Final State Certification of Biprofessional Educational Programs Graduates in Russia: Building a Model

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The paper aims to improve the diagnostic procedures of the final state certification of university graduates studying the biprofessional content training program. The research purpose is to build and test a final state certification model of biprofessional educational programs graduates. The authors propose a functional final state certification model of biprofessional educational program graduates, which includes five blocks: (1) normative, (2) informative, (3) technological, (4) diagnostic, and (5) organizational-managerial. A graduate's competencies, the integrity and effectiveness of their training as a social procurement requirement are confirmed during the final state certification. Certification is a system-forming factor. The paper presents the state examination effectiveness results using automated control in complex interdisciplinary testing and competence-oriented tasks. The proposed model allows for more accurate and targeted diagnostics of the graduates' educational achievements at state examination during the final state certification.

Keywords: final state certification, interdisciplinary testing, professional education teacher, state exam, final attestation work, competence-based tasks and assignments, biprofessional training, industry component, pedagogical component, diploma design

INTRODUCTION

Final state certification aims to establish the level of students' preparation for professional task performance and the compliance of their training with the Federal State Educational Standard of Higher Education [FSES HE]. High-quality diagnostics can be provided only in the case of properly selected certification procedures (tools), which should consider the peculiarities of training additional education teachers and the nature of their future professional activities. The state certification results are determined by the state exam and the performance and defense of the graduation thesis as a certification procedure. They are designed to provide a reliable assessment of academic success, including graduates of biprofessional university programs. The state examination procedure (oral or written exam) is focused on

mono-specialties, and biprofessional programs require a change in approach. The approach needs changes due to the limited time and the impossibility to fully cover the exam content (several questions or written assignments). Using test methods, along with creative questions such as interdisciplinary competence-oriented tasks and assignments, allow covering compliance with the requirements of educational standards widely. This increases the validity of the final certification results and excludes the traditional assessments that reduce their objectivity and comparability (Akhmerova, Grebenshchikova, Razenkova & Umnov, 2018; Bronnikov, Golovachev, Roslyakova, Sukhodolova & Soloviev 2018). Statistical analysis of test results by comparing the test results of both individual students and study groups and streams allows to identify gaps in student training and, if necessary, develop a correction program for specific elements of its content (Dickinson & Rubidge, 1973).

MATERIALS AND METHODS

The research purpose is to develop and test the final state certification model of biprofessional educational programs graduates.

Research methods are the following:

- Analysis of the final state certification of university graduates organization (regulatory requirements, content, and technology of final certification state, diagnostic tools and features of organization and management);
- Educational design and modeling;
- Questioning;
- Expert assessment;
- Testing;
- Survey;
- An educational experiment.

Modeling and study of didactic conditions that would ensure the effectiveness of the final state certification of graduates of professional-pedagogical (biprofessional) educational programs are carried out by Pedagogics and Psychology Faculty of Russian State Agrarian University – Moscow Timiryazev Agricultural Academy.

RESULTS

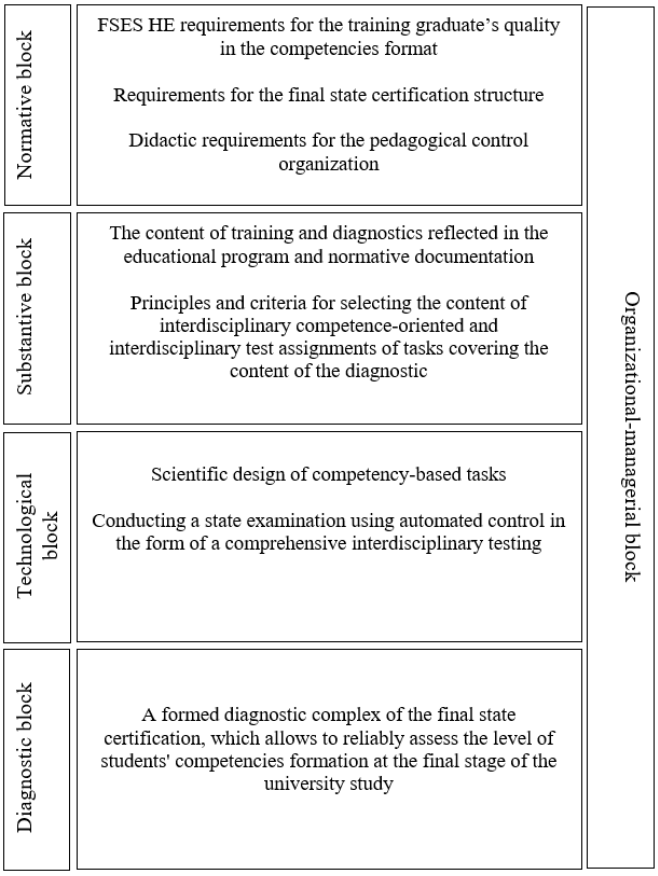
The study of complex pedagogical systems must be carried out by constructing their models, which are analogs of reality fragments (Rudinskiy, 2007; Schlosser, 1991). The model should have features similar to the original but not be identical. The model is a reflection of the investigated properties of a real object: structure and relationships between the elements of the original object. The authors develop a model of final state certification that meets the necessary criteria of the pedagogical model: (1) integrity – identified significant interdependencies between elements; (2) stability, implying reproducibility and manufacturability as the main features of the model; (3) observability, which implies the ability to trace and fix the key elements of the theoretical model in comparison with real analogs in the object under study; and (4) visibility – as a necessary and sufficient number of parameters to be included in the model.

The state's functional model, the final certification of biprofessional educational program graduates, includes five blocks: normative, substantive, technological, diagnostic, and organizational-managerial. The listed blocks are autonomous in their purpose, goals, structure, and content. However, they are mutually dependent and interconnected since they are implemented in a comprehensive manner in the general system of measures for the final state certification of higher educational institution graduates.

Each block includes certain components that have a methodological purpose. At the same time, social procurement determines the direction of the graduate's competency formation. It acts as a system-forming factor that ensures the integrity and effectiveness of the final state certification.

The proposed model of the final state certification of biprofessional educational programs graduates is designed using a systemic and competency-based approach. On their basis, the authors determine the system elements and conduct the analysis, which will contribute to the reliability of the diagnostic results using the declared certification procedures. The graphical model is in Figure 1.

FIGURE 1
MODEL OF THE FINAL STATE CERTIFICATION OF BIPROFESSIONAL EDUCATIONAL PROGRAMS GRADUATES



Normative block includes FSES HE regulatory requirements for training graduate's quality in the form of:

- Competencies;
- Requirements for the final state certification structure (preparation to pass and passing the state exam; performance and defense of the graduation thesis);
- Didactic requirements for the organization of pedagogical control, principles, criteria, and indicators of building a system of evaluation tools.

The criteria for completeness, reliability, validity, and the indicators of the completeness coefficients and didactic volume correlated with them allow assessing the diagnostic examination complex of the final state certification (Jones & Dages, 2003; Kokorich, 2006). As a system, competence-oriented tasks can meet the requirement of completeness if this system will reflect all types of professional activities and tasks listed in FSES HE and included in the complex of assessment tools. Its reliability characterizes the competence-oriented tasks system's ability to perform the required functions in the given pedagogical conditions. The correlation between the set of competencies formed in students and the system of competence-oriented tasks aimed at diagnosing them is valid.

Substantive block includes (1) program requirements (work programs of academic disciplines submitted for the state exam); (2) principles and criteria for selecting the content of interdisciplinary competence-oriented tasks; and (3) principles and criteria for selecting the content of interdisciplinary test items covering the content of the diagnostic. Among them are: (1) a systematic approach to the problem of the content selecting of educational achievement diagnostics; (2) the principle of double-entry of basic components into the system, reflecting the content of diagnostics in the form of discrete elements - apically, and the content of other elements - implicitly; (3) the principle of continuity of educational levels, etc.

The selection of the content of the competence-oriented tasks included in the diagnostic complex of graduates' final state certification should be carried out, relying on the following principles:

- Functional completeness (a set of competence-oriented tasks that should functionally reflect the entire list of professional tasks for which the graduate is preparing);
- Fundamentals (reflecting objective scientific facts, concepts, laws, and theories of a particular science highlight their historical aspects, modern achievements, and development prospects);
- Professional orientation of the content (modeling typical and non-standard situations of real professional activity).

Technological block includes a set of pedagogical actions for the scientific design of competence-oriented tasks and the precise implementation of the state examination process using complex interdisciplinary testing as an automated control.

The mechanism for designing a competence-oriented task system consists of sequential logically interrelated stages:

- Analytical and constructive (the goal is to determine the set of criterion competence-oriented tasks);
- Testing and implementing (to check the effectiveness of the developed system);
- Correctional-optimizing (to give an objective assessment of the tasks developed system).

Diagnostic block includes:

- A set of assessment tools and methods for diagnosing the level of mastering competencies according to the educational and program documentation requirements in the process of final state certification (state examination and defense of the graduation thesis);
- Development of examination diagnostic complexes for the final state certification (the complexes should include gnostic questions, competence-oriented tasks, and assignments).

During the research, the authors develop and test various diagnostic techniques that allow to comprehensively assess the preparedness level of graduates for professional activities (Shukshina, Zamkin & Burkanova, 2018).

Organizational-managerial block at the stage of graduates' final state certification aims to implement the training control function. Organizational-managerial block describes the interaction order between the educator and graduate while preparing and conducting the final state certification (forms competencies). The authors found that competency-based tasks can be seen as a leading tool that includes content, technology, and monitoring.

DISCUSSION

The application of the final state certification model for assessing students' academic achievements must meet the requirements of objectivity, comparability, validity, and, accordingly, the reliability of the results. This is crucial at the final stage of university studies – graduates' final state certification (Koznov, Malinov, Sokhransky & Novikova, 2009; McClelland, 1994). As shown above, the listed requirements can be primarily implemented by using an automated system for assessing students' academic achievements with the help of interdisciplinary testing and the use of competence-oriented tasks and tasks at the stage of the state examination.

Pedagogics and Psychology Faculty of professional education implement the state certification procedures of the future additional training teachers using test methods and competence-oriented tasks for

15 years. During this period, a large amount of statistical material has been accumulated, which confirms the legitimacy of automated control and competence-oriented tasks and tasks to assess graduates' level of educational achievement at the final stage of study university.

More than 1000 graduates participated in the study. Analysis of the accumulated data shows that interdisciplinary testing combined with a complex of professionally oriented tasks and assignments to assess the graduates' knowledge by state examination using the developed tasks can be compared with the results of intermediate control activities. These activities let us evaluate the students' achievements throughout the entire period of university study. As a result, we obtain data that properly reflect the real level of graduates' theoretical training, correlating them with the assessment according to the established scale. The authors can recommend this method for use in the state exam when conducting the graduates' final certification.

The use of competency-based tasks and assignments allow us to assess the corresponding groups of competencies. The number of solved tasks and assignments in the final didactic test indicates the formation level of the planned competencies among students. The success of solving problems and performing tasks is assessed using qualitative criteria: correctness of practical actions, exclusion of unnecessary operations, the time spent on solving the problem, and the corresponding indicators.

CONCLUSION

As a result of the research, the authors obtained empirical data that prove the timeliness and the importance of developing a final state certification model and a mechanism to design competence-oriented tasks. The obtained data makes it possible to supplement test questions and tasks to assess only the graduates' intellectual quality. In a complex, tests and tasks cover a much wider range of parameters, and to a greater extent, meet the requirements of diagnostic tools that are used in higher educational institutions as a component of diagnostic complexes for the final state certification of university graduates.

Analysis of the data accumulated in the study of the methods of state examination shows that along with the validity, objectivity, and comparability of the diagnostic results, the reliability of the assessment level and university graduates' training are ensured (confirmed by the calculations). The use of competence-oriented tasks allows expanding the diagnostic capabilities in assessing the level of formation of graduates' competencies.

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