

**M. B. Litvinova,**  
orcid.org/0000-0002-4917-2132,  
**O. M. Dudchenko,**  
orcid.org/0000-0002-7724-0892,  
**O. D. Shtanko,**  
orcid.org/0000-0003-3572-7915

Admiral Makarov National University of Shipbuilding, Kher-  
son Educational-Scientific Institute, Kherson, Ukraine, e-  
mail: [lmb965@gmail.com](mailto:lmb965@gmail.com)

## APPLICATION OF LOGISTIC CONCEPT FOR THE ORGANIZATION OF SMALL ACADEMIC GROUPS TRAINING IN HIGHER EDUCATION INSTITUTIONS

**Purpose.** From the standpoint of educational logistics, we consider organization of training of small academic groups (SAG) in higher education institutions (HEIs). We consider separate components of the logistics system of HEIs and features of resource, information and service streams for maintenance of training of SAG. We substantiate the expediency of organizing student training in the SAG to meet regional staffing needs.

**Methodology.** In our study, we use system-structural methods (including systems analysis, generalization, research-targeted generalization and systematization of economic, statistical, and scientific-methodological data) as well as the logistical approach. To substantiate the results, we conduct a sociological survey using the statistical data processing based on multicomponent correlation analysis.

**Findings.** The institution of higher education is considered as a logistics system consisting of numerous interconnected links that require the use of information, resource and service flows adapted to educational conditions. For flow management, the use of logistics technologies is proposed, which are combined in the Learning and Development (L&D) model, which has four components. The authors provide a detailed review of these components with highlights on their functional aspects that aim to ensure an economically, organizationally and methodologically sound joint SAG training for students from different specializations. The data is provided testifying to expediency of carrying out training of experts in HEIs of that region where there is a need for these experts, even in spite of bigger cost of training of SAG students.

**Originality.** For the first time, a logistical concept was used to consider the organization of SAG training in the HEIs. The application of the L&D model for logistics system flow management has been improved, as well as the contaminated form of training and diversification of subject content, which ensure the quality of the service flow during the joint training of students of different specialties.

**Practical value.** The application of the logistics concept for the organization of SAG training in HEIs allows one, on the one hand, to optimally realize the state interests in regional staffing, and on the other – to increase the stability of HEIs in a rapidly changing market economy.

**Keywords:** *educational logistics, higher education institution, logistics concept, small academic group*

**Introduction.** Ukraine's entry into the world economic and educational space requires the creation of new models and approaches aimed at combining modern economic, pedagogical and information theories and practices. Therefore, more and more often the effective solution, at first glance, of purely educational problems in latest scientific literature occurs within the framework of educational logistics.

One of the important problems that has recently become relevant in Ukrainian educational practice is the problem of teaching small academic groups (SAG). Indeed, under certain socio-economic circumstances, in recent years there has been a growing tendency to create groups of less than fifteen (and sometimes ten) students in higher education institutions (HEIs). The letter of the Ministry of Education and Science of Ukraine (MESU) 1/9-496 dated 16.09.2016 reads as follows: "The Ministry of Education emphasizes that the need to work with small academic groups requires the development of flexible curricula, individualization of work with students, establishing a real interuniversity cooperation and construction of models of real free choice of disciplines by students" [1]. The solution of such a problem is impossible without the application of the logistics concept.

Outside Ukraine, the problem of "small-scale training" of specialists [2, 3] concerns countries with large unevenly populated areas, such as Australia, USA, China, Malaysia [3, 4]. Despite the different mechanisms and sources of funding for education, their experience can be applied in Ukrainian practice. On the other hand, the know-how of educational logistics in Ukraine can be interesting for improving the planning and provision of educational services in other countries.

**Literature review.** Despite the urgency of the problem, the number of works by Ukrainian researchers on the SAG training problem remains very limited. These include works [2, 5].

The study [2] shows that in 2014, among the academic groups of technical HEIs, 34.8 % were groups with less than 15 students, and due to certain objective conditions, the percentage of such groups will only increase. It is also noted that small-scale training of specialists "in the financial crisis in most educational institutions requires the creation and implementation of new economic methods of learning management" [2].

Analysis of the most authoritative foreign works on educational logistics, indexed in the systems Scopus and WoS [6–12], shows the lack of unity of definitions, views and approaches among researchers. The most common definition of "educational logistics" is used by the author [6] as a subdiscipline of logistics, dealing with the management of pedagogical flows, based on the principles of logistics and the principle of simplicity of real Goldratt's systems. For our study, the definition of the author of the work is closer [7], which has been repeatedly used in the development of certain logistics schemes for free trade in Europe, the United States and Asia [7–9]. It considers educational logistics as a set of principles for optimizing processes in educational systems and structures.

A detailed logistics model, in which HEIs are considered as commercially competitive enterprises, is provided in [6]. As new business models, models borrowed from logistics and supply chain management (LSCM) are offered. They use the terms "agile education", "agile pedagogy", "the agile classroom" and "lean education", which mean educational structures similar to those taken from the literature on LSCM [10]. The model of training in HEIs in work [6] is considered by full analogy with the enterprises on release of products of industrial production. Research data from LSCM [10, 11], accepted as sources of information and brought into line with the pedagogical system. In this case, the student is considered a "customer" who receives a particular product (knowledge), and the functioning of all university systems provides related to the receipt of this product

educational service. As a result, the “Leagile” approach [12] was formed as a hybrid of “lean” and “agile” systems [6].

**Unsolved aspects of the problem.** In Ukraine, the dominant “purely economic” approach to education in many cases leads the government to ambiguous management decisions to optimize and often eliminate cost-effective, “inefficient” educational organizations and their components. Such components, at first glance, should include small academic groups.

The recommendations of the Ministry of Education and Science of Ukraine, which are currently aimed not at the liquidation but at the preservation of SAG, are as follows: developing flexible curricula; individualization of work with students; establishing real interuniversity cooperation; construction of models of real free choice of disciplines by students; the possibility of transferring students with their consent to study in related specialties in order to consolidate academic groups in the same institution; transfer of students from small academic groups to other higher education institutions that are able to create conditions for students to study in the chosen specialty [1].

Each of these approaches either only partially solves the problem, or may be unprofitable economically for HEIs. HEIs are also not “ivory towers” that are separated from the influence of unstable external political and economic factors, as well as from complex internal inter-entirety relations. Therefore, without justifying the need to organize student training at the SAG and the application of the appropriate logistics concept in the management system of the HEIs raises the question of the prospects for the continued existence of such groups.

**Purpose.** From the standpoint of educational logistics, we consider the organization of training of small academic groups in higher education institutions. To do this, the following tasks are solved.

1. To substantiate expediency of the organization of training of students in small complete academic groups for maintenance of regional personnel needs.

2. To consider the individual components of the HEIs logistics system (LS).

3. To consider the features of resource, information and service flows circulating in the economically sound training of SAG.

**Results. Justification of feasibility of organizing students’ training in the SAG for maintenance of regional personnel needs.**

The Federation of Trade Unions of Ukraine currently has an acute shortage of skilled workers. At first glance, it seems that this problem applies only to workers, but for specialists with higher education there is, on the contrary, their “overproduction”. However, the key word is “qualified”. Introduction of complex technologies, on the one hand, reduces the total number of workers, but also requires the number of “bachelor” level specialists who can be allowed to work with modern equipment. In regional centers during the input of new industrial capacity there already exists a problem of finding engineering staff. The regions also have significant shortage of teachers (especially of physics and mathematics: in recent years, these pedagogical specialties of all HEIs of Ukraine can be formulated only by the SAG), doctors (therapists, pediatricians, etc.), specialized IT specialists, and others.

Deficiency of engineering, medical, pedagogical, and other personnel in the regions increases the overall complexity of the economic situation in the country.

It is clear that in terms of staffing there is a significant “skew” between the center (Kyiv and several major cities) and regions, as well as a significant outflow of qualified personnel abroad, associated with different levels of wages. However, this cannot be solved by rapid artificial measures.

Despite the less advantageous economic conditions, the formation of human capital in the regions for a long time is through the natural selection of professionals who, for some personal reasons, want to stay and work where they graduated from school or HEIs. Such choice can have both a socio-economic basis (housing, parental support, children, etc.) and a socio-psychological basis: adapted vocational training and

support for a person before starting its employment, assistance in finding employment. Focus on a company of specific profile in one region does not need a large number of graduates by one educational program and targeted small-scale training of specialists simplifies their employment [2].

We believe that in order to remain with the greatest probability to work in the region, the young specialist has to receive higher education in the regional HEIs. If we analyze the balance of arrival and departure of entrants to the HEIs in 2018 (Fig. 1), it shows that Kyiv receives more than 50 percent of the number of full-time entrants coming from all over Ukraine.

According to the annual report of the National Agency for Quality Assurance in Higher Education, in the capital there are as many full-time students as almost in all other regional centers together which have a positive balance of arrival of entrants (Kharkiv, Lviv, Odessa, Chernivtsi), taken together [13].

Unfortunately, there are no official statistics on the return of graduates of Kyiv HEIs to the regions as young professionals. However, if during the study the student managed to gain a foothold in any promising city of work in the capital, then to return back to the region and from the economic, cultural and household, the psychological points of view it is already unprofitable.

During 2016–2018, we tested 426 graduates of various secondary schools in Kherson and Kherson region. The initial question was to determine if the person was planning to enter HEIs. Responses were divided as follows: “yes” – 64.1 %; “no” – 27.7 %; “undecided” – 8.1 % (this percentage will be considered a research error). Those respondents who planned to join HEIs (273 persons) two questions have been clarified. Question 1: “Where do you plan to study?”. Question 2: “Do you plan to work in Kherson (Kherson region) after graduation?”. Table 1 in the first column listed answers to questions 1, and the second column shows the unique answer for each item of question 1. The third and fourth columns give the percentage of positive responses to question 2; in the third – total, i. e. from the total number (273 persons); in the fourth – from the number of persons on the corresponding line.

The table shows that less than six percent of those who are preparing to go to study outside of Ukraine plan to return after studying abroad to work in Kherson region. The percentage of those who plan to return home as a young specialist after studying in the HEIs of another region, is less than forty percent. And only among individuals who plan to stay to study in the HEIs of Kherson more than sixty percent expect to work in Kherson region. It is clear that the percentage values given in Table 1, vary

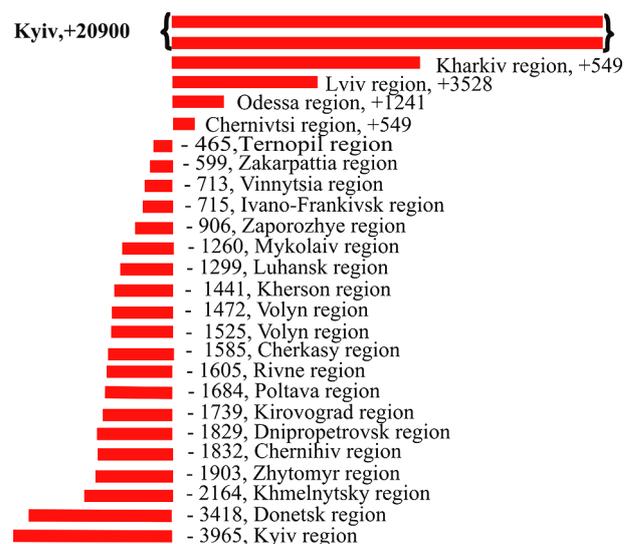


Fig. 1. Balance of arrival and departure of entrants of HEIs from different regions of Ukraine and Kyiv in 2018 (the total number of persons by budget and contractual forms of education is indicated) [13]

Table 1

The results of a survey of high school graduates

Question 1: “Where do you plan to study?”	Percentage of positive responses	Question 2	
		Total percentage	Percent per line
in Kherson	37.1	24.4	65.7
in other cities of Ukraine	50.8	18.6	36.6
abroad	12.1	0.7	5.8

significantly in different regions of Ukraine. Further life can also significantly adjust the plans of entrants. No calculation can sufficiently take into account the special economic and psychological conditions of this process. However, the results obtained are indicative to establish the appropriateness of the visit training of specialists in HEIs of that region, where there is a need for this specialist, even despite the higher cost of training students in SAG. Otherwise there is a high probability that money invested by the state in the training of specialists at the regional request will be lost, and the region will remain without specialists.

**The individual components of the HEI logistics system.** As we understand, the logistics system of higher education institutions, on the one hand, has similarity with the traditional logistics system, and on the other hand, has a number of differences.

Educational process in HEIs generally complies with the following logistics rules: *object (subject)* – trained *specialist*; *quality* – compliance of the specialist requirements of state standards of higher education and labor market requirements; *quantity* – quantitative compliance to labor market needs or by order of enterprises; *time* – the object must be bested at the right time according to labor market conditions in this period; *place* – compliance with the requirements of the regional economy; *costs* – with minimal costs for specialist training.

The purpose of logistics activities is considered achieved if all the above logistics rules are followed. Thereby, for educational institutions, execution of logistics rules requires coordination of flows whose composition is determined by the specifics of their activities.

As parts of the HEI logistics system, departments, deans' offices, laboratories, administrative and research departments can be considered between which in the process of creation and accumulation of knowledge there is a movement of information, service, financial and material flows. Information flows carry scientific and scientific-technical information, act as a link between all parts of the LS inside HEIs and with the external environment. Arranging information flows and the formation of information stock in the HEI logistics system is one of the tools of logistics management which provides efficiency, quality and reducing the costs of educational activities [5]. Under the service flow we will mean services provided to the consumer during educational activities. Consumption of services is aimed at the personal needs of the individual or the collective needs of family members.

The external environment should include industrial enterprises, organizations, business structures, other educational institutions, local governments, who use the services of HEIs in educational and scientific activities, and others. A certain scheme is used in LS chain management “educational supply” that is linked to a wide network of external organizations and stakeholders, working together to obtain the final product. According to this logistics model, the graduate leaves HEIs with the product of knowledge created in the pedagogical system. Production of this product connects all stakeholders, which are not only students of HEIs, but also future employers, students' families, government agencies, and so on.

Joint activities are organized of heads of various units (deans' offices, chairs, laboratories and other functional units) of the HEIs in order to effectively promote knowledge (information flows and services), and also targeted resource flows based on the

integration and coordination of operations, procedures and functions which are performed as part of this process. This organization corresponds to the definition of logistics as a science [6].

**Features of information, resource and service flows to LS in HEIs.** The construction of a system of flow circulating in the logistics system HEIs between its links is of particular importance to provide SAG training. To manage information, resource and service flows in a high-tech educational environment the application of the L&D (Learning and Development) model is proposed [14], which is used for the individualized needs of each student. It should be noted, that the L&D model was originally used within the framework of corporate business training for its optimal coordination with the business goals of a particular organization, to ensure effective satisfaction needs in training and development of its staff. However, later such a model was successfully used in higher education institutions [15].

Based on this model we distinguish four components in system of the flow control in LS of HEIs.

*The first:* to analyze training needs as from the customer – the regional labor market, and from the object (subject) recipient of knowledge – student, determining the appropriate purpose of training (information flow).

*The second:* to provide the resources needed for training (resources flow).

*The third:* to use adaptive learning technologies (service flow).

*The fourth:* to monitor the quality of training as a result of the effective functioning of all LS flows.

Let us consider the tasks and ways to implement of each component.

*The first component* provides:

- the implementation of constant analysis of demand by specialties of HEIs in the regional labor market;
- support relations with regional State Employment Service, participation in the programs of the regional employment center;
- granting to applicants of education special knowledge of laws and regulations on issues of state regulation of employment processes and ensuring labor relations;
- coordination with the management of enterprises, institutions and organizations (regardless of the form of their ownership) who are potential employers, actual needs for future specialists in the specialties of HEIs;
- creation of a computerized information system for optimized simplified information search, which facilitates the employment of future professionals;
- ensuring a constant (throughout the study) process of informing applicants of higher education in the HEIs on the availability of vacancies at regional enterprises, institutions and organizations with appropriate professional training for their possible employment;
- conducting constant monitoring of the employment process of students and graduates of HEIs.

In addition, a joint analysis (conjoint) of motivation is envisaged of consumers of educational services (students), which allows one to determine the subjective component of the purpose of learning. To do this at Kherson State University, Kherson branch of the Admiral Makarov National University of Shipbuilding and Kherson Technical University during 2016–2017, a survey was conducted with students of SAG (a total of 218 people). Among the respondents, there were identified two groups: the first group – students who plan to stay to work in Kherson region after graduation from HEIs (149 persons – 68.3 %); the second group – students who plan to work outside the region (69 persons – 31.7). According to the method of “Study of motives of students' educational activity” (A. Rean, V. Yakunin) [16], there were identified 16 educational motives. A student provided a sequence number to every motive according to the degree of its importance for learning. Then for all the motives, a direct ranking of arithmetic mean on the one hundred points scale was conducted.

For the largest values of indicators each group identified five leading motives. The diagram of indicators of leading mo-

tives for the first group of students is presented in Fig. 2, and for the second group – in Fig. 3.

The indicator of the motive “get a high-paying job” (*social motive*) in both groups has the highest percentage of values (71.7 % – in the first group and 81.8 % – in the second); however, it is slightly higher for students who plan to leave. According to the indicator “to become a highly qualified specialist” (*professional-value motive*), students who plan to stay and work in Kherson region are less motivated compared to those who plan to leave (respectively 67.8 and 81.1 %). The incentive motive for number 3 in two groups is different. For students who plan to travel, there is an important motive of getting a responsible job, while the first group finds the motive “to keep up with fellow students” more important. For the representatives of the second group, the motive for obtaining a diploma is somewhat lower (*formalized social motive*). For this group of students, the motive “for the approval of parents and others” is essential and for students planning to work in Kherson region, the motive of “establishing stable social ties” prevails (column 5 in Figs. 2 and 3).

Based on correlation-regression analysis, conducted according to the indicators of identified motives separately for each group, the following regression equation were obtained (the method of making such an analysis was discussed in detail in [17]).

For the first group

$$P_i = 3.59 + 0.25P_3 + 0.32P_4 \quad \text{at} \quad R^2 = 0.74, \quad (1)$$

where  $P_i$  is the corresponding indicator of the motif number  $I$ ;  $R$  is the coefficient of determination.

Based on the value of the coefficient of determination of 0.74, we can conclude that according to the students who plan to stay to work in Kherson region, availability of diploma and level of knowledge which allows you to keep up with fellow students are the most important indicators for getting a high-paying job, 74 %. The remaining 26 % are determined by other factors. For the second group

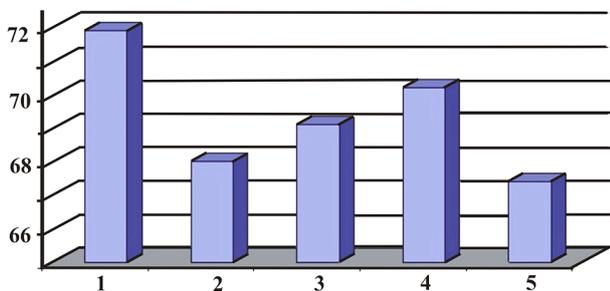


Fig. 2. Diagram of the leading educational motives in the first group:

1 – to get a high-paying job; 2 – to become a highly qualified specialist, 3 – to keep up with fellow students; 4 – to get a diploma; 5 – to establish stable social relationships

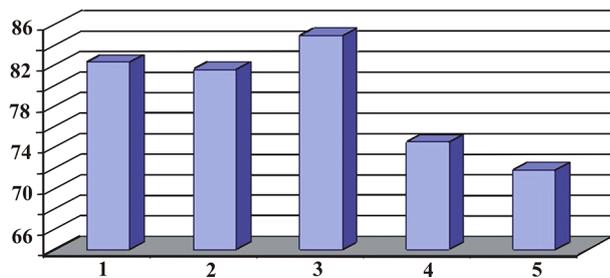


Fig. 3. Diagram of the leading educational motives in the second group:

1 – to get a high-paying job; 2 – to become a highly qualified specialist; 3 – to get a responsible job; 4 – to get a diploma; 5 – to achieve approval of parents and others

$$P_i = 2.81 + 0.24P_2 + 0.35P_3 \quad \text{at} \quad R^2 = 0.65. \quad (2)$$

From the value of the coefficient of determination of 0.65, it follows that for those students who plan to work outside the region, highly paid job is by 65 % determined by its responsibility and an employee’s high skills. The remaining 35 % is determined by other factors.

The data on the difference in learning motivation in the first and second groups indicate that to increase the number of graduates who remain and provide regional needs (the main purpose of training students in SAGs), it is necessary to take into account subjective motivating factors. From the results of the study, it follows that in addition to information about the availability of vacancies for employment, future professionals should provide rating information on employment and professional success of graduates from previous years (5–10 years). Not only students but also their families should be informed about work conditions of graduates who are already working, the level of their earnings, the availability of certain social packages at enterprises, prospects for professional growth, and so on.

*The second component.* An integrated paradigm of logistics should be used in the HEIs that realizes the general strategic, tactical or operational goal of commercialization of knowledge-intensive products with optimal use of material, financial, informational and labor resources.

The flow of labor resources in the HEIs – involvement of labor resources for the educational process – is the most problematic element of LS training in SAGs. On the one hand, reducing the number of students in all educational programs significantly increases the complexity of educational work. On the other hand, according to the existing standards, the reduction of the number of students leads to a reduction in the number of full-time positions of the teaching staff [4, 5].

At present, some Ukraine HEIs have a full course of classes in the SAG; a lecturer delivering them is paid only as for a few consultation hours. Sometimes classes for full-time students take place in an abbreviated consultation format or only remotely, which negatively affects the quality of education.

A constructive resolution to this issue should be due to the management of the labor intensity of educational work, which has several main sources.

Firstly, it is the consolidation of individual units and the increase elements of LS. Consolidation can occur as a result of unification of curricula for specific disciplines (the more disciplines are available, the more economically secure the training in SAG is). As a result, not only lectures, but also practical and laboratory classes can be conducted jointly for students who are studying in different educational programs, different specialties, different areas of study and different years of training. The implementation of such training requires special adaptive pedagogical conditions and learning technologies, which will be discussed further within the third component of the L&D strategy.

Secondly, it is the use of the latest more advanced methods for determining the number of teaching staff of the HEIs that can significantly reduce the overall labor intensity of educational work in the HEIs. The advantages, conditions and results of the application of such techniques were discussed in detail in scientific research [5]. This paper also shows that for planning and adjustment of educational load it is expedient to create automated systems for planning educational work, calculation of its labor intensity, distribution of workload between teachers, determining the profitability of training in certain specialties, determining the financial results of structural units, etc. Systematic, scientifically sound activities should be constantly carried out, aimed at optimizing the workload and labor intensity of educational work, establishing the compliance of the number of full-time posts of teaching staff to the number of students in the SAG.

*The third component.* To implement adaptive teaching technologies in SAG, it is necessary to create adaptive pedagogical conditions, including:

- development of curricula with the use of deep interdisciplinary understanding, the establishment of interdisciplinary links, the logistics of which involves the transfer of the study of compatible sections or topics from one discipline to another;
- unification of curricula for specialties that study the same discipline;
- creation of integrated educational and methodical complexes for different disciplines;
- development of appropriate methodological support;
- creating conditions for flexible learning, which allows students to get an education within individual curricula and individual study schedules.

Creating a working curriculum for a particular discipline should be as follows.

1. For the discipline the most general content is compiled.
2. Graduation chairs, whose students study this discipline, classify their topics according to the need for the acquisition of professional competence.
3. Lectures are planned on topics that are a priority for most specialties.
4. Conducting practical, laboratory and consulting classes is in a mixed form (“didactic contaminated”).

By definition, “didactic contamination” is considered as “appropriate combination of two or more forms of educational activities, the formation and application of a new type of activity due to the interspersed or combination of different techniques” [18].

The technology of conducting classes in the “didactic contaminated” form of their organization has the following peculiarities:

- solving various types of practical tasks is realized on the basis of ready consecutive blocks, containing the most common solutions to the problem. Each student receives their own initial conditions and solves a specific problem with using ready-made formulas, schemes, databases, graphs, etc. or their modification. The problem is solved according to the scheme shown in Fig. 4: obtaining initial data by variant; appeal to the general scheme of the solution; selection of a specific modification of the task that corresponds to the option; direct (from initial data to final) or reverse (from final to initial data) motion in solving the problem; finding specific parameters and obtaining the result;

- for students of different specialties there can be a simultaneous solution of problems on different topics that meet professional needs;
- solving problems is carried out at the student’s own pace, and their number per lesson is regulated only by his/her individual abilities;
- conditions are created for effective individual student’s counseling by the teacher;
- there is a need to develop special educational and methodical literature.

The application of the described technology is substantiated by the fact that at present in the online directories you can find a general solution to any standardized problem. The competence of the specialist is the ability to adapt the overall solution to the given conditions and solve their own problem. As a result, the skills of solving any professional problem under certain conditions are formed.

Thus, the contaminated form of learning allows for the diversification of subject content (Fig. 5).

On the one hand, the same subject content is used for different specialties, which allows involving only one lecturer, one room (accommodation) and provide the same level of educational services. On the other hand, there is a differentiation of subject content according to its compliance with the standards of higher education in each specialty, the requirements of graduate chairs and the individual needs of students. All this makes it possible to create a service flow for joint training of students of several SAGs in different specialties.

*The fourth component.* The management of LS in HEIs cannot be fully formalized (and, consequently, it is not algo-

rithmized by constructing a set of formalized models) and largely remains heuristic.

Determining that the production line education product is knowledge, not the students (graduates), allows attracting students with teachers as an active element LS.

In addition to the traditional methods for monitoring the quality of training in LS to HEIs, it is possible, from the standpoint of LSCM, to use “quality circles”. Their concept is taken from the development of new models at Toyota [19]. The definition of “quality circle” being adaptive to education is as follows: “Quality circle is the monitoring of the learning process, which involves the parity participation of teachers and students in solving problems related to their course of study” [6]. Circles are formed through discussion of the following issues by students working together in study groups: the problems of learning quality, developing solutions to improve it, supporting more efficient and effective teaching and learning processes. It is possible to input a rating assessment of the effectiveness of teachers; application of criteria: time – production exactly on time in accordance with the situation on the labor market; abstemious management – preservation and development of student and teaching resources; flexibility – the ability of LS in HEIs to quickly change or adapt in response to changes in the market of graduates, and more.

**Conclusions.** At present, higher education institutions face largely the same operational problems as any business organization. Therefore, their functioning requires the use of the logistics concept in general and for the organization of training in small groups, in particular. According to the results of our study, the expediency is shown of training specialists in HEIs of the region where there is a need for this specialist, even at the expense of the higher cost of training students in SAGs. To ensure the preparation of students in the SAG, the freelance management process must be flexible and abstemious using the L&D model for the operation of resource, information and service flows circulating between the links in the logistics system of HEIs. There should be a constant analysis of training needs as a customer – the regional labor market, and on the part of the recipient of knowledge – the student, to carry out actions aimed at optimiz-

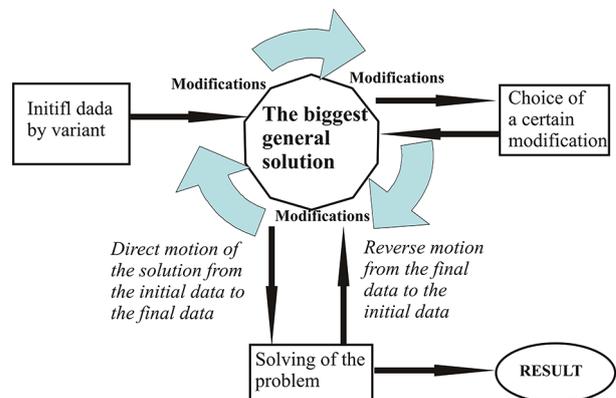


Fig. 4. The scheme of solving the problem

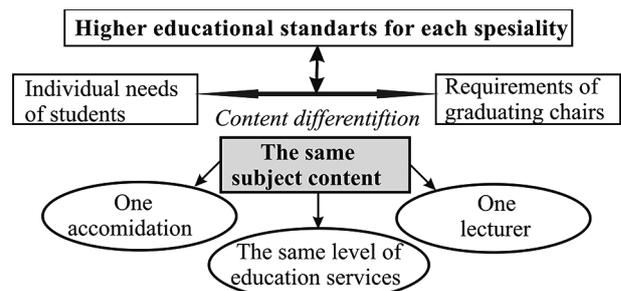


Fig. 5. Diversification of subject content

ing the workload and complexity of educational work. The training process should be applying the technology of didactic contamination with the diversification of subject content, which provides joint training of students of SAG in different specialties, and monitoring the quality of training as a result of the effective functioning of all flows of the HEI logistics system.

The development of a logistics concept for the management of higher education institutions is a new trend in the study on models of social and market economy. Its further development will allow one, on the one hand, to realize the state interests in the field of education optimally, and on the other – to ensure the stable functioning of HEIs in the rapidly changing conditions of market economy.

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## Застосування логістичної концепції

### для організації навчання малокомплектних груп у закладах вищої освіти

М. Б. Літвінова, О. М. Дудченко, О. Д. Штанько

Національний університет кораблебудування імені адмірала Макарова, Херсонський навчально-науковий інститут, м. Херсон, Україна, e-mail: [lmb965@gmail.com](mailto:lmb965@gmail.com)

**Мета.** З позиції освітньої логістики розглянути організацію навчання малокомплектних академічних груп (МКГ) у закладах вищої освіти (ЗВО). Розглянути окремі складові логістичної системи ЗВО та особливості ресурсних, інформаційних і сервісних потоків для забезпечення навчання МКГ. Обґрунтувати доцільність організації навчання студентів у МКГ для забезпечення регіональних кадрових потреб.

**Методика.** У дослідженні застосовувалися системно-структурні методи (системний аналіз, узагальнення й систематизація економічних, статистичних і науково-методичних даних відповідно до завдань дослідження) і логістичний підхід. Для обґрунтування результатів проводилося соціологічне опитування із статистичною обробкою даних на основі багатокомпонентного кореляційного аналізу.

**Результати.** Заклад вищої освіти розглядається як логістична система, що складається з численних взаємопов'язаних ланок, які потребують застосування адаптованих до освітніх умов інформаційних, ресурсних і сервісних потоків. Для управління потоками пропонується використання логістичних технологій, що поєднуються в моделі Learning and Development (L&D), яка має чотири складові. Авторами проведений докладний розгляд цих складових і виділені їх функціональні аспекти, що забезпечують економічно, організаційно та методично обґрунтоване сумісне навчання студентів МКГ за різними спеціальностями. Надані дані, що свідчать про доцільність проведення підготовки спеціалістів у ЗВО саме того регіону, де є потреба в даних фахівцях, навіть не зважаючи на більшу вартість навчання студентів МКГ.

**Наукова новизна.** Уперше застосована логістична концепція для розгляду організації навчання МКГ у ЗВО. Удосконалене застосування моделі L&D для управління потоками логістичної системи, а також контамінованої форми навчання й диверсифікації предметного контенту, що забезпечують якість сервісного потоку під час сумісного навчання студентів різних спеціальностей.

**Практична значимість.** Застосування логістичної концепції для організації навчання МКГ у ЗВО дозволяє, з одного боку, оптимальним чином реалізовувати державні інтереси в регіональному забезпеченні кадрами, а з іншого – підвищити стабільність функціонування ЗВО у швидкозмінних умовах ринкової економіки.

**Ключові слова:** освітня логістика, заклад вищої освіти, логістична концепція, малокомплектна академічна група

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