

Cross-border educational space in digital economy

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Abstract — The necessity of creation of cross-border educational space between Finland and Russia is showed. The research connected with the attitude of Finnish and Russian students and teachers to eLearning was done. The results of the survey of students and teachers of St. Petersburg and Finnish universities are presented, their attitude to the digitalization of the educational process is revealed. The results of interviews of business representatives' attitude to the eLearning are presented in the article. Students, teachers, companies stressed the necessity of eLearning in digital economy. The research was done based on the companies that is working in forest sector on two sides of the border. The companies' representatives stressed that creation of cross-border educational space is essential for them. That's why an international project "Digital forest pedagogics (DIGIFOR)" was created and received financing from the program of cross-border cooperation between South-East Finland and Russian Federation.

The article presents the content of the international project "Digital Forestry Pedagogy (DIGIFOR)" implemented by four higher education institutions of Russia and Finland. The aim and objectives of the project are described, as well as the activities and expected results, which will ensure a closer link between vocational education and labour market needs. It shows how the main results of the project will be used after its completion.

Keywords — *cross-border educational space, digital economy, forest sector, digital learning, innovational teaching methods, lifelong learning, eLearning modules.*

I. INTRODUCTION

The changes in the society demand update of education and lifelong learning. The task of the higher education in the forest sector is to prepare skilled, motivated and innovative young professionals able to work in the organizations managing, researching, utilizing and protecting the renewable forest resources. There is a need to update the teaching and learning methods in order to increase the skills of the students.

According to the South-East Finland - Russia Cross - Border Cooperation Program 2014-2020 the changes in the society demand update of education and lifelong learning [1]. The students and teachers in forest sector higher education are facing the working life's increasing demand for the future professionals' skills and competences.

Development in ICT technology has increased a variety of methods for the development of education. The possibilities of eLearning have not been utilized enough in the higher forest sector education in the cross-border countries. There is a lack of digital virtual teaching and learning approaches in the forest sector HEIs in the territory of the South-East Finland Russia

Cross - Border Cooperation Program 2014-2020. The importance of the cooperation between forest HEIs and working life became apparent in the study conducted by [2,3].

In addition, student feedback has shown that there is a need to increase the amount of versatile teaching and learning methods, the possibilities for virtual studies because the studies do not depend on the time and place [4]. Due to the necessity of decreasing the amount of contact lessons in HEIs, the digital virtual modules included in the study courses will be important for the future. The companies in forest sector may utilize the eLearning modules in personnel training.

The importance of the development of digital education is highlighted in documents such as: Europe 2020 and EU Education and Training 2020 strategy; Strategies for innovative development of the Russian Federation until 2020, Development of education in Russian Federation 2013–2020 and Development of the forest sector in Russia until 2020; The strategies of socio-economic development of the Leningrad Region until 2030; National Forest Strategy 2025 Finland.

The South-East Finland – Russia CBC 2014–2020 Program aims to promote cooperation across the borders between Finland and the Russian Federation [1]. The overall objective of the Program is to contribute to economic and social development, mitigate common challenges and promote mobility among actors of regional relevance to further improve cooperation and the sustainable development of the cross-border territories. There is a need to increase the level of education among youth and elderly people. The changes in the society in both Russia and Finland had led to the demand to update of education and lifelong learning [5]. All stages of education enable opportunities to get employment, and often reduces the risk of social exclusion.

The project KS1027 "Digital Forest Pedagogics", realized in the frame of the South-East Finland – Russia CBC 2014–2020 Program promote the cooperation and developing of the border regions by creation cross-border educational space. The project aims at economic and social development of cross-border territories by increasing the skills and competences of future workforce in the forest sector. This will happen by changing of experiences, networking, developing, creating and implementing innovative virtual eLearning joint study modules for the forest sector education. Consideration of such topics as internationality, working life connections, lifelong learning, ecological, economic and social sustainability will allow creation of basics of cross-border educational space [6,7].

II. RESEARCH METHODOLOGY

The problem of the research was identified through the information gained from the previous projects that were organized in the frame of ENPI CBC Program, seminars and conferences in the sphere of forest sector, the workshops and meetings with business representatives, publications and students feedback. In addition, the EU and Russian Federation development plans and strategies, and those of the target countries, regions and the partner universities have been utilized. There has been studied both strategic aims and demands in the educational sector as well as in the forest sector. Based on training needs analyses of the forest related companies it has been established that one of the main problems of modern forestry business is the lack of qualification of employees. In this regard, there is a need to improve the level of qualification of both those working in companies and students of forest higher education institutions. One of the solutions was to increase graduates' skills and competences of employees by using innovative approaches in teaching.

The primary target groups of the research are 1) the students, 2) the teachers of partner universities. The secondary target groups are local and regional employees in forest sector organizations.

The research was conducted on several stages. On the first stage the nowadays situation in eLearning on both sides of the Finnish -Russian border was analyzed. There were made two questionnaires: one for students and one for teachers. To analyze the attitude of the students and teachers to eLearning students were asked such questions as:

1. What kind of learner you are?
2. What kind of experiences do you have in e-learning?
3. What kind of elements were included in your e-learning experience?
4. Did you have difficulties with your e-learning?
5. What are the positive sides of e-learning from your opinion?
6. Which type of studies are good for e-learning?

The questionnaire was given to the students of different specializations in Finland and Russia. For teachers another questionnaire was given. It included 5 questions:

1. How many e-learning courses you have taught and what are your experiences of e-learning?
2. What kind of elements you have included in your e-learning, if you have experience?
3. What are the positive points of e-learning? What is more challenging for teacher and for students?
4. What type of studies suit for e-learning?
5. What is a good e-learning course like?

On the second stage of the research the interviews of business representatives were organized to understand the attitude of business to eLearning. It was asked is eLearning included in the educational strategy of the company and human capital development, as the basis of sustainable development. It was also investigated which competences of employees should be developed and how eLearning can be used in this.

III. THE RESULTS OF THE STUDY

The questionnaire was given to 36 teachers from the high forest related educational institutions from South-East of

Finland and Russia. The characteristics of the teachers participated in the investigation are presented in the Table 1.

TABLE I. CHARACTERISTICS OF THE TEACHERS FROM FINLAND AND RUSSIA PARTICIPATED IN THE INVESTIGATION

№	Characteristics	Finland	Russia
1	Courses, that are taught by the teachers	Economics Management Tourism Statistics	Economics Management Forestry IT
2.	Gender structure	80% of women	90% of women
3.	Teaching experience in years	1-27	10-38
4.	Share of those who have distance learning course, %	100	30
5.	Amount of distance learning courses per teacher	1-12	1-3
6.	Number of teachers participated in the investigation	15	21

The participants of the investigation have different experience in eLearning. Finnish teachers are more experienced in eLearning. All of them have experience in conducting the online courses, while only 30% of Russian teachers have the same experience. Most of the respondents in Finland and in Russia are women. The courses that the respondents are teaching are different. The attitude of the teachers from cross-border countries to the distance learning is shown in the Table 2.

The results of the investigation in Finland and Russia are different in the frame of some questions. The attitude to eLearning differs a lot. All the teachers from Finland support distance learning. In Russia situation is different, only 69% of teachers support eLearning. Finnish and Russian teachers include all the elements in their on-line courses. But there is one exception- group work, that is not used in on-line courses in Russia.

All teachers understand that there are pluses and minuses for the teachers and students, using eLearning. For Finnish teachers it means opportunity to plan working time, optimization of workload, while for Russian teachers it means enhancing individual work with students. Flexibility of studies was indicated by Finnish and Russian teachers as positive aspect of eLearning for the students.

Lack of contact work with the students was specified by Finnish and Russian teachers as negative aspect of eLearning for the students and teachers. Most part of the teachers from Finland and Russia understand that not all subjects can be taught on-line. But the share of those who think that all subjects can be taught on-line among Finnish teachers are bigger, than among Russian teachers two times.

All the teachers participated in the investigation answered that the good eLearning course should include 3 main characteristics:

eLearning should be organized jointly with contact lessons; the updated material should be used in the course and the course should have well-defined assignments.

TABLE II. THE ATTITUDE OF THE TEACHERS FROM CROSS-BORDER COUNTRIES TO THE ELEARNING

Nº	Question	Finland	Russia
1	Share of teacher who support distance learning, %	100,0	69,6
2	Share of teachers that include the following elements of distance learning, %:		
	Online-lectures	100,0	70,0
	Video-recorded lectures	100,0	100,0
	Assignments	100,0	100,0
	Reading / articles	100,0	60,0
	Group work	60,0	-
3	Positive aspects of eLearning by teachers' opinion:		
	-for teachers	Opportunity to plan working time Optimization of workload	Enhance individual work with students
	- for students	Flexibility in studies	Flexibility in studies
4	Negative aspects for teachers of eLearning by teachers' opinion:		
	-for teachers	Reducing contact work with students	Uncertainty of workload formation Reducing contact work with students
	- for students	Lack of social contact with a teacher Lack of support if problems arise	Lack of social contact with a teacher
5	Share of teachers, who consider that all subjects can be taught on-line, %	45,0	20,0

The questionnaires were given to 74 students of the high forest related educational institutions, from the South-East of Finland and Russia. The characteristics of the students that participated in the investigation are presented in the table 3.

TABLE III. CHARACTERISTICS OF THE STUDENTS FROM FINLAND AND RUSSIA THAT PARTICIPATED IN THE INVESTIGATION

Nº	Characteristics	Finland	Russia
1	Bachelor study program	Economics Management Tourism & hospitality Forestry IT Education Environmental Engineering	Economics Management Forestry IT Landscape Design Technology Heat power industry
2.	Gender structure	68 % of women	75 % of women
3.	Age, years	20-27	19-24
4.	Number of students participated in the investigation	28,0	46,0

Most of students, participated in the investigation, were woman. Russian students are younger than their Finnish colleagues. The characteristics of the kind of learners of the students are presented in the Table 4.

TABLE IV. THE CHARACTERISTICS OF THE TYPE OF LEARNERS OF STUDENTS PARTICIPATED IN THE INVESTIGATION

Nº	Type of learner	Finland	Russia
1	Learning by listening, %	26,0	25,0
2.	Learning by looking at videos, %	17,0	19,0
3.	Learning by doing, %	38,0	41,0
4.	Learning by reading, %	16,0	13,0
5.	Learning by something else, %	3,0 (learn by writing)	2,0

The structure of the students who participated in the answering to the questionnaire are similar for Russian and Finnish students. Most of them prefer learning by doing and learning by listening.

All Finnish students had experience in, eLearning while only 15 % of Russian students have the same experience. By the opinion of Finnish students good eLearning study course should include understandable instructions, clearly defined learning objectives and outcomes, relevant learning materials and articles, a clear learning schedule, small assignments and the possibility of contact with the teacher. All Finnish students answered on the question about what elements were included in eLearning courses they have passed. The results of their answers are showed in the Table 5.

TABLE V. ELEMENTS THAT WERE INCLUDED IN THE ELEARNING COURSES BY WHICH, LEARNED STUDENTS, PARTICIPATED IN THE INVESTIGATION

Nº	Types of elements that were included in eLearning courses	Finish students	Russian students
1.	Share of on-line courses, %	24,0	21,0
2.	Share of video recorded lectures, %	17,0	34,0
3.	Share of assignments, %	20,0	23,0
4.	Share of reading /articles, %	24,0	19,0
5.	Share of group work, %	15,0	-

The results of investigation are different for Finnish and Russian students. For Finnish students eLearning is mostly connected with on-line courses and reading books and articles. For Russian students eLearning includes mostly video recorded lectures. It is interesting that group work in eLearning in Russia is not used at all, while in Finland the students often need to do the tasks in the frame of eLearning in groups.

Students define the best eLearning course as a course which has clear instructions, clear objectives and learning outcomes, and includes small tasks, up-to-date learning materials that are clearly structured, a clear learning schedule, the possibility of face to face contact with the teacher. 54% of students answered that there are no difficulties in eLearning. But some students stressed that there are some difficulties in eLearning. 11 % have problems in self-organization to start to study, sometimes some of them even forget that they have applied for on-line course. 35 % answered that they have difficulties in studying without a teacher. They stressed a necessity of including of face-to face lessons with a teacher during the eLearning. Among other

problems that the students have are technical problems, task complexity.

The students who participated in the study noted that eLearning has positive and negative aspects. The following were mentioned as positive aspects: the opportunity to study at any time and in any place, in several universities, to do tasks together with other students online, to get more information. In addition, students noted that online learning is an independent, individual learning.

The forest related companies that participated in the interviews in the frame of the study answered that eLearning is very important part of their strategies of sustainable development since it allows to develop human capital of the company. Such approach is interesting for the companies because the employees may study in any place and any time. There is no necessity to organize travelling for those who are working in different regions. eLearning allows to raise competences of human capital of the companies on the basics of low costs for this. All the companies answered that they are already working on creation on-line courses or they are looking for the partners with whom they would like to cooperate. Big share of forest related companies is working on both sides of the border: in Russia and in Finland. That's why many of them stressed that there should be cross-border network between forest related universities and companies. Thus, it is obvious that universities and businesses face the task of creating a cross-border educational space. eLearning should be the essence of it because of digitalization of economics.

IV. DISCUSSION OF THE RESULTS

Based on the results of analyses of feedback of teachers and students from Finland and Russia, interviews of companies the application for the project "Digital Forest Pedagogics" to the South-East Finland – Russia CBC 2014–2020 Program was submitted. The application got financing and started from 1.11.2018 [7].

The overall objective of the project is to increase the skills and competences of future workforce in the forest sector in South-East Finland, St. Petersburg and Leningrad Region by creation a cross-border educational space. The specific objectives are: to increase the skills of teachers in forest sector higher education institutions (HEIs) in the cross-border territories to use eLearning in their teaching, to increase the skills of students of HEIs in the forest sector to meet the changing working life needs, to strengthen the international cooperation between the Universities participating in the project and to strengthen the connection between working life and Universities.

The creation of cross-border educational space means that the cooperation between the HEIs in the creation of virtual eLearning modules makes it possible to work together, share the previous experiences, best practices and produce more materials and tools to be included into the existing study courses. When the knowledge is shared, the content of the study courses will include the special features of both Russian and Finnish operational environment. The cooperation in the development of the forest sector education will be reasonable and benefit all the partners [8].

The project will allow Universities from different sides of the border to work and share the knowledge, experiences and best practices both in the forest sector issues and pedagogy, to respond to the demand of sustainability by creating joint study modules which have a positive influence to the forest environment and economy in the area, to get bigger advantage in the management, utilization and protection of the renewable forest resources, to get bigger amount of modules than working in cross-border educational space, to use the same modules in the curriculums of Russian and Finnish universities, when they are in English.

For the students it will allow to choose study modules and courses from the other universities, because they are virtual and available to increase the knowledge of the students in the both sides of the border about the special features of the local forest sector in practice. The increased skills and competences of the students will help them to get employment from the Program area. The working life will get advantage by getting skilled and motivated employees

One of the main outcomes includes the training of the teachers to use the virtual eLearning methods. The project will promote education in the cross-border territory by development of lifelong learning based on the developing the skills of the teachers and the students of higher forest sector education. This will happen when the teachers create and pilot working life oriented virtual eLearning study modules for the skills development. During the project, the teachers will get training in planning, creating, implementing and evaluating the virtual eLearning study modules. The teachers will be better equipped to implement teaching approaches that create more value for the students and their future employers. The created study modules will be included into the partner HEIs study courses in the existing study programs (curriculums) and those will be available for the future students as well. The study modules will be in Russian, Finnish and/or English. As the study modules will be available after the project, the future students of the partner universities can utilize and benefit from the study modules created during the project. The created MOOC courses offer the open access for all the students, working life and the other interest groups [9, 10].

The project will foster the cooperation between businesses and higher institutions by creating a network of HEIs and organizations, which will be working actively and continuously for the development of forest sector higher education in the cross-border territory during and beyond the project. The project supports the cooperation between Universities and enterprises by the created network.

The target groups of the project will utilize the main outputs of the project. The target groups are 1) the teachers of the partner universities, 2) the future students of the partner universities (including exchange students, distance students and adult students) 3) all the students not depending on the age or educational level, working life and the other interested in the forest sector studies and 4) the companies in the forest sector.

The network of HEIs and tutor companies will bring advantage to all the parties. The teachers will be able to develop their study courses based on the feedback of the companies, in proportion the companies will get better employees and trainees.

All the people, who are interested in developing and using eLearning methods in their education or training, can utilize the results of the project.

V. CONCLUSIONS

After the project cross-border educational space will be created. The project will lead to the improvement of the quality and relevance of teaching and learning, promoting cross-border cooperation, exploiting ICT, expanding the educational offer to a new group of learners and increasing teachers' digital competences. The synergies with the national Programs are in development of human resources in education, in increasing new learning environments and digital materials and increasing the cooperation between HEIs and business life and developing eLearning [11].

After the project skills of the students will be increased in order to meet the needs of working life, teachers can create and use innovative eLearning methods in their study courses, cooperation between partners will increase bringing benefit for all, network of forest sector HEIs and companies is functioning continuously for the development of forest sector higher education in the cross-border territories.

The project allows to realize it sustainably. It From the technological point of view, all the partners will have the facilities to store and share the study materials after the project. The partners will take care that the created study modules will be available for the students through their platform either already existing or purchased during the project.

Open Forest wiki-based learning environment will be included to the cross-border educational space. It includes information, access to models, real research data, space for presentations on diverse learning projects and their outcomes It can serve as models and practical examples of learning projects for teachers, students, learners, and other interested parties. Open Forest covers mobile apps to serve accurate geographic information environment (GIS) information related to these wiki articles. It can be one resource for "DIGIFOR EST" partners in future for composing and sharing their new courses and pedagogical practices [12].

The continuous cooperation between the partners will remain after the project. All the partners will participate actively in the activities of the network and contribute by sharing the information, materials, best practices, experiences and connections.

The project will foster the cooperation between businesses and training institutions by a network of HEIs and organizations, which will be working actively and continuously for the development of forest sector higher education in the Program area during and beyond the project. The working life will get advantage by getting skilled and motivated employees. Finally, project supports the cooperation between research institutions and enterprises by the created network [6, 9].

The network of HEIs and tutor companies will bring advantage to all the parties. The teachers will be able to develop their study courses by the feedback of the companies, in proportion the companies will get better employees and trainees. In addition, the joint development of training modules for the companies can be done. In addition, the project publication will be the mean to share the best practices, knowledge and experiences to the public. The number of the printed version is

300 pieces, of which 100 in English and 200 in Russian. E-publication is also available. All the people, who are interested in developing and using virtual eLearning methods in their education or training, can utilize the publication. In order to engage the companies in the activities of the network after the project ends, the following actions have been planned.

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