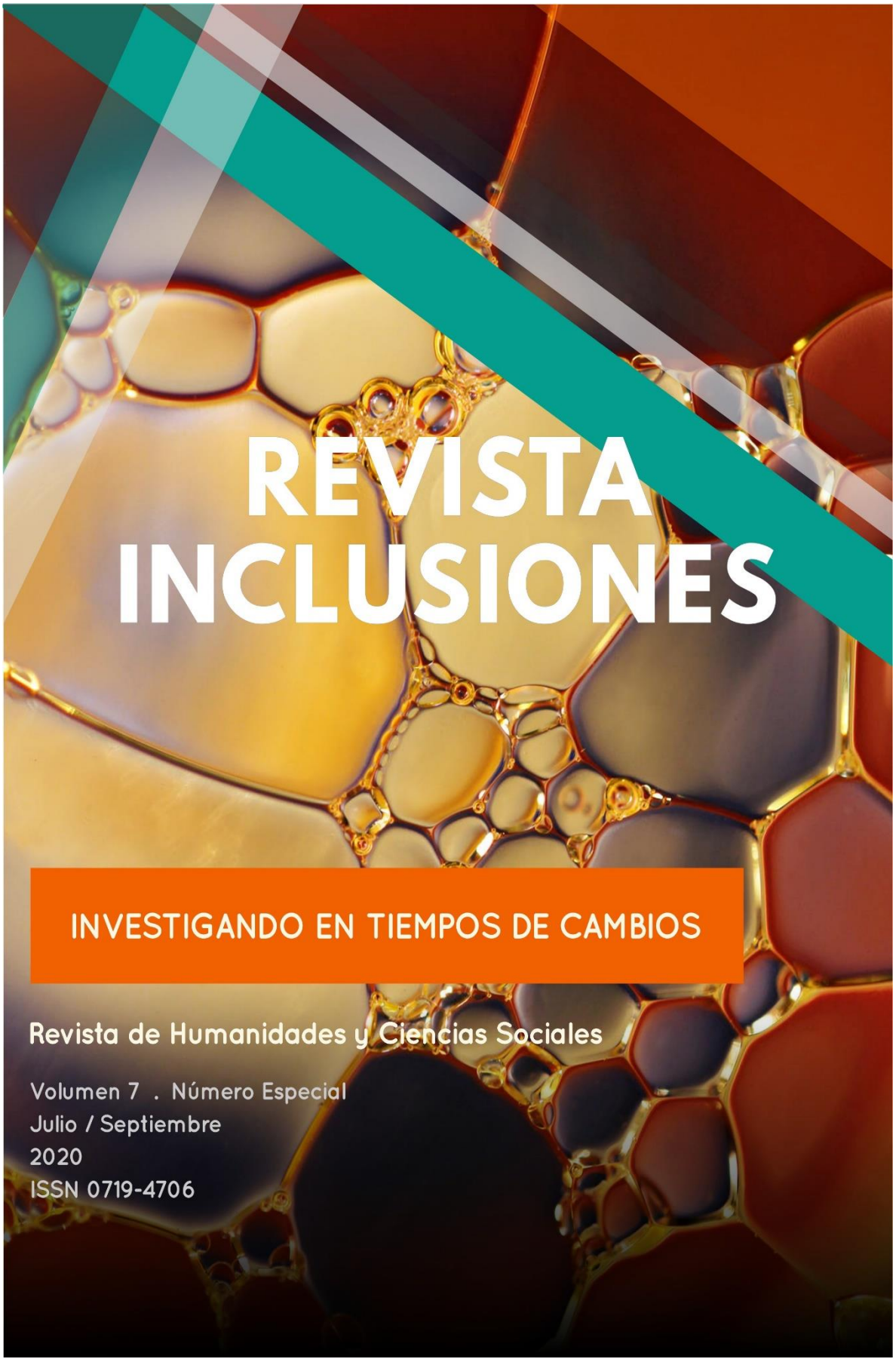

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A METHOD FOR CREATING PRACTICE-ORIENTED EDUCATIONAL PROGRAMS

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Abstract

The article states the problem of training specialists in educational organizations. Modern specialist training in the Russian education system is oriented on the formation of knowledge and skills in a given subject area that increasingly falls behind the modern labor market requirements. The authors indicate the stages and methods of organizing the educational process in a way that would make professional competencies oriented towards the independence and responsibility of a specialist and their ability to identify their professional and educational needs in the context of innovative economic transformations independently the main element in the construction of educational programs.

Keywords

Education – Educational program – Professional competencies – Educational standard

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Introduction

Annual surveys conducted among the graduates of higher education institutions in several regions of Russia on average demonstrate that most graduates have mastered professional skills only in the course of internships in the workplace. Studies indicate that professional competencies begin to form exclusively in the workplace and not in educational organizations. This finding is most often explained by the use of modern technologies, effective organization of labor, and the presence of highly qualified specialists or workers in the workplace[1].

Professional competencies present the basis of educational standards of specialist training in Russia[2]. In European countries, primarily in Germany, educational and labor competencies are distinguished. Thus, specialists' working experience acquired in real production settings is accounted for[3].

The practice of educational process organization in Russia demonstrates that the initial stages of studying in an educational organization lead to the formation of general and universal professional competencies that, for the most part, are not supported by practical experience[4]. However, the modernization of material and technical base of educational organizations, the increasing requirements of the labor market towards the quality of graduate training, the introduction of professional standards, and the active participation of employers in the control of "the final product" orient educational organizations towards the constant formation of professional competencies making graduates demanded and competitive in the labor market[5].

Incomplete correspondence between the content of educational programs and the requirements of the labor market largely explains employers' dissatisfaction with the level of qualification of the graduates of educational organizations[6].

The studies of Russian researchers illustrate that modern requirements for educational programs follow the principle of "quick, practical, and convenient" forming the personal development of students based on independent mastery of professional competencies in the process of gradually solving professional tasks[7].

If the readiness of educational organization graduates for independent professional activity is examined as a qualitatively new educational result, the potential of educational programs should be viewed differently by concentrating on its practice-oriented content. This calls for solving the following problems:

[1] M. S. Logachev, Struktura, metodika i algoritmy funktsionirovaniia sistemy monitoringa upravleniia kachestvom obrazovatelnykh program. Ph.D. dissertation in technical sciences (Ryazan: Ryazan State Radio Engineering University, 2017).
[2] M. S. Logachev, Struktura, metodika i algoritmy funktsionirovaniia…
[3] G. V. Tkacheva, Modelirovanie praktikoorientirovannogo soderzhaniia uchebnykh posobii dlia professionalnogo obrazovaniia. Ph.D. dissertation in pedagogics (Moscow, 2012).
[4] A. S. Kagosyan; N. D. Kotovchikhina y I. V. Poshentseva, "Technologies and tools to improve the quality of university education", Revista Inclusiones Vol: 7 (2020): 566-578.
[5] M.S. Logachev; G. V. Tkacheva y Iu.N. Samarin, Obrazovatelnaia programma kak instrument sistemy upravleniia kachestvom professionalnogo obrazovaniia: monogr (Moscow: Infra-M, 2019).
[6] G. V. Tkacheva, Modelirovanie praktikoorientirovannogo soderzhaniia…
[7] M.S. Logachev; G. V. Tkacheva y Iu.N. Samarin, Obrazovatelnaia programma kak…

- Modeling the practice-oriented content accounting for the labor market requirements;

- Ensuring the practice-oriented content of educational programs through the modernization of educational instruments forming professional competencies;

- Improving the qualification of all subjects of the educational process (teaching staff, methodological workers, department heads, etc.) to ensure readiness for the constant introduction and implementation of new technologies forming the content of professional competencies and scientific and practical recommendations in the preparation of educational programs;

- Improving students' motivation for the independent improvement of their qualifications in the course of their lifetime and the possibility of modeling their professional career themselves in accordance with the labor market quality criteria[8];

- Creating multifunctional systems for monitoring, planning, and managing the processes of self-examination, certification, and the comprehensive objective assessment of the educational process[9].

Methods

One of the major problems in creating practice-oriented content of educational programs is choosing a technology that would allow one to fully include employers' requirements for professional activity established in the market. Russian and foreign experience demonstrates that moderation technology presents a productive interaction of teachers and specialists employed in the real economy. This interaction ensures the selection of content and adaptation and transfer of professional requirements to pedagogical technology allowing for interaction in different groups and providing the expected result in the form of an educational program[10]. The main goal of moderation is achieving effective business communication with democratic planning ensuring the active participation of the entire team in obtaining a specific result. Group work moderation presents a complex process of managing interaction in a group[11]. It relates to several technological parameters allowing to one perform group management. Its base is formed by the processes of visualization, verbalization, presentation, and feedback[12].

The technique of posing questions is a crucial component of moderation. It requires a moderator to know the various forms of posing questions and be able to put them into practice. The requirements for correct question-posing include[13]:

[8] A. Chagovets; A. Chychuk y O. Vida, "Formation of Motivation for Professional Communication among Future Specialists of Pedagogical Education", Revista Romaneasca Pentru Educatie Multidimensionala num 1-12 (2020): 20–38.
[9] M. S. Logachev. Struktura, metodika i algoritmy…
[10] G. L. Ilin, Sotsiologiia i psikhologiia upravleniia (Moscow: Akademiia, 2005).
[11] V. M. Monakhov, "Pedagogicheskoe proektirovanie — sovremennyi instrumentarii didakticheskikh issledovanii", Shkolnye tekhnologii num 5 (2001): 26-29.
[12] A. V. Petrov, Diskussiia: priniatie reshenii v gruppe. Tekhnologiia moderatsii: ucheb.-metod. posobie (Saint Petersburg, 2005).
[13] V. E. Lankin; G. V. Gorelova y V. D. Serbin, Issledovanie i razrabotka organizatsionnykh sistem upravleniia v vysshikh uchebnykh zavedeniiakh: monografiia. Taganrog: Taganrog Institute of Technology of the Southern Federal University. 2011.

- orientation towards a person who can answer the question;
- leaving room for reflection to the person answering;
- formulating the question in a short and clear form;
- putting the interrogative word at the beginning of the sentence;
- having the questions are grouped or hierarchically organized;
- not asking several questions at the same time;
- the posed question should not be accompanied by explanations.

The technological conditions for group work moderation include the size of the working group (from 4 to 12 people), the neutral position of the moderator, and a spacious working space that would not constrain the participants[14].

Moderation has to be performed in accordance with the principles of systematic nature (all actions have to logically follow one another), structuredness (every stage of the work is rationally divided into parts), transparency, and trust[15].

Moderation in the process of constructing the content of a practice-oriented educational program includes the following stages[16]:

1. **Introduction to the topic**. Organizational aspects (plan and program) and the rules of group work (for instance, the forms of communication depending on the competencies of participants) are discussed.

Each participant has to have a clear understanding of the objectives and area of competence of the moderator. Moderator should explain the main conditions of group work and define the role of each participant. Therefore, this stage is when participants develop sensitivity: in an entertaining manner, they adjust to the content of the problem, as well as to the inner world and positions of other group members.

2. **Topic selection**. The selection of topics can involve using the methods of calling or card surveys to establish the degree of relevance of a certain problem and formulate it clearly. Further on, the systems of general management (formal and informal leaders, chief executives, secretaries, etc.), methods for topic development, and the forms of result presentation are determined in small groups.

This stage results in deeper immersion into the problem, namely, the definition of the problem and topic of discussion.

[14] A. V. Petrov. Diskussiia: priniatie reshenii v gruppe…
[15] M. N. Pevzner y O. M. Zaichenko, Teoriia i praktika soprovozhdeniia professionalnoi deiatelnosti pedagogov. Nauchnye traditsii i perspektivy pedagogiki. Gertsenovskie chteniia-2001: Interregional collection of scientific papers (Saint Petersburg: Petropolis, 2001).
[16] G. V. Tkacheva, Modelirovanie praktikoorientirovannogo soderzhaniia uchebnykh posobii dlia professionalnogo obrazovaniia. Ph.D. dissertation in pedagogics (Moscow, 2012).

3. **The study of the topic in small groups to find a solution to the problem**. At this stage, the primary basis for the specialization of actions of group members is laid and the ways and forms of coordination and integration of their actions are shaped.

The formation of small groups in the process of moderation can be either random (formed by the participants' location in the room or at their own request) or normative (the participants are grouped by common characteristics or conditions).

A randomly formed small group of participants is sufficient for creating the practice-oriented content of educational programs. The participants have to interact with each other during each meeting. The participants' cooperation is realized in mutual support, the development of each other's ideas, and mutual assistance and responsibility and should be accompanied by positive emotions. Such interaction is based on the process of cooperation the essence of which lies in the specific way of integrating individual actions to obtain a collective result[17]. The following characteristics are used for the assessment of the results of such work[18]:

- difficulty (the amount of effort necessary to complete the task);
- multiplicity of solutions (a set of acceptable or alternative solutions for completing the task);
- inner interest in the task (the degree of interest the task itself invokes in group members prompting them to activity);
- cooperation requirements (the degree of integration of group members' actions taken for solving the tasks);
- intellectual and manipulation requirements (the range of requirements for solving the problem: from purely mental to purely motor in nature);
- population familiarity (the degree to which group members are familiar with similar tasks from life experience).

4. **Presentation of the results of group work, discussion, generalization, and concretization of work results**. The presentation should not consist of reports or a conference and mirror the content of previous communications[19]. The client has to see and evaluate the results of the group. Group work presentation should be organized in one of the following forms[20]:

- collective individual: each group presents the results of their work, the solutions are discussed, and the best option is selected;

[17] V. M. Monakhov, "Pedagogicheskoe proektirovanie — sovremennyi instrumentarii didakticheskikh issledovanii", Shkolnye tekhnologii num 5 (2001): 26-29.
[18] G. L. Ilin, Sotsiologiia i psikhologiia upravleniia (Moscow: Akademiia, 2005).
[19] M. S. Logachev, Iu. N. Samarin, M. S. Tigina. Avtomatizirovannye sistemy upravleniia kachestvom obrazovatelnogo protsessa: monogr (Moscow: Moscow State University of Printing Arts, 2016).
[20] G. V. Tkacheva, Modelirovanie praktikoorientirovannogo soderzhaniia uchebnykh posobii dlia professionalnogo obrazovaniia. Ph.D. dissertation in pedagogics (Moscow, 2012).

- collective supplementing (sequential): the result of each group's work presents an independent fragment necessary for the solution of the problem;

- collective interaction: most significant ideas from the suggestions of the first group are selected, other groups add their ideas to it, and the collective result is formulated.

The visualization of results allows one to illustrate each participant's perception, accompanies group interaction, documents work results, and helps the participants identify themselves with the result of group work and clarify the content of the problem under consideration[21].

Visualization has to follow the principles:

- of availability of materials to every student,

- of compositionality of all presentation elements,

- of anonymity ensuring work objectivity and preventing the authoritarian influence of certain individuals on a group.

Visualization should also not be a goal in itself. Practical experience demonstrates that poorly prepared presentation easily becomes boring to the listeners and leads to psychological barriers. Its use has to have a functional meaning in the general didactic structure clearly understood by the participants and not be purely mechanical[22].

Visualization may result in a list of problems, descriptions, characteristics, algorithms for professional technique execution, a plan of actions, job responsibilities, etc. The acquired result must be formulated coherently and disclose the stated subject fully.

5. **Summarizing the results of work and sharing experiences**. Moderation involves conducting substantial and emotional reflection at the end of each day or work session. The concluding part of the working session begins with a review of the work and a joint debriefing.

Evaluation of group work results is highly important since it improves the understanding of interconnections and makes the successes of collective activity more vivid. Experience shows that the results should be assessed extremely carefully avoiding the evaluation of actions of specific participants, only the obtained result and its potential significance for further problem-solving should be examined[23].

Thus, with moderation, group work participants return to the procedure of determining the problem and its solution, identifying the difficulties in the course of work, and studying the possible ways of overcoming them.

[21] M. S. Logachev; Iu. N. Samarin y M. S. Tigina, Avtomatizirovannye sistemy upravleniia…
[22] M. N. Pevzner y O. M. Zaichenko, Teoriia i praktika soprovozhdeniia professionalnoi deiatelnosti pedagogov. Nauchnye traditsii i perspektivy pedagogiki. Gertsenovskie chteniia-2001: Interregional collection of scientific papers (Saint Petersburg: Petropolis, 2001).
[23] P. I. Tretiakov; T. I. Shamova y N. P. Kapustin, Upravlenie obrazovatelnymi sistemami (Moscow: Vlados, 2002).

Logging and documenting the process of group work allows one to gradually reconstruct the work session, locate mistakes and difficulties, detect the reasons for their emergence, and make adjustments to the future plans of the moderator[24]. The acquired results are clarified and recorded. The wording of the results has to be accepted by all communication participants since it presents the product of collective activity and belongs to each of them equally, there is no leaders or outsiders. A general list of issues with the indication of specific measures of resolving them is constructed. It is necessary to collectively define the perspectives for further work and agree on cooperation.

At the closing stage, it is important to not only draw the conclusions on work in a business aspect but also conduct a free exchange of opinions and impressions between the participants since the working process is filled with intense emotional experiences that need to be expressed and brought to a closure[25].

Results

The analysis of the structure and logic of professional standards results in a sequence model of professional activity presented in Figure 1.

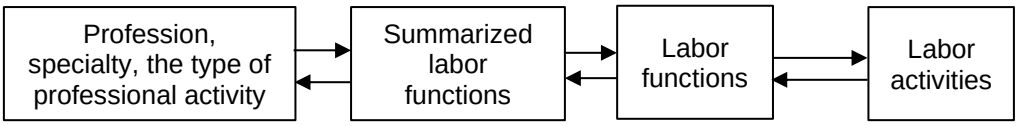

Figure 1
Professional activity structure model[26]

However, this structure contradicts the structure of professional activity implied by educational standards (Federal State Education Standards, FSES). Labor functions are professional tasks a specialist has to master as a part of their competency[27]. The set of professional tasks forms the content of professional activity the success of which depends on the clarity of the problem-solving algorithm. Therefore, practice-based educational programs will differ from traditional ones significantly.

Table 1 presents the substantial differences between practice-oriented educational programs and the educational programs traditionally used in the educational process.

№	Characteristics	Traditional educational programs	Practice-oriented educational programs
1	Goal	Communicating scientific knowledge (the cognitive orientation of learning)	Forming professional competencies (activity-oriented learning)
2	Didactic functions	Related to informing, systematization, and transformation of the scientific	Informational and instructive, aimed at the formation of various types of activity. Description of the algorithm

[24] G. V. Tkacheva, “Formirovanie praktikoorientirovannogo soderzhaniia uchebnykh posobii dlia professionalnogo obrazovaniia”, Professionalnoe obrazovanie i obshchestvo Vol: 2 num 14 (2015): 84–87.
[25] V. M. Monakhov, “Pedagogicheskoe proektirovanie — sovremennyi instrumentarii didakticheskikh issledovanii”, Shkolnye tekhnologii num 5 (2001): 26-29.
[26] M. S. Logachev; G. V. Tkacheva y Iu. N. Samarin, Obrazovatelnaia programma kak…
[27] Iu.N. Samarin y M. S. Tigina, “Algoritm otsenki urovnia sformirovannosti kompetentsii studentov, obuchaiushchikhsia po napravleniiam, sviazannym s informatsionnymi tekhnologiiami”, Poligrafist. V pomoshch rukovoditeliu i glavnomu bukhgalteru Vol: 2 num 64 (2014): 13–22.

		and theoretical, worldview, technical and technological knowledge included in educational programs as a part of theory concretization and clarification	of solving professional tasks. Theoretical knowledge has a practical nature ensuring the successful realization of professional activity
3	Structure of the educational instruments	Text, illustrations, the apparatus of learning and orientation organization are mostly aimed at the clarification of theory	All structural components are aimed at the formation of professional activity
4	Main structural elements	Academic discipline	Interdisciplinary courses, professional modules
5	Teacher's position	Translates theoretical knowledge, forms the subject-object nature of learning	Organizes the independent activity of students, forms the subject-subject nature of learning
6	Student's position	Acquiring a certain amount of knowledge. Is viewed as a storeroom for knowledge with a lifelong supply of information	Determines the amount and methods of acquiring knowledge, as well as the need for theoretical knowledge in professional practice independently. Mutual partnership between a student and a teacher
7	Result	The formation of reproductive knowledge of a certain volume	The formed professional competencies ensuring the implementation of the acquired knowledge and skills in real production conditions
8	Control	Identifying the degree of learning a specific amount of theoretical knowledge	Identifying the degree of formation of professional competencies

Table 1
Characteristics of practice-oriented educational programs[28]

The algorithm of solving professional tasks presented in practice-oriented educational programs has to comprise the following stages: the description of professional techniques; the definition of the results of applying said techniques, the supplies needed for their execution, helpful tips, the adverse consequences of wrong actions in fulfilling a professional task[29].

This format of describing the algorithm of solving professional tasks makes the logic of actions in production transparent and increases the responsibility of students, which was experimentally supported during the work on creating practice-oriented educational programs[30]. The description of the algorithm of solving professional tasks becomes more relevant if it involves workers and specialists engaged in professional activities in question. Moderation technology allows acquiring precise, comprehensive, and objective information about its content.

Based on this, a model of the process of creating a practice-oriented educational program was obtained (Figure 2).

[28] M. S. Logachev; G.V. Tkacheva y Iu. N. Samarin, Obrazovatelnaia programma kak…
[29] M. S. Logachev; G. V. Tkacheva y Iu. N. Samarin, Obrazovatelnaia programma kak…
[30] T. N. Tiagunova, Razrabotka modelei i algoritmov otsenki kachestva deiatelnosti obrazovatelnykh organizatsii. Ph.D. dissertation in technical sciences (Moscow, 2004).

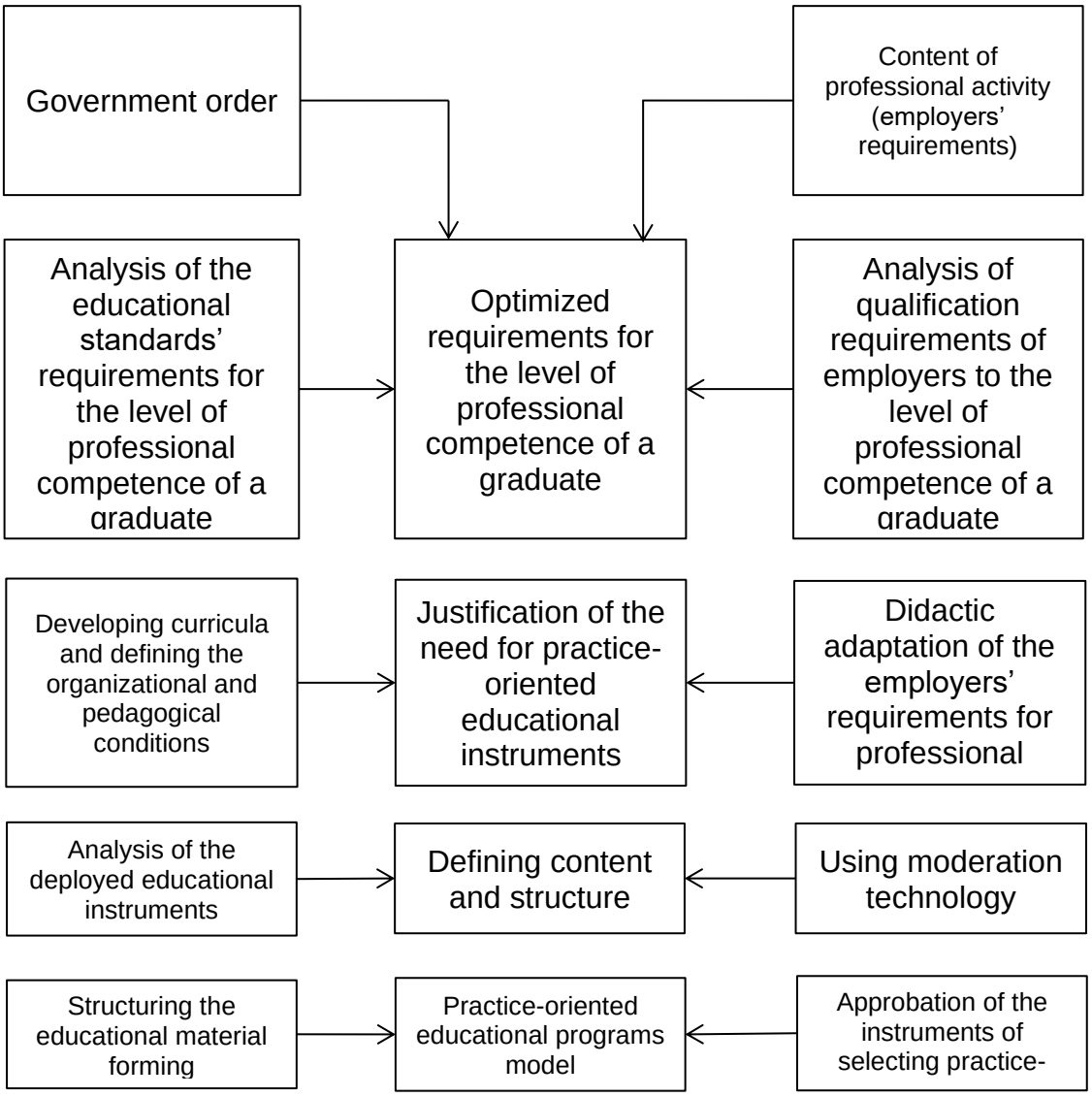

Figure 2
The model of the process of creating a practice-oriented educational program[31]

The model of practice-oriented educational programs aimed at improving the quality of specialist training based on forming practice-oriented content has to include: the objectives block (goals and objectives of learning and mastering labor functions), the objects of study and analysis (the requirements of professional and/or corporate standards, the technologies of moderation and practical resolution of professional tasks), organization and content block (educational standard requirements, competencies, material and technical base), and the assessment and results block (criteria for evaluating the results of completing an educational program)[32].

[31] M. S. Logachev; G. V. Tkacheva y Iu. N. Samarin, Obrazovatelnaia programma kak…
[32] G. V. Tkacheva, "Formirovanie praktikoorientirovannogo soderzhaniia uchebnykh posobii dlia professionalnogo obrazovaniia", Professionalnoe obrazovanie i obshchestvo Vol: 2 num 14 (2015): 84–87.

Discussion

The target orientation of practice-oriented educational programs suggests that its content, the structure of the educational material presentation, and all its structural components are aimed at the formation of professional competencies defined by standards, production conditions, and the requirements of employers[33].

The proposed model suggests that mastering such a program results in professional competencies performed by a specialist in a real production setting. Here, professional competencies are understood as the integral result of professional education that manifests in the subject's willingness to effectively use the internal and external resources to carry out professional activities in accordance with the established requirements.

Exercising the developed algorithm of solving professional tasks allows one to develop objective test materials reflecting the level of formation of professional competencies and implement them in practice-oriented educational programs. Such test materials should promote the independent learning activity of students giving them the freedom of choice, stimulate their readiness for self-development and self-education, and cultivate responsibility for the results of their work[34].

The formation of content of practice-oriented educational programs has to account for the fact that in many different professions and specializations a range of professional competencies is formulated similarly.

For example, almost every specialty has the competencies of "organizing the workplace", "preparing the equipment for work", "customizing software", etc., which allows one to conduct a structural analysis of professional activity and identify a range of competencies common for several specialties. This approach makes it possible to unify the descriptions of such competencies and use each of them as a separate module[35]. In this case, a professional task serves as a structural unit. Thus, for the implementation of professional competency, a specialist has to have the ability to solve several professional tasks. For instance, to implement the professional competency of "database administration" an "information systems specialist" has to be able to solve several professional tasks: configure data access, back up data, ensure data integrity, etc.

A professional task refers to a specific professional competency and has a specific result. A professional task can be completed using specific instruments, inventory, equipment, using the necessary raw materials, processing techniques and methods, etc.

The solution of different tasks is not interconnected, but the ability to solve each of them is a prerequisite for implementing a professional competency in general. A student can be good at solving a problem related, for example, setting up database access but to implement the corresponding competency one needs to master the techniques of performing all the tasks involved in this professional competency.

[33] M. S. Logachev y G.S. Zhukova, "Problems of professional education in Russia: Quality monitoring of educational programs", RevistaInclusiones Vol: 7 (2020): 263–274.
[34] T. Serebryakova; A. Smirnov; L. Semenova y N. Fomina, "Additional education in the system of professional training of university students", Amazonia Investiga Vol: 9 num 27 (2020): 311–318.
[35] M. S. Logachev; G. V. Tkacheva y Iu. N. Samarin, Obrazovatelnaia programma kak…

Every professional task consists of several smaller actions — the units of labor and manipulations. Executing these smaller units ensures solving a professional task, thus, learning a specific step guarantees the formation of the ability to solve the professional task as a whole. Such a step presents a specific technique, the sequential execution of which presents an algorithm for solving a professional task.

The level of performing the specific steps provides the ability to solve professional tasks, i.e. realize professional competencies.

The description of a step answers the question of “what should be done” to resolve a professional task, therefore, the step should be named specifically and correctly and strictly follow all the norms, rules, and technological requirements.

A step is characterized by the conditions necessary to follow it: equipment, tools, instruments, materials, raw materials, or devices. While the description of a step defines “what should be done” and the result explains “why it is needed”, the characteristic of step provision answers the question of “what is required to execute the step”.

Thus, a detailed listing of equipment, tools, devices, and materials necessary for solving a professional task and consequently for the formation of professional competency is provided.

Conclusion

The modern labor market sets high requirements for specialist training, requires a broad education providing professional mobility of a specialist that allows them to master related professions and quickly move on to other types of professional activities[36]. At the same time, the listed requirements for a specialist can only be fulfilled if a specialist knows the practical foundations of their specialty fully and confidently. This knowledge makes them competitive and socially secured facilitating quick and successful adaptation in a professional environment.

The formation of professional competencies is impossible outside the conditions in which future specialists will perform their professional activity. In production settings, the workers constantly face issues related to performing their professional functions, therefore, practice-oriented educational programs must pay close attention to the questions arising in completing the specific tasks and indicate the consequences of wrong decisions. In the process of describing a step, it is crucial to pay close attention to the clarity and specificity of its formulation.

Practice-oriented educational programs largely accentuate the independent work of students. Therefore, the sources of information necessary for making the right decisions must be constructive and understandable. Practice-oriented educational programs have to form the future specialists’ belief that the lack of necessary knowledge makes it difficult or impossible to complete a specific professional task. The successful performance of professional activity is impossible without theoretical knowledge and becomes a significant obstacle for further work.

[36] E. A. Kolesnik y V. G. Stepanov, “Labor potential of engineering personnel in the Russian oil and gas region: problems of development in the system of secondary professional education”, Amazonia Investiga Vol: 9 num 27 (2020): 140–148.

In the process of studying, the student has to have not only the ability to use reference literature but also the opportunity to contact experienced professionals. Professional activity will make them acquire knowledge: in real production settings, the student will shortly become convinced that the ability to find the necessary information is directly related to their professional success. The developed algorithm of solving professional tasks provides the opportunity to demonstrate the causal relationships existing within a profession or a specialty to a student. Practical experience demonstrates that the fragmentariness of students' knowledge presents a serious weakness of education. Weak interdisciplinary connections do not provide an idea of the specialty as a whole, which results in the lack of a holistic system of knowledge and skills a future specialist needs. The knowledge obtained while studying one subject is not used in studying other ones or ends up not being used at all. Oftentimes, the students ask themselves a question: "What do I need this for?". Practice-oriented educational programs present professions or specialties comprehensively. The student clearly understands what techniques they need to master to solve the specific professional tasks based on the knowledge they are expected to have. The presented structure of a practice-oriented educational program provides an algorithm of independent educational activity of students, which motivates them for the constant acquisition of new knowledge and enriching their theoretical base for successful self-realization in a professional activity.

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