

---

## INNOVATION EDUCATIONAL PROGRAMME "MARINE ENGINEER"

Larisa Zainutdinova, Anatoly Korablin, Roman Lidgi Goryayev

*Annotation:* The urgency of the problem of realizing the principles of open education for training engineers of marine specialities is shown. The innovation educational programme "Marine engineer" has been offered by the Marine technologies, power engineering and transport institute of Astrakhan State technical university [ASTU]. The structure of the Innovation educational center "Marine engineer" has been developed.

*Keywords:* open education, innovation programme, marine engineer, electronic training aids

*ACM Classification Keywords:* K.3.1 Computer Uses in Education.

---

### Introduction

---

After the USSR's break up the port-city Astrakhan situated not far from the border became the main Russia's sea gate at the Caspian sea. The conditions of Russia's participating in the Sea power community have changed, the geopolitical significance of the southern regions and sea ports in goods trans-shipment, especially oil has increased. New oil and gas companies came into the city. Opening up gaseous condensate field and the Caspian sea shelf change the Caspian region into one of the biggest centres of gas, oil and oil-products production, processing and transportation. ASTU achieved the status of a prestigious educational institution both in the country and abroad. It is considered to be one of the best educational institutions on fishing, marine and technical directions in the Russian Federation. Lately the university teaching staff have been developing fundamentally new trends connected with the rebirth of the native fishing production, navy and inland water transport, the perfection of their exploitation and increase of navigation safety, etc. On basis of these investigations the works connected with creating fundamentally new curriculum both for high schools and institutions of higher education appeared taking into account the fast evolutional process which will radically change the functional duties of senior and technical staff of enterprises and organizations in the nearest future.

Training specialists for fleets and enterprises connected with them in ASTU is conducted in accordance with the National educational standards, coordinated with the demands of the International convention about training and certificating sailors and keeping watch 78/95 (TCSKW 78/95) of the International marine organization (IMO). The university is a progressive institute of higher education realizing the intentional specialists training on the given direction.

In their graduation thesis students solve real problems of fishing, transport and port activity: the application of new technique and technology for opening up a new freight flow, developing traffic centers, creating ecologically clean fishing technologies, the questions of technical exploitation and so on.

Opening the international transport passage "North-South" in the Caspian basin will allow the Astrakhan region to get a strong impulse of developing which will broaden and improve such strategic communications as navigable, transport and railway ones. Moreover the Russian fleet ship staff has a great need for raising the level of their skills and receiving extra professional education.

The attraction of the university for investors and students is determined by a wide spectrum of activities:

- teaching activity;
- operational-technological and service activity;
- organizational and management activity;
- project-designing activity;
- production-technological activity;
- scientific-research activity.

A high level and a wide spectrum of the given services allow the university to remain the main strategic direction centre in the Astrakhan region, satisfying employers and partners' needs.

It is no secret that lately the demand for marine technical education has grown in foreign states which send their representatives to our university for a probation period and studying which points to the prestigiousness of ASTU education.

Foreign students come to our university not only to study but on excursions, to scientific conferences and friendly meetings as the university is famous for its social and cultural traditions. The International friendship club where national holidays are celebrated and the days of national culture are held is functioning. Astrakhan is a multinational city, where a tolerant attitude to the representatives of different nationalities has historically been formed.

Taking into account a great society's need in the system of the open i.e. continuous, flexible, distributed education the Marine technologies, power engineering and transport institute attached to Astrakhan State technical university has worked out the innovation educational programme "Marine engineer" for the further perspective development step.

### Innovation Educational Programme "MARINE ENGINEER"

The purpose of the innovation educational programme "MARINE ENGINEER" is: to increase the quality of education, to expand the spectrum of educational services (including the remote learning) and as a result to improve the situation on the labour market on the marine direction in the Russian Federation and first of all in the Southern Federal District. In prospect the exit to the international educational field is expected.

For realizing the programme the Innovative-educational centre "MARINE ENGINEER" was created. The centre structure is shown in figure 1.

Chief-coordinator of the Innovative-educational centre "MARINE ENGINEER" is director of the Marine technologies, power engineering and transport institute of Astrakhan State technical university.

Monitoring and analysis department provides collecting the information about educational services consumers, labour market demands, forms flexible work curriculum corresponding with National Educational Standard demands and individual trainee's requirements. Monitoring and analysis department plays a vital part in realizing Innovative-educational programme.

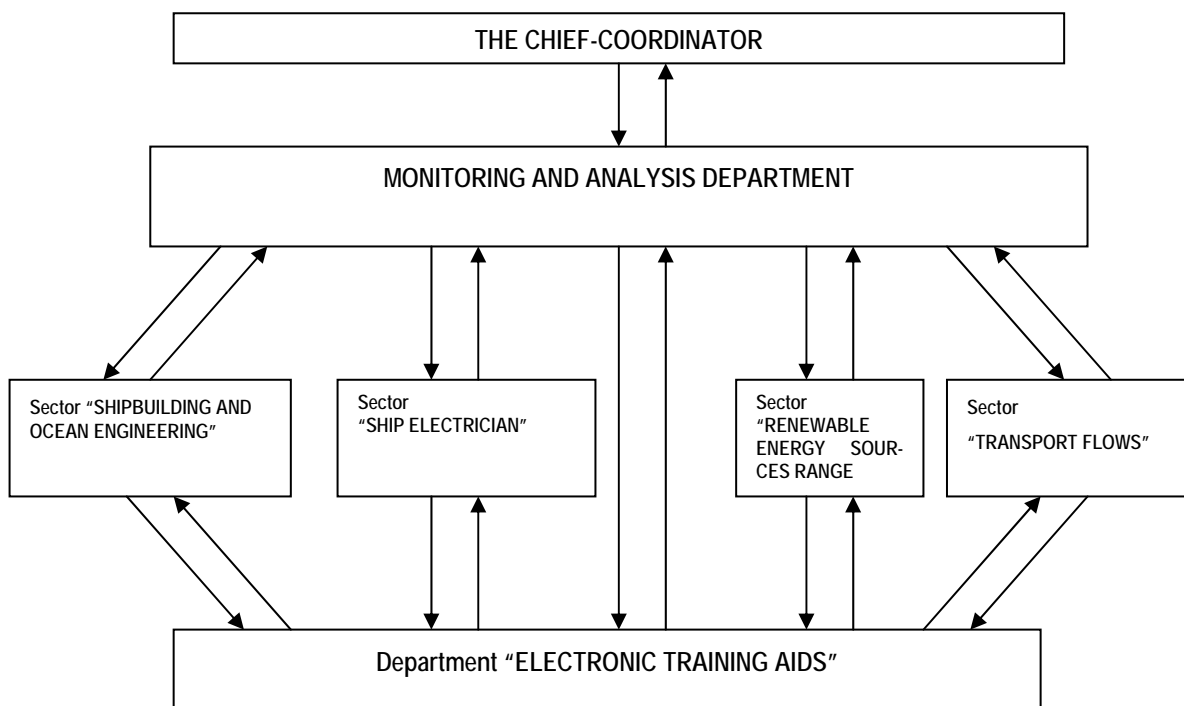


Fig.1. the Innovative-educational centre "MARINE ENGINEER" structure

### Sector "SHIPBUILDING AND OCEAN ENGINEERING".

The following enterprises take part in the work of this department: "Shipbuilding and power marine technique complexes" chair, collectives of the adjacent chairs of the Marine technologies, power engineering and transport institute; Ltd company "Marine shipbuilding plant named after K. Marx", "Astrakhan shipbuilder", "Astramarin", "Shipbuilding plant named after Lenin", "Caspribkholodflot", "Physics institute DNC RAN" and others. The purposes of the sector in the educational activity and on the labour market is to increase the quality of training students and graduates who already have the industrial and scientific activity experience, on basis of which the growth of a great demand for specialists on the direction "Shipbuilding and ocean engineering" on the labour market in the Southern Federal District and over the Russian Federation by 25-30% on the whole and as a result of it the increase of entrants by 35-40% with the students screening reduction by 50-70% is expected.

### Sector "SHIP ELECTRICIAN".

The sector functionates on basis of the chair "Electrical equipment and ship automation" which has close scientific connections with the Russian State oil and gas university named after I.M. Gubkin (Moscow), Moscow power Institute, Ufa State oil technical university. The chair has modern equipment and software of the company "SHNEIDER – ELECTRIC" – the biggest developer and supplier of the automation of energy objects and energy saving transmission engineering to the Russian market.

The biggest oil and gas industry enterprises functionate on the territory of the Astrakhan region. All of them are characterized by a high level of per capita power consumption and automation of industrial plants and technological complexes and are equipped by the most up-to-date electrical equipment, automation means and systems, the service of which requires highly qualified staff.

The prospects of the sector's "Ship electrician" work are connected with the growing necessity in electricians engineers, caused by the development of the shipbuilding and ship repairing complex in the region, a rapid growth of marine traffic across the transport passage "North-South" via the port "Olya". The demand for the specialists in the field of operational and after-sales service of electrical equipment and ship automation, electrical power audit and energy saving technologies is increased.

### Sector "RENEWABLE ENERGY SOURCES RANGE"

The sector's work is provided by the collective of the "Heating engineering" chair which has a high scientific potential and close scientific connection with the Academy of Sciences of Russia.

Renewable energy sources range (RES) is created on the territory of ASTU and on the territory of the vegetable-growing and melon-growing Scientific-research institute, Kamyzyak town. Teaching-commercial demonstrational range of renewable energy sources and installations on their basis will allow:

- To propagandize the possibilities of using renewable energy sources in the region.
- To use RES in the heat- and power supply of the objects near the Range in Kamyzyak town (vegetable-growing and melon-growing Scientific-research institute) and in Astrakhan (ASTU) for the elimination of energy shortage and the particular tariffs reduction.
- To provide the possibility of conducting scientific research on the optimization of the operating mode of the solar, wind and heat plump plants in the region's conditions.
- To work out the modernization activities for increasing the efficiency of the RES power plants.
- To provide the holding of the seminars and training activities for the region's power engineering specialists.
- To intensify the practical training of the students of heat-and-power engineering and electric power specialities on using RES in the regional power engineering.

### Sector "TRANSPORT FLOWS"

The sector functionates on the basis of the chairs "Organization and safety of traffic" and "Water transport exploitation". The subjects of the sector are:

- the effective use of the material, financial and people resources;
- providing the safety of traffic in different conditions;
- working out the effective schemes of organizing the transport means movement;
- the analysis of the production-economic activity of the region's transport enterprises;
- modeling processes of functioning the transport-technological systems and regions transport flaws;
- forecasting the development of the regional transport systems;

- developing the generalized variants of solving the region's transport problem;
- working out the measures on improving control systems on transport.

#### **Department "ELECTRONIC TRAINING AIDS"**

The department "Electronic training aids" provides the development and application of electronic training aids within the limits of the innovation educational programme "MARINE ENGINEER".

The work of this department is based on the progress of the scientific school of doctor of pedagogical science, professor Zainutdinova L.H. The main direction of the scientific research is the methodology of creating and applying electronic training aids in the field of technical disciplines. The postgraduate course on speciality 13.00.02 – The theory and principles of education and training (technical disciplines, higher education level) is opened. The specialists on developing electronic training aids are trained there. We take part in the Complex programme of the Russian Academy of Sciences "Information and communication technologies in the continual education system". There are scientific connections with the leading national institutes of higher education, among which one can find: Moscow power institute, Moscow institute of mines, Moscow steel and alloy institute, Ufa aviation technical institute and many other institutes of higher education.

Scientific connections with the following foreign educational and training institutions: the Higher technical school Konstanz city (Germany), FOI Institute of Information Theories and Applications (Bulgaria), Mount Wachusett Community College have been established.

The experience of organizing a number of international scientific-methodic conferences devoted to the application of information technologies to electrotechnical education has been accumulated. The conferences were held in 1992, 1993, 1995, 1998, 2000, 2003, 2006.

The created electronic training aids are developed taking into account pedagogical, psychological and ergonomic requirements. A sufficiently high level of the developments is verified by the stamps of the Scientific guidance board on the discipline "Electrical engineering and electronics" of the Education Ministry of the Russian Federation.

---

#### **Structural ties**

---

Both feedforward and feedback ties between the separate structural subdivisions in the Innovation educational centre "MARINE ENGINEER" structure shown in figure 1 are represented. On solving innovation tasks in conditions of the influence of many factors it is impossible to do without feedback. The feedback allows to fulfill the interactive process of the structural subdivisions for the purpose of making the optimal educational programme for the certain groups of students.

---

#### **Conclusion**

---

The Innovation educational programme "Marine engineer" providing the possibility of realizing the open education principles has been offered. The Innovation educational centre "MARINE ENGINEER" structure has been worked out.

Working out new training aids (mainly electronic) for the most suitable perception and learning the teaching material, the possibilities of the remote education in the virtual sphere; the application of educational technologies, providing the combination of theoretical and practical engineering training in conditions of modern productions; the formation of skills and abilities by means of off-centre approaches to organize independent students' work - all this is supposed to contribute to increasing the quality of training different categories of trainees.

The realization of the Innovation educational programme "Marine engineer" will give an opportunity of the systematic change from the extensive principle of training specialists toward the intensive, modern and perspective principle which is based on the development of the intellectual constituent in all the education system and the combination of the new training methods with the industrial, planning-designed and scientific research work.

The realization of the Innovation educational programme "Marine engineer" will assist in solving the problem of the continual, flexible, distributed education.

---

## Authors' Information

---

Zaynutdinova Larisa Hasanovna - Astrakhan State technical university, chief of the Electrical engineering chair, the doctor of pedagogical science, professor; Russia, 414025, Astrakhan, Tatischev street, 16; E-mail: lzain@mail.ru

Korablin Anatoly Viktorovich - Astrakhan State technical university, director of the Marine technologies power and transport Institute, candidate of technical science, the associate professor; Russia, 414025, Astrakhan, Tatischev street, 16; E-mail: imtet@astu.org

Lidgi Goryayev Roman Anatolievich - Astrakhan State technical university, director's substitute of the Marine technologies power and transport Institute, candidate of technical science, Russia, 414025, Astrakhan, Tatischev street, 16; E-mail: [Lidgi-Goryaev@rambler.ru](mailto:Lidgi-Goryaev@rambler.ru).

## THE METHODS OF CONDUCTING STUDIES WITH THE APPLICATION OF COMBINED DIDACTIC INTERACTIVE PROGRAMME SYSTEMS

Maxim Polskiy

**Abstract:** *The methods of the application of the Combined didactic interactive programme system on electrical engineering disciplines has been worked out and the possibility of its application for providing a complex of different kinds of studies: lectures, tutorials, laboratory studies and also for organizing students' independent work has been verified. The given methods provide the organization of the reproductive (recognition and reproduction) and productive heuristic educational-cognitive students' activity in conditions of gradualness and completeness of education with the closed directed automatic control.*

**Keywords:** *lecture, tutorial, independent students' work, combined didactic interactive programme system, reproductive and productive educational-cognitive activity.*

**ACM Classification Keywords:** *K.3.1 Computer Uses in Education, J.2 Physical Sciences and Engineering.*

---

### Introduction

---

The problem of the rational use of information technologies in the educational process is the most important in pedagogics nowadays. The complex use of such means for methodical provision of different kinds of studies in the widest aspect is proved by I.V. Roberts' [Роберт, 1994], studies, and for the field of general technical disciplines – by the works of S.V. Panyukova [Панюкова, 1998] and L.H. Zainutdinova [Зайнутдинова, 1999].

The Combined didactic interactive programme system (CDIPS) being used for conducting lectures, tutorials, laboratory studies and students' independent work (SIW) is developed at the Electrical engineering chair of Astrakhan State technical university. CDIPS provides the closed directed automatic control both for the reproductive and productive heuristic educational-cognitive students' activity.

Let us examine the methods of the application of this system on electrical engineering disciplines for organizing and conducting different kinds of activities

---

### Lectures

---

According to the traditional training technology in an institution of higher education lectures are considered to be the main and the most important kind of studies and lecturing is committed to the most erudite and experienced teachers. The lecture contains a great volume of a new teaching material given to students. However a teacher with such kind of studies "uses the unfastened control in the scattered information process" [Беспалько, 2002, с. 181]. As a result of it the lecture can not pretend to providing a high-quality learning of the educational-cognitive activity by students.