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**EXPERIENCE OF HIGH AND VOCATIONAL EDUCATION
COOPERATION FOR TRAINING OF MIDDLE-LEVEL
SPECIALISTS IN LOGISTICS**

Abstract

In the article, the main results of three European international cross-border cooperation projects are presented that are devoted to the development of vocational education system. It is shown that there is a sufficiency of high and vocational education organisations cooperation in this field. The importance of innovative simulators for the education of 'blue collars' in logistics is underlined. The approach for creation of curriculums and programmes is discussed.

Keywords: cross-border cooperation, logistics, education levels, vocational education training, 'blue collars', teaching of teachers, curricula and training programmes, simulators, IT-technologies, networking.

1. Introduction

Skilled professionals in logistics are either top-level managers or 'blue collar' specialists. The first are graduated from universities; the second ones are trained at vocational schools and centres. Moreover, universities develop new methods, technologies, especially IT, tools, which have to be included in practice for everyday operations by former vocational students. Cooperation of mentioned above educational organisations can improve studying of middle-level specialists. Also, it provides a sufficient and quick implementation of scientific achievements and innovations. Moreover, on the national level, in EU and Russia, one can find development programmes of high and vocational education.

However, the problem is that neither joint programmes, nor connection between them exist. There are some international programmes for high education (universities) in EU, such as TEMPUS, ERASMUS+, 7-th FRAME, but programmes for vocational education are absent. So, the instrument of European international cross-border cooperation programmes was chosen to be very useful in the field of the collaboration of high and vocational education organisations. The main focus of this study is to demonstrate positive and efficient experience of high and vocational education cooperation in the improvement of training and teaching qualified middle-level specialists in logistics. Significant effect and positive experience of such cooperation were received in three international projects: NEWLOG (Kuznetsov and Pimonenko, 2009), LOGNET (Neighboring Programme of the EU and Russia 'South-East

Finland – Russia’) and LogOnTrain (Vkok.ee, 2016a), ENPI Cross Border Cooperation Programme ‘Estonia-Latvia-Russia’.

2. Objectives

The main objective of the most of the educational projects is to answer important questions: Whom to teach? When to teach? What to teach? How to teach? In projects, described below we answered these questions: postgraduates of vocation schools and centres not willing to receive high education, at the 5-th level of the educational system, according to the created ones in projects programmes and curriculum, intending to use of simulators and IT widely.

NEWLOG – ‘Logistics Training Development Project’

The main participants of NEWLOG project are as follows: The College of Professional Education Etela-Kyumenlaakso (Finland) and Admiral Makarov State University of Maritime and Inland Shipping (Russia), as representatives of vocational and high education organisations, and North-West Russia Logistics Development Centre ‘ILOT’. The first idea of this project was to implement the port container crane simulator in the training process and prepare a group of skilled professional ‘blue collars’ for transport and logistics companies in the region. The main objectives of the project were:

- harmonisation of educational programmes and advanced vocational training standards and unification of qualification requirements to the major specialisations;
- development and implementation of the model of professional staff training (with the usage of simulators) for warehouses, stevedoring and logistic companies;
- the foundation of an expert network of educational centres.

LOGNET – ‘Development of Logistics for Supplier Net Models’

In LOGNET project participated Lappeenranta University of Technology (Finland), Petersburg State Transport University, and Centre ‘ILOT’ (both are from Russia).

The main objectives, which had to be realised in LOGNET, were:

- R&D of different logistics solutions for regions participating in projects;
- comparison of various logistics transshipment variants for better supplier chain organisation;
- special logistics vocational training courses;
- teaching materials and e-Learning.

This project mostly deals with the development and research of logistic models and only small part was devoted to development of further education training courses and programmes in logistics.

LogOnTrain – ‘Logistics and Overland Transport Network for Training ‘Blue Collars’

In LogOnTrain project, the participants are as follows Valga County Vocational Training Centre (Estonia); Riga State Technical School, Latvian Transport Development and Education Association, representing Transport and Telecommunications University (both are from Latvia), Emperor Alexander I St. Petersburg State Transport University, Saint-Petersburg State University of Telecommunications and Centre 'ILOT' (all three are from Russia). Participants extend number in this project show the growth of interest to discussing problems from region governance, business and educational organisations. The main objectives indicated for this project were:

- to enhance the level of transport, logistics and freight-forwarding training in vocational training;
- to develop special qualification courses, exchange of experience, master-classes, and teaching of faculty staff;
- to implement more widely simulation in programmes and VET process;
- to create networks between local/regional transport/logistics business communities for further improvement of VET.

3. Review

Vocational education attracts attention all over the world. There are some documents at international level. UNESCO published recommendations concerning vocational and technical training (UNESCO, 2000). This book provides a definition of vocational education and training that reflects the shifts over time in thinking about what constitutes vocational activities. Additionally, this organisation prepared statistical handbook about vocational education programmes in different countries, UNESCO Institute for Statistics (UIS UNESCO), International Centre for Technical and Vocational Education and Training, UNESCO-UNEVOC (2006). It identifies students at four different levels of the International Standard Classification of Education – from level 2, which corresponds to lower secondary education, up to level 5, which corresponds to the first cycle of higher education.

UNESCO actively worked in this field in other states. In Brazil UNESCO office issued the manuscript (Regattieri and Castro, 2013) devoted to VET. In Europe also a considerable attention is paid, as to the EU level (Field et al., 2009; Bükki, 2016), as well as in different European countries, either being the members of EU or not. For EU, the Copenhagen Declaration (Csillag, 1992) is very crucial (Declaration of the European Ministers of Vocational Education and Training and the European Commission, convened in Copenhagen on 29th and 30th of November 2002 on enhanced European co-operation in vocational education and training).

In Turkey, State Strategy and Plan of VET development was issued (Unevoc.unesco.org, 2014). There was proposed that vocational education must

be developed through the provision of courses and programmes such as initial and lifelong in service training for workers. Types of education have to be distinctly divided: Technical and Vocational Education at Upper Secondary Level, and Technological Higher Education at the graduate and postgraduate levels. The connection with Upper Secondary Education ought to take place through one of the following forms:

- Integrated (in a course at the same educational institution, through single enrollment by each student with increased hour load);
- Concomitant (at the same or different institutions, with different enrollments, with or without inter-complementarity agreements for the development of unified pedagogical projects);
- Subsequent (after Upper Secondary Education, when its completion is a prerequisite for enrollment). It still does not constitute a ‘diversified section’ of the Upper Secondary Education curriculum.

High level of interest to VET can be seen in other EU countries: in Denmark (Eng.uvm.dk, 2008), in Austria (Archan and Mayr, 2006). Vocational education and training go by various names, such as career and technical education, technical education, vocational education/training, skill development, and technical and vocational education and training. Across advanced and developing economies, vocational education and/or training programmes are offered at various types of institutions, including schools, colleges, public and private vocational institutions, at workplaces, and in informal settings like the home or community (Chappell, 2003; Karmel, 2011). The report (McCoshan et al., 2005) is concerned with mapping progress against two of the priorities for VET set out at Maastricht in December 2004 as part of the Copenhagen process: opening up pathways and *linking* VET and higher education; and the role of VET in supporting the labour market and social integration of groups at risk. However, the author could find nowhere the materials about the *cooperation of high and vocational education*.

All above considered literary sources deal with general problems and general approach to VET. There is a lack of printed publications devoted to vocational education in logistics. A particular attention attracts comparative analysis of logistics VET, edited in Turkey (Çavuşoğlu and Keskin, 2016). In some countries (e.g. Estonia) normative documents exist (regulations and standards) in this field (Government of the Republic of Estonia, 2013; Vkok.ee, 2016b). The similar situation is with the implementation of simulators in educational process. In general, there are a lot of sources and only a few for logistics (Kuznetsov et al., 2010).

4. Methods

In international cross-border cooperation projects as usually, the method of comparative analysis of investigated problems is used. This method also was

attracted for mentioned above projects for better understanding their vocational training systems. In order to make project actions as close to practice as possible, a method of organisation and conducting of the survey, based on answers from representatives of human resources and training departments of logistics companies have been applied.

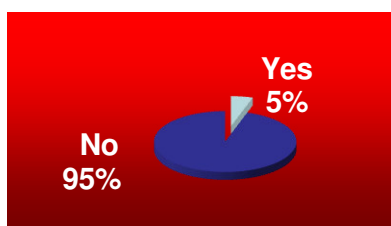
Creating curriculum, education programmes and training courses the requirements of international standards were taken into account. Special attention was paid to recommendations of International Labor Organisation (Ilo.org, 2011) concerning professional qualification levels (Ardel, 2007). For better acquaintance of academic, vocational and business communities with main results of projects organisation of seminars, master-classes, as a tool of project's implementation, a teaching of faculty staff was taken. Manufacturing of simulators, producing of corresponding instructions and modelling and adaptation of logistics information systems software to laboratory practice were applied as a sufficient method of VET improvement. Only in LOGNET project, the MOODLE software basis was used for the creation of e-learning system and courses of distant education. As one of the most popular instruments of dissemination and implementation of received results among target groups, nearly all cross-border cooperation projects use the method of networking. NEWLOG, LOGNET, and LogOnTrain projects are not an exception from this rule.

5. Results

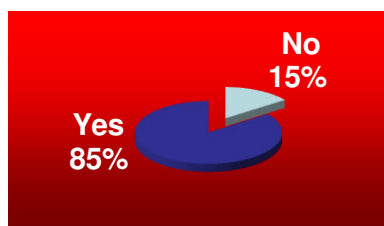
In order to make NEWLOG project actions as close to practice as possible, a survey, based on answers from representatives of human resources and training departments of logistics companies has been organised. The questionnaire included nearly 20 points. The most interesting of them, including distribution of answers are presented in the Figure 1.

The survey has shown the interest of logistics and transport companies to an international experience for the training of professional staff; the necessity of the level of education in logistics coordination, basic logistics for study workers of different professions.

Q. Is international experience for training of professional staff is used?



Q. Is it necessary to coordinate the level of education in logistics?



Q. Are there needs for unit logistics basis for study different specializations?

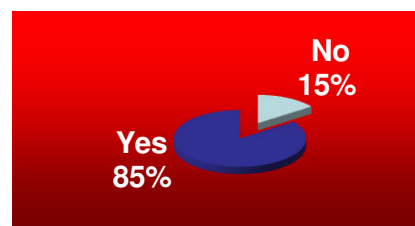


Fig. 1. Some results of NEWLOG project survey.

The list and even titles of port working specialisation in logistics in different countries are not the same. As an example in Table 1 Finnish approach to this matter is presented. It had to be taken into attention for common education course development.

Table 1

Typical professions in cargo handling in Finnish ports, and required qualifications.

DUTY	DESCRIPTION	QUALIFICATION BY LAWS	OTHER REQUIREMENTS
1 Crane operator	Lifting and moving of cargo by crane		
- cranes on rails		Vocational qualification (min. suitable part)	Perfect hearing and sight
- mobile cranes		Vocational qualification (min. suitable part)	Perfect hearing and sight
- hydraulic harbour crane		Vocational qualification (min. suitable part)	Perfect hearing and sight
- ships cranes		Vocational qualification (min. suitable part)	Perfect hearing and sight
2 Signalman (crane work)	Assisting crane operator (radio, hands), take care of safety in crane area, checking cargo plan (container loading)		
3 Forklift operator			
- small trucks (capacity < 7 tons)	All kind of cargo handling in ships and terminals	Adequate professional skill (special course by employer), driver's license	Perfect hearing and sight
- bigger trucks (> 7 tons) / tug masters	All kind of cargo handling in ships and terminals	Adequate professional skill (special course by employer), driver's license	Perfect hearing and sight
- stackers / straddle carriers	Handling of containers	Adequate professional skill (special course by employer), driver's license	Perfect hearing and sight
4 Signalman (traffic)	Controlling traffic on ship ramps etc. , take care of safety in current area	Adequate professional skill (special course by employer)	Perfect hearing and sight
5 Tallyman	Checking and counting of cargo	General orientation	

Developed educational programme and training modules were assigned for port 'blue collar', as it was stated in objectives. These materials were based on the survey of needs and demand of logistics business, taking into account requirements of International Labor Organisation (ILO) to specialisations included in the project: crane operators, signalmen, tallymen dealing mostly with container cargo.

Created in NEWLOG special course (Kuznetsov and Pimonenko, 2009), was consisted of items and modules for the theoretical teaching of middle-level professionals in logistics. The course included the following aspects:

- the significance of container terminal in cargo handling processes is explained;
- the basis of work, equipment and operations of container terminal are described;
- organisation structure, management, supervision, and control mechanisms are considered;
- quality standards of working are set;
- elements of safety and security are studied;
- environmental issues of container terminal work are also discussed.

Due to different reasons, the third goal was not reached in whole scale and volume. That was naturally undesirable, but networking of educational organisations has not been continued in a satisfactory manner.

The LOGNET project mostly had been devoted to the development and research of logistic models, and only small part was dedicated to the development of further education training courses and programmes in logistics. It was created the course of distant education and e-learning, the information about which can be found on the web-site (Vkok.ee, 2016a). The course contents the next several modules:

- Logistic Basics;
- Research of logistic methods on examples of Logistic centres of Russia and Finland;
- The modern tendencies of ICT development in Logistics;
- Containers' Terminals;
- International Transportation;
- Kouvola – border region, centres of railway cluster development.

For each module one of the university experts participated in the project was responsible. E-learning system had been realised on the base of the MOODLE software for bringing in the simple form of the difficult theoretical training materials to the employee of logistic and transport companies. Association on one information platform of representatives of the companies from different countries can help to present the challenges facing by logistics in the modern world. According to the received experience of project realisation, the MOODLE is an ideal system for a transfer of the academic and high education knowledge in the business community. As an example, results of testing pupils studying e-learning courses are demonstrated in Figure 2. Nearly ten seminars organised during two-year duration of the project, were attended by representatives of vocational education organisations and representatives of business responsible for staff training.

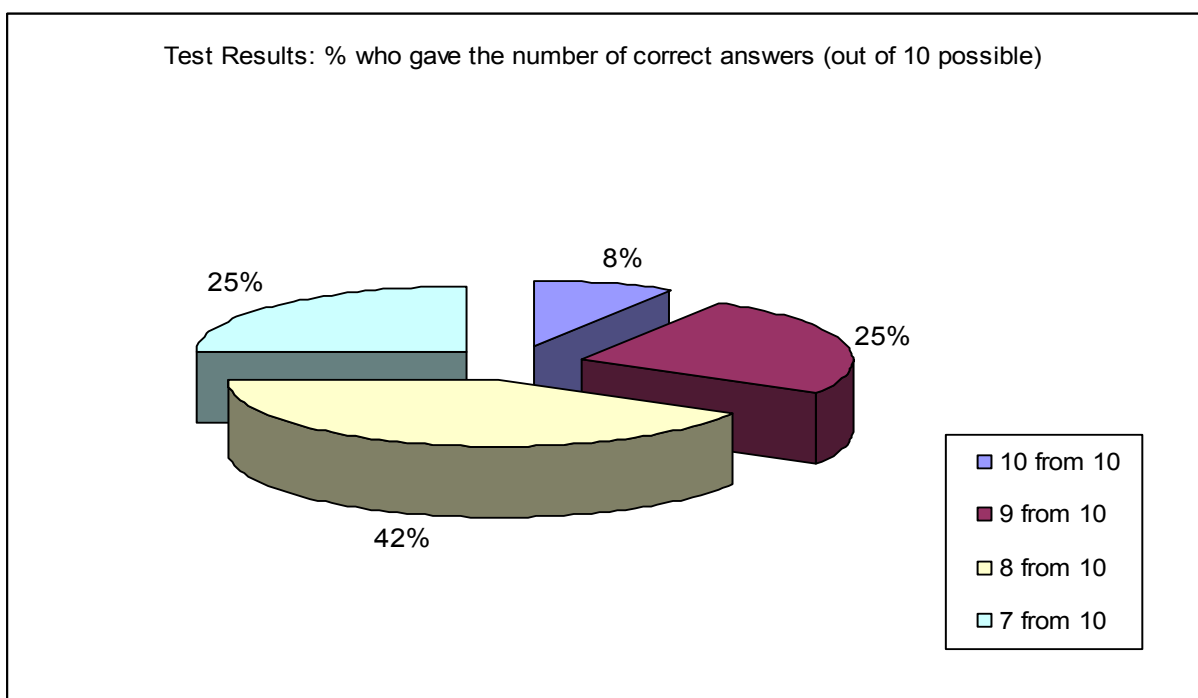


Fig. 2. Test results: The number of correct answers (out of 10 possible) given by respondents, in percentage.

During the development of basic curriculum and VET programmes, the results of Baltic Tangent project (Ardel, 2007) were used, in which it was a possibility to get acquainted with the vocational training systems of Finland, Sweden and Denmark and their curricula in transport and logistics. It was a benchmarking in vocational training with the aim to create a framework for an integrated programme in transport and logistics. In this regard, the main accent was made on the professions of warehousing, goods handling, freight forwarding, and truck driving. There was a need for training programmes and curricula specifically oriented for railways. As was found by LogOnTrain researchers, the 5-th level of education in EC countries and Russia has not curricula and programmes, so this 5th level requires the implementation of professional VET to the labour market orientation of vocational training, which can not be managed using the old methods and theory. Only a flexible and student-centered training achieves the required learning outcomes – the values and competencies. That is why for solving the problem the flexible reference model of workplace training was chosen (see Figure 3). For each stage recommendations concerning educational programmes have been prepared. It can be said, that in LogOnTrain project curricula and training vocational programmes were upgraded up to modern international standards and synchronised with those of university level to meet the demands of haulage and rail companies.

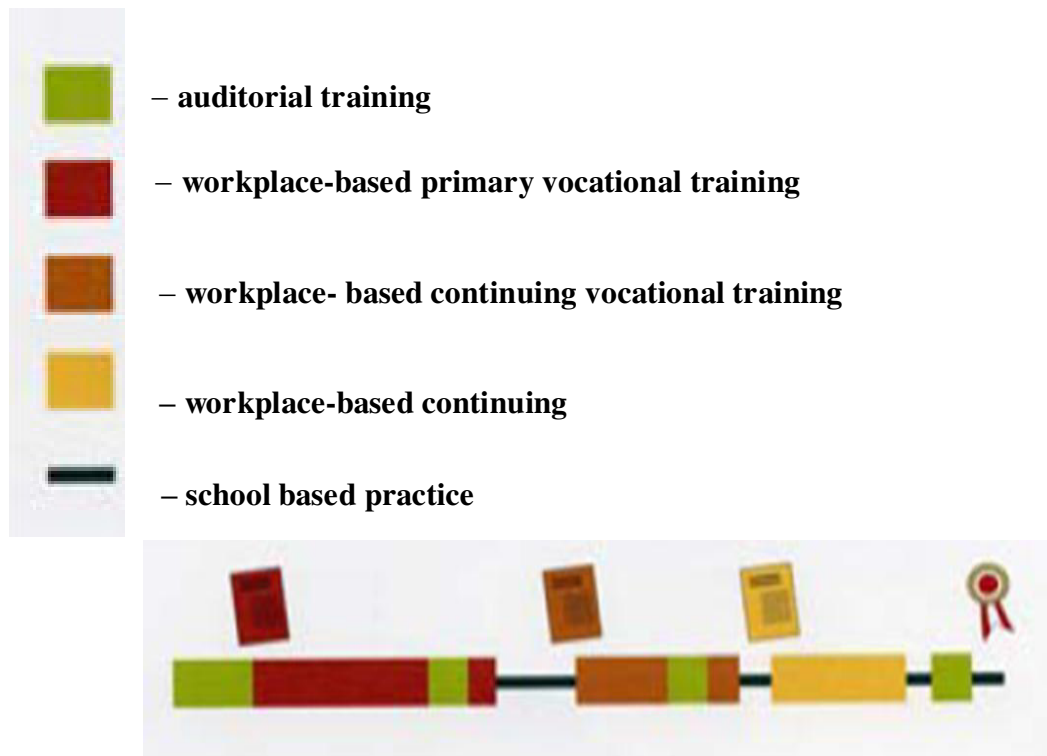


Fig. 3. The linkage between VET and the labour market. The flexible reference model of workplace training.

Using simulation and modelling in training is not that widely used in VET despite the fact that simulators are very helpful for students before they take up real jobs. Furthermore, IT-based solutions are being rapidly developed in the field of logistics and freight forwarding. Moreover, the level of implementation and usage of innovative IT had become a significant advantage for companies at a competitive market (Pimonenko, 2016). In LogOnTrain project, for the preparation of ‘blue collars’, the following innovative IT items were developed: Radio Frequency Identification Devices (RFID) and computer systems for transport logistics.

RFID has widely used now an instrument of tracing, tracking and monitoring different objects of transport processes: vehicles, containers, pallets, boxes, etc. The information recorded on a special electronic chip located at the object can be quickly and easily read at any place supplied by suitable equipment. In the project, RFID stimulator was manufactured and written correspondent instructions for students.

In educational course several computer logistics systems were included: for warehouse management, for calculation of optimal cargo loading, for determination of railway cargo transportation costs and some others of more general character (e.g. AnyLogic). Training in the application of such systems raises the professional level of ‘blue collars’ in logistics.

All goals of the project were reached, and it must be noticed too much results. In the project were issued: one manual for VET ‘Information

Technology and Transport Logistics’, as well as several methodical recommendations for course assignment execution - for maintenance process management in transport and completion of calculations for the discipline ‘freight and cargo handling’. The second important event to be emphasised is International Logistics Forum in Valga, which gathered many attendants from organisations not participated in LogOnTrain project. During the Forum, a possibility of usage of the obtained results in the practical education, training and even work operations has been shown.

6. Conclusion

In these three projects, the positive and efficient experience of joined and non-stop education in transport and logistics on the basis of high and vocational education organisations cooperation has been obtained. One has to plan carefully the training strategy to cover individual expectations and align them with strategic objectives of business. The output of above-considered projects can definitely and fruitfully be used in VET of different EC countries and Russia. Now it is time for the foundation of International Networking Centre for further developments in the field of considered in above material problems.

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