/1447-9494/cgp/v16i09/46581.

Namjoshi, R., Pani, S., Despande, U., & Ranade, A. (2021). Sustaining work-based learning during the covid-19 pandemic. *Journal of Learning for Development*, 8(2), 412–430.

Official Statistics portal (2022). Official Statistics of Latvia, Responsible agency – Central Statistical Bureau of Latvia – database, IPP010.

Onstenk, J. (2017). Work-Based Learning (WBL) in Dutch Vocational Education: Connecting Learning Places, Learning Content and Learning Processes. *Professional and Practice-based Learning*, 18, 219–243. DOI: 10.1007/978-3-319-50734-7_11.

Onstenk, J., & Blokhuis, F. (2007). Apprenticeship in the Netherlands: Connecting school-and work-based learning. *Education and Training*, 49(6), 489–499. DOI: 10.1108/00400910710819136.

Pilz, M. (2007). Two countries - One system of vocational education? A comparison of the apprenticeship reform in the commercial sector in Switzerland and Germany. *Compare*, 37(1), 69–87. DOI: 10.1080/03057920601061802.

Romanova, I., Grima, S., Spiteri, J., & Kudinska, M. (2018). The payment services Directive II and competitiveness: The perspective of European fintech companies. *European Research Studies Journal*, 21(2), 3–22.

Rosendale, J., & Wilkie, L. (2021). Scaling workforce development: using MOOCs to reduce costs and narrow the skills gap. *Development and Learning in Organizations*, 35(2), 18–21. DOI: 10.1108/DLO-11-2019-0258.

Salisbury, J., & Jephcote, M. (2010). Mucking in and mucking out: Vocational learning in Animal Care. Teaching and Teacher Education, 26(1), 71–81. DOI: 10.1016/j.tate.2009.09.018.

Salkovska, J., Batraga, A., Braslina, L., Kalkis, H., & Legzdina, A. (2020). Four Conceptual Perspectives of Innovation Components, *Advances in Intelligent Systems and Computing*, 783, 72–82. DOI: 10.1007/978-3-030-20154-8_7.

Sauli, F., Wenger, M., & Berger, J.-L. (2021). Supporting Apprentices' Integration of School and Workplace-Based Learning in Swiss Initial Vocational Education and Training. *Research in Post-Compulsory Education*, 26(4), 387–409. DOI: 10.1080/13596748.2021.1980660.

Savrina, B., & Seimuskane, L. (2018). Income and Quality of Life Influence on Citizens' Participations in Activities of Local Governments in Latvia. CBU International Conference Proceedings 2018: Innovations in Science and Education, 6, 424–432. DOI: 10.12955/cbup.v6.1193.

Sergejeva, N., & Aboltins, A. (2020). Knowledge of mathematics and physics as basis for studies in engineering sciences. *Engineering for Rural Development*, 19, 1302–1307. DOI:10.22616/ERDev.2020.19.TF325.

Sergejeva, N., Aboltins, A., & Atslega, S. (2021). Problems and solutions of acquiring mathematical knowledge at university during COVID-19 crisis. *Engineering for Rural Development*, 20, 1266–1271. DOI: 10.22616/ERDev.2021.20.TF276.

Seimuskane, L, Vilka, I., & Brekis, E. (2017). Assessment of Socio-Economic Status Relevance for Latvian Electoral Participation, LOCAL GOVERNMENT AND URBAN GOVERNANCE IN EUROPE, 209–232.

Smith, P.H. (2010). Teaching assistant apprentices? English TAs' perspectives on apprenticeships in schools. *Journal of Vocational Education and Training*, 62(3), 367–380. DOI: 10.1080/13636820.2010.510250.

Xing, X., & Gordon, H.R.D. (2021). Mediating Effects of School Engagement between High School on-Time Completion and Career and Technical Education. *Vocations and Learning*, 14(1), 1–21. DOI: 10.1007/s12186-020-09252-2.