



The Management of Independent Educational-cognitive Activities of Future Specialists in the Process of Vocational Training

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ABSTRACT

The development of a modern economy fundamentally changes the requirements for professional staff. Specialists who not only have an excellent command of their profession, are actively involved in the improvement of production, but also seek to improve their skills, master related professions are still in demand. This leads to new targets of professional training of future specialists, including the formation of readiness for independent educational cognitive activities. The purpose of this paper is to define the peculiarities of the management of independent educational-cognitive activities of future specialists in the process of vocational training. The leading approaches to the study are the system approach that allows considering of the management of independent educational-cognitive activities of future specialists as a continuous purposeful process, and an integrative approach allowing to organize the process of formation of future specialists' readiness for independent educational-cognitive activities on different logical grounds. The article reveals the methods and functions of self-educational-cognitive activities of future specialists; defines the content of future specialists' readiness for independent educational-cognitive activities; presents the mechanism and pedagogical conditions of formation of future specialists' readiness for independent educational cognitive activities in the process of vocational training. The paper submissions may be useful for scientific and pedagogical workers of educational institutions; employees of the centers of advanced training and retraining of personnel in the selection and structuring of the content for the training of scientific and pedagogical staff.

Keywords: Independent Educational-cognitive Activities, Long Life Education, Management of Vocational Training

JEL Classifications: I21, I25, I28

1. INTRODUCTION

The relevance of the study is caused by the aggravation of contradictions between objective necessity in professional personnel, capable to self-education, self-actualization throughout life, and the uncertainty of features of the management of independent educational-cognitive activities of future specialists in the process of vocational training (Shulja and Shmyreva, 2012). The development of a modern economy fundamentally changes the requirements for professional staff. Professionals who not only perfectly know their profession, are actively involved in improving of production, but strive to improve skills, master the related professions become popular (Lunev et al., 2016). The main

task of the vocational schools is the preparation of competitive specialists who are ready to learn all life. Education throughout life ("long life education") comes to be seen as a real opportunity to be in demand in the modern socio-economic conditions (Nalivaiko and Ushakova, 2009). Having the willingness to study all their life, the specialists ensure their competitiveness in the labor market. This leads to new targets of vocational training of future specialists, including the formation of readiness for independent educational cognitive activities (Kukushin, 2002). It is found that the willingness of future specialists for independent educational-cognitive activities is a component of their creative potential, the ability to improve their competitiveness in the labor market, the factor of professional and career growth, and personal

fulfillment throughout life (Pugacheva et al., 2016). The purpose of this article is to define the peculiarities of the management of independent educational-cognitive activities of future specialists in the process of vocational training.

2. RESEARCH METHODOLOGY

The leading approaches to the study are the system approach that allows considering of the management of independent educational-cognitive activities of future specialists as a continuous purposeful process, and the integrative approach allowing to organize the process of formation of future specialists' readiness for independent educational-cognitive activities, for various logical reasons (Krajevsky, 1977; Shemet, 2009). Systemic and integrative approaches lead to the management of independent educational-cognitive activities of future specialists in the process of vocational training based on the cascade and taxonomical principles.

It is determined that the formation of future specialists' readiness for independent educational cognitive activities in the process of vocational training on the basis of the principle of the cascade, allows considering of independent educational-cognitive activities as a purposeful continuous process that is manifested in the gradual development of general and professional competencies in curricula and extracurricular time, by means of self-goal-definition, self-planning, self-organization, self-stimulation, self-control, self-assessment of the results. Formation of future specialists' readiness for independent educational cognitive activities in the process of vocational training on the basis of the taxonomical principle suggests a systematic ordering of the structure-forming components of future specialists' readiness for independent educational-cognitive activities and the projecting of formation process of future specialists' readiness for independent educational-cognitive activities on different logical grounds.

During the research the following methods were used: Theoretical (analysis, synthesis, formalization, generalization, classification) and sociological (observation, interviews, questionnaires, expert evaluation, diagnosis).

3. RESULTS

The main results of the study are methods and functions of self-educational-cognitive activities of future specialists; the content of future specialists' readiness for independent educational-cognitive activities; mechanism and pedagogical conditions of formation of future specialists' readiness for independent educational cognitive activities in the process of vocational training.

It is found that independent educational-cognitive activities of future specialists is a form of vocational training carried out in curricula and extracurricular time in accordance with the established procedure and a specific mode. Methods of independent educational-cognitive activities of future specialists can be divided into the following groups: (1) Methods of

organization of independent educational-cognitive activities (annotating, reviewing of literature, solution of the industrial problems; preparation of scientific almanacs, papers, reports, summaries; information and abstracting and problem-response works; making of presentations; laboratory and practical work; supervision of the labor process; educational and creative activities; industrial-training projecting; tables' filling; drawing of diagrams; the execution of the industrial-training works, making of samples, models, visual aids; drawing of sketches; making of drawings; drawing of process charts; work with supporting documentation, periodical literature; case method; problems' solving; task at revealing of defects, work on simulators; watching of training films); (2) methods of incentives and motivation (research work and publication of results in peer-reviewed journals, preparation for participation in the competitions of professional skill and master classes); (3) control and self-control methods (testing, preparation of reports in an essay format, papers, answers to the test questions, descriptions of the tasks' decision; colloquium, the protection of scientific almanacs, articles, reports, summaries; information and abstracting and problem-abstract works).

It is found that the effectiveness of methods of independent educational-cognitive activities of future specialists is provided by the objective evaluation of the results. Few quantitative criteria can be used for objective assessment: (1) Individual pace of work (T) and progress (u): $T = t/n$, $u = p/k$, where t - Time spent on mastering of the material, n - The amount of the acquired material, p - The number of correctly executed tasks, k - The number of necessary correct assignments. Value - u - must be between 0 and 1 ($0 < u < 1$), (2) coefficient of learning material's mastering (Q): $Q = W/Z$, where W - The number of correct answers, Z - Total number of questions asked, (3) The accuracy of industrial-training task's execution: Deviation from the specified dimensions (± 0.1 , ± 0.2 . mm in length or diameter), (4) the number of manufactured parts (2, 4, 6. pieces.), (5) the percentage of defects (4.8%...), (6) the total execution time, (7) the effectiveness of labor actions (D): $D = N / (F + X/G)$, where N - Stipulated time allowed for manufacturing of parts, F - Actually spent time on the job, X - The quality of the work performed (execution's accuracy, the number of manufactured parts and etc.), G - Set indicators of this work's quality (the norm). Qualitative criteria of the results' evaluation can be: Understanding of the functional relationship between the studied phenomena and the ability to describe them; the ability to apply knowledge in practice; the ability to transform the learning material in a new environment; organization of work and the workplace.

In the process of vocational training independent educational-cognitive activities of future specialists perform the following functions: (1) Cognitive, focused on deepening of educational and general vocational knowledge and expanding of the profile of vocational training; (2) axiological, ensuring the formation of a sustainable motivational and valuable attitude to learning and cognitive activities in the chosen specialty; (3) activities, including the competencies' mastering, taking into account individual and age characteristics, the level of future specialists' readiness; (4) integrative, aimed at reflection of content and logical links of educational curricula based on cognitive capacities of future specialists, their previous training.

Readiness of the future experts to independent educational-cognitive activities - A stable motivational attitude on competencies' active-effective mastering in order to create the ability to solve non-standard professional tasks and learning through the whole life. Structure-forming components of the future specialists' readiness to independent educational-cognitive activities are: (1) Motivational - Interest in educational-cognitive and future professional activities; the perception of independent educational-cognitive activities as a purposeful process of self-improvement and development of the common cultural and professional competences; (2) intellectual - Understanding of the essence and knowledge of methods of independent educational-cognitive activities; ability to plan and organize their own educational and cognitive activities; (3) volitional - A steady need for continuous self-development; the capacity for self-organization in the process of realizing of the right to education throughout life in accordance with the educational and professional needs.

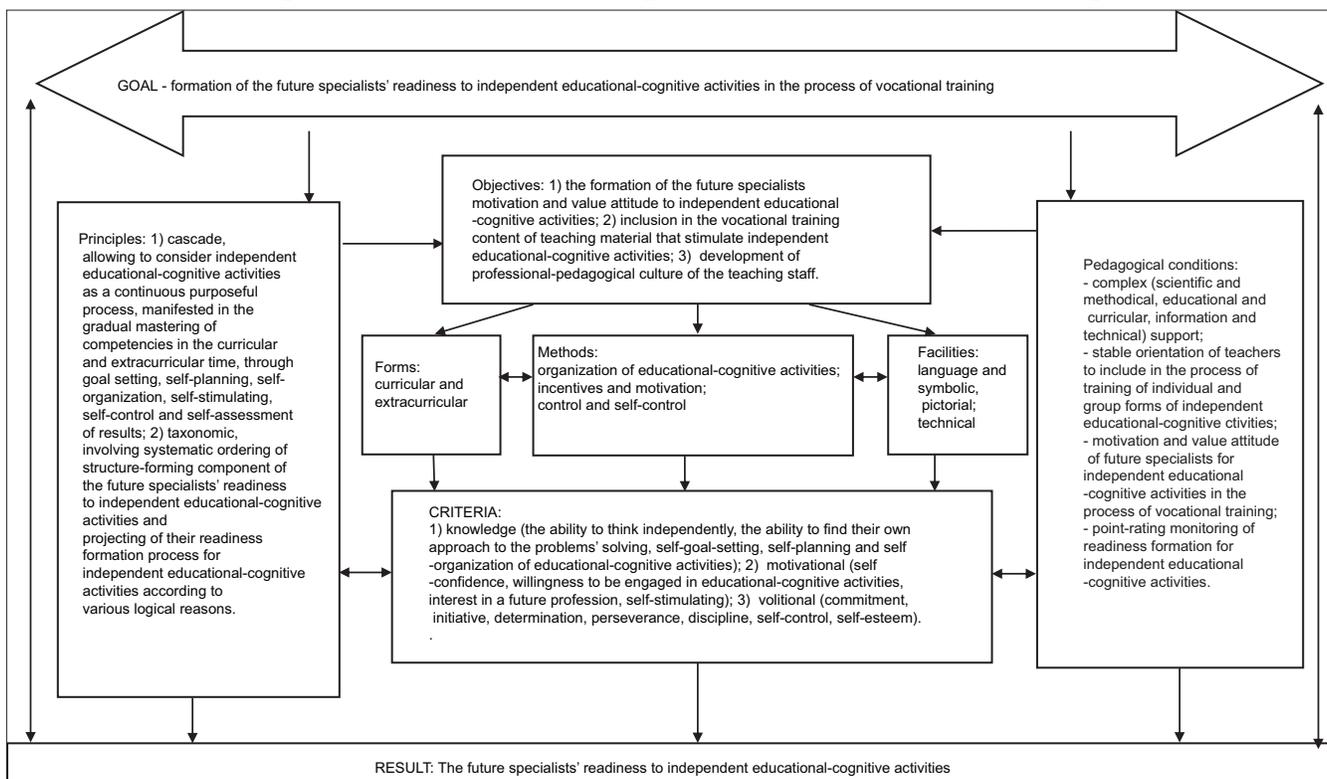
It is found that the mechanism of formation of future specialists' readiness to independent educational-cognitive activities in the process of vocational training includes goals, objectives, principles, forms, methods, tools, pedagogical conditions, the criteria, the results (Figure 1). Setting of goals and objectives are reasoned by the formation of thinking, based on universal values (the meaning and value of human life, its quality, labor) of professional worldview. In everyday life, human values play a role of guiding in the objective and social reality and indicate the attitude to surrounding objects and phenomena (Talyzina, 1998). Formation the future specialists' motivation and value attitude to independent educational-cognitive activities not only leads to sustainable development in the desire to achieve the intended

purpose, as well as the ability to build and implement personalized strategy for their own improvement, but also ensures the formation of social and personal values.

It is found that the pedagogical conditions of future specialist's readiness formation to independent educational-cognitive activities are: Complex (scientific and methodical, educational and curricular, information and technical) support; stable orientation of teachers to include in the process of vocational training of individual and group forms of independent educational-cognitive activities; motivational and valuable attitude of future specialists to independent educational-cognitive activities in the process of vocational training; point-rating monitoring of future specialists' readiness formation to independent educational-cognitive activities in the process of vocational training (Talyzina, 1975; Pugacheva et al., 2016).

Experimental verification of the effectiveness of pedagogical conditions took place on the basis of vocational colleges in the cities Shakhty, Novoshakhtinsk, Taganrog, Rostov region of Russia. In the experiment took part 75 teachers and 740 students. To test the effectiveness of the complex support (scientific and methodical, educational and curricular, informational and technical) of future specialists' readiness formation for independent educational-cognitive activities were developed: Textbook "Science of Materials (dry construction), including the divergent tasks for independent learning and cognitive activities; electronic textbook" "mounting of framing and covering structures" that allows students who are away from classes independently to study the educational and curricular material; training and methodical recommendations for students to work with educational literature

Figure 1: Mechanism of future specialists' readiness formation to independent educational-cognitive activities in the process of vocational training



and internet resources. To form a stable orientation of teachers to include in the vocational training process of individual and group forms of independent educational-cognitive activities the master-classes were held, which presented projects of the organization of independent educational-cognitive activities of future specialists; video conferences on the problem of students' readiness formation for independent educational-cognitive activities; round table discussions with the social partners (company KNAUF, the firm "BOSCH"), to discuss issues of qualified specialists' training competitive in the job market, fluent in their profession and based in adjacent areas, capable of efficient operation on the specialty at the world standards. To form motivational-valuable attitude of future specialists for independent educational-cognitive activities the annual exhibitions of "achievements" were organized, which presented the results of independent educational-cognitive activities of students (essays, case studies, projects, creative tasks). Provisions were developed for monitoring of independent educational-cognitive activities and monitoring of quality of vocational training; organizational plan for monitoring of independent educational-cognitive activities.

The experiment revealed levels (creative, productive, reproductive) of future specialist's readiness for independent educational-cognitive activities in the process of vocational training based on knowledge, motivational and volitional criteria. Level characteristics are the following. Reproductive level: Students do not know how to think independently and are not able to find their own approach to the problem's solving, training and educational activities are carried out under the direct supervision of the teacher, are strictly reproducing by nature and in a given pattern; they do not possess skills and abilities of self-goal-setting, self-planning and self-organizing of educational-cognitive activities; they are not confident; do not have stable desire to be engaged in educational-cognitive activities; show occasional interest in the future profession. Productive level: Students are not always able to find their own approach to the educational-cognitive objectives' solving, partially possess abilities and skills of self-goal-setting, self-planning and self-organizing of educational-cognitive activities; they are interested in a future career, but the desire to be engaged in educational-cognitive activities is not constant; not all volitional qualities (commitment, initiative, determination, perseverance, endurance, discipline) of the individual are firm.

Creative level: Students are able to think independently, to model their own educational and cognitive activities, able to find the right solutions to the precarious situation, their educational and cognitive activities are creative in nature; are confident, possess skills and abilities of self-goal-setting, self-planning and self-organizing of educational-cognitive activities, able to evaluate the outputs and outcomes of the activities; show interest in their future profession and desire to be engaged in teaching and cognitive activities; volitional qualities of personality (commitment, initiative, determination, perseverance, endurance, discipline) are stable.

4. DISCUSSIONS

The organization of independent educational-cognitive activities of the future specialists in the course of vocational training

are considered by different authors. In the publications of the famous Russian scientists Elizarova (2013), Kukushin (2002), Sitarov (2002), Talyzina (1975) students' independent educational-cognitive activities is seen as a desire and ability to think independently, to orient in a new situation, to find their own approach to the problems' solving. Undoubtedly, the desire not only to understand educational information, but also ways of the knowledge obtaining - It is an integral part of independent educational-cognitive activities associated with the initiative, looking for different ways to solve educational and cognitive tasks' solving without the involvement of adults and help from the outside. However, the true independence implies the conscious motivation of actions, their validity. Therefore, a set of pedagogical conditions should include motivational and valuable attitude of future specialists for independent educational-cognitive activities.

To achieve the objectives of the study works of Galperin and Talyzina (1968) are important, which identify three types of control by the process of students' mental activities formation and an assessment of their effectiveness is given. The first control mode involves the showing of only a sample for implementation of an educational task. Adapting to the sample on the basis of attempts and error, the students gradually learn to carry it, but cannot analyze the composition of the training actions. It is believed that with this type of management trainees are guided primarily on the result of the work performed, to meet a given pattern. And we need independence, manifested in educational and cognitive activities as the basis of the students' activity and manifested in setting of goals, planning, defining ways of activities, self-control, self-assessment of results. In the second type of control, Galperin and Talyzina write that students are not only shown a sample, but also are told what means can be used to do the task. In our opinion, this type of management can be applied only to a specific task and is private one. This resulted in a set of pedagogical conditions' inclusion of complex (scientific and methodical, educational and curricular, Informational and technical) support to form students' readiness for independent educational and cognitive activities, unifying curricula for the phased development of abilities and skills of independent educational and cognitive activities; informational and pedagogical bank of forms, methods and means of formation of readiness for independent educational and cognitive activities. The third type of control allocated by Galperin and Talyzina is based on allocation of methods - The general benchmarks of educational tasks' performance. With their help, students form the generalized methods of work that provides their wide transfer, flexibility in use and self-application. We believe that the greatest developing effect has that training which is organized according the third type of management. There is a shift of reference point from the result of the assignment on the process of its implementation, by mastering of the system of generalized ways of working. Taking into account the results of the study by Galperin and Talyzina, the necessary pedagogical conditions for management of independent educational and cognitive activities of future specialists are stable orientation of teachers to include in vocational training process the individual and group forms of independent educational and cognitive activities and the score-rating monitoring system of future specialist's readiness formation to independent educational-cognitive activities.

Table 1: Holistic system of vocational-group and individual-personal values, coupled with the terminal and instrumental values of future profession

Values	Terminal values	Instrumental values
Vocational-group values	Professional skills, professional career, professional cycle's training discipline, professional development, construction professions, labor dynasties, the construction industry	Efficiency in business, professional competence, mutual respect, respect for labor
Individual-personal values	Confidence, productive life, self-development, creativity, social recognition, cognition, qualifications, professional development	Responsibility, self-control, education, hard work, general competence

Thus, the problems of the organization of independent educational and cognitive activities is devoted a number of studies. But management features of independent educational and cognitive activities of future specialists are not defined; mechanism and pedagogical conditions of future specialist's readiness formation to independent educational-cognitive activities in the process of their vocational training are not developed.

5. CONCLUSION AND RECOMMENDATIONS

It is found that the characteristics of management of future specialists' independent educational-cognitive activities in the process of their vocational training are reasoned by the following trends: (1) Ensuring of the effectiveness of knowledge, providing for the formation of the ability to implement the acquired knowledge into practice taking into account the changing production's requirements; (2) the formation of a stable interest for a future profession that contributes to the gradual development of an integrated system of professional- group and individual-personal values.

Features of independent educational-cognitive activities of future specialists in the course of vocational training are the following.

Firstly, independent educational-cognitive activities of students of a vocational school is a conscious and purposeful process of teaching and learning activities, aimed at the development of competences, as well as the formation of readiness to learn throughout life.

The process of future specialists' readiness formation to independent educational-cognitive activities in the process of vocational training is characterized by the following regularities: (1) The effectiveness of students' independent educational-cognitive activities is achieved in case of its complex (scientific-methodical, educational-curricular, Information-technical) support; (2) the quality of independent educational-cognitive activities is increased with the score-rating monitoring using of students' vocational training; (3) activation of independent educational-cognitive activities of students is achieved when there is a conscious motivation to the development of competencies; (4) formation of students' readiness for independent educational and cognitive activities in the process of vocational training is achieved when teachers are focused on sustainable development of the individual and group forms of independent educational and cognitive activities.

Secondly, it is found that the independent educational and cognitive activities of future specialists leads to the formation of

an integrated system of vocational-group and individual-personal values, coupled with the terminal and instrumental values (Table 1).

Third, the mechanism and the pedagogical conditions of future specialists' readiness formation for independent educational-cognitive activities are conditioned by the content of vocational training, pedagogical relations arising between the teacher and students, motivational and valuable attitude of students to vocational training, as well as the use of pedagogical diagnostics and skills' and abilities' assessment of independent educational-cognitive activities.

It is found that the complex (scientific-methodical, educational-curricular, informational-technical) support not only promotes the future specialists' readiness formation for independent educational-cognitive activities, but also the development of social and professional skills (organization, responsibility, reliability), the assimilation of professional concepts and terms. Sustainable motivational-valuable attitude of students to independent educational-cognitive activities in the process of vocational training is characterized by the desire to acquire knowledge and to accumulate professional experience, curiosity, the desire in the future to be engaged in professional activities in the specialty, the ability to cooperate, and such motifs as "to become a qualified and competitive specialist," "successfully continue professional training in high school," "ensure a successful future career." Point-rating monitoring of the process of future builders' readiness formation to independent educational-cognitive activities stimulates their self-educational and cognitive activity; improves the competitiveness in the process of vocational training; reflects the level of readiness for independent educational-cognitive activities and contributes to its timely correction.

Summarizing the above mentioned information, it is possible to identify the following perspective directions of research to the problem: To create and test innovative methods of future specialists' readiness formation to independent educational-cognitive activities in the process of their vocational training; to develop an algorithm of managerial solving of the problems on the future specialists' readiness formation to independent educational-cognitive activities in the process of their vocational training.

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