Solution of urgent problems of training specialists for the forest industry within the framework of the international project «Digital Forest Pedagogy»

L Gromskaya1*, Yu Zhuk2, E Kuznezov3, V Katsadze 4

1Department of Industrial Transport, Saint Petersburg State Forest Technical University, 5 Institutskiy Lane, St. Petersburg 194021, Russian Federation
2Department of computer modeling and computer graphics, Saint Petersburg State Forest Technical University, 5 Institutskiy Lane, St. Petersburg 194021, Russian Federation
3Department of Forestry, Saint Petersburg State Forest Technical University, 5 Institutskiy Lane, St. Petersburg 194021, Russian Federation
4Department of Techological processes and machines of the forest complex, Saint Petersburg State Forest Technical University, 5 Institutskiy Lane, St. Petersburg 194021, Russian Federation

*Corresponding email: gromskaya.stl@gmail.com

Abstract. In the article the problems of high forest education are considered. The problems associated with organization of an effective training process for the forest sector specialists have been highlighted. The urgency of raising the qualification and competence of specialists of the forest industry by using innovative teaching methods in training is justified. Possibilities of use of distance educational technologies for training of students and for improvement of professional skills of workers of the enterprises of forest sector are considered. Possibilities of the development of distance learning technologies which are realized by the international project of cross-border cooperation of South-East Finland and Russia KS1027 "Digital forester pedagogy"(DIGIFOR) are presented.

1. Introduction
The main objectives of the strategic development of the forest complex until 2030 are: achieving sustainable forest management, innovative and effective development of forests use, protection, and reproduction of forests, providing for the outpacing growth of the forest sector of the economy, social and environmental security of the country, unconditional fulfillment of Russia's international obligations in the field of forestry, increasing the long-term competitiveness of the forest industry and increasing the contribution of the forest complex to the socio-economic development of the country [1].

One of the problems hindering the achievement of these goals is the low level of technical, scientific and human resources support for the forest sector. The situation with the staff is significantly deteriorating in the forestry sector. Currently, about a quarter of specialists do not have specialized forestry education. The situation is caused by low wages and the low prestige of the profession In order to achieve the goal of scientific and technological development of the forest sector in the frame of the economy of the Russian Federation, the strategy of development of the forest complex requires:
a) Creation of opportunities to identify talented young people and build a successful career in the field of forest science, technology and innovation, thus ensuring the development of the intellectual potential of the country; creation of conditions for research and development in the forest sector, corresponding to the modern principles of scientific, technical and innovative activities, as well as the best Russian and world practice;

b) The formation of an effective system of communication in the field of science, technology and innovation, ensuring an increase in the susceptibility of the forest sector of the economy and society to innovation, the creation of conditions for the development of knowledge-intensive business;

c) The formation of an effective modern management system in the field of forest science, technology and innovation, providing for increased investment attractiveness of research and development, as well as the efficiency of investment in the forest sector;

d) Creation of conditions for the formation of the model of international scientific and technical cooperation and international integration in the field of forest research and technological development, allowing to protect the identity of the Russian scientific sphere and state interests in the conditions of internationalization of sciences, increasing the efficiency of the Russian forest science due to mutually beneficial international cooperation [1].

Today, there are 46 forest higher education institutions in Russia, 8 of which provide a full range of specialized training of forest specialists. Every year about 15 thousand specialists are trained for the forest complex. About 3.5 thousand people are graduating every year receiving specialty "Forestry". The amount of trained in general meets the needs of forestry in the specialists with higher education. There is a shortage of middle-level personnel, as well as workers' professions. Training of specialists for the forest industry is carried out by 32 secondary educational institutions (technical schools and colleges), of which 19 are specialized on a full range of forest specialties [1].

The deterioration of the quality of scientific support for the forest industry should be highlighted. The number of scientific researchers working in forest scientific organizations continues to decrease. Financing of forest scientific research and development does not exceed 0.1 percent of gross domestic product created in the forest sector and 1.2 percent of the total financing of forestry. Subjects of the Russian Federation, to which most of the resources in the field of forest sector have been transferred, and forest business practically do not participate in research activities [1].

The main problems of the higher forest education system are: low quality of education, poor practical training of specialists, which does not meet the needs of forest companies.

In this regard, the issues of increasing the level of knowledge and qualification of workers in the industry, as well as the issues of improving the system of forest higher education are very important.

2. Methods and Materials
It is impossible to solve the problems of training qualified specialists without the introduction of innovative educational technologies, as well as the involvement in the educational process the professional community and business. One of the ways to improve the quality of training of forest sector specialists is the use of e-learning methods. Several international projects were conducted to develop the higher forest education. One example of such projects is the KS1027 project "Digital Forest Pedagogy" (DIGIFOR), which has been implemented by a group of Russian and Finnish universities since November 1, 2018 within the framework of the program of cross-border cooperation between South-East Finland and Russia. The Finnish participants in the project are: University of Applied Sciences of South-East Finland (leading partner), University of Eastern Finland. The project participants from the Russian side are: Saint-Petersburg State Forest Technical University, Saint-Petersburg State University of Industrial Technologies and Design.

The DIGIFOR project supports the promotion of skills and competencies in the use of e-learning methods, international cooperation, as well as establishment of closer links between educational institutions and the forest sector labour market [2, 3].

The article provides a qualitative analysis of the content of the DIGIFOR project, the directions of its implementation and the results that allow improving the quality of forest education.
3 Results and Discussion

Project DIGIFOR has created a very precise plan to implement e-learning methods in the study curriculums of the partner Universities. The competences of teachers were planned to be developed on the first stage of the project. It is especially important for the Russian Federation. Nowadays situation in Russia is so that the modern e-learning technologies have not been used in teaching and learning actively. To improve this situation, there is a need in teachers’ education how to use the new techniques. In the DIGIFOR project the e-learning competences of teachers are developed by the creation of the pedagogical methodological bases and coaching the teachers. It is used for the creation and development of e-learning study modules and to train and coach teachers in co-designing their e-learning modules. The activities include the evaluation of this process through research before, during and after the training. During the project, the teachers will get training in planning, creating, implementing and evaluating the virtual e-learning study modules. The teachers will be better equipped to implement teaching approaches that create more value for the students and their future employers. Both activities increase the skills of the teachers to be able to create and use innovative e-learning methods in their teaching.

The second step in the project is creating the virtual e-learning study modules and the piloting of the created study modules in the study courses in partner universities [4]. The aim of this activity is to increase the amount and variety of innovative virtual e-learning methods and materials in the curriculums of the partner institutions by planning all together 32 pieces of study modules size of 1-2 credit units (cu). Innovative virtual e-learning tools will be used in the creation of the study modules. The joint online modules of 1-2 and more cu, that will be created are: Basics of Geo Informational systems, Forest ecology, Introduction to Bioeconomy, Complex use of timber, Leadership, Small business, Logistics of pulp & paper industry, Forest pests and damages, Business analysis of financial statements, Learning methods, IT, Environmental issues, Forest harvest management. The topics of these courses are supported by perspective directions of development in the forest sector of economy. Each course is developed under the supervision of a business tutor – a person who is working in forest company. This approach emphasizes the need to take into account the needs of employers, which are conditioned by the specific of forest higher education. The study modules will be included into the existing study courses in the partner institutions. Piloting of the study modules created in the cooperation between the teachers of partner Universities and tutors from business life will be organized in partner Universities. They will be piloted in the existing study courses in the partner institutions. Both activities help the students to meet the needs of working life based on the improved skills and competences. 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 peculiarity of the project is the work on creating courses in international groups, which include both Russian and Finnish teachers. This will help to adopt the best practices that are used in educational process Russia and Finland in the partner universities. The project will result in an increase of the level of competence of teachers, which significantly affects the quality of training future and nowadays specialists for the forest sector [5].

The third step in realization of the DIGIFOR project will be the joint creation and implementation of Massive Open Online Courses (MOOCs). The aim of this activity is to create 4 study courses, which can be used by all those who are interested in the problems connected with the forestry and forest industry development. The joint creation and implementation of MOOCs will increase the cooperation between the partner universities and give possibility for the students and the other stakeholders to increase their professional skills in the development forest sector. The activity strengthens the international cooperation between the project partner universities and will help to disseminate the project outcomes.

Creation of virtual e-learning study modules and MOOCs, made jointly by the teachers from partner universities, will allow using the best practices and approaches in teaching students in partner universities. It will contribute to the raising the competences of teachers and as a result to raising the quality of forest education [6].
The fourth step in realization of the project will be creation of the network between High Educational Institutions (HEIs) and working life. The aim of the activity is to strengthen the connection between working life and project partners. One way to strengthen such connection is to create a network between Russian and Finnish universities and business, where all the members will be beneficiaries. The activity helps to build a network, which functions actively and continuously for the development of forest sector higher education. The network will be created on the basis of Saint-Petersburg State Forest Technical University. The project will foster the cooperation between businesses and training institutions in Russian Federation and Finland during and beyond the project. The network will be presented in the social media and will help to establish new connections between Universities and forest related companies. It will help for the forest Universities to train students with the competencies that are need for the companies. The increased skills and competences of the students will help them to get employment from the Russian and Finnish companies. The working life will get advantage by getting skilled and motivated employees. Finally, the created network between forest higher educational institutions and forest related companies supports the cooperation in the frame of scientific research in forest sector.

The analysis of the project content allows to make a conclusion that each stage of the project implementation allows to fulfill certain tasks related to the using of methods of digital pedagogic in the training of specialists for the forest sector. At the first stage, the tasks of increasing the competence of teachers will be solved, on which the quality of education of students depends greatly, as well as the ability of teachers to use modern teaching methods and provide students with information that corresponds to the current state in the industry. In the second and third stages, the international groups of teachers will create virtual courses and MOOCs, which allow increasing the accessibility of forest education and attracting new stakeholders in the forest sector. On the fourth stage, the creation of a network between Universities and forest related companies creates additional opportunities for cooperation in various areas and forms.

The considered opportunities of the project allow concluding that it creates a basis for solving urgent issues of training for the forest industry.

4. Conclusion

Using the main approaches of the DIGIFOR project will help to solve the problem of improving the quality of training of specialists for the forest sector. This will be possible on the base of the project’s results [7]:

a) Strengthening connections with business through the creation of a network of forest enterprises and forest Universities, that are participating in the project, on the basis of St. Petersburg State Forest University. This will help to solve the following problems:
   a.1) Organization of trainings and internships for the students at the enterprises working in the forest sector in order to give them opportunity to receive working experience and to find a job in the future easier.
   a.2) Joint development of continuous training courses for the forest companies for the retraining of forest workers, advanced training of workers, middle and senior management personnel.
   a.3) Organization of development and implementation of the program for teachers’ forest sector development.
   a.4) Making easier adaptation of the young specialists at the forest sector enterprises by creating special courses for their adaptation.

b) Active involvement and participation of the forest sector community in the training process, development of professional standards, educational standards, and public accreditation of educational programs;

c) Creation and using of modern e-learning methods in the frame of higher forest education will allow making access to forest education easier for all the stakeholders in the frame of forest education.

d) Using the best practices of the partner universities in forest digital pedagogic will allow raising quality of high forest education.
e) Methods of e-learning that will be used in forest high education will motivate students to study more effectively, because the study process can be organized not only on the premises of the Universities but in any places, it will be convenient for the students.

Based on the analysis of the international project of cross-border cooperation of South-East Finland and Russia KS1027 “Digital forestry pedagogy” may be concluded that it will contribute to the solution of urgent problems of training specialists for the forest industry due to implementation in teaching process innovational teaching methods, connected with the e-learning education for students and representatives of the forest companies and creating an opportunity for more closer cooperation between universities and forest companies[8].

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