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MODEL CHARACTERISTICS OF PSYCHOLOGICAL AND PEDAGOGICAL TRAINING OF AN AGRICULTURAL ENGINEER

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МОДЕЛЬНІ ХАРАКТЕРИСТИКИ ПСИХОЛОГО-ПЕДАГОГІЧНОЇ ПІДГОТОВКИ СУЧАСНОГО ІНЖЕНЕРА-АГРАРНИКА

Abstract

Introduction. *Modern requirements for the activity of an engineer-farmer warrant the development of the new concepts and models of psychological and pedagogical training in the specialized university. This model, focused on the formation of administrative and human competencies of future specialists, should be based on certain methodological characteristics.*

Methods. *The analysis of studies in the psychology and pedagogy, the survey, generalization and modeling of the research problem.*

Results. *The model characteristics of psycho-pedagogical training of engineers in specialized agricultural university, indicators and guidelines of implementation for the appropriate model have been identified.*

Discussion*. The problem of succession and continuity of psycho-pedagogical training of an engineer-farmer student at profile university requires the further study.*

Keywords: *psycho-pedagogical training, model training, functions and approaches of the engineering-pedagogical training, engineer-farmer.*

Анотація

Вступ. *Сучасні вимоги до діяльності інженера-аграрника потребують розробки нової концепції і моделі психолого-педагогічної підготовки у профільному вузі. Ця модель, зорієнтована на формування адміністративно-управлінських та людинознавчих компетенцій майбутнього фахівця, повинна базуватися на певних методологічних характеристиках.*

Методи. *Аналіз психолого-педагогічної наукової літератури, опитування респондентів, узагальнення та моделювання проблеми дослідження.*

Результати. *Описано модельні характеристики психолого-педагогічної підготовки інженерів-аграрників у профільному вузі. Визначено показники і принципи реалізації відповідної моделі.*

Перспективи. *Потребує вивчення проблема наступності та неперервності психолого-педагогічної підготовки інженера-аграрника у профільному вузі.*

Ключові слова: *психолого-педагогічна підготовка, модель підготовки, функції та підходи інженерно-педагогічної підготовки, інженер-аграрник.*

Аннотация

Вступ. *Современные требования к деятельности инженера-агрария требуют разработки новой концепции и модели психолого-педагогической подготовки в профильном вузе. Эта модель, ориентированная на формирование административно-управленческих и личностноориентированных компетенций будущего специалиста, должна базироваться на определенных методологических характеристиках.*

Методы. *Анализ психолого-педагогической научной литературы, опрос респондентов, обобщение и моделирование проблемы исследования.*

Результаты. *Описаны модельные характеристики психолого-педагогической подготовки инженеров-аграриев в профильном вузе. Определены показатели и принципы реализации соответствующей модели.*

Перспективы. *Требует изучения проблема преемственности и непрерывности психолого-педагогической подготовки инженера-агрария в профильном вузе.*

Ключевые слова: *психолого-педагогическая подготовка, модель подготовки, функции и подходы инженерно-педагогической подготовки, инженер-аграрий.*

Introduction. System changes in society, being relevant to science and technology, forecast changes of requirements for the quality of professionals' education and training. Therefore, the national higher educational system is required to design a conceptual paradigm of proficient professional education, providing its methodological support. This paradigm must take due account of modern life demands, as well as prospects for development of a particular field of science. The problem mentioned is of particular concern for agricultural engineering education, in a view of the fact that it combines both conservatism and internal dynamics.

The question of responsiveness of higher education sector output to social demands has received much attention in recent years. Many agricultural engineering universities graduates start their career as production managers, unwittingly becoming involved in functional (or at least mid-level) management of the company. In practical terms, they have to work with real people, and, as a result, be engaged in educational and pedagogical activities. Challenges, facing human resources management, stay just as important as production and process engineering. Therefore, agricultural engineering university graduate must be ready to precise as an org-man since day one, demonstrating creative thinking, sufficient personal and professional qualities, ability to find operational solutions, and high level of social and professional responsibility. The most important requirements to engineering industry graduate are: high level of culture; systemic integrative education; occupational mobility; administrative ability; and communication skills.

Psycho-pedagogical training of a skilled specialist includes development of the ability to work with people, taking into account their individual characteristics, as well as emotional and intellectual states, and use their own reserves to build constructive relations both vertically and horizontally. Before 1994, psycho-pedagogical disciplines typically weren't included in training programs at non-teaching universities. Since 1994 training programs of all universities have been complemented with the discipline 'Psychology and Pedagogy', later being replaced by the 'Psychology'. However, content of both courses didn't (and still doesn't) meet the requirements for professional activity of agricultural engineering universities graduates.

Present system of two cycle training of agricultural engineer at university includes psycho-pedagogical competences mastering on two levels:

1) general professional training, provided by the 'Psychology' course as a component of humanities training (Bachelor Degree);

2) Master Degree training at agricultural engineering universities, including courses in 'Engineering Psychology', 'Pedagogy in Higher Education', 'Psychology in Management', in a view of the fact that the holder of master's degree to be focused on administrative or teaching activity.

At the same time, psychological and pedagogical training at agricultural engineering universities has several key deficiencies: lack of differentiation and continuity in learning process, caused by the gap between different types of classes; fragmentariness of training subjects that keeps from the coherent picture of subject creation; lack of focus on basic functions of professional activity and professional problems solving.

In a view of challenges mentioned above, the model of agricultural engineer complex training needs to be established. This model must be focused on increasing the role of the personal factor of production efficiency and rethinking the objectives and content of professional activity of engineer, provided by increasing of organizational and management functions.

Analysis of recent research and publications. Various aspects of psycho-pedagogical education have received much attention in recent years. A grooving body of literature in the field of pedagogical science has studied some problems of steadiness and continuity of teacher education (S. Goncharenko, G. Gurevich, I. Zyazyun, A. Kovalenko, H. Kostiuk, N. Nychkalo), integrity of teacher training (B. Likhachev, V. Ilyin), evaluated the patterns of personality development in a system of lifelong learning (I. Zymnyaya, N. Kuzmina S. Sysoiev) etc.

The engineering education literature focuses on scientific substantiation of technical university students' psychological support (A. Brushlynskyy, V. Vzyatyshev, M. Nechayev), training of engineering and pedagogical universities students (V. Bezrukov, E. Zeyer, V. Lednov), as well as designing issues of university educator's professional training (L. Hurye, V. Ivanov, A. Kirsanov).

Unfortunately, there is still considerable disagreement between declared significance of psychological and pedagogical education in professional's training and inconsistency of methodology of lifelong continuous professional orientated psychological and pedagogical education of agricultural engineer.

Therefore, the purpose of this research is to review the characteristics of psychological and pedagogical training of agricultural engineering university student, its relevance for future professional activity, and special aspects of development of psycho-pedagogical training model for engineers of the agricultural sector.

Methods. The analysis of studies in the psychology and pedagogy, the survey, generalization and modeling of the research problem.

Results. A discussion of defined problem indicates that the most common approaches to the analysis of professional and pedagogical training of the specialist are based on their specifics, features (tasks, functions, and jurisdiction), differences from other activities, and requirements to address certain specific administrative and management decisions.

The need for psycho-pedagogical training of students at agricultural engineering universities, as well as expanding its content, was caused by data conducted within the framework of research on farms managers in Western Ukraine, provided by the Department of Vocational Education, State Agrarian and Engineering University in Podilya. Almost all of respondents noted the need for management training in professional agrarian engineers education, expanding their awareness of human resources management. Similar results were obtained by researchers at the Kharkov Polytechnic University [6]. All respondents stressed the importance of disciplines such as 'Psychological and Educational Impact', 'Conflict Management', 'Effective Communication' etc. for engineer training.

Psycho-pedagogical training at engineering university, according to O. Romanovskoho [5], is provided due to the following production system trends:

1) changing in social production nature and goals, its anthropocentrism;

2) increasing the role of human factor, which determines efficiency of administrative action, taking into account individual characteristics of each personality;

3) the fact that professionals expends much of their time in communicating, extending communication management skills. This is why psychological competency and culture of interpersonal communication becomes an integral element of agrarian engineer training;

4) the effectiveness of group activities is mainly determined by the psychological climate in team and psychological comfort of each person;

5) every person during professional experience have to perform a significant amount of activities associated with physical, emotional and psychological stress. In this regard, training process at higher educational institutions must provide development of student's emotional-volitional system, and resilience to stress;

6) specialists must be aware of their abilities, possibilities and limitations, reveal their inner psychological reserves to set the best possible targets and successfully organize group work. For this purpose they need to be aware of self-improvement and self-actualization methods and means that may be provided by psychology and pedagogy;

7) engineers' activity is driven by the need for education and training of people they works with;

8) each specialist in addition to his professional activities realizes himself in family life, requiring for psychological and pedagogical knowledge.

The provided analysis has confirmed the fact that psychological-pedagogical disciplines are complex, controversial, interesting part of professional training, based on students' experience and content insight. Each specialist must understand that his psychological and pedagogical competency can provide professional and personal success.

According to V. Slastonina, 'Pedagogical skills are very difficult to separate in practice from various other personal qualities that affect the professional success. They exhibit, emerge and develop as an integral part of the system of properties, relationships and actions of individual… and represent synthesis of different abilities, qualities of mind, feelings and will'[8, p. 7]. And this seems to be an innovative approach. So, acquisition of key teaching skills are of the essence of professional-pedagogical training that can be provided by psychological literacy and is crucial for addressing the significant professional management and communication problems. Thus, the following assignments may be suggested:

1. Situation analysis, result designing, planning and organizational of administrative actions;

2. Design and implementation of professional activity (organizational, project, communicative, group, etc.);

3. Profession activities regulation;

4. Accounting and assessment of results, and identifying of new challenges.

The allocation of these actions is based on the concept of human activity, according to which the structural elements of mediation, regulation and control are distinguished. Implementation of these actions requires mastering of pedagogical knowledge and skills that are "refracted" through personal characteristics, getting personal perception and causing the selection of one of many possible options – the most appropriate one [3, p.127].

Tremendous upgrowth of science and engineering, replacement of some old technologies with new ones, innovative processes in a field of agriculture and agrarian business require constant development of engineer's intellectual capacities, as well as education quality increase due to anthropocentric approach. Therefore, psychological and pedagogical (and humanitarian as such) training model for modern engineers at agricultural universities should be continuous in its nature, satisfying the requirements of humanism, subjectivity, autonomy, and activity. In this context it seems advisable to use V.E. Deming's PDCA Cycle (Plan-Do-Check-Act, i.e.

analyzing the problem – developing a potential solution – measuring the effectiveness – implementing the solution) [9]. Deming's Cycle, on the one hand, provides continuity of engineer's psychological and pedagogical training on both levels of higher education, on the other hand, underlines this continuity and guaranties its quality (fig. 1).

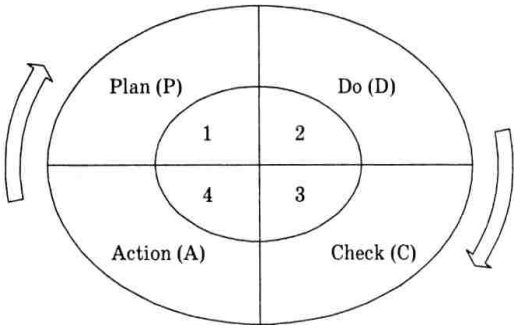

Fig. 1. The cycle engineer's psychological and pedagogical training (by Deming)

In educational practice, implementation of this model is based on the following principles:

- polyfurcation, providing that professional, organizational and managerial competence include cognition, creativity, communicativeness, reflexive activity and professional experience activity;
- educational integration, providing system integrity and continuity of all components of training process at different levels of psychological and pedagogical education of engineer (targeting, motivational, substantial, procedural, controlling and evaluating), and at the same time liaising organizational development and communication professional skills mastering;
- affiliation, aimed at developing of students sustained, informed and positive attitude to their profession orientation, their commitment to succeed, need for developing skills and productive interaction with others;
- congruence, providing self-realization and self-assertion;
- reflected subjectivity, relying on the principle of representation of some ideal human life situation for solving the reality situation of another.

The most important structure-forming component of the model is development of students learning and researching motivation, grounded on their readiness for lifelong learning. It can be provided by participation in students' psychological and educational partnerships, university (regional, national, international) student conferences, forums, academic competitions, including development and implementation of scientific and educational research projects; cooperation with university psychological service, including essays and research papers writing in a course of studying psychological and pedagogical disciplines; active use of modern information forms and methods, integrative organization of educational process. Modern rapid changes in the market economy environment require the engineer to be ready for prompt response, and making adjustments in his own activities, as well as activities of employees. However, these qualities wouldn't be developed without continuous improvement of professional skills and personal qualities. That is why the process of continuous psychological and pedagogical training has to satisfy the following requirements: firstly, to be insightful; secondly, to provide a sequence of courses, programs, complementing and developing each other; thirdly, to integrate traditional and innovative teaching methods,

combining academic and professional administrative activity; fourthly, to develop and, if necessary, generate appropriate personal and professional competencies at different educational levels.

The next structural component of the model is improving the student's professional engineering skills through development of methodological and motivational culture and creative activity. Methodological culture is the basis of creative style of thinking, activity, and communication, providing professional engineering competencies (professional tasks solving, assessment of current and final results of choice made, implementation of group interaction technologies, application of advanced science achievements within the discipline). Creative activity of an engineer (measure of profession and professional activity satisfaction, evaluation of professional orientation, development of communicative competence, desire to improve own knowledge, experience) causes the development of co-creation activity. Therefore, its purpose is to form and develop major skills of project management, conflict management, managerial decision making, teamwork and ability to solve professional situations.

Another component of the model is construction of an integrative training system based on variant integration mechanisms.

Such mechanisms can be introduced into university education process through integrated courses aimed at thematic and objective integration of psychological, pedagogical and professional disciplines; use of various integrative forms of education, focusing on intellectualization of students activities, development of their academic autonomy and ability to self-realization and self-education; subjective integration, i.e. considering students as subjects of pedagogical process, able to goal-setting, planning, organizing, adjusting their education; performing certain social roles (lecturer, reviewer, etc.) under teacher guidance; emotional saturation of educational material. Methodological core of this integrative humanitarian approach is based on ideas of the unity and interrelation of all sides of human existence, recognizing man as a microcosm of the world. Therefore, the key element of humanitarian integrative approach is human, taken in all the richness of internal and external communications, described by V. Shubinsky as 'biological psychological social natural cosmic creature'. This person is collaborative. Harmoniously integrating a variety of aspects of human existence (cognitive, creative, artistic, emotional and sensual, rational and analytical, mystical and religious, active et al.), such person is capable to carry on a dialogue with nature, socio-cultural environment, past and future. This approach is extremely important for understanding of the nature of engineering in industrial world. External dialogue is impossible without self-dialogue. Man, who has not learned to understand himself, is unable to understand others. Thus, reflexive abilities of an engineer have turned to be necessary personal and professional skills that launch their existence at higher education institutions and continue to evolve throughout life.

The evidence from our study points towards the idea, that optimum implementation of these models in educational practice require abidance by following terms: 1) organizational; 2) technological; 3) psychological and educational; and 4) scientific and methodical.

The qualitative difference of this model is that it is not only the psycho-active, but also personalized in its nature, and provides an active, creative approach to development of individual skills and self education abilities, as well as self-concept personalization.

Discussion. Psycho-pedagogical education is one of the means, providing humanization and fundamentalization of students training at agronomic engineering universities. Its effectiveness is strongly influenced by educational content, materials scientific character, and target orientation of training sessions.

The proposed model determines the development of motivational-value, communication, and reflective components of engineer's psycho-pedagogical competency. This is the area,

where the processes of intellectual potential formation, memory, attention, thinking, communication skills takes place, creating an educated professional and a thinking person

Knowledge, skills and abilities obtained by engineers during specially organized psychological and pedagogical training, allows them to solve skillfully psychological, management, production and other tasks by using the human potential.

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