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THE TECHNOLOGICAL BASIS OF TRAINING FUTURE TEACHERS OF AGRICULTURAL DISCIPLINES IN HIGHER EDUCATION INSTITUTIONS: PEDAGOGICAL EXPERIENCE OF GREAT BRITAIN

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ABSTRACT

The article **aims** to develop a comprehensive pedagogical model for training future teachers of agrarian disciplines in the context of implementing a three-level pedagogical technology for educational process management (EPM). The pedagogical experience of Great Britain is under review, which can be used to improve the technological process of forming the professional competence of teaching specialists.

The research **methodology** was determined by a set of methodological approaches (system, activity, competence, technological, personal

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development) and was based on a pedagogical experiment that included ascertaining, formative and control stages.

Results. *The theoretical and methodological foundations of the introduction into the educational environment of the three-level pedagogical technology of educational process management in the conditions of training future teachers of agricultural disciplines in higher education institutions are analysed. An applied model of educational process management for the training of future teachers of agricultural disciplines is proposed on the example of the first (bachelor) level of education in the conditions of introducing a SMART-educational communicative environment.*

The structure of the readiness of future teachers of agricultural disciplines for professional activity (motivational-cognitive, practical-active, creative-developmental levels) is determined.

The technological stages of the process of professional training of future teachers of agricultural disciplines in institutions of higher education in the context of the pedagogical experience of Great Britain (motivational-orientational, planning, cognitive-transformative, control-analytical, regulatory-developmental) are considered. The didactic methods, forms and means of the proposed pedagogical technology for managing the educational process are substantiated.

Conclusions. *The results of the experimental work demonstrate a significant increase in the quality indicators of the professional training of future teachers of agricultural disciplines in higher education institutions (motivation, creative activity, productivity) in the conditions of the implementation of the three-level pedagogical technology of the EPM.*

The implementation of a three-level pedagogical technology in the educational process management system allows for boosting students' creative activity, increasing the level of their internal motivation, and deepening the level of independence and individualisation of learning, which eventually is determined by a high level of readiness for professional pedagogical activity.

KEYWORDS: *Educational and Creative Activity; Educational Process Management; Professional Training; Teachers of Agricultural Disciplines; Three-Level Pedagogical Technology.*

INTRODUCTION

Professional training of highly qualified teachers of agrarian disciplines in higher education institutions, capable of solving complex pedagogical problems imaginatively, is considered one of the decisive levers for overcoming the socio-economic crisis and bringing Ukraine's education to the level of highly developed

countries. First of all, it is envisaged to meet complex challenges related to the reform of the agricultural education system of Ukraine following international standards and the formation of highly qualified, creatively gifted educational personnel on this basis (Gerliand, & Nahaiev, 2021; Dotsenko, 2021; Klochko, 2018).

An essential aspect of this problem is the

introduction of pedagogical technologies into the educational environment as an objective prerequisite for the formation of the professional and creative competence of the future teacher of agricultural disciplines as a harmoniously developed personality proficient in innovative searches and creative self-development (Lushchyk, 2017; Nahaiev, 2018; Khryk, 2021).

The peculiarity of teaching agrarian disciplines is the need for teachers to develop an appropriate system of knowledge and skills regarding the technology of agricultural work and operations since the agricultural industry is a closed technological circle.

At the same time, the educational process should natively combine the content of technologies of the agricultural industry (product processing technology, food technologies, organic farming technologies, etc.) with appropriate pedagogical technologies.

In this regard, the requirements for the technological support of the educational process management of achieving the educational result are increasing. Modern teachers of agricultural disciplines must possess a complex of innovative knowledge, abilities and skills that correspond to the intensification of pedagogical processes and advanced achievements of science and education.

The requirements mentioned above stipulate the formation of experience of creative activity at the level of technological support of the educational result in future teachers of agrarian disciplines. However, the current training process for teachers of agrarian disciplines in Ukraine does not provide a high level of their professional competence and, as a result, an adequate level of readiness for creative pedagogical activity.

The facts above evidence the

contradictions identified by the authors, which prove the inconsistency of traditional didactic methods, forms and means of training pedagogical staff with modern technological requirements in the field of education. Under these conditions, the pedagogical system of a higher educational agrarian institution should respond appropriately to the social order and promote the activation of technological support for the training of pedagogical personnel, taking into account the experience of the countries of Western Europe, primarily Great Britain.

The training of highly qualified teachers of agrarian disciplines in higher education institutions in the context of the introduction of modern educational technologies is one of the priority directions of educational policy, which is confirmed by the state normative legal acts of the development of educational policy (Lushchyk, 2017; Lushchyk, 2017; Lushchyk, 2020; Luzan, 2015).

As noted in the latest provisions of the national strategy for the development of education in Ukraine, the education of the future should be based on a combination of information and digital technologies and individual technologies of personality development within the framework of a common electronic platform (Kabinet Ministriv Ukrainy, 2012).

The corresponding direction of professional training is closely connected with the problem of technologisation of educational process management, which can be solved based on a system approach with the search for new pedagogical technologies and innovative didactic means (Khryk, 2021; Titova et al., 2021).

In accordance with the above provisions, the pedagogical experience of Great Britain, as one of the leading countries of Western Europe, which actively uses modern information, communication and

digital technologies in education, is of great interest. The country's leading position in this field is conditioned, in particular, by the high level of scientific and technical development in the educational sector and the constant search and implementation of the newest strategies for educational process management (Lushchyk, 2017; Lushchyk, 2017; Nahaiev, 2018).

The purpose of the article is to substantiate the technological foundations of the professional training of future teachers of agricultural disciplines in higher education institutions based on the introduction of pedagogical technology of educational process management in the context of the pedagogical experience of Great Britain.

METHODOLOGY

The research was based on a pedagogical experiment with a technological procedure for separating control and experimental groups and included ascertaining, formative and control stages. The experimental groups studied according to the pedagogical model of educational process management (EPM), and the control groups studied according to the traditional education system (TES). On analysing the conditions of the experiment, it should be noted that in each experimental group, students were trained both under the state order and the contract form of education. The program of educational disciplines for the experimental and control groups was the same regarding the volume of classroom and independent work.

The content of professional training of experimental groups differed in the technological provision of educational process management, which determined the higher level of independence, individualisation, and creative learning activity of future teachers of agrarian

disciplines. The study was conducted on the example of professionally oriented disciplines ("Agronomy", "Fundamentals of Breeding", "Technology of Processing Agricultural Products", "Plant Protection", "Fruit and Vegetable Growing", and others) at the bachelor's educational level of applicants of speciality 015.37 "Professional Education (Agricultural Production, Processing of Agricultural Products and Food Technologies)" at the State University of Biotechnology.

The quality of specialists' training was monitored by the method of multi-level assessment using various diagnostic methods, which comprised: testing, oral and written surveys, solving situational problems, business games, analysing student youth's feedback on proposed pedagogical innovations, etc. The control system included current, intermediate and final control measures.

RESULTS

Taking into account the necessity of forming in future teachers of agrarian disciplines in institutions of higher education of abilities to creative activity within the chosen profession, the pedagogical system of higher education providers should find a place for innovative methods of organisation of students' educational-creative activity based on managerial concepts and comprehensive development of activity approach in the conditions of systematic application of pedagogical technologies. The subject of such activity should be an innovative pedagogical system with pedagogical technology for managing the educational process at the macro- and micro-level.

For example, the education system's modernisation in Great Britain is complex. The implementation of the technological aspect takes place in various directions, particularly in the educational process, education, scientific research, and

administration. Thus, the introduction of modern computer technologies in higher educational institutions of this country provides excellent opportunities for enhancing the quality of educational services and, on this basis, improving the professional training of future teachers of agricultural disciplines in higher education institutions (Titova et al., 2021).

An example of an innovative update of the didactic system of teaching staff training in professional education in Great Britain is a webinar. Note that this term is used to define both a virtual lecture and an online seminar. Participation in this type of work is considered one of the aspects of managing students' independent and individual work (Newman et al., 2017).

Also, an important direction in the development of professional education in Great Britain is the use of the tutor system with the application of the online learning environment Moodle (Modular Object-Oriented Dynamic Learning Environment), providing access to course materials and offering discussion forums, chats and web conferences (Hernandez-de-Menendez & Morales-Menendez, 2019).

Another innovation in the field of didactic principles of professional training of agricultural disciplines teachers is information and communication technologies aimed at forming the creative personality of future educators. For example, the so-called "flipped learning" has recently become extremely popular in Great Britain.

Compared with the application of the virtual educational environment such as Moodle, mainly used for course administration, storage of their contents and additional resources, "flipped learning" influences the pedagogical methodology, offering a way of combining online and classroom training. At the same time, students watch short video lectures

at home, while in the classroom, time is allocated for exercises, discussion of projects and debating (Newman et al., 2017, p. 48).

It is also appropriate to introduce the practice of dual education, which institutions of higher education widely implement in Great Britain in the professional training of teachers in the agricultural sector. The development of dual education, when both educational institutions and specialised agricultural enterprises participate in the training of future highly qualified specialists, is a mechanism that contributes to the improvement of the quality of education and its compliance with European standards and a competitive dynamic labour market.

It should be noted that the development of a model of practical training for a future professional teacher should be preceded by: an analysis of the current level of professional training; determination of qualitative changes in modern agricultural production; consideration of prospects for the development of agricultural production; determination of modern needs for the professional competence of the future specialist based on modern production requirements.

Analysing the experience of the leading universities of Great Britain, it is possible to propose its use in the professional training system of future teachers of agricultural disciplines in higher education institutions in Ukraine.

For example, the goal of implementing pedagogical technology for the management of the educational process is to increase the creative activity of students at all stages of their professional training, to stimulate systematic, regular cognitive activity, to increase the level of individualisation and differentiation of learning, which will contribute to the

formation of the creative personality of future teachers of agricultural disciplines.

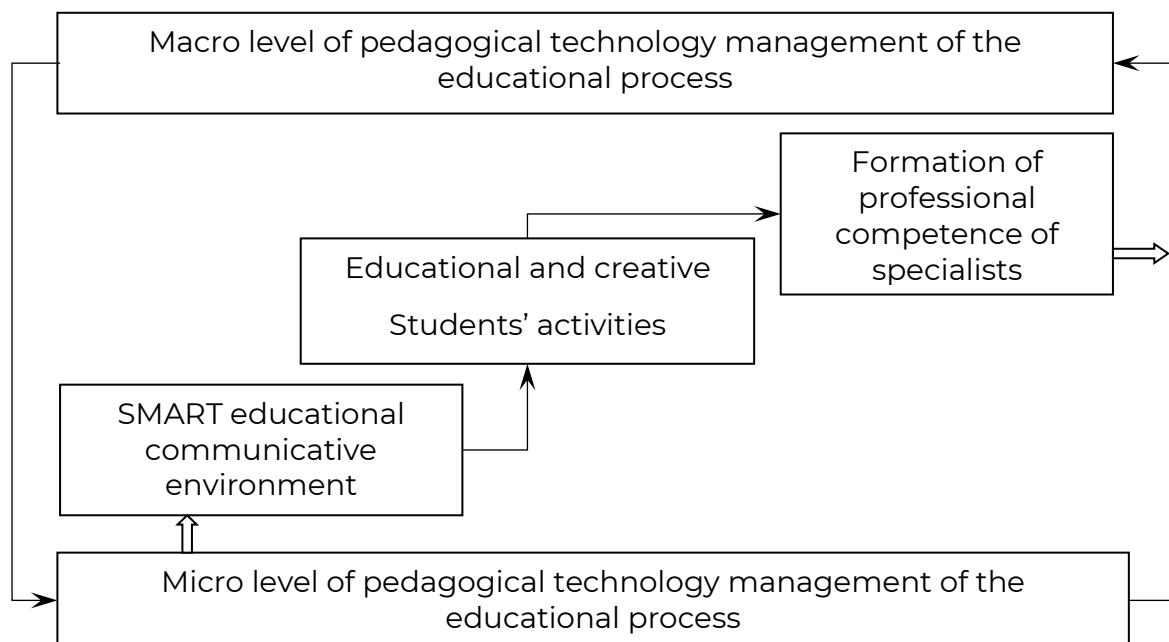
We have designed a three-level pedagogical technology for educational process management (EPM). At the macro level, management of the educational process is carried out by the university management, student self-government bodies, and public scientific organisations under the leadership of the educational department and the university's research department by involving students in creative educational and scientific activities.

At the micro level, management of the educational process is organised by a scientific and pedagogical worker while

teaching an educational discipline in the context of implementing pedagogical technology for managing students' educational and creative activities. At the information and communication level, the EPM technology unites the subjects of the pedagogical process with a SMART educational module of information that ensures the implementation of didactic principles in the conditions of the created information and communication educational environment (Klochko, 2018; Klochko et al., 2021; Luzan et al., 2021). The proposed model of the three-level pedagogical technology of educational process management (EPM) is shown in Figure 1.

Figure. 1.

Model of the three-level pedagogical technology for managing the educational process in training future teachers of agricultural disciplines in higher education institutions.



Our previous studies proved that students could consider the educational and creative activity as an object of management (self-management) under the conditions of purposeful influence of the individual on it, which leads to the formation of creative experience in the

system of educational results. The problem of management of students' educational and creative activity lies in developing the corresponding model, which would ensure the effective functioning of all components of the pedagogical system. Such a pedagogical

model should be represented by a kind of management microsystem, which includes a management body (the approximate part of the action), the executive body (the organisational part of the action), and the controlling body (the control part of the action).

Analysing psychological and pedagogical approaches, we conclude that the technology of managing the educational process should begin with the motivational and orientation stage, which forms the motives of students' educational activities based on the development of their needs for creativity.

While using a technological approach, it is possible to determine the following stages of organising the orientation activity: students' awareness of the necessity, possibility, and sequence (technology) of mastering the material of the discipline, as well as the construction of a scheme of the indicative basis of actions. The sequence of mastering consists in determining the purpose and tasks, revealing a set of questions when studying the topic, the necessary literature, the level of proficiency (reproductive, research, creative), and results (Nahaiev, 2018).

The planning stage of the EPM technology substantiates the system of students' learning goals. The implementation of the target program is carried out through the function of the organisation, which outlines the appropriate actions of the management subject in relation to the object in the pedagogical system.

According to the pedagogical experience gained in Great Britain, the effectiveness of planning activities is ensured by using various SMART-educational tools, in particular models: the curriculum of the speciality, the structural-logical scheme of the discipline and the structural-technological map of the thematic plan (Koshuk, 2017). At the same time, the main

task of organising the educational and creative activity (ECA) is to establish a creative educational environment, which will influence the students' creative activity in the future.

The next stage of the pedagogical technology of the EPM is the cognitive-transformative stage, which represents the processes of micromanagement at the level of the oriented basis of the student's actions. Such a well-adjusted micro-impact on educational and creative activity is determined by the achieved partial educational results and the content of the mental processes which run inside the personality of the future specialist. On this basis, processes of micro-reflection arise with the analysis of the achieved intermediate results, the study of directions for the further sequence of actions and obtaining an educational result.

The logical stage of the pedagogical technology of the EPM is the control and analytical stage, which should ensure the appropriate achievement level of educational goals at all stages of professional training of future teachers of agricultural disciplines in higher education institutions. This stage is provided by various types of control (current, intermediate, final) and diagnostic tools (testing, problem tasks, situational assignments, etc.), which determine the level of formation of pedagogical experience. At the same time, an essential psychological and pedagogical condition is the organisation of students' self-control, which is specified in achieving the appropriate managerial result.

The regulatory and development stage of the pedagogical technology of the EPM is carried out on the basis of the interpretation of the received control data, after which the subject of management exercises a corrective influence on the object of management – educational and

creative activity. Forms of the regulation process can be represented by organisational, pedagogical, psychological and other activities (improvement of the organisation of students' independent work, optimisation of the parameters of the pedagogical system, formation of new information channels between subjects of the pedagogical process, etc.).

At the same time, the student analyses the results achieved within the framework of reflective activity and determines the directions of further pedagogical interaction with the construction of an appropriate self-development strategy. Regulation of educational and creative activities is carried out individually on the basis of self-management skills (self-motivation, self-planning, self-organisation, self-control). Thus, according to the process approach, the pedagogical technology of EPM includes the following functional stages: motivational-orienting, planning, cognitive-transformative, control-analytical, and regulatory-developmental.

Following the proposed pedagogical technology of managing the educational process, the subject's pedagogical influence is determined by the function of

facilitation, providing students with stimulating mechanisms for self-learning. On this basis, the learners plan a personal strategy of self-management of educational and creative activities, which is organised according to the characteristics of a creative educational environment.

Self-management of learning includes such student functions as self-planning, self-organisation, self-motivation, self-control, and self-regulation, which leads to the activation of educational and creative activities and, as a result, to the achievement of the main goal – the formation of the creative pedagogical experience of a specialist (Nahaiev, 2012).

According to the results of the control stage of the experiment, the experts concluded that as a consequence of the implementation of the three-level pedagogical technology of the EPM, the majority of students acquired knowledge on the ground of which professional skills and abilities were formed, which are part of the whole complex of ensuring the readiness of future teachers of agricultural disciplines for professional activity. They are especially noticeable in the experimental groups (Table 1).

Table 1

Levels of formation of readiness of future teachers of agrarian disciplines for professional activity

Component	Motivational and cognitive				Practical and active				Creatively-developmental			
	High	Sufficient	Average	Low	High	Sufficient	Average	Low	High	Sufficient	Average	Low
EG (experimental groups), %	36.7	43.1	18.5	1.7	35.8	39.4	21.2	3.6	33.8	35.2	29.6	1.4
CG (control groups), %	18.8	34.1	44.6	2.5	17.5	31.4	32.9	18.2	15.9	29.1	42.3	12.7

The comparative analysis of the obtained results gives reason to state that the students of the experimental groups have a higher level of readiness for professional pedagogical activity, which is reflected in the motivational-cognitive, practical-active and creative-developmental spheres.

The comparative analysis of the obtained results gives grounds to state that the students of experimental groups have a higher level of readiness for professional pedagogical activity, which is reflected in the motivational-cognitive, practical-activity and creative-development spheres.

The data in the table prove that at the end of the experiment, the high level of the motivational-cognitive component of readiness reached the mark: for EG students – 36.7%; for CG students – 18.8%. Analysis of the state of the practical-activity component as a result of the pedagogical experiment illustrated that 35.8% of future EG specialists demonstrated a high level of readiness for professional activity. 33.8% of EG students and 15.9% of CG students showed a high level of the creative and developmental component of readiness. A sufficient level was revealed in 35.2% of EG students and 29.1% of CG students, respectively.

DISCUSSION

Professional competence according to the criteria of formation of the creative pedagogical experience of specialists is the final result of the functioning of the newly developed pedagogical technology of EPM. Meanwhile, management can be structured on the elements of ECA management by the teacher, teacher and student co-management and elements of student self-management. A crucial role in the educational process management is played by the SMART-educational communicative environment, in which

the organisational and methodological impact of the pedagogical system is realised during the training of future teachers of agricultural disciplines in higher education institutions.

This approach is based on introducing information and communication technologies into the educational process, which is determined by an electronic network of interactive didactic connections grounded on the principles of digital pedagogy. While considering the relations and connections between the components of the pedagogical system in the proposed pedagogical technology of the EPM, it is necessary to ascertain their non-linear nature, where specific relationships prevail in a synergistic unity, which leads to the emergence of new pedagogical structures and didactic criteria for the self-development of future specialists.

CONCLUSIONS

Summarising the experience of professional training of future teachers of agricultural disciplines in higher education institutions in Great Britain, it should be noted that there is a system of effective integration of information and communication technologies and active teaching methods aimed at forming the creative personality of the future teacher.

In the proposed three-level pedagogical technology of the EPM, the object of management is the educational and creative activity of students with elements of scientific research, which transforms the existing potential of the learner (abilities, motives, needs, level of training, etc.) into a quality result – the formation of the experience of the pedagogical activity of future teachers of agricultural disciplines in higher education institutions in the system of professional competence. According to the technological approach,

the management of students' educational and creative activities in the system of professional training of future teachers of agricultural disciplines in higher education institutions in Great Britain includes the following functional stages: motivational-orienting, planning, cognitive and transformative, control and analytical, regulatory-developmental.

This process results in organisational and technological algorithms, which aim to improve both the educational product and the structure of future specialists' educational and creative activities. An important aspect of the three-level pedagogical technology of educational process management is the harmonisation of organisational-technological and

psychological-functional (personal) factors based on the principles of subject-subject relations.

The obtained results make it possible to determine the ways for further scientific and pedagogical studies in this respect, among other things: design of network management of the educational process in the conditions of remote access to educational resources; development of interactive methodical electronic SMART-complexes for educational and methodical support of the educational process management; introduction of pedagogical micro-technologies of functional management of the educational process of applicants during their master's training.

CONFLICT OF INTERESTS

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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АНОТАЦІЯ / ABSTRACT [in Ukrainian]:**ТЕХНОЛОГІЧНІ ЗАСАДИ ПІДГОТОВКИ МАЙБУТНІХ ВИКЛАДАЧІВ
АГРАРНИХ ДИСЦИПЛІН У ЗАКЛАДАХ ВИЩОЇ ОСВІТИ:
ПЕДАГОГІЧНИЙ ДОСВІД ВЕЛИКОЇ БРИТАНІЇ**

Мета статті полягає в розробці комплексної педагогічної моделі підготовки майбутніх педагогів аграрних дисциплін в умовах впровадження трирівневої педагогічної технології управління навчальним процесом. Аналізуються педагогічний досвід Великої Британії, який може бути використано для вдосконалення технологічного процесу формування професійної компетентності фахівців-педагогів.

Методологія дослідження визначалася сукупністю методологічних підходів (системний, діяльний, компетентнісний, технологічний, особистісно-розвивальний) і базувалася на педагогічному експерименті, що включав констатувальний, формувальний та контрольний етапи.

Результати. Проаналізовано теоретичні та методичні основи впровадження в освітнє середовище трирівневої педагогічної технології управління навчальним процесом в умовах підготовки майбутніх викладачів аграрних дисциплін у закладах вищої освіти. Запропоновано

прикладну модель управління навчальним процесом для підготовки майбутніх викладачів аграрних дисциплін на прикладі першого (бакалаврського) рівня освіти в умовах запровадження SMART-освітнього комунікативного середовища.

Визначено структуру сформованості готовності майбутніх викладачів аграрних дисциплін до професійної діяльності (мотиваційно-пізнавальний, практично-діяльнісний, творчо-розвивальний рівні).

Розглянуто технологічні етапи процесу професійної підготовки майбутніх викладачів аграрних дисциплін у закладах вищої освіти в контексті педагогічного досвіду Великобританії (мотиваційно-орієнтувальний, планувальний, пізнавально-перетворювальний, контроль-аналітичний, регульовально-розвивальний). Обґрунтовуються дидактичні методи, форми та засоби запропонованої педагогічної технології управління навчальним процесом.

Висновки. Результати експериментальної роботи засвідчили суттєве підвищення якісних показників професійної підготовки майбутніх викладачів аграрних дисциплін у закладах вищої освіти (умотивованість, творча активність, продуктивність) в умовах впровадження трирівневої педагогічної технології УНП.

Реалізація трирівневої педагогічної технології в системі управління навчальним процесом дозволяє активізувати творчу діяльність здобувачів, підвищити рівень їх внутрішньої мотивації, поглибити рівень самостійності та індивідуалізації навчання, що у підсумку визначається високим рівнем готовності до професійної педагогічної діяльності.

КЛЮЧОВІ СЛОВА: навчально-творча діяльність; управління навчальним процесом; професійна підготовка; викладачі аграрних дисциплін; трирівнева педагогічна технологія.

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