

# Individual Learning Route as a Way of Highly Qualified Specialists Training for Extraction of Solid Commercial Minerals Enterprises

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**Abstract.** In view of changing educational paradigm (adopting of two-tier system of higher education concept - undergraduate and graduate programs) a need of using of modern learning and information and communications technologies arises putting into practice learner-centered approaches in training of highly qualified specialists for extraction and processing of solid commercial minerals enterprises. In the unstable market demand situation and changeable institutional environment, from one side, and necessity of work balancing, supplying conditions and product quality when mining-and-geological parameters change, from the other side, mining enterprises have to introduce and develop the integrated management process of product and informative and logistic flows under united management system. One of the main limitations, which keeps down the developing process on Russian mining enterprises, is staff incompetence at all levels of logistic management. Under present-day conditions extraction and processing of solid commercial minerals enterprises need highly qualified specialists who can do self-directed researches, develop new and improve present arranging, planning and managing technologies of technical operation and commercial exploitation of transport and transportation and processing facilities based on logistics. Learner-centered approach and individualization of the learning process necessitate the designing of individual learning route (ILR), which can help the students to realize their professional facilities according to requirements for specialists for extraction and processing of solid commercial minerals enterprises.

## 1 Introduction

The training of highly qualified specialists in logistics for mining enterprises is one of the actual problems in our country. Nowadays such definitions as “expertise”, “undergraduates’ competence” appear instead of “competence”, “knowledge”, “the common culture”. According to recent requirements the graduates of redbrick universities must have formed

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organizing abilities, make decisions and take responsibility for their consummation, have all necessary communication skills, be able to define social processes and the role of professional engagement in them, know how to improve it etc.

This problem solution is connected with the content standards modernization, optimization technique of educational process. To join to the World Education Space is necessary to adopt new requirements for the level of education, the quality of training specialists in logistics. In turn it requires significant changes in pedagogical theory and in the practice of education process.

The improvement of the quality of specialists training in logistics for mining enterprises, their academic qualification can be achieved with the help of new training forms, using modern learning and information and communications technologies when carrying out a learner-centered approach.

Moreover it is absolutely necessary to gain experience of individual work, to have skills to define problems, to work with up-to-date resources, to find out-of-the-box solutions etc. Thus centered orientation is recommended for modern student. It is supposed to have individual, comfortable programmers.

One of the technologies which can improve the effectiveness of individual work is individual learning route. It is supposed to found special pedagogical conditions to choose means, forms and methods of training which can keep up different educational and scientific interests.

Individual learning route is defined by educational needs, individual student's skills and capability (the level of readiness to complete program me) and forms competences defined by Federal State Standards of Higher Education.

## **2 Materials and methods**

Individual learning route (ILR) is a purposeful, designed, graded educational program me when a student can take the position of the subject of choosing, making, carrying-gut of an educational program me with support of a lecturer in professional identity and self-fulfillment.

We can mark out some types of individual educational routes inside the system of higher education, let us name the most important of them, in terms of their application for a specialist preparation in logistics sphere for mining enterprises:

-Self-oriented individual educational route (this route is oriented on self-knowledge, personal abilities, personal resources);

-The route, oriented on receiving knowledge (this route is related to the separation of the system subject areas: transport logistics, warehousing logistics, informational logistics, with the system of supply control);

-The route, oriented to the student's self –creation as a specialist to be ( this route is related with undergoing of practical training);

-The route, related to the students orientation on the scientific activity, it is characterized by the definite aim dependence. This route is initially planned and it is aimed at the receiving of concrete results (in research sphere, the theme and the problem of the scientific research work). The leading direction of the development of this route is knowledge direction and personal growth direction.

Modern computer technologies allow students to establish order and intensity of studies themselves according to the individual educational route; while realizing the possibility to work at home using PC with University electronic library system, with information materials, with electronic learning and teaching resources, with Internet technologies usage, and the including of students PC into the local University network.

### 3 Results and discussion

Scientific research work takes up the main position in the student individual work. But the first year students are not often involved in this activity. There are some reasons:

- First year students don't have necessary skills and abilities;
- There is low level of the teaching staff and curator's activity to coordinate and find students who are interested in the scientific research work.

As a result we can see the progressive reduction of the student's cognitive activity that can have negative result at their further professional activity.

However, it is possible to organize scientific research work while training subjects of general education, based on the individual educational route organization during the first and the second years of education.

Let's study the individual educational route scheme of the first year student scientific research work specialization «Transport logistics», department of automobile transportation, the Institute of information and communications technology, machinery and automotive transport, Kuzbass State Technical University, named after T.F. Gorbachev.

According to the degree course scheme, «Scientific research basics» course is studied on the third year of education, in view of this, it is possible to make the individual educational routes related to the scientific research work for the first year students who study this specialty. Let's name the individual educational route – the map-navigator of scientific research work.

The realization of the individual educational routes is impossible without modern educational resources usage and information and communication technologies. They include:

-Electronic Libraries: scientific and technical library of Kuzbass State Technical University. a T.F. Gorbachev, PC-based library system.

-AUTOSTAT analytic agency has been assisting top managers and key specialists of over 2,000 companies in Russia and abroad in these processes for more than 12 years. The agency carries out surveys of car owners and automotive business experts, prepares marketing reports on different segments of the Russian automotive market, organizes conferences and training seminars. They are the leading analytic agency in the Russian automotive business statistics and analytics and provide complete and actual information on it.

-The official site of the «Mining engineering» magazine.

A national specialized scientific/technical/industrial journal about achievements in mining operation technologies, mining equipment and mineral processing, state-of-the-art computer-based systems, R&D, markets of mineral resources, trends and case studies of investments into mining industry in the former Soviet Union and other foreign countries.

The journal presents reviews, research- and- technology, feature, and analytical articles, advertising materials, information on the leading mining and machine- building companies and new products of domestic and world manufacturers.

Mining Industry is a regular participant and media sponsor of major international and regional professional exhibitions specializing in mining, geology, road construction and other related topics.

The journal is circulated among visitors and participants of many conferences and exhibitions on mining in Russia and abroad, such as Mining World Russia (Russia, Moscow), Coal of Russia & Mining (Russia, Novokuznetsk), Expo Coal (Russia, Kemerovo); Mining World Central Asia (Kazakhstan, Almaty), Mining World Uzbekistan (Uzbekistan, Tashkent) and others

-Desktop applications: Microsoft Office, Open Office, Libre Office

-E-mail technology and provided services in sending and receiving messages (electronic messages) through the distributed (including global) system.

The scheme of the map-navigator of the scientific research work of the first year student of the Kuzbass State Technical University

**Table 1.** The scheme of the map-navigator of the scientific research work of the first year student.

| <b>The educational program specialization 23.03.01.03 « Transport logistics»</b> |                                                                                                                               |                         |                       |                                                                                                                                           |               |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| <b>Research advisor</b>                                                          |                                                                                                                               |                         |                       |                                                                                                                                           |               |
| Stages of the scientific research work                                           | Proceeding                                                                                                                    | Advisor, consulter      | Projected period      | Reporting form                                                                                                                            | Actual period |
| Organizational aspect                                                            | Student's scientific research work review in KuzSTU.                                                                          | Learning circle advisor | September             | Conference                                                                                                                                |               |
| Course selection                                                                 | Under the frame of « The introduction in specialty» course                                                                    | Course lecturer         | During the first term | Report                                                                                                                                    |               |
| Problem statement                                                                | The urgency of the research statement                                                                                         | Research advisor        | October               | Conference                                                                                                                                |               |
| Literature sources work                                                          | The view and theoretical survey of scientific literature                                                                      | Research advisor        | November              | Report, reference list                                                                                                                    |               |
| Choice of the object and the subject of the research                             | The development of the theoretical constructs of scientific research work                                                     | Research advisor        | December              | Conference                                                                                                                                |               |
| Practice                                                                         | Empiric study                                                                                                                 | Research advisor        | January-February      | Conference, Report                                                                                                                        |               |
| Presentation of the results                                                      | The materials handling, conclusion statement                                                                                  | Research advisor        | March                 | Report, Presentation                                                                                                                      |               |
| Preparation for the presentation                                                 | The scientific research work defense. The Preparation of the scientific research work materials for conferences, roundtables. | Research advisor        | April                 | The proceedings of the report, the presentation at the Russian research-to-practice conference of young researchers« The young of Russia» |               |

## 4 Conclusions

In view of changing educational paradigm of higher education, it is necessary to use new educational and information communication technologies applying executing learner-centered approach during highly –qualified specialists preparation for enterprise for solid commercial minerals extraction and recycling.

One of the technologies directed at the improvement of the effectiveness of the student's individual work is the individual educational route.

The scientific research work takes the principal place into the student's individual work.

The individual educational route development of the scientific research work of the first year students will allow them to form scientific research competence, to develop organizing skills, to learn how to make decisions and take responsibility for their achievement, that are corresponding the requirements which are demanded for highly –qualified specialists at enterprise for solid commercial minerals extraction and recycling

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