

# Innovative Information Technologies in the Development of the Transport Industry Education

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**Abstract**—The state of the transport industry education system is considered in the article. It is shown that the training of specialized professionals is one of the objectives of the transport industry education system aimed at increasing the country's competitiveness in the transport service market. This can be achieved by introducing modern innovative information technologies into the transport industry education system.

**Keywords**—transport industry education system, innovative information technologies, transport service market, distance learning, network education conglomerates

## I. INTRODUCTION

The transport industry education system has proven the relevance and high potential for possible development since its inception and throughout its existence. Transport educational institutions retain their leading positions in the field of industry-specific professional education all over the world.

The transport industry education system requires the need to introduce modern innovative information technologies into its educational process in order to comply with the modern trends, which would allow creating a modernized system for training transport industry personnel. Training of highly qualified specialized professionals in the transport industry education system is one of the main objectives at all levels of professional training of transport educational institutions, which, in turn, leads to an increase in the country's competitiveness in the transport service market.

## II. PROBLEM STATEMENT

As noted above, training of highly qualified personnel, who keep up with the times, possess the necessary theoretical knowledge in their field and apply it in practice using modern innovative information technologies, is one of the main objectives of transport industry education.

Modern transport educational institutions produce a large number of specialists, however, various studies [1, 2, 3] show that there is still a shortage of highly qualified personnel in the transport service market. The motivational components for attracting prospective students to this particular area of transport industry education should be:

### 1. Quality education.

In transport industry educational institutions, appropriate resources should be available in the form of modernized educational and laboratory classrooms equipped with the necessary innovative information technologies in the form of various equipment for training transport service workers. It should be noted here that this should apply to all levels of professional education: secondary, higher, postgraduate and continuing education. Thus, we would get specialized professionals who would be able to work with modern innovative information technologies upon graduation from a transport educational institution, and already working specialized professionals with advanced training or retraining.

### 2. Subsequent employment.

Transport educational institutions should have statistical data on requests to offer graduates places of possible employment corresponding to their knowledge level, both in the public sector and in the private sector in the transport service market. That is, there should be an interdependent employer ↔ graduate scheme. Studies show that the demand for specialized transport professionals in the transport service market will grow in the future. Graduates of transport educational institutions will always be able to find work in the transport infrastructure: as design engineers for various transport equipment, as design engineers in mechanics, hydraulics, electrical engineering, in logistics companies of various levels, in marketing and freight forwarding services, in the logistical system of wholesale and retail transport equipment and components trade, etc.

## III. PROBLEM SOLUTION

Looking at the experience of developed countries, we can see that any upgrade of the transport industry education system today is impossible without introducing modern innovative information technologies [3]. For instance, in the People's Republic of China, the leader in high-speed railway traffic (over 16,000 km of high-speed railway lines are operated in the PRC today), with more than 70 universities producing transport specialists, 37 of them producing railway specialists, the focus is on specialized modernized training centers. These centers provide both training and retraining for transport infrastructure professionals. The Beijing Jiaotong University, one of the leading technological universities of the People's Republic of China, has a center (Fig. 1) with all the necessary innovative information technologies for training

various profile specialists in the field of high-speed railways. An electronic library containing materials on the development of high-speed transport in the world was built at the university in 2006.



Fig. 1 The high-speed railway control training center of the Beijing Jiaotong University

As we can see, the modern educational process, in particular, in the transport industry education system discussed in this article, at all its levels is open to the introduction of innovative information technologies—hardware and software designed for processing, storing and transmitting information [4,5,6]. These technologies include computers and telecommunication networks, video and audio tools, various multimedia systems, the use of which in the education system is aimed at supporting the educational process.

One of the new forms of the combined application of these Internet-based innovative information technologies has given rise to the currently widespread distance learning.

The best-known definitions of "distance learning" are as follows:

"distance learning" as a learning process in which "teacher" and "student(s)" are geographically separated and therefore rely on electronic and printed materials to organize the learning process (the definition of the United States Distance Learning Association (USDLA)) [7, p.11];

"distance learning" is a remote education technology, in which teachers and students are physically in different places and use case, TV and network technologies (group of MESI specialists) [7, p.17].

From the definitions, we can conclude that the distinctive feature of distance learning is the possibility of learning remotely, which has become possible today because of the Internet.

The purpose of using distance learning is to increase the availability and quality of education through the use of modern Internet-based information and communication technologies.

The prospects of the development of distance learning are especially clear if we study the indicators of the global market in this area. According to the data and forecast published by Forbes [8, 9], the volume of the world distance learning market reached \$107 billion in 2015, and it is expected to rise to \$325 billion by 2025.

## The volume of the world distance learning market (\$ bln a year)

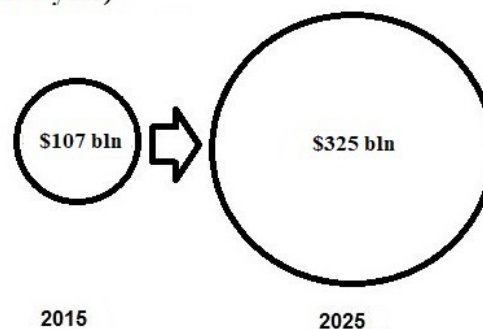


Fig. 2 The estimated volume of the world distance learning market (2015-2025)

The volume of the global distance learning market shown in Fig. 2 is estimated with positive dynamics, indicating a growing demand and prospects for the development of this form of education in the future.

In the transport industry education system considered in this article, distance learning can be used at all levels of professional education: secondary, higher, postgraduate, and continuing education.

Internet-based distance learning in the system of higher transport industry education is designed to improve the performance of the two main motivational components described in the previous section, for the subsequent increase in the number of prospective students in this particular area of industry education:

1. improving the quality of professional education in transport educational institutions;
2. providing professional personnel for the transport service labor market.

Let us single out two advantages of distance learning in the transport industry education system [10]:

1. since distance learning based on modern innovative information technologies connected by the Internet is large-scale, this form of education can be implemented not only within a separate transport industry educational institution, but also within a region, city, country or even between countries of the world, which consequently leads to further integration of national transport industry educational systems into a world system of transport industry education;
2. with distance learning in the transport industry education system, communication can be established not only with other transport educational institutions, but also with any corporate unit of the transport infrastructure, creating the education ↔ production industry cooperation.

These two advantages contribute to the intensive circulation of industry knowledge flows in a single industry information and educational space, which is very important today, given the speed at which information today is created, processed and shared.

This is essentially how distance learning industry network interactions are formed—network education conglomerates, which are classified, in particular, by geographical scope [10]:

- A regional distance learning industry network brings together participants within one region;
- A national distance learning industry network brings together participants in the territory of one country;
- An international distance learning industry network brings together participants in different countries.

Since a distance learning industry network is an open structure, it can be expanded by including new elements in it. A regional distance learning industry network can get the status of an international distance learning industry network by including foreign educational institutions. An example of such a network education conglomerate in the transport industry education system is the Network University for Transport and Logistics of the International Association of Transport Universities of Asian Pacific Countries (IASTU APC) [11].

IASTU APC was established in 2009 and already included 12 transport universities and organizations from Australia, Kazakhstan, PRC, Republic of Korea, Mongolia, Russia, Japan in 2014 [12]. At the moment, the official website of the association lists 31 transport universities from Australia, Vietnam, Indonesia, Kazakhstan, RPC, Republic of Korea, Mongolia, Russia, Uzbekistan, Ukraine [11]. The geography of the members continues to expand every year. The main objective of the association is to work out directions and projects of cooperation in the field of science and education in transportation that meet the current demands of the world community, individual countries and regions, to create and implement intellectual products and services that provide training and retraining of personnel [12].

The Network University for Transport and Logistics of Asian-Pacific Countries operates on the basis of an equal partnership of all universities and organizations that are members of IASTU APC, while the coordinator university carries out the coordination work. The main goals of the network university are: training of highly qualified specialists at Bachelor's, Master's, postgraduate and doctoral levels in transport and logistics; search for and organization of new forms of inter-university cooperation. The Network University makes it possible today to implement a model of open distance learning in the IASTU APC member countries and thereby significantly reduce the cost of educational programs.

The activities of the Network University for Transport and Logistics of Asian-Pacific Countries are carried out in the following order in several main online steps [13]:

- Member universities of the Network University submit educational programs to be included in the integrated database, providing them to the coordinator university in electronic form.
- The coordinator university processes the information provided by the member universities, updating the integrated database of the Network University on the IASTU APC website, placing the programs on the IASTU APC web-site, handling information distribution and maintaining the records related to the activities of the Network University.
- A member university of the Network University interested in the implementation of a joint educational

program searches the integrated database to select the appropriate program.

- For the further implementation of the joint educational program, the interested member university contacts the partner university that submits this program for discussion, approval and launching.
- The information on the launched joint educational program is communicated within the Network University by member universities to the coordinator university.

The advantages of the Network University for Transport and Logistics of the Asian Pacific Countries are as follows: a wide range of offered educational programs; the possibility of issuing more than one diploma; production of highly qualified personnel who will be able to work across the entire territory of Eurasia; the opportunity to use the information and communication base of member universities; access to the electronic libraries of member universities; the opportunity to publish research articles and papers in specialized printed publications of member universities [13].

## CONCLUSION

Training of highly qualified personnel is one of the main objectives of transport educational institutions aimed at increasing the country's competitiveness in the transport service market. The problem can be solved only if the transport industry education system meets modern professional quality standards. Modern innovative information technologies should be introduced into transport industry educational institutions to provide the educational process with the necessary technical conditions for training, advanced training and retraining of highly qualified specialized professionals in the transport industry. One of these technologies is distance learning, which allows raising the education level through the use of modern Internet-based information and communication technologies.

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