

Information-educational environment as a means for developing projecting competence of future elementary school teachers

El entorno de información educativa como medio para desarrollar la competencia de proyección de los futuros maestros de escuela primaria

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ABSTRACT:

The article is aimed to theoretical and practical justification of information-educational environment model as a means for developing projecting future elementary school teachers competence. The model is provided by a range of pedagogical conditions: Smart-learning principles, IT solutions, imitative modeling of pedagogical situations. The study involved 578 students of South Ural State Humanitarian Pedagogical University. Experimental data allow for the conclusion that developing projecting teachers competence is possible if the educational process is carried out with account of model and pedagogical conditions.

Keywords: information-educational environment; projecting; projecting competence; elementary education; elementary school

RESUMEN:

El artículo tiene como objetivo la justificación teórica y práctica del modelo de entorno de información educativa como un medio para desarrollar la competencia futura de los docentes de primaria. El modelo es proporcionado por una variedad de condiciones pedagógicas: principios de aprendizaje inteligente, soluciones de TI, modelado imitativo de situaciones pedagógicas. El estudio involucró a 578 estudiantes de la Universidad Pedagógica Humanitaria del Estado de Ural del Sur. Los datos experimentales permiten concluir que el desarrollo de la competencia proyectual de los docentes es posible si el proceso educativo se lleva a cabo teniendo en cuenta el modelo y las condiciones pedagógicas.

Palabras clave: Entorno de información educativa; saliente; capacidad de proyección; educación elemental; Maestra de primaria.

1. Introduction

Higher professional education today sets up new requirements prescribing the necessity of

innovative approach to the problem of the formation and development of future specialists' professional competences. The most important component of a future teacher's professional competence is projecting competence allowing the teacher to forecast possible changes in educational process and to efficiently use pedagogical innovations. With that, special attention is paid to future elementary school teachers' projecting competence development allowing them, according to Occupational Standards for Teaching, to perform "pedagogical activity in projecting and implementation of educational process in educational establishments of elementary school education" efficiently (Occupational Standards for Teaching, 2015).

According to the requirements of the Federal Law of the Russian Federation "On Education in the Russian Federation", the realization of professional programs in higher education requires the development of "certain conditions for information-educational environment functioning as a system of electronic, informational, and educational resources" (The Law "On Education in the Russian Federation" FZ-273, 2012). Information-educational environment created at a pedagogical university with the use of high tech informational support tools will result in the development of future elementary school teachers' projecting competence. The significance of the aforementioned problem is emphasized in legislative acts such as the Federal State Educational Standard of Higher Education (The Federal Policy on the Development of Higher Education for 2011-2015 years), The National Doctrine on Education in the Russian Federation to 2025 year (National Doctrine on Education in the Russian Federation for the period till 2025), "Our New School" National Educational Initiative ("Our New School" National Educational Initiative, 2010), The Federal Policy on the Development of Education in the Russian Federation Concept for 2016-2020 years (The Federal Policy on the Development of Education in the Russian Federation Concept for 2016-2020 years), Occupational Standards for Teaching (Occupational Standards for Teaching, 2015).

The problems of development of future teachers' professional competences in the context of higher education are represented in some papers (Ángel De-Juanas Oliva, Rosa Martín del Pozo y Encarnación Pesquero Franco 2016; Bumazhenko, Danich, and Kartashev 2013; Gafurova, Umarova and Sharonov 2012). Several investigations introduce the characteristics of various aspects of projecting competence development in professional training (Lesley dePutter-Smits, Ruurd Taconis, Wim Jochems, and Jan Van Driel 2012; Marycheva 2008; Sorokina 2010). Some of the papers are dedicated to the process of future elementary school teachers' professional competences development (Jia Rong Wen y Wen Ling Shih 2008; Andrionova 2013; Lyfenko 2013). The problem of information-educational environment modeling in higher education establishments is shown in the following works (Sally Caird y Andy Lane 2015; Rubtsov and Ivoshina 2002; Sosedov 2000; Sukhloev 2004).

However, in the present context, disregarding significant material accumulated in professional education theory and practice, the problem of the development of information-educational environment as a means for developing projecting competence of future elementary school teachers is not covered enough. It is not questioned that the main reasons of the problem are the following:

- The lack of grounding in existing psychological and pedagogical investigations of the process of information-educational environment as one of the efficient means for developing projecting competence of future elementary school teachers;
- Insufficient extent of theoretical, methodological, and practical research of the process of information-educational environment modeling as a means for developing projecting competence of future elementary school teachers;
- Immaturity of substantive aspect of the problem of information-educational environment modeling in the process of the students' projecting competence development.

With the aforementioned reasons in mind, the urgency of the subject is defined by:

- At *governmental and strategic level* – by the rise of requirements to future elementary school teachers' professional training and permanent complication of their professional activity;
- At *social and pedagogical level* – by the trends in higher professional education system development showing the necessity of future elementary school teachers' projecting competence

- development with the use of advanced information technologies;
- *At theoretical and methodological level* – by insufficient research in theoretical fundamentals of the process of information-educational environment modeling as a means for developing projecting competence of future elementary school teachers;
- *At scientific and methodological level* – by the need of more substantial and thorough development of the scientific and methodological support of the process of future elementary school teachers' projecting competence development with the use of information-educational environment.

After analyzing some philosophical, scientific-methodological, psychology-pedagogical papers and studying own practical experience in higher education establishment, the subject has been set. The very core of the subject lies in the resolution of the conflict between modern society's higher requirements of a high-quality training for future elementary school teachers' expected to possess a high level of projecting competence development; and insufficient extent of scientific-methodological and theoretical-methodological research of the competence efficient development with the use of information-educational environment.

The significance of the subject and its insufficient extent of research in professional education theory and practice determined the present research objective which is to develop, to find theoretical grounding and to implement a structural-functional model of information-educational environment as a means for developing projecting competence of future elementary school teachers, as well as to elicit and test the set of pedagogical conditions of the model efficient functioning.

The investigation course was determined by a hypothesis whereby the extent of future elementary school teachers' projecting competence development will rise if:

– *First*, to develop and implement a structural-functional model, which:

- 1) It is formed on system-environmental, activity-related and competence-contextual approaches;
- 2) It includes three interrelated components characterizing information-educational environment content: informational, operational, material;
- 3) It contains three interdependent units with some fixed fundamental links between main structural elements of projecting competence development process: substantive and methodological, activity-related and technological, and evaluation and resultative;
- 4) It is implemented with regard to the principle of integrity, hierarchy, as well as the leading role of the education process participants teamwork; psychological and pedagogical support of future elementary school teachers' personal involvement; the development of students' ability to solve professional problems independently, and sequential modeling of content and future elementary school teachers' professional activity conditions in various fields of studies;

– *Second*, to identify and realize the following set of pedagogical conditions of the developed model efficient functioning:

- *substantive and organizational conditions*: a) the process of future elementary school teachers' training involves the principles of Smart-learning; b) future elementary school teachers' work is focused at the use of advanced information technologies;
 - *Activity and competence-related conditions*: a) a future elementary school teacher's shift from objective to subjective position is provided; b) imitation modeling of pedagogical situations.
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2. Methods and Materials

The need of structural-functional model development may be explained by the fact that, currently, the defined problem is not represented in pedagogical theory and practice. Thus, we decide on the theoretical grounding and experimental testing of the model developed.

To develop an information-educational environment model as a means for developing projecting competence of future elementary school teachers we chose three approaches: system-environmental, activity-related, and competence-contextual. Thus, the system-environmental approach defines the internal structure of the process of information-educational environment formation as a means for developing projecting competence of

future elementary school teachers, it provides the sequence of the investigated process, discovers the process makeup and its intrasystem links, as well as contributes to the creation of conditions close to professional activities of future elementary school teachers. Activity approach involves professional activity modeling in the process of information-educational environment development as a means for developing projecting competence of future elementary school teachers, is based on the teacher's and the student's activities media and results, as well as their interaction within correspondent activities aimed at developing future teacher's professional (projecting) competences. Competence-contextual approach allows characterizing structure and specific features of information-educational environment as a means for developing projecting competence of future elementary school teachers in the context of their further professional activities.

The model we developed includes three interrelated components characterizing the content of information-educational environment: informational, operational, material; contains three interdependent blocks specifying consistent basic interrelations between structural elements in the process of developing projecting competence: substantive and methodological, activity-related and technological, evaluation-related and resultative.

Each of the aforementioned blocks and components is a part of the model that provides achievement of the common objective by specifying function, methodology and result of this or that block and component realization.

The informational component defines all further components and blocks of structural-functional model, their interrelations and the result of the model development. Informational component should be defined as each system model development first of all starts with setting goals for the model development. As a model development goal the process of developing projecting competence of future elementary school teachers in the context of information-educational environment is considered. Informational component of structural-functional model provides acquisition, processing, reprocessing, and preservation of information obtained by future elementary school teachers in the context of information-educational environment with the use of the worldwide computer network; study guides; electronic-educational resources, etc.

This component, therefore, implements informational function that is connected to efficient and proper usage of the world-wide information computer network, teaching tools, electronic learning resources, and scientific electronic library providing quick access to normative and methodological documents regulating educational process at elementary school.

The operational component is characterized by a range of operations providing an opportunity to process, reprocess and store the information obtained by future elementary school teachers in the context of information-educational environment. The component represents specificity of target-oriented, substantive-processual and evaluation-resultative stages of pedagogical project developed by future elementary school teachers in the context of information-educational environment; the component main objective is to consistently implement all project stages: from the choice of the subject and its grounding to presentation of the project in the form of a document given in written or electronic form.

Thus, the operation component performs the constructive-substantive function that consists in detailing pedagogical project (structural analysis of Federal State Educational Standard for Elementary General Education, specifying core educational program (CEP) scheduled results, selecting didactic units, designing thematic planning, etc.).

The material component provides a range of logistic and information resources essential for realization of students' future professional activity. The material component main elements are: the university campus, computer and networking equipment, software ("Electronic Model of Primary General Education Content" (EMPGEC); electronic textbook "Federal State Educational Standard: Primary Education Content" (Fortygina 2012)) essential for future elementary school teachers for their further professional activity. The "Electronic Model of Primary Education Content" software represents an interrelated data set that is formed and used by an elementary school teacher in projecting, realizing and assessing primary education content assimilation (Leonova 2011).

The software and material security function consists in developing innovation complex of material security of the process of developing projecting competence of students.

The substantive-methodological unit represents specificity of the future elementary school teachers training process content aimed at developing projecting competence elements of students in their hands-on training. The substantive aspect of the given component is characterized by a comprehensive module program that includes three modules: information-analytical, projecting-practical, reflexive-evaluative. Information-analytical module allows students obtaining primary information on primary general education core program structure, types of the results planned and for universal learning activities (ULA), etc. The projecting-practical module is aimed at developing projecting competence of future teachers in the process of solving a pedagogical problem. The third one – the reflexive-evaluative module – is dedicated to realizing personal projecting activity by future teachers in order to assess and correct implementation of learning operations aimed at eliminating all shortcomings emerged. Within the frameworks of implementing the comprehensive module program, the students learn the ways of pedagogical projecting, become familiar with types and forms of their efficiency evaluation.

Thus the substantive-methodological unit has two functions – those are of goal-setting and forecasting. The goal-setting function of the component involves setting goals whose achievement and implementation enables the process of information-educational environment model development. The forecasting function consists in forecasting, foreseeing and planning results of information-educational environment development as a means for developing projecting competence of future elementary school teachers.

The activity-technological unit reflects the specificity of interaction between educational process actors, including three stages: target-oriented, substantive-processual, and evaluative-resultative. Substantively, each of the aforementioned stages relates to the forms (lectures; seminars; individual work); methods of learning-cognitive activities of future teachers (projective work; reification; situation analysis); types of pedagogical projects developed by future elementary school teachers: "Developing Information-Educational System at Educational Establishment"; "Developing Primary General Education Core Program", "Developing Thematic Planning in Primary School".

In our model, the method of project-based learning involves students' actively using "Electronic Model of Primary Education Content" software, as well as methodological construction kits ("Planning Results" and "Thematic Planning"), "Developing Universal Learning Activities" and "Correcting Academic Subject Content" software.

The method of reification involves analysis and correction of various pedagogical projects developed both by individual elementary school teachers and teaching staff (subject work programs, primary education core programs, etc.).

The situation analysis method involves providing students with a learning task requiring analysis and making decisions in learning process based on theoretical knowledge obtained. In summary, it can be said that the method of situation analysis – imitation of those real-life situations which future elementary school teachers will inevitably face in practical teaching in general and every single class in particular. The leading organizational forms of educational process include lectures, seminars, and individual work.

Thus, the given unit is based on the following functions: modeling and projecting. The modeling function involves learning step-by-step operations required for developing pedagogical project based on the use of EMPGEC. The projecting function is connected to structure definition and content planning for pedagogical project based on the use of EMPGEC.

The evaluative-resultative unit defines the efficiency of development projecting competence components (information, operational, and individual) of future elementary school teachers in the context of information-educational environment that involves identifying correspondent criteria and indicators. The quality of the developed model functioning and of pedagogical conditions defined, depend on the following criteria: cognitive, technological, and subjective.

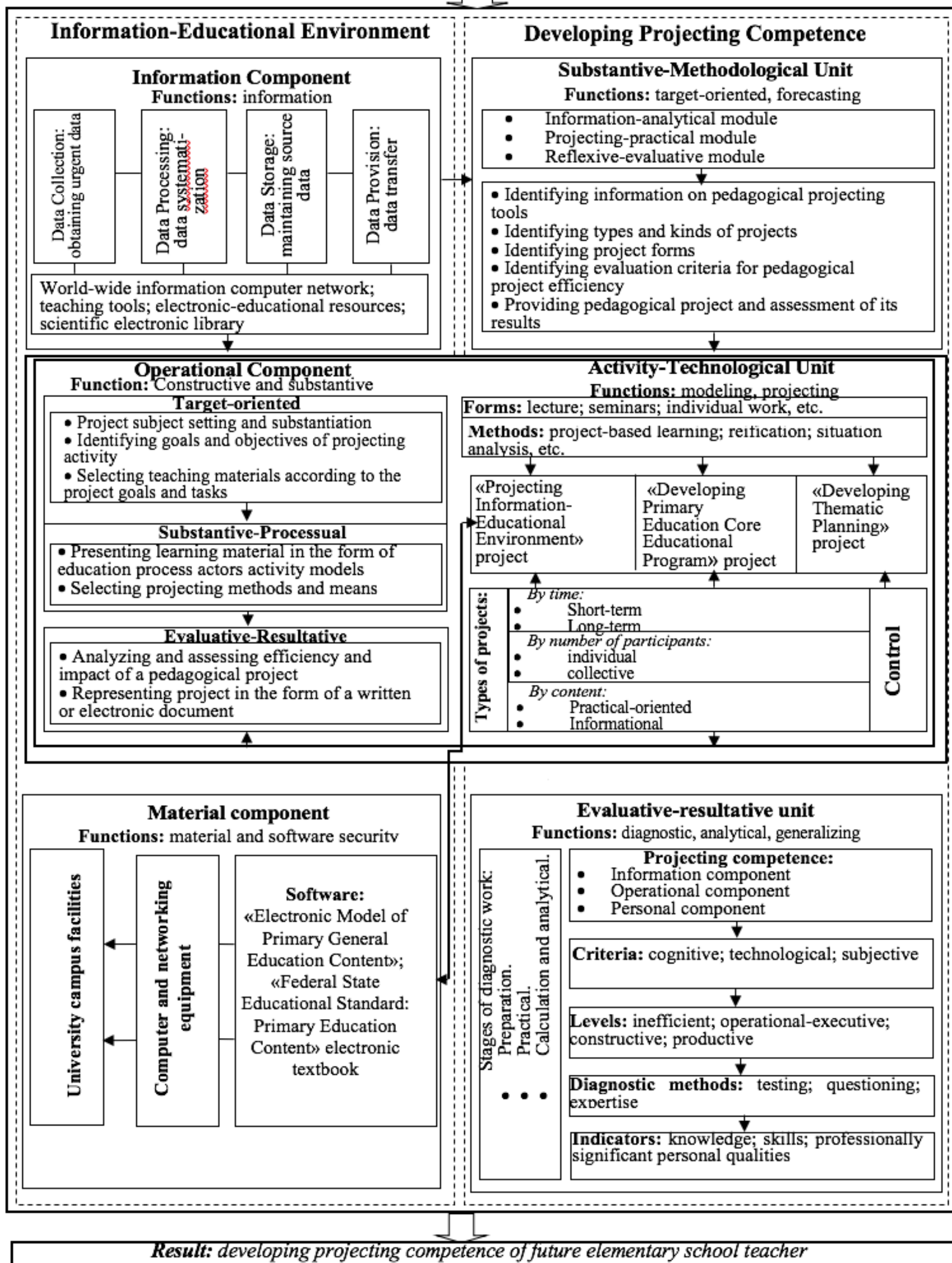
Moreover, in our investigation we define levels (inefficient; operational-executive; constructive; productive) and indicators (knowledge; skills; and professionally significant qualities) of future elementary school teachers projecting competence development. The resultative aspect of this unit is represented by a monitoring program including three stages of diagnostic work (preparation, practical, and calculation and analytical).

On the preparation stage, students set a goal, objectives, chose diagnostic tools, etc. On the practical stage they collected the data. On the calculation and analytical stage the future teachers analyzed the data obtained. The results of diagnostic work were recorded in expertise lists and protocols. The obtained data showed the extent of future elementary school teachers projecting competence development.

Therefore, in the context of evaluation-resultative unit the following functions are performed: diagnostic, analytical, and generalizing. The diagnostic function consists in identifying levels of future elementary school teachers projecting competence development. The analytical function consists in processing, interpreting and evaluating information obtained on the level of each student projecting competence development for implementation of further correction actions. The generalizing function enables final summarizing regarding efficiency of the model as a means of developing projecting competence of future elementary school teachers. Modeling information-educational environment as a means of developing projecting competence of future elementary school teachers is represented in figure 1.

Fig.1

Model for Information-Educational Environment as a Means for Developing Projecting Competence of Future Elementary School Teachers



According to developed structural-functional model the process of developing projecting competence of future elementary school teachers was built with defined pedagogical conditions taken into account.

The first substantive-organizational condition (*the use of Smart-learning principles in the process of future elementary school teachers training*) was performed through learning material that was based on Smart learning principles:

- Providing a future elementary school teacher with mobile access to Federal State Educational Standard of Primary General Education and supporting legal and methodological documents;
- Implementing individual working rhythm in studying of each legal document in Electronic model of primary general education content;
- Applying to interactive content in projecting thematic, calendar-thematic planning and technological maps of primary school classes;
- Creating a set of alternative planning for the same academic subject in a definite primary school education system;
- Editing sections (subsections) of Electronic model of primary general education content, formulation of the section title, setting the section properties: level of involvement, accessibility, number, adding didactic units to the section, establishing links with didactic units selected;
- Editing subject title (if necessary, its detailing in special insertion) and number of hours in projecting thematic planning of Electronic model of primary general education content;
- Imaging characteristics of primary schoolchildren activities according to result chosen from the EMPGEC;
- Identifying perspective forms of performing practical, assessment, and laboratory classes for developing primary schoolchildren cognitive concern.

The second substantive-organizational condition (*future elementary school teacher's work orientation to the use of advanced tools of information technologies*) was performed through a range of activities aimed at providing students with professional and pedagogical information in the form of a dialogue by means of regulating and giving access to information enabling each student's individual working style in obtaining and processing essential information. Interaction between the student and the software allowed not only watch his every action and operation during the tasks set, but to make essential changes in students learning activities. Students developed projects in such topics as "Projecting Information-Educational Environment at Educational Establishment", "Creating Thematic Plan for an Academic Subject within a Chosen Educational Program", "Developing a Primary General Core Educational Program". Characteristics of projects developed by future elementary school teachers are presented below.

Developing "*Projecting Information-Educational Environment at Educational Establishment*" project involved analysis of educational establishments websites, as well as their requirements to information-educational resources, analysis of the software provided (Electronic model of primary general education content; "Federal State Educational Standard: Primary Education Content" electronic textbook). Introducing the software was made in so called "dialogue" form that allowed not only see the result of each projecting action in the process solving the tasks set, but to make necessary changes in students learning activities. Such changes enabled each student's learning at his own pace that positively affected his work on information sources, and that resulted in saving time on information search.

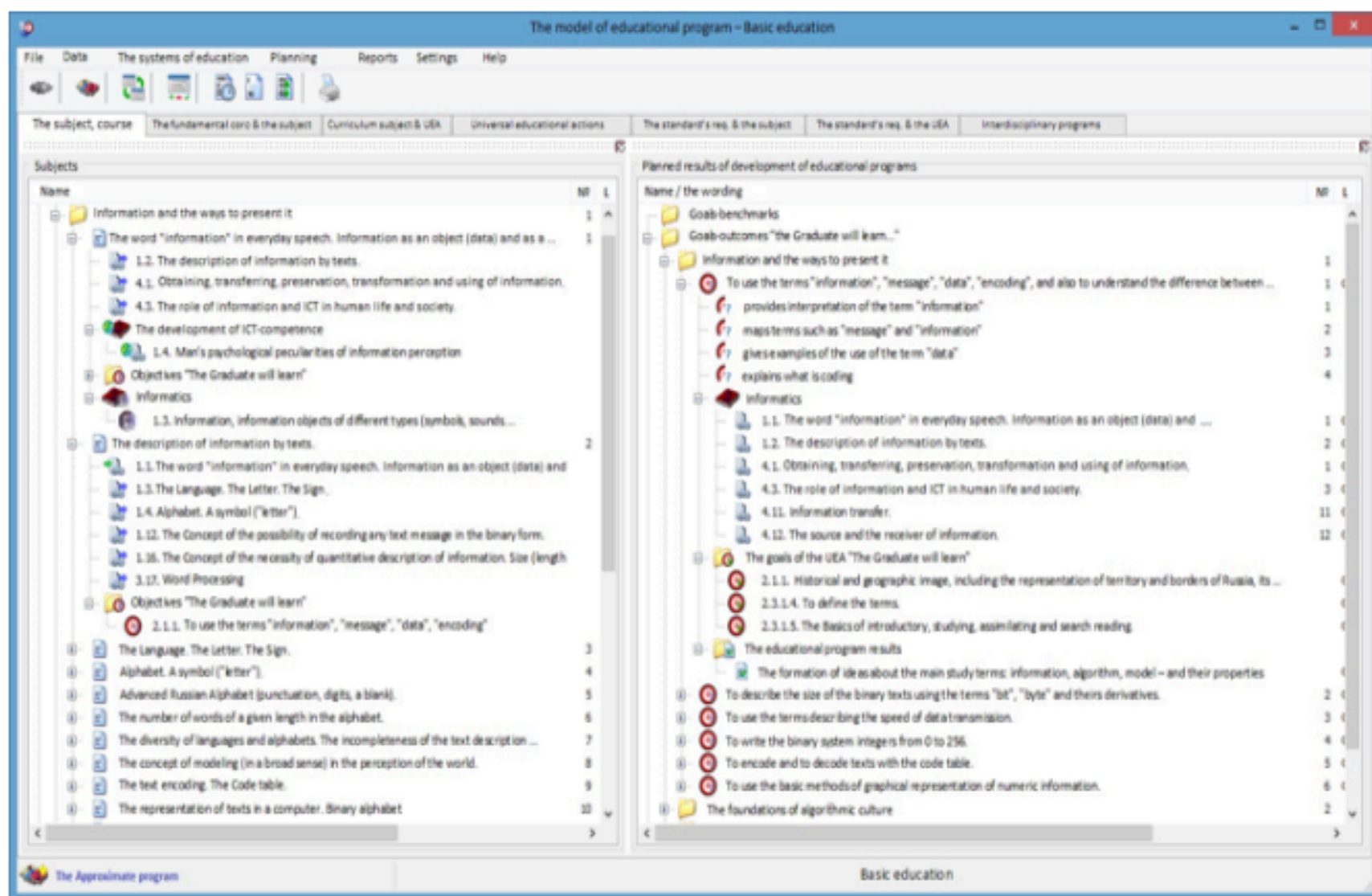
Implementing "*Developing a Primary General Core Educational Program*" project was performed in several stages. The first stage involved creating an explanatory note to Core Educational Program according to chosen primary general educational core program; defining school component content, structural elements of section "Program of Separate Academic Subjects and Courses" of the Core Educational Program; identifying interdependence of educational system and academic subject content; filling content of the program for developing healthy and safe lifestyle, as well as "Developing ULA Program" section. The second stage involved studying prospective metasubject and personal results in learning subject of the elementary education system chosen by the student; selecting indicators of the level of subject, metasubject, and individual ULA development based on working with EMPGEC "Developing ULA Program" section. Working on the project of "Basic Educational Program of the Primary General Education Establishment" is presented in Tables 1 and 2.

Stage 1	
Section developed	Actions
I. Explanatory note	1) Complete the introduction. Mind presenting the educational system concept (study guide) and provide the basis for the choice made. 2) Analyze requirements of the standard (results of the educational program acquisition) and, according to the chosen educational program concept, include the requirements of the school component.
V. Curriculum of separate academic subjects, or courses	1) Identify the structure of the section presentation and assign its units. 2) Define the relation of the academic subject content of educational program that is specified in the core educational program explanatory note, to approximate program in the context of EMEC.
IV. ULA program development	Complete the section units
VII. Program for the development of the culture of healthy and safe lifestyle	Complete the section units
Stage 2	
II. Scheduled results of acquiring the primary core educational program	<ul style="list-style-type: none"> ● Add new academic subjects, courses if that is provided by the educational system and the school specificity. ● Analyze schedule results on the educational program subject. ● Include the results of the school component to the electronic model. ● Insert the results of acquiring the educational program into the core educational program.
V. Programs of separate academic subjects or courses	1) Present thematic planning on the subject
IV. Program for the development of ULA	Complete the section units
VII. Program for the development of the culture of healthy and safe lifestyle	Complete the section units

The first activity-competent condition (*providing future elementary school teacher's transfer from objective to subjective position*) was realized through solving learning tasks in which the reasons of difficulties in those tasks solving were identified and registered: the choice of certain ways of projecting activities in the context of information-educational environment (subject statement; number of hours devoted to a chosen topic learning; filling the results of acquiring educational program, and characterizing schoolchildren activity; presenting results of acquiring ULA, and practical and control works). On the chosen program, the future elementary school teacher made up a program of a student's planned results, targets and goals, objectives of ULA ("The graduate will learn", "The graduate will be able") that aim the teacher at the level of the basic learning material acquisition expected of graduates. Specifically, the student defined his scheduled results that could deep and widen his

knowledge and perform as introduction to further learning of the subject (see Figure 2).

Figure 2
Electronic Model of Content of Education software main window



The second activity-competency condition (*imitative modeling of pedagogical situations*) was realized through imitation of those real pedagogical situations that future elementary school teachers will inevitably face in practice while projecting learning process in general and each lesson in particular. Before projecting calendar-thematic plan (see Figure 3) and technological lesson chart starts it is necessary to define: the results of acquiring learning program planned which achievement will provide the lesson content; characterizing the student's activity – a set of skills comprising the results planned; the planned results of ULA development; basic subject topics; subject topics which acquiring is based on knowledge and skills obtained on that topic; intersubject relations and relations between intersubject programs.

3. Results

The experimental work on efficiency of realizing our model and conditions of its effective functioning were performed from 2010 till 2015. The experiment involved 578 students of the Federal State Financed Educational Establishments of Higher Education "South Ural State Humanitarian Pedagogical University".

According to that goal, hypothesis and objectives of the research, the experimental work proceeded in three phases:

- 1) The stating phase of the experiment aimed at defining initial level of developing projecting competence of elementary school teachers in control and experimental groups according to criteria and indicators specified;
- 2) The developing phase aimed at approbation of the structural-educational environment model developed as a means for developing projecting competence of future elementary school teachers and a set of pedagogical conditions of its effective functioning;
- 3) The summarizing phase aimed at describing the course of experimental work, processing, analyzing, and summarizing the results obtained.

Taking into account the logic of developing scientific research, we shall note that the criterion of realizing the structural-functional model and the set of pedagogical conditions is in raising the level of developing projecting competence of future elementary school teachers. The given criterion in the form of a set of partial criteria (cognitive, technological, and subjective) is directly related to projecting competence development.

The level of future elementary school teachers' projecting competence development is shown on four basic levels: unproductive, operational-executive, constructive, and productive. The levels of projecting competence development characteristics are summarized below:

- The unproductive level – the projecting competence is not completely developed on the level of a simple intuitive presentation;
- The operational-executive level – the projecting competence is developed on the level of reproducing simple operations; the process of developing projecting competence requires algorithm;
- The constructive level – the projecting competence has error-free independent expression in the context of projecting activity;
- The productive level – the projecting competence is sustainably expressed in new non-standard conditions of the student's projecting activity.

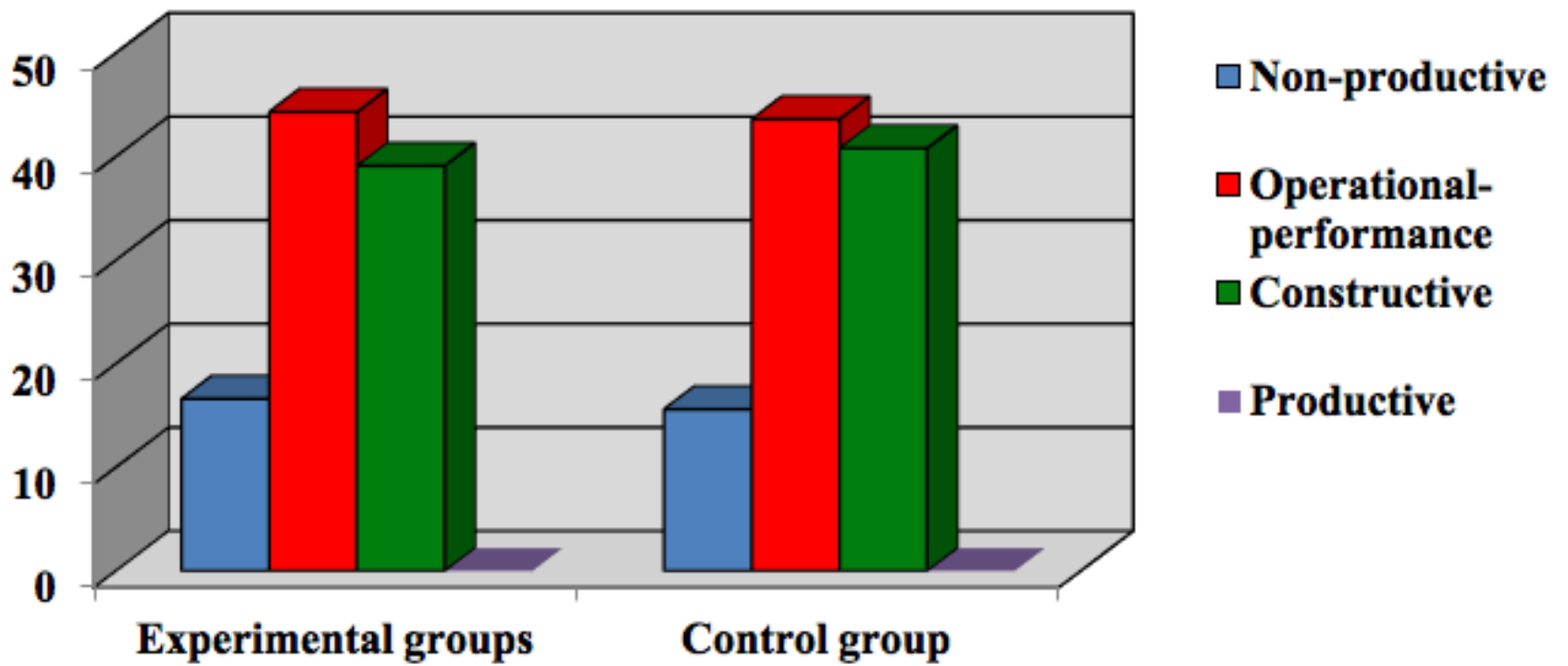
According to the experiment stating phase objective, we made a beginning-of-year assessment to assess the initial level of elementary school teachers' projecting competence development. The results obtained within the experiment stating phase in control and experimental groups were summarized in table 3.

Table 3
Beginning-of-year assessment data according to level of elementary school teachers' projecting competence development in control and experimental groups

Group	No. in group	Projecting competence development levels							
		Non-productive		Operational-performance		Constructive		Productive	
		Abs.	%	Abs.	%	Abs.	%	Abs.	%
CG	289	48	16,6	128	44,3	113	39,1	0	0
EG	289	45	15,6	126	43,6	118	40,8	0	0

The distribution of students according to levels of elementary school teachers' projecting competence development is clearly represented in Figure 4.

Figure 3
Results of the stating phase – the initial level of elementary school teachers' projecting competence development



Results obtained from a beginning-of-year assessment that assesses the development of projecting competence was fulfilled according to the same criteria and with a developed layered scale given in Table 4 taken into account.

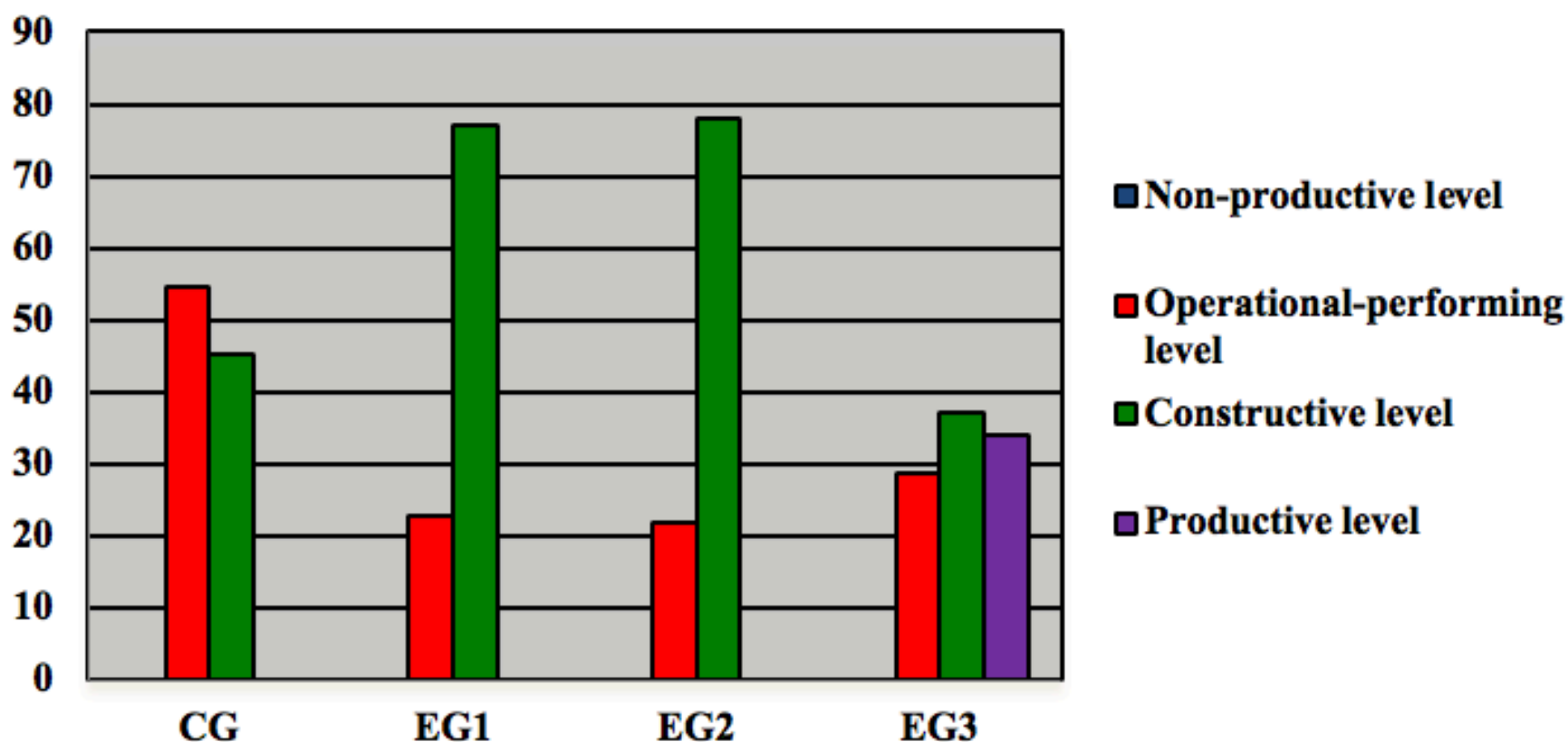
Table 4
Projecting competence development level at ascertaining and control stages of experiment

Group	No. in group	Projecting competence development levels (%)							
		Non-productive		Operational-performance		Constructive		Productive	
		Abs.	%	Abs.	%	Abs.	%	Abs.	%
CG	289	0	0	158	54,67	131	45,33	0	0
EG1	96	0	0	22	22,92*	74	77,08*	0	0
EG 2	96	0	0	21	21,87*	75	78,13*	0	0
EG 3	97	0	0	28	28,86	36	37,11*	33	34,03*

Note: * here and after reflects statistically significant differences between experimental groups with $P < 0.05$ (Pearson's chi-squared criterion)

The distribution of future elementary school teachers participating in experiment according to the level of projecting competence development according to the results of the end-of-the-year assessment are clearly represented in Figure 4.

Figure 4
Distribution of future elementary school teachers according to their level of projecting competence development based on end-of-year assessment test



Evaluating the effectiveness of the developed model and the set of pedagogic conditions in the context of the end-of-the-year assessment helped to define that in all experimental groups, opposite to the control ones, the number of students with constructive level of projecting competence development conclusively raised. Thus, in EG1 and EG2 the dynamics comprised accordingly to 77% and 78%. As for EG3 which, along with the developed model, implemented the whole set of pedagogical conditions, it showed a conclusive raise in number of students showing the productive level of projecting competence development (34 %; $P < 0.05$, Pearson's chi-squared criterion).

According to results of the end-of-the-year assessment, we shall note that the distribution of students according to the levels of projecting competence development in all four groups is significantly different. The table shows that in experimental groups, opposite to control ones, the number of students with constructive level of projecting competence development conclusively raised. With that the biggest raise of indicators was detected in EG3 whose students showed the productive level of projecting competence development.

4. Conclusion

Thus, developing projecting competence of future elementary school teachers at a higher education establishment is possible in case of providing educational process with the developed model specificity, as well as necessary pedagogical conditions taken into account. With that, the content of the study material can be absolutely different (different primary school educational systems; different kinds of exemplary learning-thematic plans; different content of academic subjects with a definite school specificity taken into account; different information on didactic unit of the chosen learning subject with the references to other didactic units, as well as planned results taken into account, etc.) that confirms the universal character of the structural-functional model.

References

- "Our New School" National Educational Initiative: approved by the President of the Russian Federation Dmitry Medvedev on 04. 02. 2010. No Pr-271. (2010). *Official documents in education*, 9, 5-12.
- Andrionova, D.L. (2013) Students Individual Work as a Means in Developing Professional Competences of Future Elementary School Teachers. *Students Science and XXI Century*, 10, 83-86.
- Oliva, Á.D.J., Pozo R.M.D & Franco E.P. (2016) Teaching Competences Necessary for Developing Key Competences of Primary Education Students in Spain: Teacher Assessments, *Teacher Development*, 2016, 20:1, 123-145. DOI: 10.1080/13664530.2015.1101390.

Bumazhenko, N.I., Danich O.V., Kartashev S.A. (2013). Developing Professional Competences of Future Teachers in the Context of Higher Professional Education. *Academy of Knowledge Bulletin*, 2 (5), 104-110.

Caird, S. & Lane, A. (2015) Conceptualising the role of information and communication technologies in the design of higher education teaching models used in the UK. *British Journal of Educational Technology*, 46 (1), 58-70. Recovered from: <https://www.learntechlib.org/p/150778/>.

Fortygina, S.N. (2012). Electronic textbook "Federal State Educational Standard: Primary Education Content" as a Tool in Improving the Quality of Future Elementary School Teachers Training. *Info-Strategy 2012: Society. State. Education. Conference information package*. Samara.

Gafurova, B.G., Umarova, M.M., Sharonov, S.I. (2012). Developing Professional Competence of Future Teachers as a Pedagogical Problem. *Studies of Khujand State University named after Academician*, 1 (29), 156-161.

Wen, J.R. & Shih, W.L. (2008). Exploring the information literacy competence standards for elementary and high school teachers. *Computers & Education*, 50 (3), 787-806.

Leonova, E.A. (2011). Electronic Model of Education Content as a Tool in Implementing Requirements of the Standard. *Public Education*, 2, 174-181.

De Putter-Smits, Lesley G.A., Taconis R., Jochems W. & Van Driel J. (2012). Analysis of Teaching Competence in Science Teachers Involved in the Design of Context-Based Curriculum Materials. *International Journal Of Science Education*, 34(5), 701-721. DOI: 10.1080/09500693.2012.656291.

Lyphenko, A.V. (2013). Developing Professional Competences of Future Elementary School Teachers in the Field of IT in Education. *Elementary School Plus: Before and After*, 4, 79-82.

Marycheva, L.E. (2008). Developing Projecting Competence of Future Teachers. *Cand. Sci. Dissertatio*. Shuya.

National Doctrine on Education in the Russian Federation. Retrieved from <http://www.lexed.ru/doc.php?id=3206#>.

Occupational Standards for Teaching. Retrieved from <http://img.rg.ru/pril/article/73/89/59/Standart.pdf>.

Rubtsov, V.V. (2002). Projecting Developing Educational Environment at School. Moscow: Moscow State University of Psychology and Education.

Sorokina, T.M. (2010). Developing Professional Competence of Future Primary School Teachers in the Context of Intersubject University Department. *Bulletin of Vyatka State University of Humanities*, 2-1, 127-129.

Sosedov, G.A. (2000). Projecting Professional Training of Specialists in the Context of Learning-Information Environment at Specialized Secondary Educational Establishments (as exemplified by a specialist in the sphere of commerce). *Abstract of Cand. Sci. Dissertatio*. Voronezh.

Sukhloev, M.P. (2004). Modeling Personally Oriented Learning Environment with the Use of Computer Technologies in the Context of Teaching Physics: *Abstract of Cand. Sci. Dissertatio*. Rostov-on-Don.

The Federal Policy on the Development of Education in the Russian Federation Concept for 2016-2020 years (approved by the Order of the Government of the Russian Federation of December 29, 2014. Iss. 2765-p) Retrieved from <http://www.garant.ru/products/ipo/prime/doc/70736882/#ixzz3aCvGZ6AK>

The Federal Policy on the Development of Higher Education for 2011-2015 years Retrieved from <http://fip.kpmo.ru/fip/info/13430.html>

The Law "On Education in the Russian Federation" FZ-273 of 29.12.2012. (2012). Moscow.

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