

PalArch's Journal of Archaeology
of Egypt / Egyptology

MODELING THE RESULTS AND MECHANISMS OF PROFESSIONAL
EDUCATION IN AN ORGANIZATION OF VOCATIONAL EDUCATION
AND TRAINING

Galina B. Golub¹, Natalia Yu. Postalyuk², Viktoria A. Prudnikova³, Irina S. Fishman⁴,

¹Leading researcher, PhD in Historical sciences,

²Head researcher, Grand PhD in Education, PhD in Education, leading researcher, PhD in
Education,

³Samara branch of the Russian Presidential Academy of National Economy and Public
Administration

⁴Samara, Maslennikovprospekt

E-mail: ¹golub-gb@ranepa.ru, ²postalyuk-ny@ranepa.ru, ³prudnikova-va@ranepa.ru
⁴fishman-is@ranepa.ru

**Galina B. Golub, Natalia Yu. Postalyuk, Viktoria A. Prudnikova, Irina S. Fishman.
Modeling The Results And Mechanisms Of Professional Education In An Organization
Of Vocational Education And Training-- Palarch's Journal Of Archaeology Of
Egypt/Egyptology 17(10), 1928-1943. ISSN 1567-214x**

**Keywords: Professionally Significant Personality Traits, Professional Education,
Practical Experience, Key(Universal)Competencies, Transversal Competencies**

ABSTRACT

The relevance of the study is due to the changed parameters of the life of society and the professional and labor activity of people. New challenges of uncertainty and unpredictability of development require the modernization of the system of professional education (upbringing) in educational institutions in order to orient it towards ensuring the adaptability of specialists, the development of their ability to transform personal resources and career strategies in response to changes in the external environment.

In this regard, this article summarizes the outcome of modeling the results and mechanisms of professional education (upbringing) in the context of changing requirements for professionally significant personality traits and increasing the value of general civil education in the activities of a vocational educational organization.

The study uses a set of methods of the abstract theoretical and empirical level, including modeling and design, interviewing specialists in the field of recruitment and content analysis of job advertisements, the semantic differential method, the ranking method (in the technique of rank lattices), the method of repertoire lattices by J. Kelly et al.

The article presents a worked out and practice proven model of the results of professional education (upbringing) of students of vocational educational organizations, based on the hierarchy of professionally significant qualities of an employee. The model integrates general civic value attitudes into the structure of the results of professional education (upbringing). The core structure of the results model is such qualities as the ability for conscious self-regulation and self-analysis (reflection). Professional education is considered as a process of forming a set of situations in which a student receives and analyzes the required practical experience. The model consolidates the diversification of the process of professional education (upbringing) in accordance with individual interests and inclinations, professional and life plans of students at the level of ways of forming educational results with the invariance of the educational results themselves; customization of promotions and activities; inclusion of the resources of the external (non-educational) environment in the education (upbringing) process.

The materials of the article are of practical value for researchers of professionally significant personality traits and patterns of their formation, as well as practitioners who organize and accompany the processes of professional education (upbringing) in educational institutions of vocational education and training.

Financing

The paper was prepared as part of the state task of the RANEP for 2020 research 'Development of approaches to the formation of a result-oriented professional education (upbringing) system in an educational organization '.

INTRODUCTION

The amendments to the law 'On education in the Russian Federation' dated July 31, 2020 about students indicates an increase in the importance of young people adopting values that define the personality of a citizen and unite society for modern Russia [1].

The actualization of the tasks of general civic education allows reviewing the goal setting and content of private areas of education, primarily professional education, in the context of the current situation.

The concept of professional education is interpreted as the process of forming professionally significant personal traits that are individual properties of the subject of activity, necessary and sufficient for its implementation at a standard level, and that correlate with at least one of its main efficiency parameters (quality, productivity, reliability) [2].

Today, in the content of professional education, the emphasis shifts on the "self" of the student, their subjective positions towards professional values. The tasks of professional education are called the development of readiness for efficient self-knowledge and self-development, the ability to self-realization, identification with the future profession, its activity forms, values, traditions, social and personal meanings.

The evolution of the concept allows to record the transition from the position of 'profession in a person', which reflects the purposeful formation of professionally significant traits to be more successful in a certain socio-professional role, to the status of a 'unique person' in the profession. This status implies the prospect of constantly changing the social and professional positions in accordance with external challenges, personal values and project goals. This evolution is determined by changes in technological and social reality. It is expressed in the fundamental uncertainty of society and the economy and the unpredictability of trends and rates of modernization, as well as the increasing complexity of the environment both in terms of composition and in the variability and mutual influence of components. The rate of de-standardization of employment is increasing. Radical shifts in job requirements around the world in 2019 are recorded in the World bank report 'Changes in the nature of work' [3; 4]. Employers place increasing demands on universal competencies (key skills) in the structure of employees readiness for professional activity [5; 6].

These changes are a challenge that the vocational education system does not yet have adequate tools and procedures to respond to. The external request is not currently translated into a set of internal tasks for which the system could develop adequate mechanisms. Therefore, the purpose of this study was to model the results and mechanisms of professional education in the context of changing requirements for professionally significant traits, and increasing the importance of general civil education in the activities of professional educational organizations.

MATERIALS AND METHODS

The methodological approach used in this study is based on modeling the system of professional education in an educational organization and is based on the concept of G. Hofstede [7].

Modeling the results of professional education goals to establish a junction point between the professionally important traits and socially significant values declaratively designated in society on the one hand, and educational results known in modern pedagogy on the other hand. The latter is important because it allows identifying technologies for generating educational results and ways to evaluate them. In other words, to translate a declarative request into a format that allows managing the process of its satisfaction and the output of this process – educational results. In addition, the identification of the type of educational result makes it possible to involve into active forming

experimentation and consideration the educational technologies with proved adequacy to the specifics of the type of educational result.

An original diagnostic tool was used to study employers' requests for professionally significant traits; it included interviewing specialists in recruitment and content analysis of job ads. The deconstruction of images of ideal employees in the representations of employers for employment was based on measuring the significance of these qualities (ranking) using rank grids [8].

Resolution of matching theoretical constructions and subjective perceptions in everyday representations used 'identified' constructions from job ads and conversations with recruiters to present them to respondents. To avoid an inadequate understanding of the proposed terms, the table for the semantic differential also included constructions articulated in similar formulations. Thus, diagnostic scales are super ordinate constructions [8] that are quite generalized and understandable not only for employers but also for researchers, and at the same time are used (given meaning) among employers and job seekers.

The basis for compiling a list of professionally significant qualities to conduct a survey of requests was the requirements of employers in job ads regarding wide variety of professions and positions (jobs). These requirements considered as bipolar constructions became the initial points (constructions), which are further reconstructed in the technique of repertory grids by J. Kelly. To build the profiles of professionally significant traits for professions (groups of professions), which are offered to professional educational organizations as a starting point for planning the results of the education system, this study used comparisons of average values of indicators on scales.

LITERATURE REVIEW

Research problems of professionally significant traits that determine the efficiency of labor activity have been the subject of research by a number of Russian and foreign specialists, especially in recent decades [2; 5; 9]. Experts of the Partnership for 21st Century Skills created the concept of 'XXI century skills' [6].

In 2006, the recommendations of the European Parliament identified eight key competencies that should be mastered throughout life, as well as the knowledge, skills and behaviors that provide resources for mastering these key competencies. The document contains seven fundamental cross-cutting topics that are the basis for today's recognized transversal competencies. These are the ability to solve problems and make decisions, critical thinking, risk assessment, sufficient control over feelings, creativity, and initiative [10].

In recent years, transversal (cross-cutting/global) competencies have become an independent topic of research in education and are increasingly distinguished from the general list of relevant educational results. According

to experts of the European Union and ESCQO (European Skills, Competencies, Qualifications and Occupations), transversal or global competencies are the 'cornerstone for personal development' [11].

In the early 2000s, key skills were defined primarily as assigned methods of activity that are common to entire classes of affected objects. That is, a certain resource equipment of a specialist manifested in the 'professional-object of work' or 'professional – work situation' interface. Today, more and more often it is about transversal competencies, the core of which are the traits that determine the choice and consolidation of certain universal resources (methods of activity) in the professional's arsenal.

It is significant that the list of basic competencies includes personal resilience, which is understood as a person's resilience in subjectively new, stressful situations, and the potential to overcome difficulties [12]. M. Rutter was the first to define resilience as a combination of abilities and traits that are in active interaction to allow a person to return to normal state, to cope with a challenge, and to be successful despite significant stress or difficulties] [13]. Later, many foreign researchers agreed and defined human resilience as the ability to recover from stressful situations, readiness for regeneration and post-traumatic growth [12; 14-16].

Russian researchers (E. F. Zeer, A. A. Derkach, E. A. Klimov, S. V. Kondratieva, N. V. Kuz'mina, A. K. Markova, L. M. Mitina, V. D. Shadrikov, et al.) studied many aspects of the problem of professionally significant personal traits [2; 17-21].

Three methodological approaches to the interpretation of traits necessary for successful professional activity can be distinguished as relatively independent: 1) traditional professional approach; 2) the resource-based approach; 3) an approach based on meta professional personality traits.

Russian researchers have proved that professionally significant traits are structure-forming for a particular activity. Their system, being a symptom complex of subject properties corresponding to a particular professional activity, is formed in the subject during the development of their activity (in the process of formal, non-formal and informal education/training).

The personality traits that are predictors of success include the following resources:

- Resources of stability that give the subject a sense of support and self-confidence;
- Self-regulation resources that reflect the acquired ways of building dynamic interaction with the life circumstances;
- Motivational resources that reflect the energy supply of an individual's actions to overcome stressful situations;
- Instrumental resources, including abilities, knowledge and skills that the subject of activity can rely on when resolving various problems [22-24].

RESULTS

Based on the lists of professionally significant traits and competencies of an employee declared by the World Economic Forum, the European Commission, UNESCO, and the OECD, as well as on the results of international research [5; 6; 9; 10], their structure is represented as a core that includes:

- Integrative personality characteristics (transversal competencies);
- Internal shell of universal methods of activity that ensure the formation, inclusion, structuring, and use of resources (key skills);
- external shell containing special knowledge and professional competencies that are in demand in a particular situation (see Fig.1).

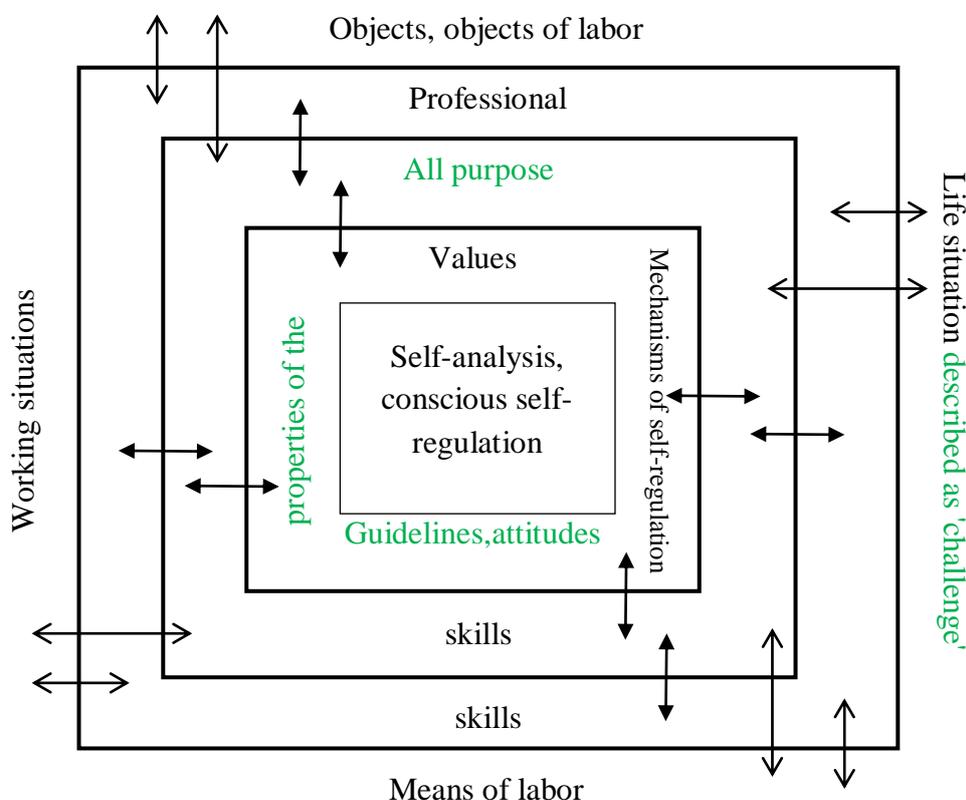


Figure 1 – Block diagram (outline) of professionally significant traits.

It should be noted that the structures of the outer shell are often outdated and replaced with new or transformed ones, and educational practices are an adequate support for this process. The structures of the inner shell are built up and transformed throughout the professional career and professionalization. The principal tool for this development are the components of the core of professionally significant traits: the abilities to self-analysis, self-assessment and conscious self-regulation. In turn, they develop under the influence of a variable set of acquired methods and a variety of situations of activity. Thus, the core structures - transversal competencies – can build up, and this is due to the experience of independent activity, its analysis and reflection.

Such a structure of professionally significant traits allows to build a hierarchy of objectives for professional education using the following reasons: the extremity of the process (possibility to get result is understood as the changing characteristics of the student during his training) and measurable outcome (possibility to capture the changing characteristics of the student within the educational process by means of pedagogical diagnostics).

The goal structure is shown in Fig. 2 and includes the following levels:
 (a) goal-mission (an immeasurable long-term goal that indicates the effects of education. The effects include personal traits of the student; integrating values; generalized ways to solve professional and personal problems; ways to manage their own psychophysical characteristics);
 (b) goal-result (a measurable ultimate goal that indicates a diagnosable educational result that forms the outer or inner shell of professionally significant traits: professional competencies or key skills);
 (c) intermediate goals (measurable goals that indicate intermediate educational outcomes that can serve as a catalyst for self-determination and introspection, as well as ensure the achievement of ultimate goals).

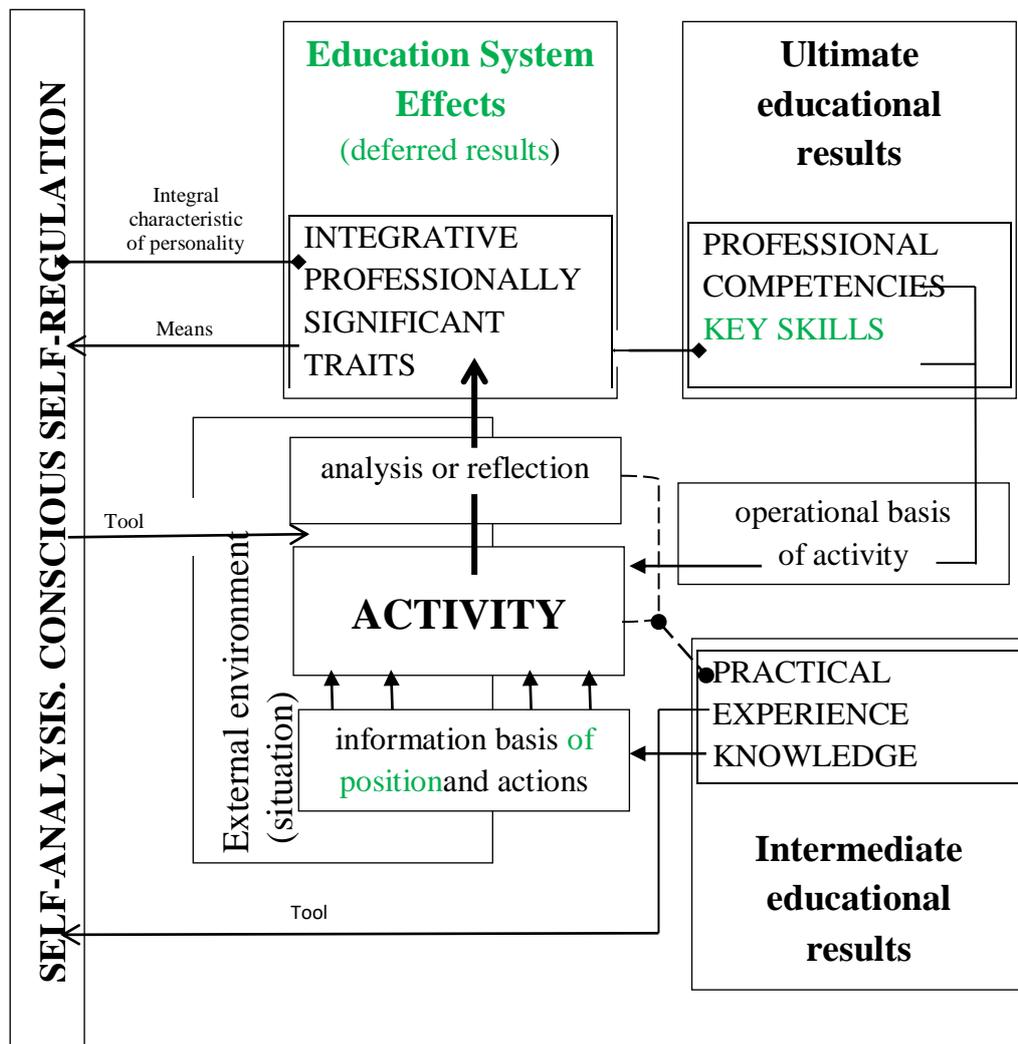


Figure 2 - Hierarchy of professional education (upbrining) goals.

The rationale for intermediate goals as catalysts is based on the fact that the effects of the education system are integrative professionally significant traits of the individual (they form the core of professionally significant traits). Integrated elements are:

- key skills recognized as a personal resource;
- values realized as regulators of one's behavior and perception;
- information (awareness) with an orienting value for self-determination and conscious regulation of one's activities, relationships and state;
- innate or acquired properties (orientation, abilities, character traits, physical condition, etc.), recognized as a personal resource or limitation.

The integrating mechanism consists of the practice and assigned methods of self-analysis and conscious self-regulation. Thus, the core basis of professionally significant traits – self – analysis and conscious self-regulation - is decomposed at all levels of goal setting: from the goal-mission to the intermediate goal.

The principal condition for launching the integration mechanism is to position the student in the educational process as a subject of activity. Accordingly, the organizational and pedagogical condition is the inclusion of students in activities within the framework of situations that make them take a subjective position. The context of such situations should be meaningfully related to the integrative professional traits of the individual reflected in the effects of the educational system; at the same time, specific circumstances can be extremely diverse.

It is possible to distinguish the following types of activities within and outside the educational process:

- educational activities (including those aimed at obtaining individual results, the responsible decision about the need for which is made by the students themselves);
- professional practices (including industrial practice, professional volunteering);
- project activity (responsible purposeful transformation of reality);
- social practices (including experience of action from the position of certain social roles, community service, activities for analyzing and discussing social phenomena, cases, and gained social experience).

The content of the education process that ensures the achievement of goals at all levels is reduced to three subprocesses:

- 1) design and implementation of a holistic environment and specific situations in which students' activities are carried out;
- 2) assistance in students' activities,
- 3) organization and assistance to students' analysis and/or reflection on their activities, their results, their motivation, resources, and self-promotion.

An algorithm for forming/updating the planned results of professional education has been developed and tested, which makes it possible to obtain a hierarchy of goals. It includes the following steps:

1. Study of requests from local and regional employers for professionally significant integrated personality traits including requirements for the levels of formation of universal competencies.
2. Conversion of requirements of federal state educational standards of secondary vocational education (hereinafter – SVE), state legal acts and framework documents regarding education, and requests from employers to the list of educational results.
3. Inclusion of educational results of the education system in the program and methodological documents that organize the educational process in colleges or technical schools.

For the first two stages, it is important that all educational outcomes are formulated diagnostically. At the third stage, it is better to make the most of the opportunities that the content of academic programs, interdisciplinary courses and practices provide for the formation of educational results. A significant part of the educational results like "to know something", "to be able to do something", as well as a key skills, would be integrated in the corresponding work programs of academic disciplines and interdisciplinary courses, and the individual results of the "practical experience" - in industrial practice. In order to get the results that were not integrated into the corresponding units of the curriculum of secondary vocational education programs, it is necessary to form a program of extracurricular actions and activities as part of the program.

The algorithm for design and implementation a comprehensive environment and specific situations for students' activities and joint planning of specific actions and activities of the education system carried out by the administration, teachers and students is built as a cycle of the following processes:

1. Making a draft list of actions and extracurricular activities.
The goal of each action or activity is defined as an indication of two types of educational results: practical experience and certain aspects of key skills. Educational results regarding experience would be obtained due to the content of students' activities within the framework of the action/activity, and the key skills – due to the methods of activity. The classification should include an excessive set of actions and activities focused on the formation of the same educational result so that the student has the opportunity to choose a specific situation of gaining experience and specific content of the activity.
2. Informing students about the planned educational results for the academic year and how to achieve them.
3. Adjustment of the plan of extracurricular actions and activities.

4. Initiation and support of students' activities on participating in the proposed actions/activities and/or to form their own proposal.
5. Support of students' activities in organizing extracurricular events and activities.

DISCUSSION

As a result of testing of the model conducted in 2018-2020 on the basis of regional innovation platforms of professional educational organizations of the Ministry of education and science of the Samara region, which was attended by 12 educational organizations of vocational schools (colleges and technical schools) Samara region (Togliatti, Syzran, Samara), the following patterns of implementation of the algorithms were revealed.

It is established that the technology of pedagogical management (including in the form of support) of students' activities is no less significant factor determining the formation of the specified results of education than educational technologies. It is the management of the educational system in a professional educational organization that allows students to be pin an environment that is complex, uncertain, mobile, and offers an excess or shortage of resources for making and implementing personal decisions. A multi-variant educational environment forces them to constantly review their abilities and preferences, each time revealing gaps between them and the opportunities available in the context of the situation. Overcoming these gaps is possible through purposeful self-change (self-development), different self-perception in the situation (self-determination), or the situation itself (goal-setting and activity).

The necessary and sufficient organizational and pedagogical conditions for creating a multi-variant educational environment are identified. Creating such an environment means creating obligations and opportunities. Obligations are developed when the student is presented with the planned results and opportunities provided, as well as a thesis about the need to share responsibility for achieving educational results between him and the educational organization. The set of opportunities corresponds to the list of activities where the student acts as a subject of decision-making and activities for their implementation.

Effective ways of detailing educational results in relation to professional education of college/technical school students are also established. The results of the "Key skills (universal competencies)" type were previously described some works [25]. It is advisable to find the results of the practical experience type using those values and/or behavioral attitudes that are identified as relevant requests in specific situations. For example, (a) "acquired experience in planning, coordinating with interested persons, and improving public spaces"; (b) "acquired experience in professional volunteering (offering and providing services based on professional skills or professional competencies)";

(c) "acquired experience in activities and communication within a group, team, or community with specific cultural norms", etc.

The testing of the models showed that it is advisable to outline the boundaries of the experience development situation broadly. This allows the student to independently complete or choose a situation to get the required experience. For example, a public space can be the hall to one's house, lounge hall in the building of an educational organization, staff recreation rooms at the place of industrial practice, a waste lot in the neighborhood, or a central city park. The corresponding range of opportunities should be formed both in relation to the subjects interacted with and to the methods of planning, coordination, and improvement. Thus, the student becomes the subject of planning his results; he has the opportunity to realize their ambitions and interests that are relevant at the moment, and assumes part of the responsibility for the result and the process of obtaining it.

It should be emphasized that the structure of professionally significant personal traits presenter in the model in Fig. 1 is formed in a specific way. The rigidity of the connection of a given professionally significant trait with the specifics of a particular workplace decreases from the external to internal contours of the model.

The application of the concept of 'man in the profession instead of 'profession in man' means that the rational organization of the system of education in professional educational organizations requires the selection of invariant results when planning educational outcomes. They should be customized pools of educational programs and groups unique to each professional education program results of education system.

The testing of the model showed that formation of the content of education programmed that allows obtaining the planned results requires taking into account the fact that in the presence of many extended (customized) results, mass events are not effective. Local actions (single-time activities) or activities (repeated activities) are required; they should be customized in accordance with the specifics of pre-defined experiences. An educational organization should not offer a comprehensive list, but a set of proposals in which each idea of an action or activity is built in strict accordance with the planned result without dispersing efforts to achieve several results, which is typical for goal-setting activities of educational work today.

A schedule of educational work should be creates together with students as a constantly transformed database that defines the following parameters:

- (a) activity/action - the source from which the intent of the activity or action is derived (the subject of the intent);
- (b) Educational outcomes;
- (C) Effects/additional features (the ability to gain certain knowledge or skills, for example);

(d) Students – a field for registering those who want to participate in a promotion or activity, etc.

Such a schedule not only provides customization of proposals and equal opportunities for all participants in the educational process to implement their ideas, but also becomes a situation in which students gain experience in choosing, making an open public statement about their idea and their responsibility, and planning.

The modeled system would work if the professional educational organization establishes a norm according to which the student is required to participate in at least one action or activity that forms each of the planned educational results, while no planned action or activity can be mandatory for students.

Participation obligations can be removed if the student can and wants to get the required result outside of the educational program of a professional educational organization (for example, by participating in the work of a public organization, making a trip with an educational context with their parents, agreeing on an additional task with their head of industrial practice, etc.). This feature is fundamentally important, since it not only allows attracting non-educational resources of the environment to get an educational result, but also forms a certain attitude towards the challenges of the external environment.

The testing of models has shown that one of the most difficult and at the same time absolutely necessary conditions for the implementation of educational programs is the formation of an infrastructure for pedagogical support of the process of self-determination about the form of obtaining experience and its subsequent reflection. This fact is consistent with the results of studies that prove that it is analysis and/or reflection that make a person's experience a personal experience [22-24; 26-27].

The study showed that at this stage, the boundaries of students' personal experience can be significantly expanded when organizing group forms of communication. In other words, when students who have gained experience in different situations exchange their conclusions and impressions.

The elements of the model of the professional education system are the goals of professional education and the mechanisms that normalize the main processes of the professional education system. The conducted research has shown that providing basic parameters of processes in the system of education is possible with a certain range of indicators of the educational environment in which these processes are carried out. Therefore, when modeling the system of professional education in an educational organization, it is necessary to set criteria for evaluating the educational environment of the organization in such a way that these criteria allows controlling the indicators of the educational environment that are important for maintaining the required process parameters.

The components of the educational environment in the developed model are:

- 1) Information component that characterizes information available to various groups of users and the rules for accessing it, as well as the principal methods of collecting / receiving, processing, storing, and accessing/transmitting information;
- 2) A communicative component that characterizes the fundamental goals of communication, communication styles, and the main communication platforms in an educational organization;
- 3) A spatial-subject component that characterizes the features of the architectural, aesthetic, and functional design of an educational organization's space.

CONCLUSION

Thus, the main advantage of the proposed model of professional education is that it allows correlating the declared results of education with the types and types of educational results, which means that it provides the processes of formative assessment and summarizing assessment for management purposes. In the sets of professionally significant traits as the results of professional education, the system-forming elements are self-regulation (self-management) and self-assessment (reflection) of the student. Therefore, the system of professional education should be built as a set of situations in which the student receives and analyzes certain practical experience. The main parameters of the effectiveness of educational work programs should be transparent and diagnostic results, diversified methods of obtaining these results, as well as the division of responsibility of the subjects of the educational process for obtaining them.

Teachers and students should develop an aim to understand a particular situation as an area of experience, to perceive any challenge as an invitation to self-development, completion of their internal resources, or as an educational situation that allows them to increase their capabilities by incorporating the gained experience. This aim creates the vital stability of the individual - the most important trait for life and professional development in conditions of uncertainty.

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Scientific value is determined by the fact that a model of professional education has been created and tested. It is based on a system of professionally significant personal traits, the system-forming element of which is the ability of the subject of activity to self-regulation and self-analysis. The organizational and pedagogical conditions of its effective application in the framework of the system of professional education in the organization of secondary vocational education are determined.

The relevance of the study is due to the changed parameters of society's life and professional and labor activity of people. New challenges of uncertainty and unpredictability of development require modernization of professional education in educational organizations. The modernization is aimed at ensuring the adaptability of professionals, their ability to transform their personal resources and career strategies in response to changes in the external environment.

The novelty of the results lies in the fact that professional education in an educational organization is considered as a process of forming a set of situations in which a student receives and analyzes the required practical experience. The model fixes the diversification of the professional education in accordance with individual interests, affinities, professional and life plans of students at the level of ways of to form educational results. The background is invariance of educational results themselves; customization of actions and activities; inclusion of resources of the external (non-educational) environment in the process of education.