SOCIAL SCIENCES. Education & Educational Research

Training of Future Specialists in Higher Educational Institutions

Authors' Contribution:
A – Study design;
B – Data collection;
C – Statistical analysis;
D – Data interpretation;
E – Manuscript preparation;
F – Literature search;
G – Funds collection

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Abstract

Background and Aim of Study:	*The research deals with studying issues concerning training of specialists in high school and the student's role in this process. The perspective trends of training specialists in higher educational institutions are determined. They relate to such, where the university is a configuration part of much bigger establishments and processes and where it corresponds to the social and individual demands of the youth.* *The aim of the study: to ascertain competences, pedagogic technologies and methods, demanded by cadets and students, as well as to forecast perspective trends of studying in higher educational institutions.*
Material and Methods:	*A set of methods is used to study issues of training specialists in high school: collection of information, systematisation, rating assessment, analysis and results interpretation. The dispersion coefficient of Kendall concordance is calculated, its significance is proved on the basis of determining Pirson's criterion for the significance level of 5% and 1%. The research was held in the academic years of 2013-2018 on the basis of National Academy of National Guard of Ukraine within the framework of the subject "University Education". The average number of respondents was 535 people (35 groups), who studied at the Humanities Faculty, The Technical Faculty, the Faculty of Economics and Management.*
Results:	*It is specified that there is a tendency of decreasing number of students who want to study in higher educational institutions. The demand of the student youth is determined for competences, pedagogic technologies and methods which are mostly required in high school. It is proposed to specify competences classification and content of the notions "professional competences" and "special competences".*
Conclusions:	*On the basis of modern scientific and technical achievements, application of educational logistics and social demand, the main tendencies and future trends of training specialists in higher educational institutions in IT-sphere, technical, military, economic, medical and educational fields are forecast.*
Keywords:	*high school, training of specialists, student youth, professional competences, special competences, educational logistics.*

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Introduction

Creating a united European educational system and Ukraine joining the Bologna process demanded a significant renovation in organisation and content of education. The main bases for the higher educational system, declared by a new edition of the law of Ukraine, create conditions for increasing collaboration of state organs and business with higher educational institutions supported by principles of autonomy, combination of education, science and production aimed at training competitive human resources for hi-technological and innovative development of the country, self-realisation of the personality, meeting the needs of the society, labour market and state in qualified workers. In the new edition of the law of Ukraine it is emphasised that training of specialists should be realised with due regard to the needs of a personality, interests of the state, territory communities and employers (Law of Ukraine, 2014).

Thus, the changes in the education paradigm of training specialists, which should be based on collaboration, are declared by standard. Still, as a rule higher education today remains to be organised into strictly specialised spheres of knowledge and traditional subjects that provides training of specialists without taking into account social demand, modern trends and competition at the labour market. That is why it is obvious that such inflexible training of specialists creates a situation when a large part of graduates cannot find a job according to the major obtained in the university. Thus, realising it they refuse from higher education. This problematic situation is highly troubling, as for a developing country it is important to train qualified specialists who can make discoveries, create new products, develop methods and technologies.

There is an urgent necessity to study issues of training qualified specialists in high school which correspond to modern realities and create a reliable basis for employing graduates at the European and world labour market as well as promote personal and professional development of the youth.

Theoretical value and practical significance for developing issues of training qualified workers in high school were implemented in scientific works concerning the problem of organising activity of higher educational institutions in conditions of globalisation and internationalisation (Altbach and Knight, 2007). Institutional dynamics of European University is researched by Olsen (2007). The mission, spheres of training and trends of university activity (mass higher education, professional specialised higher education, research and academic training) are analysed by Laredo (2007). The issues of general management of education quality are revealed in the work by Sallis (2014). The research was realised in the countries of the European Union and was focused on their peculiarities. The realities of the Ukrainian system of higher education and students' requirements into forming their competences in the process of studying in high school differ from the European youth (Melnyk, 2017). Thus, there is a necessity to research the modern system of students' national training in high school and the student's role in this process.

For the first time an attempt to generalise international and Ukrainian experience as well as to provide methodic recommendations for developing and modernising curricula in conditions of the European integration of national higher education was made by scientists (Zakharchenko, Luhovyi, Rashkevych, and Talanova, 2014).

The content modernisation of curricula required their implementation in high school. It would have been possible on the basis of introducing pedagogic logistics in high school which has an important significance for solving the outlined tasks. The first research into organising the educational process on the grounds of implementing pedagogic logistics in high school has been made by Melnyk and Pypenko (2017), in which the authors proposed methodological and theoretical bases for this activity, determined definitions of the notions: "educational logistics", "pedagogical logistics" and "teaching logistics".

Besides, it was necessary to continue researching and improving the issue of organising psychological and pedagogical interaction in high school. Their theoretical and practical aspects were researched by Melnyk (2017).

The research of the mentioned above issues will give the possibility to organise the educational process of the specific higher educational institution with due regard to the needs of a personality, interests of the state and employers, as well as to provide the modern training of specialists, who will be demanded on the European and international labour market.

The aim of the study. To research issues concerning modern training of specialists in high school and the student's role in this process; to ascertain competences, pedagogic technologies and methods, demanded by cadets and students, as well as to forecast perspective trends of studying in higher educational institutions.

Material and methods

To study the issues of training specialists in high school a set of methods is used:
- collecting information (systematic blind written questionnaires);
- systematisation;
- rating assessment;
- analysis and results interpretation.

The author's methods (questionnaires) and instruments (Melnyk, 2016; 2017) are applied. We were guided by competences classification based on materials of the Quality Assurance Agency for Higher Education, QAA, UK and Tuning educational structures in Europe, TUNING (Tuning Association, 2010).

With the aim to determine the concordance level of respondents' ideas, the dispersion coefficient of Kendall concordance has been calculated, its significance (the calculated value of the criterion exceeds the critical one for the significance level of 5% and 1%) has been proved on the basis of Pirson's criterion.

Cadets and students were questioned with due regard to their individual, group and collective choice to provide representative selection and obtain the necessary information.

Participants. 15 groups of cadets and 20 groups of students of the day-time department of National Academy of National Guard of Ukraine (NANGU) have taken part in the research. The average amount of respondents is 535.

Organisation of the research. The research was realised in the academic years of 2013-2018 on the basis of NANGU. In particular, the academic years of 2013-2014 – 3 groups of cadets, 4 groups of students (the average amount of 143 people); the academic years of 2014-2015 – 3 groups of cadets, 4 groups of students (the average amount of 103 people); the academic years of 2015-2016 – 3 groups of cadets, 4 groups of students (the average amount of 105 people); the academic years of 2016-2017 – 3 groups of cadets, 4 groups of students (the average amount of 98 people); the academic years of 2017-2018 – 3 groups of cadets, 4 groups of students (the average amount of 86 people). The cadets and students were questioned around the subject "University education" at the fourth year, of different majors, from the Humanities Faculty, Technical Faculty and the Faculty of Economics and Management.

Statistical analysis. To obtain the rating assessment of the collective selection of students and cadets, the algorithm of calculating the average values has been used, in particular the weighted arithmetic average. The weighted arithmetic average has been calculated from the values of the varying characteristics from 1 to 5 taking into account the weights. Upon that the values of the characteristic are presented in the form of variation distribution series. The quantity of units in the variation series is not the same: 30 competences, 16 technologies, 25 methods. According to each series 5 units have been chosen, that headed the rating. In this case weighting has been carried out by frequencies (weights from 1 to 5), which show how many times this or that variant is repeated. That is why calculating the weighted arithmetic average by each of the chosen competences / technologies / methods all values of the weights in the range from 1 to 5 are multiplied by frequency of their repetition, the obtained cup product has been summed up, this sum has been divided into the sum of frequencies (15), i.e. the average volume of the total. Rank 1 has been assigned to the highest value of the weighted arithmetic average of the corresponding competence / technology / method, rank 5 has been assigned to the lowest one.

The dispersion coefficient of Kendall concordance has been applied to determine the level of concordance of the respondents' ideas. As there are no connected ranks in the research, the dispersion coefficient of W concordance has been calculated as ratio of deviation of the sum of ranks in the second degree from the average sum of ranks in the second degree, multiplied by 12, to the experts quantity m in the second degree, multiplied by the spread between the third degree of the quantity of factors which are ranged, and the quantity of these factors n.

The obtained value has been estimated in terms of significance with the help of Pirson's criterion χ^2 by multiplying this coefficient W by the quantity of experts m and by the quantity of the degrees of clamping (n-1). The calculated value of Pirson's criterion has been compared to the table (critical one).

On this basis the conclusion has been made about the significance of the researched coefficient.

The concordance coefficient and Pirson's criterion values are shown in Table 1.

Table 1. The concordance coefficient and Pirson's criterion values.

Demand type	The concordance coefficient W	The calculated value of Pirson's criterion χ^2	The table (critical) value χ^2	
			for the significance level 5%	for the significance level 1%
For demand into competences	0.812	50.02	42.56	49.59
For demand into pedagogic technologies	0.848	33.01	25.00	30.58
For demand into methods	0.873	43,97	36.42	42.98

In all the cases the calculated value of Pirson's criterion exceeds the table (critical) values for 5% and 1% of the significance level. Thus, the calculated values of the concordance coefficient are accepted as significant that proves the concordance of the respondents' ideas.

Obtaining the average complex assessment has allowed us to reveal the demand into forming competences / technologies / methods of the student youth for the last five years.

Results

For five years of research (2013-2018 academic years) there has been a tendency to decrease the quantity of cadets and students in groups of the higher educational institution, who were under research, by 39.86%. If the quantity of students for this period was twice as fewer, then the tendency to decrease the quantity of cadets in groups for the last year (2017-2018) was ceased, and even had a higher index than for the last three years. The results are illustrated in Figure 1.

The demand for forming competences in high school among cadets and students has been studied by methods (Melnyk, 2017), which presuppose individual, group and collective choice of 5 most important competences from the proposed list (30 general competences) (Tuning Association, 2010, p. 63-64). These competences had to be ranged according to the level of their significance.
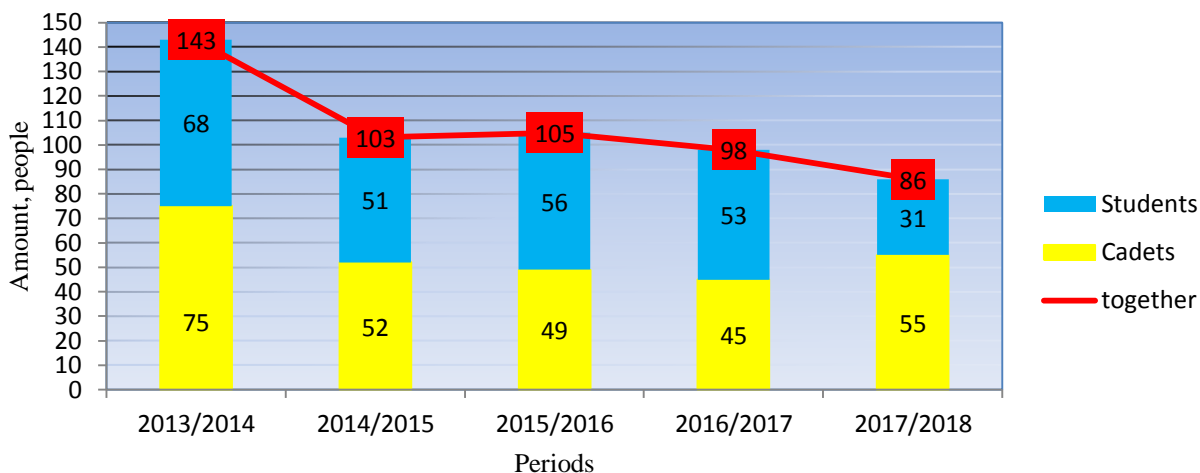
Figure 1. Dynamics of quantity of student youth in higher educational institution.

The obtained results prove that among cadets and students of NANGU for the last 5 years the most required is the demand into forming the following competences by teachers:
1) ability to apply knowledge in practical situations 25.0%;
2) determination and perseverance in the tasks given and responsibilities taken 20.7%;
3) ability to make reasoned decisions 14.3%;
4) ability to work in a team 11.8%;
5) ability to adapt and to act in new situation 8.3%;
6) all other competences 19.9%.

The demand for other competences has been poorly expressed or is absent at all. Let us note that 12 (40%) out of 30 competences have not been chosen at all. That is why they are not considered in the mathematical calculations. The absence of choice for certain competences indicates the necessity to review the groups classification and their content by other characteristics.

Determining the need for the mentioned above competences, the respondents considered personal needs and possibilities in order to use them in their professional activity.

That is why we consider it to be appropriate to implement such two groups of competences into classification: professional competences and special competences.

Professional competences are general abilities of a personality to perform position duties. They are based on personal skills, knowledge and experience and are revealed in the result of professional activity. For example, professional competences of a teacher are characterised by the indices of their educational and pedagogic, scientific and research, organising and methodic activity.

Special competences are specific abilities of a personality, which are based on their psycho-physiological peculiarities and personal potential as for the possibility to do work defined by the branch standards, where they study or work. For example, special competences of a student are characterised by indices of their academic performance, psycho-social maturity, communication, etc.

The summed up percentage rating of the respondents' questionnaires results for the demand of forming competences in a higher educational institution is illustrated in Figure 2.
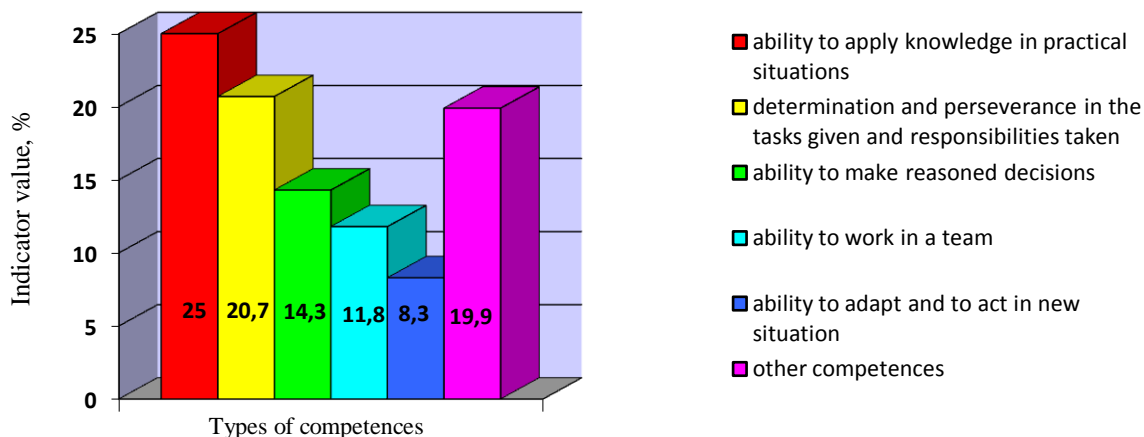
Figure 2. Summed up rating of questionnaire results of student youth for demand into forming competences at higher educational institution.

The carried out research proves that only certain competences are required by the student youth. It can be explained by today's realities and peculiarities of an educational institution. The student youth's demand into forming competences necessary to be mastered by a graduate should be taken into account by teachers when they include them into the content of curricula, as there is a correlation connection between the results of studying and competences (Melnyk, 2017). Studying the demand into forming the student youth competences will favour operational efficiency and flexibility by reacting to their demands.
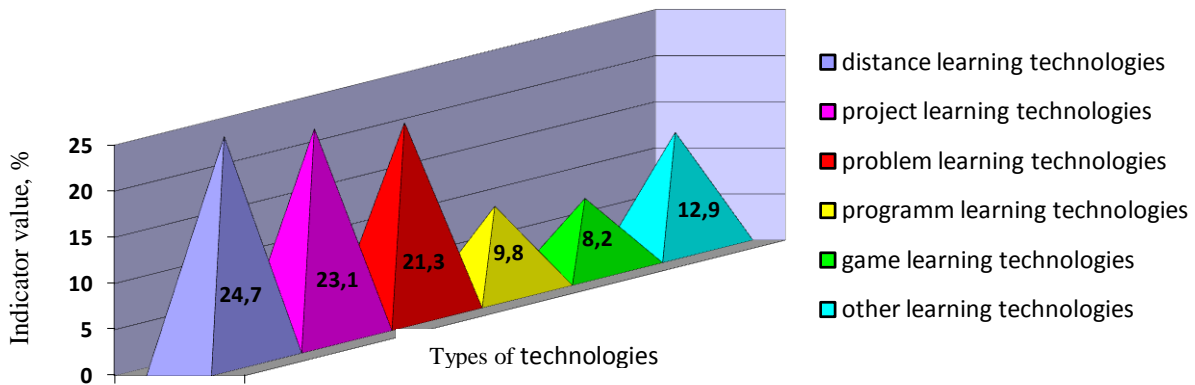
Questioning cadets and students into their demand for using pedagogic technologies in studies has been carried out by similar methods which presupposed individual, group and collective choice of 5 most important technologies from the proposed list (16 pedagogic technologies) (Melnyk, 2016, p. 36). These technologies are to be ranged according to the level of their value.

The demand rating for using pedagogic technologies by studying was as follows:
1) technologies of distance learning 24.7%;
2) technologies of project learning 23.1%;
3) technologies of problematic learning 21.3%;
4) technologies of programming learning 9.8%;
5) technologies of game learning 8.2%;
6) all other technologies 12.9%.

The summary rating of the results of the respondents' questionnaires as for the demand into using the pedagogic technologies by studying is shown in percentage in Figure 3.

Figure 3. Summary rating of student youth questionnaires results for demand into using pedagogic technologies in higher educational institution.

The questionnaires results of cadets and students of NANGU for the last 5 years prove that among the most required technologies are those which give them a possibility to be more mobile and provide for acquiring professional competences which guarantee competitiveness at the labour market.
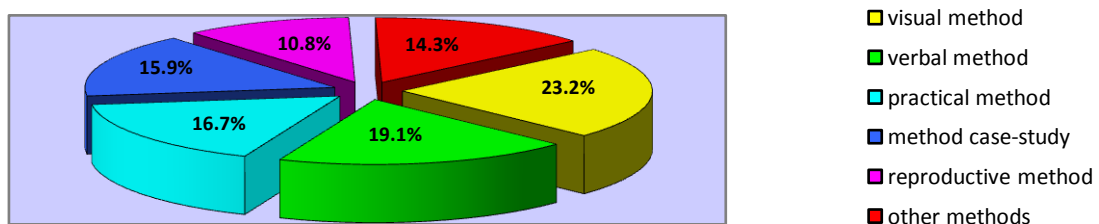
Questioning cadets and students for their demand into using pedagogic methods in high school by the methods mentioned above, presuppose individual, group and collective choice of 5 most important pedagogic methods from the proposed list (25 pedagogic methods) (Melnyk, 2016, p. 27-29). These methods are to be ranged according to the level of their value.

The demand rating for using pedagogic methods by studying have turned out to be as follows:
1) visual methods (illustrations, demonstrations, video watching) 23.2%;
2) verbal methods (explanations, clarifications, discussion, dispute) 19.1%;
3) practical method (research, exercises under control) 16.7%;
4) method case-study (active problematic and situational analysis) 15.9%;
5) reproductive method (work by the ready models) 10.8%;
6) all other methods 14.3%.

The summary rating of the respondents' questionnaires results for the demand into using pedagogic methods by studying is illustrated in percentage in Figure 4.

Figure 4. Summary rating of students' questionnaires results for demand into using pedagogic methods in high school.

The questionnaires results of cadets and students of NANGU for the last 5 years prove that among the most required methods are those which apply computer and digital equipment, trainers focused on forming competences which provide cadets and students with skills to solve practical tasks. The demand for the first three groups of methods among cadets and students does not differ significantly, while the reproductive method is specific for cadets, and students prefer the method of case-study. It is explained by the peculiarity of military training of cadets at an educational institution. Such methods as working with a book (reviewing, making notes etc.) are practically not chosen by cadets or students. The indices of a verbal method such as story-telling or lecture have turned out to be insignificant.

Discussion

Questioning the student youth has given us a general idea about competences, pedagogic technologies and methods which are among the most demanded in high school. The analysis and systematisation of the research results, as well as the usage of the educational logistics gives the possibility to forecast perspective trends of training specialists at higher educational institutions. In the research we applied the following interpretation of educational logistics and possibilities for its usage in high school: "Educational logistics is a sphere of education that determines the average strategy of its mission, forecasting and development, its specific projecting and planning, forecasting the results as well as determining the standards corresponding to the educational aims" (Melnyk and Pypenko, 2017, p. 13).

Formation of the student youth competences is of vital importance by training future specialists in higher educational institutions. The problems of competences classification in high school are highlighted in the work "Competence-based learning. A proposal for the assessment of generic competences" (Sánchez and Ruiz, 2008). The problem of forming student youth competences in the European educational system is revealed in the materials The Quality Assurance Agency for Higher Education, QAA, UK and Tuning educational structures in Europe, TUNING (Tuning Association, 2010). The correlation of competences and results of studying in high school are researched by Wagenaar (2014); Burganova, Abdugalina, and Shaiheslyamova (2016). Pedagogic aspects of forming competences of the student youth are researched by Meterbayeva, Karmenbayeva, Tleulinova, Auhadieva, and Egimberdieva (2015). Formation of a personality and problems of forming students' competences are revealed in scientific works by Valeeva and Bushmeleva (2016); Melnyk (2017). In the research we applied the classification of competences (Tuning Association, 2010), which consists of three groups: instrumental, interpersonal, system, which in their turn account for the main three dozens of competences. Some of these competences are conventionally referred to a specific group, as they could be found both in the interpersonal and system groups. It has made us overview this classification and expose a necessity to single out other groups: professional competences and special competences, which are based on another peculiarity, as well as specify the essence of these notions.

The specification proposed by us to the competence classification is not an exchange or reduction of the classification (Tuning Association, 2010). The specification promotes clarification of the group competences content as for the problem of training specialists by specific peculiarities – practical orientation.

Besides, the groups of competences outlined in our research allow classifying their components more substantively in relation to domains as well: self-consciousness, self-administration, social awareness and management of relations (Boyatzis, Goleman, and Rhee, 2000).

It allows determining the specific indices, coordinate syllabi, which will be directed at possibilities of an educational institution, students' request and employers' demand at the European and world labour market.

In the research by Altbach and Knight the modern state of the international education is analysed (Europe, America, Asia, Africa) and the tendencies of increasing demand for international education are outlined, which result in mobility of students and educational institutions through national borders. Also it is forecast "Along with traditional private and public higher education institutions, "new providers" include commercial IT and mediacompanies, corporate universities, professional associations, and international conglomerates. Providers use face-to-face and virtual modes to deliver education to students in their home countries through twinning, franchising, articulation, validation, and joint or double degree arrangements. Some providers also seek to establish aphysical presence through branch campuses, independent institutions, teaching andtesting centers, and acquisitions or mergers with local higher education institutions" (Altbach and Knight, 2007, p. 295).

Modern scientific and technical achievements, informatisation of the society allow forecasting tendencies and future trends in training specialists in higher educational institutions within the context of distance learning. It requires development of new technologies and methodic provision of the educational process.

Development perspectives of the educational branch within the context of distance learning along with implementation of mobile learning for students is researched by Sahin (2008); Frohberg, Goth, and Schwabe (2009); Wang, Shen, Novak, and Pan (2009); Park, (2011); Keegan (2013).

The efficiency and long-term benefits of implementing modern technologies and distance learning are proved: "…innovative 21st strategies make learning in both physical and online classrooms more stimulating and motivating for students, which promote better retention of the course content, minimise dropout rates, and

maximise students' learning of the course content" (Kalaian, 2017).

The research by Schmidt, Baran, Thompson, Mishra, Koehler, and Shin (2009) is useful for description and comprehension of goals by using technologies in the educational sphere Technological Pedagogical Content Knowledge (TPACK). The possibilities of managing technologies of teaching and studying in high school are revealed by Bates A., Bates T., and Sangra (2011).

The perspectives and problems of teaching structures in higher education of Europe are researched by Haug (1999). Teaching methods in high school have been a core subject of numerous research for many years (Wiersma and Jurs, 2005; Lodico, Spaulding, and Voegtle, 2010).

In their work Wiersma and Jurs (2005) give a general idea for using methods of the research in education, pay attention to quantitative and qualitative indices as well as methods of statistics as important research tools.

The fact that cadets and students chose mentioned above technologies and methods that involve modern IT-technologies and distance learning was easy to foresee. However the choice of case-study and reproductive methods has to be explained.

Choosing the method of case-study (active problematic and situational analysis) was specific mainly for students, and more seldom for cadets, who studied at the Technical Faculty and the Faculty of Economics and Management. We relate the student youth's interest in the real fact material and solving problematic situations close to the reality, to their need of forming professional and special competences, which will help them in practical activity.

The reproductive method (work by ready patterns) has been chosen by cadets and students of the Humanities Faculty. We explain it by the trend of training and peculiarity (military one) of the educational institution.

Thus, we relate the choice of these 5 methods among others which have been proposed to the respondents (cadets and students), firstly – to the social demand of the student youth into forming professional and special competences in high school, which correspond to the modern realities; secondly – to the field of training; thirdly – to the peculiarity of the educational institution. That is why developing technological and methodical support of a higher educational institution, administration and teachers have to take into account such factors as peculiarities of an educational institution, social requests of the student youth for competences and employers' demand for them.

Conclusions

It has become of vital importance for training specialists in high school to study the problem of determining competences, pedagogic technologies and methods required by the student youth as well as specifying the tendencies of developing the branch in which the educational services are provided. On the grounds of modern scientific and technical achievements, educational logistics and social demand we forecast the following basic tendencies and perspective trends in training specialists in higher educational institutions:

1) IT-sphere (programming, design, analytics);
2) technical and military spheres (engineering, robot technology);
3) economic branch (trading of alternative currencies, cryptographic finance;
4) medical branch (genetics, transplantology, bioengineering, molecular dietology);
5) educational branch (mobile learning in the context of distance education).

Taking into account perspective trends in training specialists will allow higher educational institutions to elaborate the development strategy of their institution and the content of syllabi according to the modern tendencies. It will have a positive influence on the quantity of students who will be able to get education for a Bachelor's degree as well as to continue it by Master's or Post-graduate programme, and also courses for retraining specialists. By such conditions the university will be able to provide their main function, i.e. training highly qualified specialists, and will be smoothly integrated as a configuration part of much bigger establishments and processes, into the national and European educational sphere, providing for social and individual needs of the youth. There is a necessity to study further the issues of competences classification as well as content development of group components "professional competences" and "special competences" according to the syllabi of training specialists at different levels of higher education.

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