

# Experience in designing a system for monitoring and assessing the results of vocational education of a future educator at a university

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**Abstract.** In the modern system of higher vocational education, special attention is paid to modernizing approaches to building the educational process, changing the system of monitoring and assessing the results of students' vocational training. Scholars and practitioners pay special attention to identifying opportunities for self-development of students, including within the framework of assessment activities [1, 2, 3, 4, 5]. At the same time, the emphasis is shifted to the need to choose assessment tools that contribute to the reflective assessment of students' achievements in educational activities, building their own educational route in mastering the necessary competencies. The paper shows the problematic nature of solving the problem under consideration in the direction of substantiating conceptual approaches to the organization of control as a function of managing the vocational training of future educators, choosing the forms and methods of monitoring and assessing educational activities. The purpose of the paper is to show conceptual approaches and their practical application in the organization of control and assessing the results of the educational activities of future educators. Based on the experience of their own professional activities in the preparation of future preschool teachers and supplementary education teachers, the authors have shown the design system of assessment tools, demonstrated conceptual approaches to solving this problem.

## 1 Introduction

One of the most important functions of the organization of control at the university is its developmental nature, manifested in the ability, through assessment and self-assessment, on the basis of precisely defined standards, to determine the student's gaps in his/her knowledge and skills necessary to solve the problems of future professional activity and to build an individual trajectory of his/her self-development. Analysis of modern psychological and pedagogical literature shows the complexity and ambiguity of solving the problem of assessing the formation of competencies within the framework of the

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organization of training at a university [6, 7, 8]. At the same time, the researchers point to the multidimensionality of the characteristics of the competencies that should be formed in the future educator, the ambiguity in the use of diagnostic tools, difficulties in the design of indicators and assessment levels.

In the system of modern vocational education, a wide variety of means and methods of control and assessment, both quite traditional for the teacher (tests, surveys, individual and group control tasks, solving practical problems, etc.), and those that have innovative educational potential to evaluate the quality of educational results (case studies, project tasks, portfolios, competence-oriented tasks, etc.), are used in the preparation of future educators. Authors dealing with the development of assessment tools pay special attention to identifying the requirements for their design [9]. In particular, these include the validity of the assessment tool (compliance of the assessment methods with the planned results), objectivity (the scientific validity of the assessment tools, the validity of criteria, indicators, scales and assessment levels), and the openness of the assessment procedure (the availability of criteria for assessing their educational activities to students).

## **2 Materials and methods**

### Research methods

Theoretical analysis of sources; a mass survey of university lecturers (the stage of formulating the problem (78 lecturers)).

### Experimental research base

The main research methods have been tested on the basis of Surgut State Pedagogical University; the study has involved lecturers of the Faculty of Psychology and Pedagogy, the Department of Psychology, Theory and Methods of Preschool and Primary Education, Special and Pedagogical Education. The pilot survey period is 2020-2021.

## **3 Results and discussion**

The main purpose of designing of assessment tools based on the requirements of the Federal State Educational Standard of Higher Education 3++ is to activate the possibilities of professional self-development of students and building an individual growth path in mastering the necessary set of competencies [10]. This provision was taken into account when building the concept of organizing vocational training of students at Surgut State Pedagogical University at the Bachelor's level. Let us consider the experience of designing a system for monitoring and assessing the educational activities of Bachelors in more detail on the example of the implementation of the training direction 44.03.05 Pedagogical Education (with two training profiles), the direction of Preschool Education and Supplementary Education.

In order to identify the experience of using assessment tools and the nature of the difficulties faced by university lecturers in their design, a diagnostic study has been carried out, in which 78 university lecturers took part.

As the analysis of the data obtained has shown, all assessment tools used by educators in the process of assessing educational results can be conditionally divided into two large groups: traditional and demonstration. As traditional assessment tools, respondents noted an individual interview (100%), written tests (98%), working with concepts (91%), solving test problems (90%), colloquium (57%), and dispute (17%). These forms of assessment tools, as noted by the respondents, are applicable in cases when it is necessary to evaluate the level of formation of the cognitive component of competencies.

Demonstration forms of assessment tools are aimed at identifying the level of formation of practical skills and abilities of future educators. As the most frequently used forms, respondents noted complex practical tasks (98%), the use of cases (52%), development and defense of projects (50%), individual creative tasks (57%), business (18%), imitation (14%) and role-playing (20%) games, research papers (article) (31%), practice-oriented tasks (100%), preparation and defense of a portfolio (34%). These forms of assessment tools are often used in subjects of a methodological plan, which makes it possible to evaluate the level of formation of specific competencies.

The main difficulty that educators face when designing assessment tools is the desire to abandon static assessments of the competence formation level at the time of measurement and to move to a dynamic assessment of the preparedness of future educators for professional activity. Consequently, educators are aware of the need to evaluate the educational result not here and now, but the desire to see the result in the form of the dynamics of the increase in the level of competence formation, taking into account the subjects mastered by students.

The results of the educators' survey have shown that most of them use traditional means of monitoring and assessing the educational achievements of students. Preference is given to individual surveys, answers to pre-asked questions, tests, module tests. However, in this case, it is rather difficult to determine the degree of a student involvement in the educational process, the effectiveness of his/her training, focus on self-development and self-improvement in the field of his/her future professional activity.

Therefore, when building a system for monitoring and assessing the results of students' educational activities, it was taken into account that in the modern educational paradigm, priority should be given to expert means of monitoring students' progress. These include:

- continuous assessment—self-assessment of the results of solving educational problems accompanied by the educator's assessment, highlighting the strengths of the assignment and the mistakes and inaccuracies made with possible ways to eliminate them;
- summative assessment—self-certification of students and external expert assessment of a lecturer aimed at enhancing self-improvement in the field of future professional activities, at professional self-development.

The need to switch to the standards of the Federal State Educational Standard of Higher Education 3++ in the preparation of Bachelors determined the need for the design of all the constituent components of the main educational program, including the funds of assessment tools. The main tasks were set as follows:

- definition of conceptual approaches to structuring the fund of assessment tools;
- selection of technologies for the development of specific assessment tools to assess the students' educational results.

The methodological basis for designing a system for monitoring and assessing the results of vocational training of students was the scientific theory of V.S. Lazarev built on the basis of the principles of the activity approach to learning [11, 12]. The author has developed an activity-based definition of the concept of competence, which is considered as a functional system of the psyche that provides a person with the ability to solve problems of a certain type at the level of requirements for their solution. An important statement is that to form competence means to form an appropriate functional system of the psyche as a holistic, integrative education that will allow solving certain types of problems.

V.S. Lazarev's fundamental research reveals scientific provisions on the essence of competence and its component composition, which consists in the fact that all the components of a method for solving a problem (including a professional one) should be combined into an integral functional system. At the same time, the main components in this system are as follows: knowledge (cognitive), orientational, operational, and experience. According to the author, the developed system can be implemented only in the conditions

of activity, where the content of each of the components of competence identified by the author constitutes an integral complex. Following the author's characteristics, the knowledge (cognitive) component of the competence should be a complex of knowledge, the possession of which is required by the subject to solve the selected type of tasks; the orientational component provides for ways to formulate, to plan an implemented solution, and to assess the results obtained; the operational component is provided by defining methods to perform the required actions; the experience is a component of competence, due to which all components are integrated into the way of solving problems of the selected type.

When developing the main educational program for the training of future educators of preschool and supplementary education within the framework of a two-profile Bachelor's program, in accordance with the requirements of the Federal State Educational Standard of Higher Education 3++, pedagogical and project activities, which determined the direction of professional training of students, have been chosen as the main ones. The types of tasks of professional activity (pedagogical, project) are associated with the formation of appropriate competencies in students. So, under the pedagogical activity, it is assumed the formation of the competence CTP-1 (classical training program) (capable of training in an educational program based on the use of modern approaches and educational technologies) and CTP-2 (capable of carrying out targeted educational activities), which consist of an appropriate set indicators of achievement of components of professional competence (cognitive, operational, orientational, and experience). The project type of activity is directly related to the competence of CTP-3 (the ability to design the organization of the educational process in the subject, the content of academic subjects, educational outcomes, individual educational routes, and the trajectory of professional growth).

The control matrix of the formed competence consists of a number of tasks aimed at: setting a learning goal, selecting methods and teaching aids for the corresponding program, implementing actions and assessing the quality of training in an educational program based on the use of modern approaches and educational technologies.

The solution of each task involves the formation of the appropriate amount of knowledge in Bachelors, necessary to complete the task, the definition of requirements for the result of solving the task and the sequential steps for its implementation. So, for example, in the formation of professional competence CTP-1 for solving such a problem as "selection of methods and means of teaching in educational programs based on the use of modern approaches and educational technologies", a student in the course of theoretical training in subjects can master the essential characteristics of modern methods and means of teaching (including conditions of use, requirements for use) (cognitive and orientational components of competence). Within the framework of practical training, students master the sequential steps to solve the problem: assessing the conditions of educational activity, in accordance with the set goal, choosing the appropriate methods and means of teaching, as well as self-assessing this choice (operational component and experience). Accordingly, the competence control matrix allows seeing a holistic picture of the action being formed and the content of the knowledge, orientational, and operational component.

Let us give as an example the design of a control system for substantive practice (for expressive reading), which is carried out in the first year of students' education. In order to assess the results of the formation of competencies in educational subject-content practice (expressive reading), an assessment form has been built. The first part of the form consists of a generalized model of controlled competencies with an indication of the list of subjects (practices) involved in their formation. The second part—a functional map of this practice type—includes components of competencies (knowledge, orientational, operational, and experience), the indicators of which are subject to assessment. The third part is a detailed control model that allows seeing the tasks being solved within a specific competence;

relevant knowledge, actions (steps), methods, types of control, and assessment tools. And, finally, the fourth criterion-assessment part contains an algorithm for assessing the level of achievement of educational results.

Let us consider the technology of developing specific assessment tools for assessing the educational results of students in this type of practice. The developed assessment form should be aimed at checking the development of the CTP-1 competence: the ability to carry out training in an educational program based on the use of modern approaches and educational technologies. First of all, the model of controlled competence allows seeing the subjects (practices) of the curriculum, the content of which is aimed at the formation and assessment of this competence.

In the functional map of educational practice in expressive reading, indicators are highlighted that serve as the basis for assessing educational results. So, as indicators of competence CTP-1 are two components—operational and experience. The indicators for assessing the operational component are: the ability to design the content of the taught subject in accordance with the requirements of the Federal State Educational Standard, MC, and the achievements of science and pedagogical practice, to plan educational activities in educational programs; the ability to implement educational activities based on modern educational technologies for educational programs.

In accordance with the selected tasks, the control model defines the sequence of student actions to solve the task, the methods used, the types of control, and the corresponding assessment tools (see Table 1.)

**Table 1.** Control model for educational subject-content practice for expressive reading

Task	Actions (stages)	Control type / assessment tool	Methods	Control type / assessment tool
CTP-1 Selection of teaching methods and means for PEO and SE educational programs based on the use of modern approaches and educational technologies	1. Assessment of the conditions of educational activity, in accordance with the set goal—age characteristics, the requirements of regulatory documents, the possibilities (limitations) of methods and means for a reasoned justification for the choice of appropriate methods and teaching aids. Determination of criteria for the selection of literary works for reading to preschool children. 2. Selection of appropriate teaching methods and tools. The study of age characteristics of the perception of literary works in children of younger, middle, senior preschool age. Compilation of a list of recommended literature for children of different age groups. 3. Self-assessment of activities for the selection of methods and means of teaching. Self-analysis of selected literature.	Interim assessment / Diary / List of recommended literature for children of different age groups / Selection criteria for literary works / Self-analysis	Methods of analysis and assessment of the conditions for organizing the educational process	Interim assessment / Diary / List of recommended literature for children of different age groups / Selection criteria for literary works / Self-analysis

Thus, the methodological provisions of the considered concept, the establishment of a system of interconnection: type of professional activity – task – competence – components of competence – became the basis for constructing a system of assessment tools within the framework of monitoring the students’ educational activities.

In this case, assessment tools are understood as a specially constructed form of presentation of control measures, consisting of a number of components. The first one includes a methodological description of the assessment tool, its purpose, objects of assessment, implementation features in the educational process. The second element is the immediate assessment task. The third element reveals the criteria, scales, and levels of assessment based on them. The designed assessment tools allow identifying the dynamics

of students' professional self-development based on determining the level of formation of the necessary components of competencies.

We will show the considered provisions on the example of specific subjects included in the curriculum for training Bachelors—future preschool teachers and supplementary education teachers. Thus, under the subject “Theory and Methods of Mathematical Development of Preschool Children”, students master one of the main professional competencies—the ability to organize and to assess various activities of preschool children aimed at their mathematical development (PC-1). We will correlate this competence with the labor actions indicated in the Occupational Standard for an educator in order to determine professional tasks that should be solved by an educator. In the Occupational Standard of an educator, this competence corresponds to the following labor action: “the organization of activities carried out in early and preschool age: subject, cognitive-research, games (role-playing, directorial, with a rule), productive; designing, creating ample opportunities for the development of free play for children, including providing play time and space. Organization of constructive interaction of children in different types of activities, creating conditions for children to freely choose activities, participants in joint activities, materials” [13]. Thus, for the implementation of this labor action, the future educator needs to learn how to solve the following professional tasks:

- to set goals for organizing various activities of preschool children aimed at their mathematical development;
- to choose the forms and methods of organizing various types of activities for children;
- to carry out actions aimed at organizing various types of activities for children;
- to assess the quality of the organization of various types of activities.

Each of these professional tasks requires the student to possess certain knowledge, skills, and abilities that allow him/her to perform certain actions aimed at solving a professional problem.

Let us give an example of an assessment tool aimed at assessing the formation of the components of the PC-1 competence.

*Part 1. Organizational and methodological*

The developed assessment form is aimed at controlling the formation of the ability to set goals for organizing various activities of preschool children aimed at their mathematical development.

Components of the PC-1 competence assessed:

- knowledge of modern requirements for the organization of various types of activities of preschool children reflected in the regulatory documentation;
- the ability to determine the results of the organization of various types of activities of preschool children based on the study of regulatory documents, assessment of the conditions for their organization;
- the ability to formulate the goals of organizing various types of activities for children and to self-assess activities to set goals and to achieve its result.

*Part 2. Substantial*

*Exercise 1.Fill in the table*

**Table 2.** Activities aimed at the mathematical development of preschool children

Activities	Activity potential in the development of mathematical representations	Methods and techniques used in organizing this activity
Play		
Communicative		
Cognitive-research		

**Table 2.** Continued

Reading fiction		
Constructive		
Visual		
Labor		
Musical		

Exercise 2. Suggest a project for organizing a corner of entertaining mathematics (games store) for children of one of the age groups of the kindergarten. The project can be implemented in the form of a diagram with the attachment of an explanatory note, including a justification for the need for the proposed sets of games and materials, their compliance with the age characteristics of children. Indicate the ways of organizing various cognitive activities of children in the games store, methods of activating it. Identify possible ways of self-organization of children for the implementation of independent mathematical activities.

*Part 3. Criteria-evaluative.*

**Table 3.** Criteria for assessing the performance of tasks

Tasks	Indicators	Assessment criteria
Completion tables	<i>The presence in the answer of the definition of concepts, characteristics, methods, and techniques for organizing activities, assessment criteria (effectiveness and efficiency), the presence of examples of use, presentation of experience (own or based on psychological and pedagogical literature).</i>	9-10 points—the student demonstrates the full range of actions (high level)—the main points of the content on this question are reflected—concepts, characteristics, methods, assessment criteria (effectiveness and efficiency), examples. The material is presented in a professional language using the appropriate system of concepts and terms; 7-8 points—the student demonstrates an incomplete set of actions (intermediate level), makes some mistakes (no more than 2 components). The material is presented in a professional language using the appropriate system of concepts and terms; 5-6 points—the student demonstrates a low level of mastering the content, only some points (but not less than 3) are reflected that reveal the content of the question—concepts, characteristics, methods, assessment criteria (effectiveness and efficiency), examples. The material is presented in a professional language using the appropriate system of concepts and terms; less than 5 points—only individual components of the question content are presented; 0 points – no answer.
The project of organizing a corner of entertaining mathematics (games store) for children of one of the age groups of the kindergarten	The presence of mandatory components in the project—justification of the need for the proposed sets of games and materials, their compliance with the age characteristics of children; determination of ways of organizing various types of activities of children in the games store, methods of activating it; determination of possible ways of self-organization of children for the implementation of independent mathematical activity.	9-10 points—the student demonstrates the full range of actions (high level)—the need for the proposed sets of games and materials, their compliance with the age characteristics of children are justified; ways of organizing various cognitive activities of children in the games store, methods of activating it are shown; possible ways of self-organization of children for the implementation of independent mathematical activity are determined; 7-8 points—the student demonstrates an incomplete set of actions (intermediate level), makes some mistakes (no more than 2 components); 5-6 points—the student demonstrates a low level of mastering the content, only some points (but not less than 3) are reflected that reveal the content of the question; less than 5 points—only individual components of the question content are presented; 0 points – no answer.

Thus, this assessment tool makes it possible to holistically assess the level of formation of the three components of the PC-1 competence—knowledge, orientational and operational, and to reveal the students' possession of a specific professional task.

## 4 Conclusions

The approbation of the designed system for monitoring and evaluating the results of students' educational activities in the vocational training system of Bachelors has shown that in the practice of using assessment tools, priority should be given to diagnosing the quality of the created conditions of vocational education and identifying the effectiveness of the results of professional self-development of the future educator, manifested in the level of formation of the necessary competencies. At the same time, one of the main indicators of assessment is the dynamics of student growth in professional self-education. The final result of monitoring and assessing the quality of the vocational training process of a future educator should be the achievement by each student of the growth of individual and educational results in mastering the necessary set of competencies indicated in the requirements of the Federal State Educational Standard of Higher Education 3<sup>++</sup>. A lecturer who aims at the professional self-development of a student should give priority to systemically constructed assessment tools, including: a description of the well-defined results of assessing the components of professional competence (knowledge, orientational, operational, experience); control tasks to identify the level of formation of the corresponding components; valid rating scales, multi-point peer review system. The use of assessment tools in the practice of lecturers of Surgut State Pedagogical University both in their own assessment activities and in the organization of mutual assessment and self-assessment by students of the quality of academic assignments, made it possible to achieve the necessary results in mastering the relevant components of the competencies by future educators.

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