

State Order for the Training of Specialists With Higher Education and Optimisation of the Higher Education Network

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The relevance of the study is determined by the need to analyse the effectiveness of the development of the state order and the optimisation of the higher education network as important aspects of the recovery of the economy of Ukraine in the conditions of the war and the post-war period. The result of the scientific work is the examination of the issue of the distribution of the state order both in general and in relation to each individual educational programme, the shortcomings of the current system and possible ways to eliminate them in the post-war period; the proposed mechanism for optimising the higher education network.

Keywords: network of higher education institutions of Ukraine, efficiency, distribution of state orders, post-war period, educational programmes, state budget

INTRODUCTION

The problem of development of a state order for the training of specialists with higher education and organisation of its implementation not only does not lose its relevance, but also acquires importance in the conditions of the war and post-war recovery of the economy of Ukraine. The positive contribution of higher education to the development of society is recognised in most countries of the world, as it contributes to increasing the level of competitiveness at the global level conditioned upon the development of a qualified, productive and flexible workforce, and the creation, application and dissemination of innovations and modern technologies (Maričić et al., 2019; Stukalenko et al., 2016; Kalkeyeva et al., 2014). Research universities are considered one of the central institutions of the knowledge economy of the 21st century (Altbach & Salmi, 2011; Anđić et al., 2021). Funding for higher education is a significant part of total government spending. This is determined by the leading role of higher education in the development of society and the national economy. Modern societies must direct investments in education and research to keep up with the growing competition in the rapidly developing global economy (Kaiser et al., 2001; Zhussupbekova et al., 2018). The funding mechanism is a key component of the institutional mechanisms that define the higher education system. The funding mechanism creates a system of incentives, organisation models, and specific institutional processes that guide the management and evaluation of the education system. The financing mechanism is one of the key tools of the higher education reform process (Miroiu & Aligica, 2003; Sapazhanov et al., 2021). To strengthen their influence in the international system of higher education, universities strive to obtain the status of “world level” and increase the level of internationalisation. Internationalisation and building a “world-class” university involves not only concentrated financial investments, but also a comprehensive transformation of university management in

a global context (Yonezawa & Shimmi, 2015). The ability of universities to effectively produce high-quality knowledge has become a leading goal of education in many developed countries. Thus, today many countries manage universities based on monitoring performance indicators and competition (Himanen et al., 2009; Stukalenko et al., 2013).

The issues of forming a state order and financing its implementation have been covered widely enough in the scientific literature. In his article, S.M. Nikolayenko (2020) emphasises the urgent need for serious improvement of the so-called broad competition during admission to the higher education institutions (HEIs) and supports the thesis of the unconditional priority of the needs of the economy in the process of forming a state order. In the study of Yu.M. Vitrenko and V.O. Vorona (2020), in particular, proposals regarding priorities and quantitative guidelines in the process of forming a state order for the training of specialists with higher education are formulated. The legal issues of providing funds to higher educational institutions are considered in work A.M. Detyuk (2018), where the features of the administrative-legal regulation of state procurement in the field of education are determined, new conceptual provisions for the field of administrative law are formulated, and proposals and recommendations for improving this legal regulation are developed. The study of O.V. Zakharova (2021) investigated the issue of evaluating the market of educational services in Ukraine in the field of training bachelors of management, without which it is impossible to reasonably form a state order.

L.V. Anipko (2021) in his work substantiates the dominance of supply on the market of educational services over demand for certain specialties. Defines tasks and measures, the solution of which will allow creating a regular approach to the mechanism of development of a state order for the training of specialists with higher education based on state priorities and prospects for the development of the national economy. S. Londar (2017) in his article “Approaches to Estimating the Cost of Training Specialists in the Field of Higher Education in Ukraine” substantiates the thesis that increasing the efficiency of the use of budget funds within the budget programme “Training of personnel by institutions of higher education and ensuring their activities practice bases” should be carried out based on the principle “money follows the student” and offers approaches to improving the methodology of determining the cost of training one specialist of a certain specialty and the corresponding educational and qualification level. The study of Yu.M Kovalenko and L.O. Vitrenko (2020) proposed a model of educational lending, which provides access to paid higher education of various strata of the population outside of the state order. V.Ye. Bakhrushyn (2020) in his article “Enrollment of Entrants to Institutions of Higher Education as a Task of Multi-Criteria Decision-Making Under Conditions of Uncertainty” analyses the problem of distributing state orders within specialties based on a wide competition, considering the experience of practical implemented in the course of the introductory campaigns of the last three years.

However, the problem of evaluating the effectiveness of the distribution of state orders between higher education institutions in general and with regard to specialties from an economic standpoint was left out of the authors' attention. The problem of the influence of the actual distribution of the volumes of the state order on the quality of the training of specialists with higher education was also not considered. Currently, in Ukraine, the organisation of the state order of higher education institutions for the training of specialists with higher education is carried out based on a nationwide competition. Such a distribution system was put into effect by the Order of the Ministry of Education and Science of Ukraine No. 1085 “On Approval of the Terms of Admission to Higher Educational Institutions of Ukraine in 2016” (2015), according to which the provision of state order places to specific entrants is carried out on the basis of a broad (nationwide) competition.

ANALYSIS OF THE DISTRIBUTION SYSTEM OF THE STATE ORDER IN THE HIGHER EDUCATION NETWORK OF UKRAINE

Higher education institutions obtain a state order and corresponding funding together with entrants who have obtained such places, considering the priority of their applications and their competitive score. The main goal of the developers of this system was to minimise the administrative impact on the distribution of the state order between higher education institutions and to maximally help applicants with high

competitive scores to get a budget place in the chosen specialty or educational programme in a specific higher education institution. Practice has shown that this goal has been achieved. Indeed, it has been almost impossible to administratively influence the allocation of state contract places for the training of bachelors for six years. Moreover, the entrant who has the highest competitive score among all applicants of Ukraine applying for a state-ordered place in a certain specialty or educational programme will receive his budget place in the higher education institution of his choice. Therefore, the best entrants among all those who want to get a budget place in a certain specialty or educational programme will come to the higher education network. This is one of the conditions for quality training of a specialist with a higher education. However, this is a necessary but insufficient condition for the development of a quality specialist! The practice of applying the current state order distribution system confidently demonstrates that the best of all applicants, especially for technical and natural sciences, which are extremely necessary for the recovery of the economy of Ukraine, do not always have sufficient basic school training and the necessary level of cognitive abilities to form the necessary professional skills and personal competencies (Kraliuk et al., 2021). This is clearly evidenced by the low passing scores when enrolling in the budgetary form of education in higher education institutions for these specialties (Ponomarenko, 2020; Bidaybekov et al., 2017).

The state procurement system, by its definition, should attract the most capable and motivated entrants to the specialties needed for the country, but the current system does not motivate for this. An increase in the size of the state order for this or that specialty does not provide the necessary motivation, but only leads to a decrease in the passing score when enrolling in a budgetary form of education (Ponomarenko, 2020; Pak et al., 2021). Therefore, the current system of distribution of state orders does not ensure the selection of the best applicants for the specialties needed for Ukraine. However, in this article, the author examines the other side of the current state procurement distribution system. It is talking about whether this system ensures the assignment of the training of specialists needed by the country to those higher education networks that have the opportunity to train them with acceptable quality. After all, it is known that the higher education institutions of Ukraine have significant differences in the available material and technical base, the qualifications of the scientific and pedagogical staff and the compliance of its structure with the licensing conditions for those educational components that provide the educational programme for a certain specialty or in general. They have a different level of popularity among external stakeholders, which de facto ensures the volume of income to the special fund. The presence of significant volumes of the special fund of a certain higher education institution gives it the opportunity to supplement funding from the general fund both for improving the material and technical support of one or another specialty, and for material encouragement of scientific and pedagogical staff. All this forms the necessary conditions for high-quality training of specialists.

The network of higher education institutions of Ukraine was formed gradually during the period of development of an independent state. There were periods when 100 higher education institutions were created within two years and, therefore, their number almost doubled. At that time, the population of Ukraine was at the level of 52 million people, while in 2020 it was already equal to 42 million people, and considering the trend of accelerating the annual decrease of the population of Ukraine and the migration processes caused by the war, the number of the population in 2023 will be significantly less than 40 million persons (Ponomarenko, 2021). Therefore, the problem of the adequacy of the number of higher education institutions in Ukraine to the needs of the population and the economy in general becomes urgent. This problem is closely related to the distribution of public orders based on a wide competition. In the process of forming a list of higher education institutions that have the right to obtain a state order for a certain specialty, it is necessary to consider the history of recruitment of a specific higher education institution for a certain specialty or educational programme during the previous two to three years.

If in the pre-war period, a certain higher education institution did not recruit even 15 applicants to the bachelor's level of the relevant specialty or educational programme, considering government-subsidized and contract students, then it is necessary to draw a conclusion about the significant risks of granting it a state order for this specialty (educational programme) in the next year. Since there is a significant probability that next year this higher education institution will have an incomplete group for this specialty or educational programme. In this case, this higher education institution will not be able to provide them

with high-quality training, which will indicate an irrational distribution of the state order. The importance of this problem is confirmed by the amount of expenditures from the general fund for the training of specialists with higher education, which in 2021 was used inefficiently conditioned upon the irrational distribution of the state order for the training of bachelors. Let's assume that the funds allocated to a certain higher education institution for the preparation of bachelors in a specialty or educational programme when the total number of applicants in the group is less than 15 will be considered inefficient use of budget funds from the general fund of the budget. They mean that they consider not only applicants who study with budget funds (hereinafter – government-subsidized students), but also those who study with the funds of individuals or legal entities (hereinafter – contract students).

The expediency of considering the number of contract students in this case is explained by the fact that their funds are also used for salaries and other expenses aimed at ensuring the educational and scientific process in higher education institutions. So, if in the academic group of a certain higher education institution there is even one government-subsidized student studying in a certain specialty, and the remaining 15 are contract students, then it can be assumed that the funds from the general fund of the budget are potentially being used effectively. Since the lack of funds for salaries and other expenses for the educational process received from the general fund of the budget will be compensated from the special fund. And, on the contrary, if only 14 government-subsidized students study in such a group, then funds from the general fund are used inefficiently in this higher education institution for this specialty. This is understandable, because the funds from the general fund transferred to this higher education institution to ensure the educational process in such an academic group (incomplete group) will not be enough even for teachers' salaries, not to mention communal services and the development of the material base. In practice, higher education institutions that have such specialties (with incomplete groups) are forced to combine applicants of different specialties into one group with the corresponding adjustment of educational programmes. Therefore, the sets of competencies formed by students of various specialties are almost the same. In fact, the quality of training of bachelors in each of these specialties is reduced to a minimum. In turn, this means that funds from the general fund of the budget for the training of bachelors in these specialties are used, to put it mildly, inefficiently.

THE PROBLEM OF IRRATIONAL DISTRIBUTION OF THE STATE ORDER IN THE HIGHER EDUCATION INSTITUTIONS OF UKRAINE

The analysis of data from the Unified State Electronic Database on Education (2021) for 2021 showed a phenomenal dispersion of the state order by admission to the first course. In general, according to the criterion indicated earlier, 6908 budgetary admission places for the first year were distributed irrationally. According to the budget passport of 2021 (2021), 70376.3 UAH was spent on one recipient from the above contingent from the general fund. So, approximately 0.5 billion UAH ($6908 \times 70376.3 = 486159480$) from the general fund of the budget of Ukraine was used inefficiently. Approximately the same situation took place in the previous three years, therefore, for the full cycle of bachelor training (four years), conditioned upon the irrational distribution of the state order for the training of bachelors, approximately 2 billion UAH ($0.5 \times 4 = 2$) was used inefficiently. With these funds, almost 28000 bachelors of extremely low quality from an unspecified specialty were “trained” ($6908 \times 4 = 27632$). Powerful and popular higher education institutions, which have among their 20-50 specialties two or three with incomplete groups, are able to cover the lack of funds for salaries and other expenses for ensuring the educational process. They ensure sufficient quality of training of bachelors in these specialties, since there is no need to combine students of different specialties into one group and therefore, in fact, do not adjust the educational programmes. In addition, in Ukraine there are relatively multidisciplinary higher education institutions (20 or more specialties), which do not have specialties at all with irrationally distributed budget places, which are potentially the foundations of quality training of bachelors. A list of these higher education institutions and those with less than 10% of irrationally distributed specialties is given in Table 1.

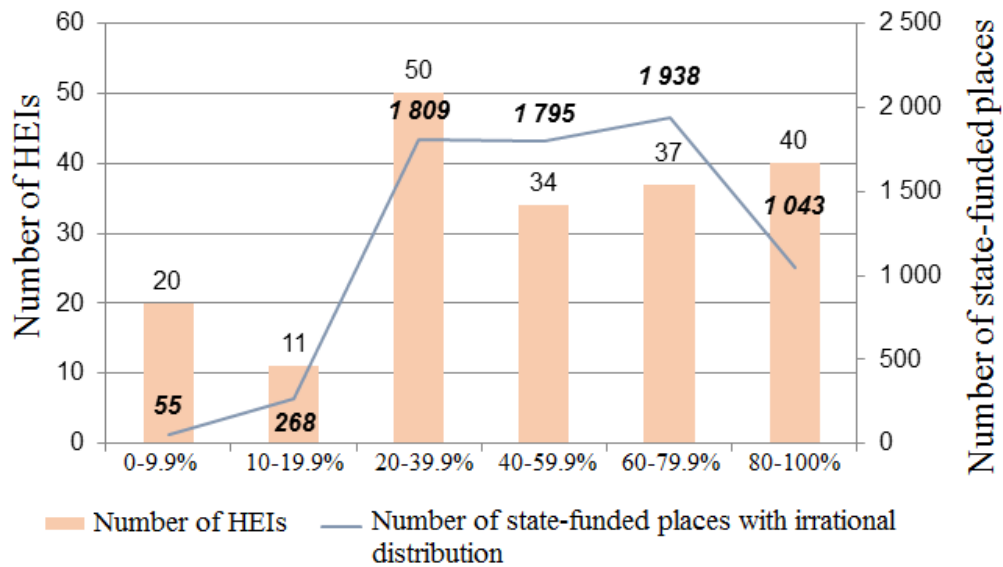
TABLE 1
LIST OF HEIS PROVIDING TRAINING IN 20 OR MORE SPECIALTIES, AMONG WHICH
NO MORE THAN 6% HAVE IRRATIONALLY DISTRIBUTED BUDGET PLACES

No. s/n	Names of HEI	The total number of specialti es in HEI	% of specialties with irrational use of budget places	The number of irrationally distributed budget places
1	National University of Food Technologies	22	5.88	5
2	National University of Life and Environmental Sciences of Ukraine	44	5.71	9
3	National Aviation University	44	4.88	2
4	National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”	44	4.55	20
5	Borys Grinchenko Kyiv University	34	3.03	8
6	Kyiv National University of Trade and Economics	26	0.00	0
7	National University of Kyiv-Mohyla Academy	24	0.00	0
8	University of Customs and Finance	23	0.00	0
9	Simon Kuznets Kharkiv National University of Economics	20	0.00	0

The data in Table 1 show that the specified nine universities inefficiently used only 44 places of the state order. In addition, since the percentage of specialties with incomplete groups in these universities is less than 6%, their management easily compensates for the lack of funds at the expense of specialties with complete groups. Therefore, the quality of undergraduate training will not be reduced conditioned upon lack of funding. However, along with the above-mentioned higher education institutions in Ukraine, there are those that have 80-100% of specialties with incomplete groups (irrationally allocated budget places). It remains to build hypotheses about how the educational process takes place in such higher education institutions. According to the results of the admission of 2021, a histogram (Figure 1) of the distribution of higher education institutions by percentage of specialties with incomplete groups was constructed based on the data of Unified State Electronic Database on Education (2021).

Figure 1 shows that 20 higher education institutions have less than 10% of specialties with incomplete groups in the first year. Only 55 students study in such groups, which is approximately two to three students per higher education institution, which certainly does not pose a problem for ensuring the high quality of the educational process. However, there are two groups of higher education institutions with the number of 37 and 40 units, in which from 60 to 100% of specialties have incomplete groups, in which 2981 students (1938 + 1043 = 2981 people) study in the first year under the state order. The quality of the educational process in these higher education institutions raises serious doubts. The number of specialties with an acceptable set at these higher educational institutions ranges from 39 to 0%, which makes it practically impossible to organise the educational process in a high-quality manner. So, on all four courses, approximately 12000 people (2981 × 4 = 11924 persons) are studying in higher education institutions, which objectively cannot provide a high-quality initial process, because they do not have sufficient funding from the general and special funds of the budget of Ukraine.

FIGURE 1
HISTOGRAM OF THE DISTRIBUTION OF HIGHER EDUCATION INSTITUTIONS OF UKRAINE BY THE PERCENTAGE OF SPECIALTIES WITH INCOMPLETE GROUPS (LEFT AXIS OF THE ORDINATE) AND THE GRAPH OF THE NUMBER OF STATE-ORDERED PLACES OF HIGHER EDUCATION INSTITUTIONS WITH INCOMPLETE GROUPS (RIGHT AXIS OF THE ORDINATE)



Blocking the distribution of the state order by these higher education institutions during the next three years will lead to their natural exit from the market of educational services of Ukraine. So, it can be offered an objective criterion by which the optimisation of the network of health centers can be organised. It should be said that among these 77 higher education institutions there are so-called displaced ones that functioned in the occupied territories until 2014. In 2021, there were 9 higher education institutions. Providing them with a state order and, most importantly, providing them with funding for its quality implementation is a separate problem that is not considered in this article. Based on those data, let consider the structure of the state order for specialties. With this approach, the dispersion of the state order has an even more prominent appearance. Often, the state order is given to a large number of higher education institutions, which have neither the appropriate material base nor the financial capabilities for its high-quality performance. Let's consider a specific example from Unified State Electronic Database on Education (2021) with the clarification that a group of up to 10 people studying at the state's request and at the expense of individuals and legal entities will be considered an incomplete group (Table 2).

Analysis of the data in Table 2 shows the absurdity of the situation with the allocation of the budget order. In the specialty “Environmental protection technology”, the state order was awarded to 28 higher education institutions, of which 26 (93%) were unable to recruit an academic group of more than 10 people in total with the state order and the cost of individuals and legal entities. So, these 26 higher education institutions received funds from the general fund of the budget and used them inefficiently, since this is not enough for high-quality training of bachelors in this specialty, and they were also unable to supplement their volume with contract students. It would be much more rational to give all 118 state contract places to two higher education institutions, which during the previous two years have shown that they are able to recruit full-fledged academic groups and therefore have the opportunity to train high-quality specialists in this specialty. If one of the applicants really needs only this specialty, then he can enter the higher education institution that will qualitatively form the relevant professional and personal competencies in him. However, the existing system persistently awards state contracts to all 28 higher education institutions,

although it is clear in advance that 26 of them are unable to fulfill state contracts with quality and this is a waste of budget funds.

TABLE 2
ADMISSION DATA FOR THE BACHELOR'S LEVEL BASED ON THE COMPLETE
SECONDARY EDUCATION OF 2020

Ciphers	Names of specialties	The total number of vocational schools conducting training, pcs.	Total number of students (budget), persons	The number of higher education institutions in which fewer than 10 people are enrolled , pcs.
103 (183)	Environmental protection technologies	28	118	26
133	Industrial engineering	53	696	25
144	Thermal power engineering	30	160	24
205	Forestry	22	175	12
136	Metallurgy	12	66	9

The specialty “Industrial mechanical engineering” is very necessary for the development of the economy of Ukraine, 696 places of state procurement have been allocated to it and they are distributed to 53 vocational schools, of which 25 vocational schools recruit incomplete groups and therefore are unable to qualitatively train bachelors in this specialty. Therefore, those funds from the general fund, which are allocated by these 25 higher education institutions, will be used inefficiently and the country will acquire two hundred bachelors of dubious quality. This situation is repeated from year to year, while 28 HEIs recruiting complete groups could successfully train the necessary number of bachelors in this specialty and use the funds provided from the general fund of the budget to improve their laboratory base. An almost comedic situation has developed with the metallurgical specialty. For 2021, the state order was allocated in the amount of 66 places, which were distributed among 12 higher education institutions, of which only 3 recruited complete groups. For high-quality training of bachelors in this specialty, higher education institutions must have a specific material and technical base for conducting laboratory work, with the aim of forming professional competencies in students, conduct scientific research on relevant topics to ensure high-quality content of special educational disciplines, have a wide range of enterprises for organising practice for writing course and diploma projects. Finally, these HEIs must have the appropriate authority among employers to hire their graduates.

There are well-founded doubts about the presence of all the specified requirements in those higher education institutions that could not recruit complete groups for this specialty. However, from year to year, budget places are allocated to them only because two or three applicants with sufficient points expressed a desire to acquire this specialty exclusively at this higher education institution. The analysis showed that in 2021, state order places were distributed irrationally in more than 200 specialties and educational programmes. This is not a statist approach, as it leads to the dispersal of funds from the general fund of the budget, which causes their inefficient use.

CONCLUSIONS

The current system of distribution of the state order for the training of specialists with higher education has significant shortcomings that lead to inefficient use of funds from the general fund of the budget. To improve it, it is necessary to introduce a retrospective analysis of the results of recruitment and training for each specialty or educational programme of each higher education institution – an applicant for the

provision of budget places in the next year. If during the previous two or three years, a certain higher education institution recruited less than 15 applicants for this specialty or educational programme, total budget employees and contract employees, then it must be deleted from the list of applicants for receiving funding from the general fund for this specific specialty or educational programme. Therefore, entrants will not include this higher education institution among the priorities for obtaining a budget place in this particular specialty.

In two or three years, in the process of implementing such an approach, the educational process of training bachelors in a certain specialty will be concentrated in several higher education institutions, which actually have the opportunity to train specialists in a high-quality manner. In other words, the process of certain specialisation of higher education institutions will take place. Moreover, higher education institutions that will not be able to receive funding from the general fund of the budget in this way and do not have the appropriate popularity to form a special fund will be forced to leave the market of educational services. So, two problems will be solved: first, it will be significant the efficiency of the use of funds from the general fund of the budget has been increased through the rational distribution of state order places; secondly, the process of optimising the network of higher education institutions of Ukraine will begin by withdrawing from the market of educational services those of them that are unable to qualitatively train specialists with higher education.

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