

## Applied Bachelor Degree Programs as Technology Enhanced Education in the Innovative Russia (Implementation Experience in Krasnoyarsk Region)

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**Abstract.** *The article presents the analysis of the problem, risks and prospects of launching an Applied Bachelor degree program within the process of training professionals in the secondary and higher educational institutions of the Krasnoyarsk region. The team defined the basic principles, the invariable part of the Applied Bachelor program with makes the model universal: it may be transferred to any other training program in any other subject area.*

**Keywords.** Applied Bachelor degree, constructive learning paradigm, innovative technology, effectiveness indicator, program assessment

### 1. Introduction

Developing the innovative economy in Russia caused considerable changes in the educational concepts, technologies and priorities. The role of enterprises – employers in training and retraining professionals for modern economy is increasing. The reform taking place in Russian educational system, the new law on education adopted recently, introduction of the new federal educational standards reflect in the new requirements toward modern teacher. These requirements correspond to the current world tendencies and the needs of the innovative economy of Russia. A pedagogical experiment aimed at solving the mentioned problems started in Krasnoyarsk in 2010. This experiment involves training elementary school teachers within the Elkonin-Davidov system. This system is based on the Vigotsky's developmental theory. A peculiar feature of this experiment is the innovative character of the training program – Applied Bachelor degree in Education – the training is carried out on the basis of the two educational pedagogical institutions of different

types (Institute of Education, Psychology and Sociology, Siberian Federal University (IEPS SFU) and A.M. Gorky's Pedagogical College #1). The necessity of implementing the applied bachelor program in the system of education in Russia is caused by the significant complications in the professional activity – secondary professional educational institutions graduates need a significant theoretic background. Secondary professional training becomes more complicated and approximates a university level [2].

### 2. Applied Bachelor degree in Education

The experiment on introducing Applied Bachelor degree in Education for training elementary school teachers was carried out in accordance with the new federal standards. It should be mentioned that by that time the out-of-date regulations did not correspond to the adopted standards. This was a considerable obstacle on the way of implementing innovative pedagogical technologies into practice. We could overcome the bureaucratic obstacles by means of practical approach and close cooperation with the employers and the Ministry of Education of the Krasnoyarsk region. Training elementary school teachers for work in the constructive learning paradigm in accordance with the Applied Bachelor program at IEPS SFU has been carried for the latest two years. Other specialties joined the experiment later and now the Applied Bachelor degree is implemented for training professionals for the needs of mining, construction, airspace, oil and gas industries of the Krasnoyarsk region. This testifies to the fact that the model has an invariable component of training professionals in accordance with the practical approach; and serves integration of the secondary and higher professional institutions. The experiment showed the necessity to distinguish certain effectiveness indicators and

indices of effectiveness of educational innovations; these criteria should be coordinated with the employers and correspond to the requirements of the federal state educational standards and the prospective graduates' educational needs. That means that the Applied Bachelor program should serve to form universal competences asked-for on the labor market.

The article presents the analysis of the problem, risks and prospects of launching an Applied Bachelor degree program within the process of training professionals in the secondary and higher educational institutions of the Krasnoyarsk region.

### 3. Problems

The complexity of task (implementing Applied Bachelor degree in Education) is caused by the fact that Russian professional education does not have the experience of implementing such models in the humanitarian area, and by the absence of quality control technologies, and the means of measuring the effectiveness of the innovations being introduced.

Every educational institution in Russian Federation taking part in the federal experiment implement Applied Bachelor degree programs using the available resources (scientific, technological, methodological resources, experimental laboratories, etc.) and their ideas of the results and ways to achieve them [2]. That is why the experience of every institution – participant is important as it helps in the creative process of working out the technology which can be easily transferred into any industry.

We may briefly define the problems which the developers faced while working at the Applied Bachelor program:

- the necessity to coordinate the goals of the educational program and the ways to assess the educational results with the requirements of a higher or secondary educational institution, the employers' and the students' requirements;
- coordination is needed as the experiment involves both higher and secondary educational institutions;
- additional funding is needed to pay the tutors' work during practical students' work;
- the academic programs and professional modules should be coordinated in accordance with the requirements of all the participants of the experiment- higher and secondary educational institutions, the employers' and the students' requirements;

- the necessity to work out an integrated competency matrix including the competencies of both higher and secondary educational institutions;
- the necessity to construct an object model of pedagogical innovations (the results of implementing the Applied Bachelor degree) in future;
- the necessity to construct a model of an integral structure of the educational program: coordination of the functions carried out by different subjects of the educational process, and the search of the form of realizing the Applied Bachelor degree;
- the search of adequate innovative forms of realizing the Applied Bachelor degree program which allows producing the innovative content of education - these changes will serve the quality of education (e.g. implementing a system of professional workshops for students, participation in professional competitions, independent assessment and certification, etc.);
- solving the mentioned problems directly reflects in the effectiveness of the Applied Bachelor degree program.

### 4. Results of the research. Dissemination of the results.

Implementing the Applied Bachelor degree in Krasnoyarsk region received support from the Ministry of Education of the Krasnoyarsk region and the regional Duma as the program is important for the leading industries of the region: machinery construction, metallurgical industries, oil and gas industry. The efforts of the educational system (higher and secondary educational institutions) and the employers were united to achieve the result [1]. To make a large-scale project in implementing the Applied Bachelor degree for the important economic clusters a pilot model has been worked out.

There are different approaches toward assessing quality of education. The works devoted to measuring the effectiveness of the academic programs use the synonyms “indicators” and “indices”. These terms allow speaking about the current state of the educational system and informing the society about it [1].

Speaking about our model of efficiency indicators assessment we do not use the terms “indicators” and “indices” as synonyms. We think that effectiveness indicators specify

significant characteristics and essence of the object under assessment, while effectiveness indices imply assessing the level or the norm of achieving the indicator in qualitative or quantitative dimensions. Indices are used in the analytic function for “analyzing and assessment a system or a structural activity, and also for planning and control, i.e. for giving reference points and monitoring the progress of the systems”[1]. This is the prospective administrating function. We agree with M.L.Agranovich in considering that the effects of education as an open system are of deferred character and may reveal themselves after years.

The existing in the Russian Federation mechanisms for assessing the quality of educational programs for training professionals in higher/secondary educational institutions include comparative analyses of the six groups of indicators: supporting the staff, technical support of the general educational programs, methodological, social and pedagogical support, financial and scientific support. This approach toward assessing the effectiveness of the academic programs is aimed at establishing a licensing and accreditation status of the educational institution. This mechanism of assessing efficiency of academic programs provides evaluating the adequacy of the processes providing the students’ professional training. This is the necessary but not the only indicator of quality of the professional training taking into consideration the fact that nowadays the technologies of production are constantly changing.

The project team considers our Applied Bachelor degree project successful. It supports step-by-step achieving short-term and long-term results of Bachelor program professional training combined with the minimum expenses. Such understanding of effectiveness correlates with the effectiveness of academic programs and projects in highly-developed countries, when the effectiveness is understood as reaching maximum result by means of the given resources or using minimum resources to achieve the necessary quality and quantity of the represented services. While working at the system of efficiency indicators of the Applied Bachelor degree we followed the social-economic interpretation of quality of education. "This approach presupposes assessing whether the achieved educational results correspond to the standard, to the social and personal expectations of the customer (the state, employers, students

and their parents) by means of the three components: values, technology and personality " [2].

Realization of the competency approach implies that the main goal of the students' professional and educational activity is not only achieving a certain level of *professional knowledge and skills* but *working out a system of general and special competencies which allow the students implementing these knowledge and skills in practice* during students' practical work. This practical work is carried out at up-to-date industrial complexes and is included in the curriculum. Within the framework of the competency approach we have worked out *the system of indicators to assess the level of the achieved knowledge, skills and competencies and the procedures and indices to measure them for all the main types of educational and professional activities*.

In accordance with the principles mentioned above the project developers defined the following main areas for realization of the Applied Bachelor degree program. These areas measured by the assessment system are:

- basic technologic and production experience;
- training in scientific/research/projecting activity;
- types of activities for career planning and professional development of Bachelor program graduates.

While working at the project we held a projecting workshop devoted to probating the results of the efficiency indicators model. The projecting workshop allowed introducing corrections in the model. We specified indices for every indicator in accordance with peculiar features of the educational process in different areas of training. In our work we considered educational process from the point of view of the students, employers, the state and the society.

Below is the list of the main efficiency indicators for Applied Bachelor degree program. This list was agreed with the employers during the workshops devoted to the production and technological experience of the students. We distinguished the following indicators:

- compliance of the workplace with the qualifying characteristics;
- key (general) competencies of a Bachelor program graduate in accordance with the educational standard of higher/secondary professional education in the information, communicative, cognitive, self-organizational, self-educational areas;

- professional competencies of a Bachelor program graduate;
- professional skills/abilities of a Bachelor program graduate;
- professional knowledge of a Bachelor program graduate;
- requirements toward the labor culture and toward working with documents and databases.

Among the employers the most controversial was the indicator "labor culture". It was suggested that it should be included in "professional skills" indicator: students' skills in compiling and processing the documents, work with professional documentation and databases, complying with the state standards, branch standards, technologic regulations and the standards of the Applied Bachelor degree program. The following effectiveness indices of the production and technologic experience were agreed with the employers and included in the system:

- the signed agreement between the educational institution and the employer on providing the students with the workplace for practical training included in the curriculum: the workplace should correspond to the qualification characteristics of the Bachelor program;
- the academic program (blocks and modules of disciplines) contains the tasks for students' independent and practical work which involve applying all the competencies;
- the employer takes part in the *intermediate* assessment and in *final* qualification examinations of the Applied Bachelor program students;
- the Applied Bachelor program students are included in the employers' list of candidates *when a vacancy is announced*;
- worked out, realized, presented and defended the Applied Bachelor program students' project works;
- a system of practical trainings and independent work agreed with the employers* (including virtual workshops and interactive classes) *for developing professional skills*;
- a system of practical tasks agreed with the employer - fulfilling of these tasks demand applying professional knowledge;
- description of the knowledge laying the grounds of *professional competencies*.

During working out the model of efficiency indicators for the Applied Bachelor degree program we paid special attention to organizing the students' activity in the field of career

planning and professional development. This activity reflects the need of the society in the ambitious graduates ready to fill in the gaps on the labor market and occupy the leading positions. We defined the following indicators of activity aimed at career planning and professional development:

- individual/group project in the professional area;
- ability to build communication and cooperation with different subjects of the professional community;
- readiness to study, develop and creative work;
- individual characteristics such as state of health, stress resistance, responsibility, initiative, discipline;
- career development;
- correspondence to the needs of the labor market.

We offered different mechanisms of measuring indicators. Thus, we offer to measure the indicator "correspondence to the needs of the labor market" by means of calculating the statistics within the three years after students graduate the educational institution. This statistics should contain information on how many graduates got a job in the area of their specialization.

The indices measuring an indicator "career development and correspondence to the needs of the labor market" include the following:

- the amount of graduates continuing their education (Master program for university graduates and entering a university for secondary educational institutions graduates) in the area of their specialization;
- students' participation in professional competitions, conferences and other event aimed at professional development organized by the employer;
- the amount of graduates who got a job in the area of their specialization within the three years after graduation.

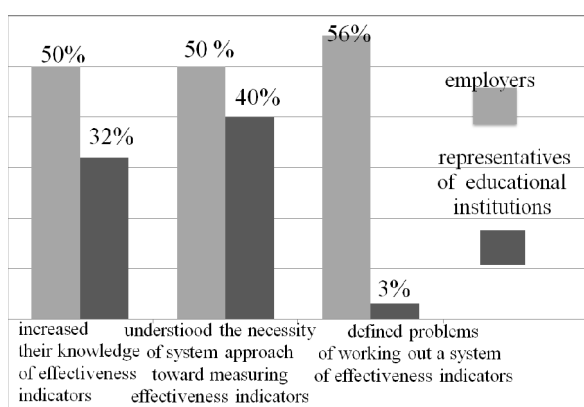
The academic community together with the employers' representatives admitted that the offered model of efficiency indicators of the Applied Bachelor degree programs may be transferred to any other educational program within the framework of the federal educational standards for both higher and secondary professional training levels.

Within the two years we held an experiment on implementing the Applied Bachelor program in Education for training elementary school teachers for the constructive learning paradigm.

This program has been already functioning for two years and we may take it as an example to show the basic principles allowing to implement the new federal standards and realize the innovative approaches in training teachers of the XXI century. The enumerated below principles, with adaptation, may be transferred to any other training program in any other subject area:

- educational and professional workshops (engaging students in working at real projects/products)
- holistic and integrative approach to studying the disciplines (the principle of subject immersion - studying a discipline within blocks of professional disciplines)
- logical completeness of professional modules (constructing a system of studying the disciplines grouped in accordance with the professional modules and correlating to the basic types of future professional activity)
- main professional disciplines (pedagogy and psychology) are integrated in all the professional modules
- complex final assessment procedure including state examination, presenting and defending of the personal; professional e-portfolio in the context of presenting the results of the practical training; and presenting a final graduation thesis.

Our project extended and changed the understanding of program effectiveness. On the results of the questionnaire poll we draw up the diagram. The question was: “Did you change your understanding of the program effectiveness indicators after participating in the project?” We asked it to the university staff and the employers. Below you can see the results of our interview.



**Figure 1. Project results**

The interview showed that most part of the employers (50-56%) and the significant part of

the university representatives (3-42%) admit that participating in the project resulted in their understanding of the system of effectiveness indicators. These results confirm the necessity of such collaborative work of employers and educators.

## 5. Conclusion

The federal experiment on implementing the Applied Bachelor degree presupposes an important task of working out and implementing the new types of *professional educational programs*, aimed at mastering modern production technologies, new forms and methods of organizing the labor and support training of highly qualified professionals in compliance with the labor market needs and prospective economic development. In the beginning the experiment on the Applied Bachelor degree involved only two educational institution of the Siberian Federal Region (Siberian Federal University and Pedagogical College №1), today 5 institutes of SibFU and 7 colleges of the Krasnoyarsk region take part in the experiment. The project includes training professionals in all the important for the Siberian Federal Region industries: oil and gas, metallurgical, engineering industries. By means of implementing the innovative Applied Bachelor degree Krasnoyarsk region constructed a modern flexible system of integrating secondary and higher professional education in close connection with the needs of labor market. Applied Bachelor degree is a prospective pedagogic technology which allows realization of the multi-level life-long training in within the system of professional training aimed to satisfy the needs of the innovative economy of the region. Applied Bachelor degree programs allow satisfying the employers' requirements. These new competencies and the graduates' thinking and creative approach toward professional activity become the part of the educational process when employers take active part in working out the effectiveness indicators of the innovative professional education programs. Moreover, at the stage of developing professional modules for new Applied Bachelor programs these modules are agreed with the employers. All this helps to make the content of the educational program corresponding to the modern professional standards.

## 8. Acknowledgements

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## 9. References

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