ПЕДАГОГІЧНА ОСВІТА

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LIN-EDUCATION IN THE HIGHER TECHNICAL EDUCATIONAL INSTITUTION IN THE CONDITIONS OF TRANSITIVE ECONOMY

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Актуальність дослідження полягає у вивченні особливостей трансформаційних змін в суспільстві щодо цінностей освітнього процесу в умовах транзитивної економіки. Уточнені стратегії впровадження лін-технологій в процесі професійної підготовки майбутніх викладачів вищих технічних навчальних закладів – як своєрідних інвестицій в освіту
Ключові слова: *вищий технічний навчальний заклад, викладач вищого технічного навчального закладу, трансформація цінностей, лін-освіта, лін-технологія*

The problem and topicality of research is the study of transforming processes in society according to the value of educational process in the conditions of transitive economy. There were specified the strategies of introduction of the lin-education, exactly, the lin-technologies in the process of professional preparation of the future teachers of the higher technical educational institutions as some kind of investments in the theory and methodology of professional education. There was grounded the system of development of the higher education on the base of saving production. There was determined that introduction of the idea of thrift and prudence in the use of possibilities of educational process in professional preparation of the future specialists in higher technical educational institution are directed on the formation of all types of professional skills of the future specialist as the set of competences in the process of his professional preparation that is the node idea of lin-education. The study of the native labor market allows ascertain that the culture of social dialog of the higher technical education with economy needs from the higher technical educational institution the special prognostication and orientation on the European choice. There was elaborated the lin-strategy of introduction of the "knowledge economy" in the process of professional preparation of the future teachers of the higher technical institutions. The methods of research are: analysis, prognostication, diagnostics, monitoring
Keywords: *lin-education, transitive economy, higher technical education, lin-technologies, lin-strategies, kaizen, saving production, values transformation*

1. Introduction

On the way to the European educational space Ukraine intensifies the work on the unified requirements, criteria and standards for guaranteeing the proper conditions of preparation of the professional stuff of the world level [1]. The priority direction of the higher technical education development and therefore of our research is the introduction of the modern innovative technologies that guarantee the further improvement of the process of professional preparation of the future specialists, availability and productivity of the higher education, training of specialists for the life activity in information society. So, in our opinion, the main task of the higher technical educational institutions and our research task must be the preparation of qualified, competent specialists able to carry out the tasks of society based on knowledge.

2. Analysis of the last researches and publications on this problem

The problem of reformatting of the professional preparation of the future teachers of higher technical educational institutions whose competence allows the effective work in conditions of transitive economy attracted attention of the native and foreign scientists among which are Yermakova S. S. [2], Harrington Dj, Woul F.[3], Womak Dj. [4], Svitkin [5], Bunderson C. V., Inouye D. K., Olsen J. B. [6], Melezinek A. [7], George M. [8], Fidelman G. N. [9], Imai M. [10], Zhigalova O. V. [11] The analysis of publications on this problem demonstrates that in the conditions of formation of information society, economy of knowledge and crisis of transition period in Ukraine appeared the necessity of the more precise interpretation of certain positions and notions of

the saving production in the higher educational institutions, taking into account the special features of its activity, specificity of mission and tasks and of the elaboration of some methodological questions for solving the problem of qualitative preparation of the future teachers of the higher technical educational institutions able to work in the information society.

3. Aim of the article

Elucidation of situation, that was formed at the market of educational services directed on guaranteeing of the professional preparation of the teachers at and for the higher technical institutions who are able to give the response on the challenges of the "knowledge economy"; to specify the vectors of the lin-economy in the higher technical educational institution in the conditions of transitive economy.

4. Lin-education at the higher technical educational institution in the conditions of transitive economy

The policy of European integration and joining the Bolognese process influences the system modernization of the higher technical education in Ukraine. At the same time modernization of the higher technical education became the objective necessity that is caused by the unprecedented growth of the attention paid to it, spread of its functions and role in society. The highly effective process of professional preparation within the modern conception that interprets education as the continuous flexible purposeful democratic process of receiving knowledge during all the life must be based not only on the recreating teaching but on the creative style. Not only possession of the certain set of fundamental theoretical knowledge and concrete practical skills but also formation of the readiness for introduction and acceptance of non-standard managerial decisions in the condition of dynamism and information crisis. So, the conception of information society transforms into conception of the knowledge society.

The analysis of dynamics of the historical stages in society connected with the direction of the research idea (especially, in the aspect of the validity of continuous education of the future specialists of the technical specialty and their professional preparation as the potential future teachers) and monitoring of the program documents and historical-pedagogical materials that regulate the educational process in the higher technical educational institution gives the grounds for concretization of the step-by-step preparation of the future teachers for the higher technical educational institutions. Let us concretize it.

1. Actualization, enrichment and systematization of the technical and pedagogical knowledge; the purposeful accumulation of the scientific experience. Scientists offer to use this direction of the professional preparation in two types – current and periodical education and its effective forms are the following ones: scientific seminars, colloquiums, propaedeutic, elective, specialized courses, learning of the native and foreign experience, scientific arrangements (conferences, congresses, symposiums) and so on.

2. Scientific-pedagogical probation as the direction of practically oriented activity that is directed on the development of pedagogical competence with the aim of widening and deepening of the present professional-pedagogical knowledge, the obtaining of the outrunning preparation of specialists and also the acquaintance with the methods and means used in the correspondent branch. It is worth paying attention to the type of scientific-pedagogical probation – object and official one, at the same time the content parameters determine the intensive specialized courses, learning of pedagogical experience, long-term courses in the native and foreign countries, individual pedagogical probation, preparation of theses, textbooks, inventions and so on.

3. Requalification that is carried out for intensify the fundamental professional preparation of the teachers of higher technical educational institutions. But this direction can be used only in separate cases when qualification does not correspond to the changes in society and also at the appearance of the new directions in science and education for which the stuff (future specialists) are prepared. Experience demonstrated that the individual forms of professional preparation are the most effective ones [12]. Teachers of the higher technical educational institutions or persons who come to the pedagogical activity from the productive one need the systemic, controlled preparation on the cycle of psychological-pedagogical subjects. There was presupposed that such preparation must be directed not only on the learning of the applied aspects of pedagogical activity in the higher technical educational institution but also on the fundamental ground of the teacher profession, and it is impossible to become the specialist in this branch without knowing it.

Explaining the essence of professional activity of the teacher of the higher technical educational institution, scientists pay the special attention to the new "status" of the teacher of aforesaid institution. The revealed tendency is presented in experimental attempts of the foreign researchers to create the "innovative route" of the teacher professional preparation as some kind of experimental monitoring technology for aforesaid institution realized on the grounds of the renewed structure of continuous professional preparation of the specialist in the higher technical educational institution (lin-education [2]), that gives the possibility to determine the new educational aims that are offered by the foreign and native higher technical education for the teacher of the higher technical institution and to characterize it in the following way: preparation to the independent scientific-pedagogical activity – specialization; complex social-economic, psychological-pedagogical, information-technological preparation – MA course; enrichment of pedagogical erudition, development of individual style of the professional-pedagogical activity – postgraduate course. According to the educational aims it gains the certain characteristics in the context of research, namely: propaedeutic one – specialization, methodological-directive (the main one) – MA course, creative-reflexive (the final one) – postgraduate course. The problem of effective professional preparation of the future specialists for the higher technical

educational institution is actualized especially within the educational program of MA course.

Yermakova S. S. proves that the effectiveness of the professional preparation of the modern specialists in the higher technical educational institution is directly connected with its formation within educational benchmarking, that is taking into account the world experience of formation of the value flows of professional-special and economic-managerial knowledge that is the important instrument of the system of guaranteeing and management of the quality as the new stage of development of the higher technical education [12]. So, the study of the "content kernel" of the quality of professional preparation of the teachers for the higher technical educational institutions allowed determine the new approach (that differs from the traditional logic of professional preparation) – the continuous education of the future specialist on the grounds of the calculation and thrifty use of the educational process possibilities of the higher technical educational institution. In this connection there was established that the professional preparation of the teachers for the higher technical educational institutions must outpace the time.

The idea of improvement of the world higher technical education becomes the prognostic guiding line of the native higher educational institutions that makes possible the advancing of the need in enrichment of the professional knowledge by the way of the personal cognitive activity, the permanent personal-professional self-development and as the result the outrunning professional preparation of the teachers for the higher technical educational institutions on the grounds of lin-education. So, the market conditions in Ukraine offer the qualitatively new requirements for preparation of the modern specialist in engineering branch. The special feature of the engineering activity becomes the active strategic thinking, understanding of the general regularities of cyclicality of productive-economic development, the ability to right assessment of the cycle phase of the innovative process of this production, arrangement, and ability to prognosticate the situation at the demand market. So, there are all grounds to ascertain that the search for the main world guiding lines of the professional preparation of the teachers for the higher technical educational institutions are in optimization of the educational process at the expense of the power of the modern technical educational institution, especially through the actualization of the resources and introduction of the monitoring accompaniment of the professional preparation.

So, in the aforesaid context the cardinal change of humanitarian dominant of the higher technical education, its orientation on the universal human values and intellectual wealth of the mankind target the teacher of the higher technical educational institution at the formation of the future engineer that corresponds to the modern requirements and in its turn determines the requirements to the person of the teacher of the higher technical educational institution himself. The most important requirements of the modern society to the person of teacher of the higher educational institution are generalized in the rich humanistic potential; in the deep understanding of the universal human values and humanistic ideals.

5. The results of research

At generalization of analysis we came to the conclusion that the effective professional preparation of the future teachers of the higher technical educational institution presupposes the separation of the following node categories of research:

– diversification of the professional readiness of the future teacher of the higher technical educational institution;

– providing of the pedagogical innovations in the process of formation of the readiness of the future teachers of the higher technical educational institution to the professional activity;

– interactive didactic means of outrunning professional preparation of the creative individuality of the future teacher of the higher technical educational institution;

– positive communication in the subsystem "teacher-scientist – future teacher".

So, let us concretize the aforesaid categories.

Diversification of the higher technical education system actualizes the widened summative, hierarchical system of lin-education connected with the formation of new paradigm of educational function of "educational-scientific-productive" activity that guarantees the competitive advantages of professional person able to give the adequate response on the worldview demands of society; diversification of the professional readiness of the future teacher of the higher technical educational institution is considered as the process and result of his professional preparation that allows state it as the process of change of the professional-personal growth of the future specialist according to the needs of education, science and production. The specificity of diversification of the system of professional preparation of the future teacher of the higher technical educational institution is also the transfer of the professional preparation of future specialists at the higher qualitative level of unity (the harmonic one) that is caused by the several pedagogical, organizational, economic, social and technological factors.

With the development of innovative education on the base of lin-technologies the competition in the field of professional preparation of the future specialists escalates. At creation, mastering and spread of higher technical education innovations is formed the essentially new modernized educational system – the global system of the open, flexible, personalized "value" knowledge; the education of person during the whole its life. The system of transformation of the scientific knowledge into the value taking into account the interests of all participants of educational process is the providing of the pedagogical innovations. Correspondingly, the providing of pedagogical innovations in the process of formation of the readiness of the future teachers of higher technical educational institutions to the professional activity it is the system of integration of educational-forming interaction of the subjects of educational process in the conditions of higher technical educational institution and internal professional-personal self-determination of the future teacher of the higher technical educational institutions in the space of pedagogical reality and transformation of the professional-pedagogical, scientific and productive knowledge into the value educational product.

Organization of providing of pedagogical innovations according to the main factors of the theory and methodology of the professional education becomes possible at the expense of pedagogical logistics as the branch of logistics that studies the management of pedagogic processes on the base of principles of logistics and principle of the simple real systems that in its turn allows synchronize the pedagogical system on its managerial level with the economic systems. It gives possibility to lower the risk of non-effective use of the means for development of the higher technical education and as the result to increase the inflow of capital in this branch.

Actualization of lin-education in the higher technical educational institution is realized mainly at the expense of interactive didactic means of outrunning professional preparation of the creative individuality of the future specialists that favor the comprehensive manifestation of the double advance of the higher technical education; the principally important in this process is the understanding of the aim of professional preparation that sets the model of the future competitive specialist that is realized on the grounds of intensive lin-technologies.

The base of organization of the professional preparation of the future teachers of the higher technical educational institution is the system of developing education (educational environment in which the normative formation of the professional-pedagogical activity is not imposed to the future teacher, but he receives the possibility to determine the trajectory of individual creative development himself and then appears the possibility of accumulation of scientific knowledge, practical skills and continuous formation of mechanism of his self-organization and self-realization, the development of cognitive abilities), which priority aim was determined at the development of the professional abilities of the future teachers. The leading value in organization of such activity is the realization of individual coach-accompaniment connected with the detection of the personal interests of the future teachers, projecting of their professional way and formation of experimental monitoring technology of the professional preparation, especially the processes of professional self-determination guarantee the technologies of coach-pedagogy and within it take place the organization of positive communication in the subsystem "teacher-scientist – future teacher".

The professional-pedagogical coaching is in fact the system of self-development and self-improvement of the personal and professional teacher's qualities at the correspondent moment of life through the self-consciousness and self-actualization that leads to the effective interaction between the teacher and students based on the confidence and mutual respect.

The central idea that combines all these categories is kaizen – the permanent self-development, internal activity of the future teacher directed on the qualitative self-transforming; the process of permanent self-improvement. So, there was made a conclusion, that the transformation of education into mechanism of self-development of the person and society, direction of the higher school as the socio-cultural institution not on the reproduction of the traditional forms of the social being but on the development of democratic, humanistic society, the permanent self-improvement is the pedagogical kaizen.

So, the professional preparation of the future teachers of the HTEI in the context of idea of the continuous education on the base of lin-education and as the result the "saving" production of knowledge is the system of continuous monitoring of the effectiveness of educational process and the thrifty use of its possibilities in the higher technical educational institution as the dominant of the professional preparation of the future engineers that is directed on the permanent self-improvement.

6. Conclusions and prospects of the further researches

Based on the aforesaid there was established that the *lin-education* is the branch of professional pedagogy that directs the preparation of the future specialists on the principle "strictly in term" on the transfer to the personalized education and guaranteeing of introduction of the integrative-competent preparation of the future teachers [2].

Introduction of the *lin-technologies* in the process of professional preparation of the future teachers of the higher technical educational institutions guarantees the "saving" education, the "pulling" education, the visual monitoring, kaizen, that, in its turn, forms the rational vector of solving of the given problem. In such a way there was actualized the acceptance of the quality of the professional preparation of the future specialists at the higher technical educational institution on the grounds of lin-education with two important functions: accompaniment (innovative technology of the professional preparation and monitoring of the professional preparation) and the permanent self-improvement. Such integrated scientific-educational system is the "saving" professional preparation of the future specialists, the combination of "European pragmatism" and the "Eastern philosophy" [2].

The result of professional preparation of the future teachers in the higher technical educational institutions is their readiness to the professional activity [2]. The juxtaposition of the results of research of the formation level of readiness of the future teachers of the higher technical institutions to the professional activity proved the mutual influence and interdependence of the all its components (motivational, content, operational, personal-volitional, effective) and also the effectiveness of the experimental monitoring technology of professional preparation of the future teachers of the higher technical educational institution to the professional activity on the base of integrative-competent preparation. Without stopping on the details of all changes dynamics let us briefly note, that the research-experimental work guaranteed the positive dynamics of changes of the motivational component formation at the sufficient level in the CG 31 %, in the UG – 24 %. The most essential positive dynamics of changes was observed in the process the formation of content component of the personally studied professional quality: if at the beginning of experiment at the sufficient level were 15 % of UG and CG, after the end of it the 43 % of students of UG and 22 % of students of CG reached this level. The diagnostics of the operational component of readiness demonstrated that at the sufficient level were detected – 41 % of UG and 18 % of CG.

The dynamics of formation of the personally-volitional component of the readiness in the process of the forming experiment was also the essential one – from 7 % to 41 % of UG and from 8 % to 19 % of CG. The indices of the effective component of the readiness formation were fixed in UG at the sufficient level – 39 % and, respectively, 20 % of CG respondents. In the result of analysis of the readiness of the future teachers of the higher technical educational institutions to the professional activity on every component was revealed the mean coefficient of their readiness to the professional activity. Its dynamics is illustrated by the following numeric values: 0,471341463 (UG) and 0,457012195 (CG) (the first section) and 0,773780488 (UG) and 0,532317073 (CG) (the second section). Comparing the results of formation of the studied personal-professional quality in students of UG and CG at the final stage of experiment was fixed the following indices: the low level in UG – 10 % (in CG – 30 %), the middle level of UG reached 13 % (CG – 28 %), the sufficient level is 55 % in UG and 29 % in CG, the high level, respectively – 22 % UG and 13 CG. So, the purposeful introduction of the experimental monitoring technology of the professional preparation of the future teachers of the higher technical educational institutions essentially influenced the increase of the level of their readiness to the professional activity.

This research does not include all aspects of the given problem. The further scientific exploring is considered according to the following strategy of development of the process of the study of monitoring of the professional preparation of the future teachers of the higher technical educational institutions based on three concepts: methodological, theoretical and technological ones.

Methodological concept reproduces the interconnection and interaction of the scientific approaches (personally oriented, personally-active, systemic) to the study of the problem of monitoring of professional preparation of the future teachers which dominant is the competence paradigm that allows elaborate the systemic general scientific idea about the professional preparation of the future teachers of the higher technical institutions taking into account the interpretation of the competence node rescripts (“knowledge in action”, “knowledge of the ways of activity”, “procedure knowledge”).

Theoretical concept determined the totality of starting parameters, definitions, assessments that make possible the scientific explanation of the singularity of the monitoring of professional preparation, its specific functions and characteristics. The essence and theoretical grounds of the monitoring accompaniment of the professional preparation of the future teachers of the higher technical educational institutions are considered through the triad of the characteristic of educational-scientific activity (aim, means, result). On this base were determined the theoretical grounds of the monitoring paradigm as the specific subsystem of the professional preparation of the future teachers of the higher technical educational institutions.

Technological concept represents monitoring of the professional preparation as the pedagogical instrument of the management of the effective professional preparation of the future teachers of the higher technical educational institutions. The experimental monitoring technology of the professional preparation of the future teachers of the higher technical educational institutions is based on the theoretically grounded totality of the necessary and sufficient pedagogical conditions.

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ДІАГНОСТИЧНА СИСТЕМА ВИЗНАЧЕННЯ РІВНІВ СФОРМОВАНОСТІ БАЗОВИХ КОМПЕТЕНТНОСТЕЙ МАЙБУТНІХ ТЕХНІКІВ-ЕЛЕКТРИКІВ У ПОЛІТЕХНІЧНИХ КОЛЕДЖАХ

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У статті визначено сутність поняття «базова компетентність» фахівця, виокремлено основні базові компетентності майбутніх техніків-електриків, що формуються під час їх природничо-наукової підготовки, зокрема, у процесі вивчення фізики в політехнічних коледжах. Автором визначено та обґрунтовано критерії, показники, рівні сформованості та засоби процесу діагностування базових компетентностей майбутніх фахівців енергетичної галузі у відповідності до їх основних компонентів
Ключові слова: *базові компетентності, критерії, показники, рівні сформованості, техніки-електрики, політехнічні коледжі*

In the article was determined the essence of the notion "basic competence" of specialists, on the base of Branch standard of the higher education on preparation direction "Electroenergetics, electrotechnology and electromechanics" were separated the main basic competences of the future technicians-electricians that are formed during their natural-scientific preparation, especially at studying physics at polytechnic colleges. There was described structural-component composition of the subject (physical), information-communicative and self-educative competence. The author noted that the obligatory components of whatever competence of the future specialist must be: positive motivation to the demonstration of competence; value attitude to the content and result of activity; knowledge that is the base of choice of the method of correspondent activity; skills and abilities for realization of the necessary actions on the base of the received knowledge.
There were also determined criteria, indicators, levels and its characteristics for components of basic competences formation of the future technicians-electricians. There were selected and grounded the complex of theoretical, practical, creative means of diagnostics. The special attention was paid to the fact that the offered diagnostic system is oriented on monitoring of value-motivational, cognitive, operational-active, reflexive components of the basic competences of the future specialists in energetic branch
Keywords: *basic competences, criteria, indicators, formation levels, technicians-electricians, polytechnic colleges*

1. Вступ

В умовах інтегрування економіки України в світове господарство та появи конкуренції на ринку праці зросли вимоги до рівня професійної підготовки та мобільності майбутніх фахівців. Зокрема, невпинний розвиток сучасних енергозбережувальних технологій потребує підготовки висококопрофесійних спеціалістів енергетичної галузі, здатних критично мислити під час вирішення професійно-виробничих завдань і бути готовими до професійного самовдосконалення.

У системі професійної освіти вагоме місце посідає базова підготовка майбутніх фахівців, що сприяє формуванню в студентів загальнопрофесійних компетенцій, які визначають їхню успішну адаптацію в майбутній професійній сфері та є фун-