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Принципы проектирования системы оценочных средств по образовательным программам модульной архитектуры в вузе

Образовательный процесс в российских вузах находится в состоянии динамичных изменений, связанных с обновлением федеральных государственных образовательных стандартов. В связи с этим академическое сообщество испытывает потребность в научно обоснованных оценочных средствах, которые позволяют оценить уровень подготовленности студента на различных этапах его профессиональной подготовки.

Цель данного исследования заключается в научном обосновании принципов проектирования системы оценочных средств по образовательным программам модульной архитектуры в условиях реализации компетентностного подхода в вузе.

Для достижения поставленной цели были использованы методы: а) теоретический анализ педагогической литературы и нормативных документов по проблеме исследования, б) анализ существующих практик в области разработки системы оценочных средств, в) обобщение прогрессивной практики использования педагогического проектирования оценочно-диагностических процедур модульной архитектуры коллективами ведущих вузов.

По результатам исследования выделены методологически обоснованные принципы проектирования системы оценочных средств по вузовским образовательным программам: целостности, гармонизации, адаптивности, междисциплинарности, ориентированности на конечный результат, коллективного субъекта, принцип обратной связи, прозрачности.

Ключевые слова: система оценочных средств, основная профессиональная образовательная программа, модульная архитектура образовательной программы, принципы педагогического проектирования

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Principles for designing a system of assessment tools for modular architecture educational programmes in higher education

The educational process in Russian higher education is in a state of dynamic changes associated with the updating of the Federal State Educational Standards. In this regard, the academic community needs scientifically based assessment tools that allow assessing the level of students' preparedness at various stages of their professional training.

The goal of this research is to scientifically substantiate the principles for designing a system of assessment tools for modular architecture educational programmes in the implementation of the competency-based approach in higher education.

To achieve this goal, the following methods were used: a) theoretical analysis of pedagogical literature and normative documents on the research problem, b) analysis of existing practices in the development of a system of assessment tools, c) generalisation of progressive practices in using pedagogical design of assessment and diagnostic procedures of modular architecture by teams of leading higher education institutions.

Based on the research results, the authors identify methodologically sound principles for designing a system of assessment tools for higher education programmes of integrity, harmonisation, adaptability, interdisciplinarity, focus on the outcome, the collective subject, the feedback principle, and transparency.

Key words: a system of assessment tools, basic professional educational programme, modular architecture of the educational programme, principles for pedagogical design

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Introduction

The urgency of the research problem is dictated, first and foremost, by the needs of society and the state, reflected in the "Concept of Long-Term Socio-Economic Development of the Russian Federation for the Period till 2020", which identifies the importance of "forming mechanisms for education quality assessment" (the fourth task) and in the "Concept of the Federal Target Program of Education Development for 2016-2020", where special attention is paid to the "qualitative state of the model and the tools for assessing the quality of education and educational outcomes".

The enacted Federal State Educational Standards of Higher Education (FSES HE 3++), which are based on the competency-based approach, coupled with professional standards (PS), set new guidelines in the design of basic professional educational programmes (BPEP):

- focusing on the educational outcomes, expressed in the language of competencies; involves an independent determination by higher education institutions (based on the requirements of the FSES HE, PS, selected training profile and requests of the regional labour sphere) of a set of competencies that reveal in detail the image of the BPEP graduate to his/her professional activity [1];
- variability of education, granting students the right to choose an individual trajectory of learning BPEP, taking into account their educational preferences and available opportunities; implies the rejection of the disciplinary approach in favour of a non-linear organisation of the educational process, and, accordingly, the transition to the modular BPEP format [2];
- linking theory with practice, activity and the gradual nature of the formation and the assessment of students' educational outcomes in conditions as close as possible to the professional ones; suggest a transition from traditional educational technologies and control methods to the modern quasi-professional ones, providing students an opportunity to be active, independently master and comprehend the acquired knowledge, skills and experience of professional activity: to participate in projects, solve contextual tasks, form a portfolio, reflect on one's achievements, show one's attitude, etc. [3].

Unfortunately, the FSES HE 3++ does not provide recommendations on how to create BPEP of a new type. The low practical experience of the academic community of higher education institutions in the field of designing competency-based modular architecture educational programmes and lack of development in pedagogical science of theoretical-methodological and technological bases of this activity at the higher education level make it difficult to transfer higher school to new standards of higher education.

In pedagogical science, there are theoretical prerequisites for studying the problems of designing pedagogical objects. Baidenko [4], Blinov [5], Lednev and Nikandrov [6] were engaged in searching for the conceptual basis for designing educational programmes of higher education. When designing competency-based educational programmes, researchers Smyshlyaeva, Evarovich and Malkova consider the adaptability principle as a theoretical basis, as well as the polysubjectivity principle, which involves active interaction of a student, a teacher, an employer, and other interested parties of the educational process [7; 8]. Yakovleva's studies are devoted to the design of innovative systems. The authors consider the principles of accessibility, optimality, realisability, flexibility and scientificity as

the conceptual core of design [9]. When designing the competency model of a specialist, Safontseva used the principles of openness and accessibility, goal setting, continuity, and technologisation [10].

Studying systems for evaluating the quality of professional training, Permyakov [11] considers the following principles as a basis for the development of these systems: the principles of interdisciplinarity, continuity, openness and transparency, scientificity, and the principle of focus on changing needs. Bushmakina's research has proved that when designing multi-level assessment tools, the design process must be built on the principles of student-centredness, diagnosticity, multifunctionality, and interactivity [12]. The assessment tools and procedures for assessing the level of students' competencies formation in Efremova's works are considered in detail [13].

The focus of researchers' attention is on the design of fundamentally new systems for monitoring and evaluating educational outcomes. Fomin suggests putting the integrity principle as a basis of design, as "including verification of indicators. Their complex characteristic gives a complete picture of the educational outcomes relevant to the goals and the objectives of the basic educational programme of the FSES HPE", and the interdisciplinarity principle, as "focusing on the use of new achievements in pedagogy, psychology, information technology, advanced organisational, methodological and technological experience in assessing educational outcomes" [14, p. 5].

However, many important aspects in the field of designing a system of assessment tools for modular architecture educational programmes remain poorly understood: the scientific knowledge of design principles that could serve as a methodological guideline for the academic community of a higher education institution in creating an authoring system of assessment tools taking into account the specifics of the subject area is fragmented.

The presented analysis of the current state of pedagogical theory and practice gives reason to put forward a purpose of this article, which is to scientifically substantiate the principles for designing a system of assessment tools in the context of modular construction of BPEP in implementing the competency-based approach in higher education.

The specifics of the object (its features, properties and functions assigned to it), the conditions for its creation (the environment and stakeholders) determined the choice of theoretical-methodological grounds for identifying and justifying the principles of its design.

Methods

As methodological guidelines were selected:

The system approach. Using the system approach to assessment, it is possible to minimise the difficulties associated with the development of authentic and reliable assessments, and thus positively affect the education quality. Unlike most studies in the field of assessment and quality of assessment, this thesis focuses on the holistic design of the assessment programme, rather than on individual methods and technologies for assessing the level of competency formation among students at higher education institutions [15]. Concepts and principles of the system approach aim at studying the system of assessment tools as an integral system, being considered as a set of structural elements, the relationship of which determines the integral properties of this set. However, the characteristic of the system of assessment tools is not determined by a simple summation of its structural elements; special importance is given to the system-

forming, integrative relations both between elements within the system and with other subsystems of the educational process as a whole [16].

The competency-based approach became a leitmotif of the process of education modernisation, the essential characteristic of which is that it focuses higher education on the acquisition and formation of competencies (as an expected educational outcome), expressed as the ability and readiness of graduates to demonstrate this in their future professional activities [17]. The activity-oriented nature of the educational process organisation will allow students to master the actions and activities that make up a set of specified competencies [18]. Another important characteristic of the competency-based approach is its focus on the interdisciplinary type of organisation of knowledge, activities and the overall educational environment. The competency, in this case, becomes interdisciplinary, as a set of different disciplinary knowledge, skills and abilities, combined with the most important personal qualities formed [19]. Formation technologies and techniques for assessing competencies impose certain obligations on designers of modular architecture educational programmes and systems of assessment tools. To assess the dynamics of formation and the competency formation, as an unstable characteristic, it is necessary to create innovative assessment tools that provide guarantees of quality assessment to ensure the possibility of comparing students' educational achievements throughout the world educational space [20].

The system of assessment tools, as "a pedagogical object, cannot be formed as a result of self-organisation; their creation and implementation in the real educational process require special actions, careful preparation" [9, p. 5]. So, the question of the possibility of anticipating representation of reality and the prediction of future changes based on pedagogical design is particularly acute.

The competency-based approach has become a stimulating factor in the process of introducing pedagogical design into educational practice. The rationale for using this technology to create a system of assessment tools is primarily dictated by the fact that:

- the activity is designed to investigate, anticipate and predict the challenges of society to future specialists, expressed in PS [21];
- this is a collective activity to create a ready-to-operate technological pedagogical object and its implementation programme (Zair-Bek, Kolesnikova, Gorchakova-Sibirskaya, Vishnyakova);
- the dominance of goals over the process and the interdisciplinary nature of design activities determine its use in creating a system of assessment tools for modular architecture educational programmes [22].

The humanitarian approach is a humanistic basis for designing a system of assessment tools of a new formation. The entire pedagogical system is a system of interaction and relationships of educational subjects, coloured by their personal characteristics, the level of professionalism and united by common values [23]. A characteristic feature of the design object is its human nature, which determines the choice of this methodological approach to identify its design principles. The humanitarian approach defines the design tactics and is reduced to describing and studying the conditions for functioning, as well as the features of interaction of pedagogical design subjects.

Pedagogical assessment involves new approaches to technologies that ensure achieving outcomes provided for by the FSES HE and the PS.

Results

The technology, developed by the authors, includes a universal mechanism for creating a system of assessment tools that reflects the specifics, functional characteristics, conditions for its creation and use, as well as the presence of internal and external links.

Below is a structural model for the principles of designing a system of assessment tools for modular architecture educational programmes in higher education, developed under the theoretical provisions discussed above. The authors have identified two groups of design principles. The first group is a basis, a fundamental requirement for developers when creating a system of assessment tools for modular architecture educational programmes. The second group of principles acts as a regulator of the process of creating a system of assessment tools.

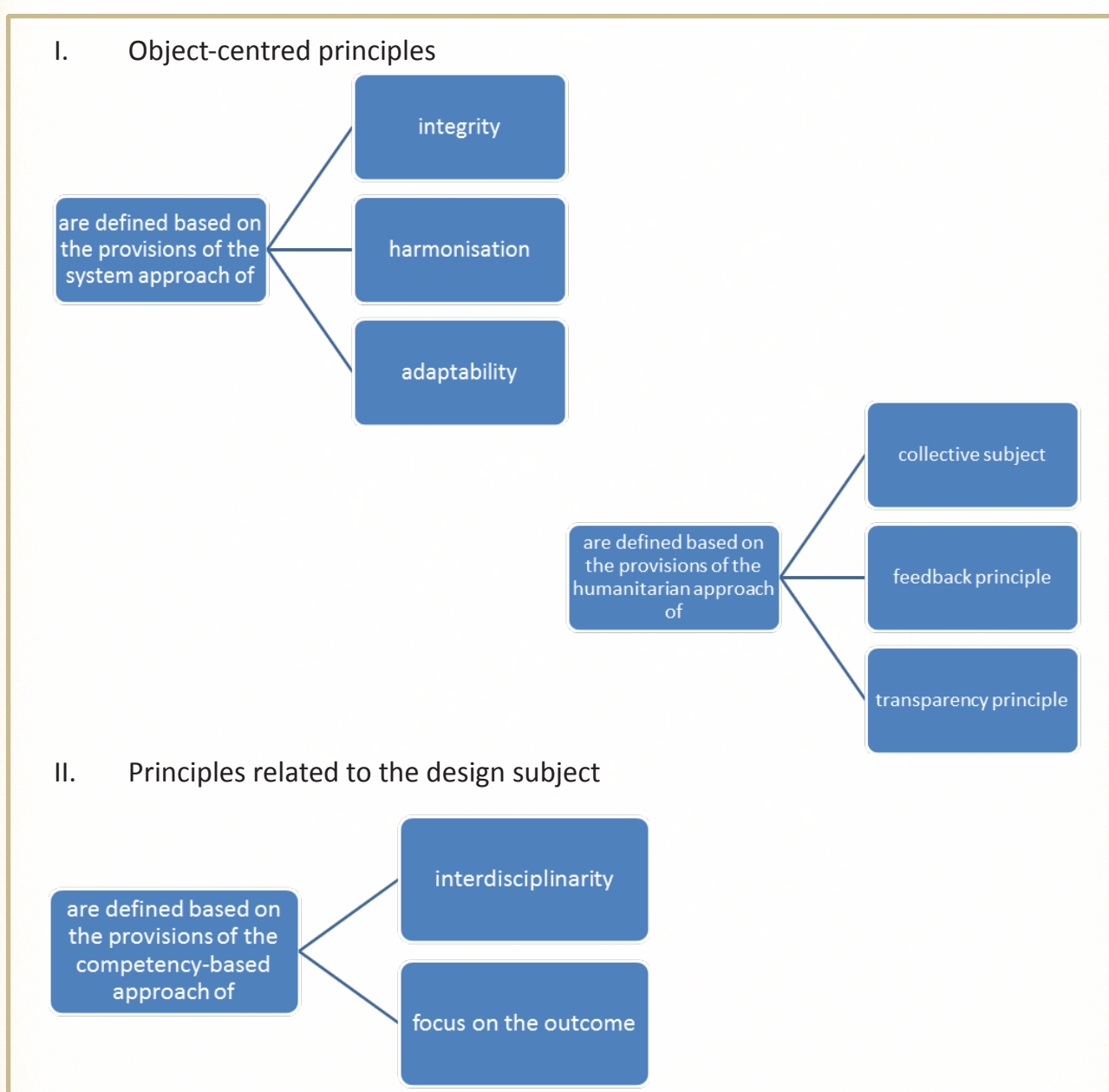


Figure 1 Structural model of the principles for designing a system of assessment tools for modular architecture educational programmes in higher education

The object-centred principles are a group of principles that reveal the features and endow with the parameters and characteristics assigned to the designed object. In turn, they serve as guidelines and postulates for designers when creating a system of assessment tools for modular architecture educational programmes in higher education.

The integrity principle involves considering a system of assessment tools as a holistic software package, since it is an integral component of the basic professional educational programme in higher education as a broader system, which, in turn, is part of an even broader system of professional training of specialists at higher educational institutions.

The harmonisation principle implies designing a system of assessment tools in full compliance with the requirements of the current FSES HE, PS, the requirements of the regional labour market, the requests of applicants and their parents. The created objective and authentic assessment procedures will allow creating a reliable base, based on which it will be possible to compare the outcomes of graduates' educational achievements at different universities not only in one country but also around the world for mutual recognition of diplomas and obtaining an opportunity to move freely in a single global educational space. It should be noted that all activities, envisaged in the project, should be provided with various types of resources necessary for their implementation – financial, informational, material, and labour [22].

The adaptability principle implies a systematic change in evaluation tactics. The system of assessment tools should be flexible, easily customisable and changeable for the rapidly changing requirements of society, the state (PS and FSES), employers and university students themselves. Continuous updating of the competency-based model, as a set of controlled educational content, formulation of results in the language of descriptors in the form of signs of competency development and selection of appropriate assessment technologies to determine the level of students' competency formation – this is the algorithm of the assessment tools system of a new format [20]. This principle can be effectively implemented using information and computer technologies. Researchers note that the moment has come to implement the system of assessment tools in the information space, multi-user mode, online access mode for each interested and authorised user [24].

The interdisciplinarity principle implies the creation of interdisciplinary-oriented tools for assessing a complex, integrated educational outcome (knowledge, skills, experience) obtained at the junction of several disciplines, included in the module [25]. First of all, the complexity of design is related to the multidimensional nature of the competency, i.e. when assessing learning outcomes, not only a wide range of knowledge, skills and abilities is covered, but also the ability to manifest them in activities, a personal attitude to the work being done. Second, the BPEP modular construction involves the organisation of interdisciplinary connections between the structural elements of each module: the selected disciplines, elective courses and practice, which together ensure the formation of the assigned educational outcomes of the module [2]. Resulting in one interdisciplinary exam, based on the outcomes of the module mastery, is the main serious problem, which should be provided for by the procedural and resulting funds of assessment tools [26].

The principle of result orientation suggests determining the correspondence between the expected learning outcomes and the demonstrated educational achievements of students through appropriate assessment procedures. The competency-based approach, as a new educational strategy, makes significant adjustments, in particular, in the evaluation activities at higher education institutions. By focusing on learning outcomes and defining them as a tool for reforming the educational content, the requirements for their description

and achievement are increased. The educational outcomes, as a means of expressing competencies, are formed gradually and therefore, in the system of assessment tools, it is necessary to provide an assessment of the accumulated experience (knowledge, skills, etc.), formed by students individually. The assessment is integrated into the teaching/learning process and includes a continuous, cumulative collection of information to form an idea of the achievement of the stated and expected educational outcomes for both students and teachers [27].

Principles related to the design subject are a group of principles that act as rules for managing the design process of a system of assessment tools, ensure coordinated activities of all subjects of the educational process, proactive management and consideration of external and internal factors affecting the design object.

The collective subject principle assumes joint and coordinated work of pedagogical collectives at higher education institutions, since the specificity of the design object is determined not only by the goals of its creation but also by the value orientations of the pedagogical process subjects. The humanely-oriented nature of pedagogical design regulates designers' activities, makes the mechanism they create for evaluating students' educational achievements unique, which is expressed by a certain set of tools, forms, and methods for assessment procedures. The choice of assessment tools or their combination is determined primarily by the competency being formed (its structural element). The next task of this research is to develop methodological recommendations for coordinating the assessment tool and the educational outcome. The modular nature of BPEP constructing implies the integration of disciplines common in content into relatively autonomous structural elements that develop and form certain groups of competencies [2]. The specifics of this architecture of the educational programme and the system of assessment tools, as part of it, dictates the need to unite all participants in the pedagogical process in a single academic community, based on the principles of a common goal and value orientations aimed at improving the quality of future specialists' training. It will ensure constructive and effective interaction for the task implementation. A distinctive feature of this community called a "collective subject" is the conduct (maintenance and management) of joint active scientific-pedagogical activities aimed at solving problems to improve the quality of students' professional training. The formation of such a community will stimulate and motivate subjects of the educational process to solve professional and pedagogical tasks in the control and assessment activities, to use a professional and creative approach [28]. To develop an interaction culture, it is necessary to use institutionalised mechanisms to ensure it (active participation of the university administration to create conditions for such activities) [29].

The feedback principle suggests creating a "live" feedback system both at the organisation level (generating internal feedback) and with external stakeholders in the educational process. "Feedback is information about the gap between the actual level and the reference level; this is a system parameter that is used to change the gap in some way" [30, p. 4]. "Feedback is information about what people think about goals, standards, and criteria (of learning and performance) and how all participants in the educational process relate to this" [31]. An important attribute of this principle is that information does not become "feedback" if it is not provided in a system that can use this information to influence future results. The peculiarity of the "feedback" definition is that information is considered as feedback only when it is used to change the current situation. If information is simply recorded and passed on to a third party who lacks the knowledge or authority to change the result to lead to appropriate actions, this is ineffective feedback [32].

Using the feedback system makes it possible to strictly focus on the assessment strategies used to achieve the goal; manage resources; quickly respond to changes, external influences; expand the capabilities of teachers, students, and employers when designing the feedback system [33]. Designing the feedback system should not and cannot fall solely on teachers' shoulders. Coordination with representatives of the labour market of the model of a future graduate, criteria and methods for assessing the achieved learning outcomes, testing the selected assessment methods (and this can also be training technologies) directly at the workplace are key to success in creating a mechanism for evaluating the level of students' competency formation [34].

However, one should not forget that students should also play a central and active role at all stages of education, at every stage. During the design process, students will be oriented towards learning goals, which will allow them to define their learning strategies, form a conscious attitude towards learning outcomes, and build an individual learning route, which will lead to an increase in the effectiveness of the educational system as a whole [35]. A "by-product" of students' participation in this interaction is the monitoring of their learning outcomes, the ability to evaluate the achievement of expected goals and regulate this process.

The transparency principle implies creating an environment of clarity and understanding for all participants in the assessment process. Designing a system of assessment tools, as one of the tasks, the solution of which is aimed at improving the education quality, requires the accumulation of forces not only of teachers, but also of university administrations, heads of municipal and federal institutions in the educational sphere, and employers' unions. The implementation of this principle ensures the openness of the entire assessment cycle. For example, students should know the assessment purpose, the type of assessment activity and the method, and be familiar with the criteria and conditions for assessment procedures to be able to adjust their learning activities accordingly. This also applies to teachers and/or evaluators (employers, independent experts) who need to know and understand the entire assessment system in order to be ready for their roles as an evaluator [15].

The closeness of the process of designing assessment tool systems and its excessive individualisation is an obstacle to improving the quality of the assessment culture and does not allow for the active participation of all stakeholders in this process [36].

Conclusions

In conclusion, it should be noted that the result of this research is the justification of the optimal set of principles for designing a system of assessment tools for the basic modular architecture educational programmes in higher education, which:

- will allow designing a complete system of assessment tools for the BPEP in higher education, which provides an opportunity to conduct an interdisciplinary comprehensive assessment of learning outcomes, the process of developing competencies and levels of their formation in students at various stages of mastering the educational programme;
- will ensure the creation of a universal assessment mechanism adapted to the needs and requirements of the educational process subjects;
- will significantly reduce the number of errors of teachers-developers through collective discussion;

- will create conditions for the development and use of reliable assessment tools for assessing complex competencies;
- will facilitate students' involvement in the development of assessment procedures.

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