

Structural-Functional Model of Designing Individual Educational Path of Teacher's Professional Development in Conditions of Information Educational Environment

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•Received 15 May 2013 •Revised 29 July 2015 •Accepted 30 July 2015

Actuality of studied problem is due to constant modernization of teacher's professional development which depends on many factors and conditions aimed at identifying the reserve possibilities of professional qualified and competitive specialist. In this context, this article aims to develop structure the content of structural-functional model of designing individual educational path of teacher's professional development in conditions of Information educational environment. Leading techniques of studying this problem are theoretical analysis of the subject and the object of study; systematic analysis, psycho-pedagogical, methodological and scientific and technical literature on the areas of research; modeling and pedagogical experiment. The model presented in the article includes conceptual, technological assessment and effective units, as well as information component of the educational environment of teacher's professional development. The results of experimental work confirm the effectiveness of developed structural-functional model of designing individual educational path of teacher's professional development. Article submissions are of practical value for managers and employees of Centers of professional development when designing individual educational path of teacher's professional development.

Keywords: model, individual educational path, professional development, teachers, information educational environment

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doi: 10.12973/ijese.2015.266a

INTRODUCTION

In particular, there is a constant need for the use of modern information technology, development of new methods, techniques and professional activities in teachers work.

The problem of designing individual educational path (Loginiva, 2006) in the system of teacher's professional development is relevant in view of the fact that the education system more than any other social institution, needs a mechanism for continuous quality improvement and advanced development (Subetto, 2006). Quality of the professional development system should be guaranteed. This can be facilitated:

- purposeful change and add elements of information educational environment, which contain the innovations and qualitatively improve the characteristics of the individual components and the education system itself (Kalimullin and Vinogradov, 2012; Tutovskaya, 2008);
- designing individual educational path (Triapitsyna, 1994), as a systemic and targeted development of certain competencies of teachers in the process of continuing education;
- development of complex professional competencies (informational, educational, social, pedagogical, functional and methodical, diagnostic and consultative, constructive and creative, research, prognostic (Paaso and Korento, 2014).

Such opportunities may have structural and functional model of designing individual educational path of teacher's professional development including the model of optimal information educational environment (Shajhelislamov, Sharifzyanova & Shtreter, 2014; Sibgatullina, 2014), associated with the introduction in the educational process of distance and communication technologies, techniques using special digital educational resources: training manuals and electronic publications, computer-based training systems, multimedia audio and video learning materials (Salmon, 2000; Traxler, 2014).

It will help in the preparation of highly qualified specialists as active processes of self: self-education, self-knowledge, self-determination, self-government, self-improvement, self-realization, and self-development (Golovanova, & Sibgatullina, 2015). It promotes the development of a whole range of professional competencies: (informational, educational, social, pedagogical, functional and methodical, diagnostic and consultative, constructive and creative, research, prognostic. Their development allows the teacher effectively carry out its own educational activities for progressive creative self-development.

METHODOLOGICAL FRAMEWORK

Objectives of the study

The study addressed the following tasks: 1) to determine the theoretical, methodological and psycho-pedagogical preconditions of need to develop structural and functional model for designing individual educational path of teacher's professional development in conditions of Information educational environment; 2) to justify and design a structural-functional model of designing individual educational path of teacher's professional development in conditions of Information educational environment; 3) to design the components of the optimal Information educational environment related to the implementation of distance and communication technologies in the educational process.

Theoretical and empirical methods

To test the hypothesis has been used a complex of variety methods, complementing each other:

- *theoretical methods*: analysis and synthesis innovative teaching experience related to questions of teacher's professional development in conditions of Information educational environment, modeling method.
- *empirical methods*: (observation, questioning, testing, self-assessment, interviewing, ranking), ascertaining and forming experiments; method of collective peer review; analysis of documents (curricula and work programs, accounting documents); for mathematical processing results of the study used statistical software package Microsoft Excel XP for Windows XP, criterion χ^2 of Pearson and criterion of Student, correlation analysis of the relationship

Base research

The basis of this study was the Volga Region Center for Further Training and Professional Retraining of the Kazan (Volga Region) Federal University. In the experiment, was attended by 686 teachers.

Stages of the study

The study was conducted in three stages:

On the first stage (2012-2013) were determined theoretical and methodological approaches to the problem, developed a program of experimental work.

On the second stage (2013-2014) were carry out experimental work, were tested structural-functional model for designing individual educational path of teacher's professional development in conditions of Information educational environment.

On the third stage (2014-2015) were treated the material and results of the experiment, continued their discussion and implementation, completed the text of this article.

Evaluation criteria

Engineering Design teacher competence involves the development of complex of professional competences (information and self-education, social education, functional and methodical, diagnostic and consultative, constructive and creative, research, prognostic). Therefore, special attention in the research is paid to its development as one of the basic predetermines-those reflected the impact of other professional competencies. We have described, tested and presented in a series of articles diagnostic tools of assess the levels of formation of the designing competence of the teacher. (Shajhelislamov, Sharifzyanova, Shtreter, 2014). It contains a number of components: cognitive, operational, technological and creative.

Evaluation criteria

Cognitive component

The level of formation information and self-education component is characterized by theoretical training in the sphere of ICT and its usage in the professional teaching activities. The level of the developed cognitive component is determined through the test containing theoretical questions with the variants of answers and analysis of the questionnaire data.

Operational and technological component

The level of the component development is determined using an expert assessment of the results of performing different practical tasks. It was developed a database of professionally-oriented tasks for evaluation of formation component on the ascertaining stage of the experiment.

Creative component

We have used the adapted modification of the personal creativity test by Williams, the John-son's creativity questionnaire, the assessment test to determine the creativity level to diagnose the level of the developed creative component.

RESULTS

Description of structural and functional model for designing individual educational path of teacher's professional development in conditions of Information educational environment

The developed structural and functional model for designing individual educational path of teacher's professional development and implementation of opportunities of Information educational environment their design competence. It includes leading idea (as a goal and result the implementation of the capabilities of information educational environment in the system of professional development); stages of the process, the process means (to highlight the regularities of the process included a number of principles, methods and forms of organization of the process); organizational - pedagogical conditions for designing individual educational path of teacher's professional development in conditions of Information educational (Agarwal & Prasad, 1998).

Structural and functional model for designing individual educational path of teacher's professional development in conditions of Information educational environment meets the requirements of accelerating socio-economic development of society and modern pedagogical and information, communication technologies and based on the following approaches: student-centered, system-activity and competence.

The model consists of the following units: conceptual, technological and assessment and effective and reflect didactic and specific patterns of the learning process.

The conceptual block includes:

- principles: advanced training and professional and personal self-development, appropriate training objectives and types of professional activity, the gradual formation of skills, creative professional and practical orientation, humanization and learning motivation, continuity, integration and individualization;
- the purpose, objectives, content and types of individual educational trajectories (IET) of teacher's professional development;
- organizational - pedagogical conditions for designing individual educational path of teacher's professional development in conditions of Information educational environment (subjective-personal, educational, resource);

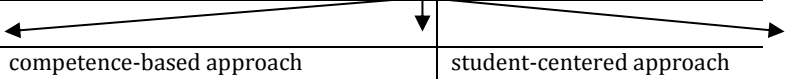
Technological unit includes:

- stepwise algorithm of designing individual learning paths, which consist or several of variability (profile, internships, post-cycle professional development and systematization of experiences) and invariant modules;

- methods and technological stages of organization of Information educational environment;
- stages of implementation of Information educational environment (IEE);

Assessment and effective unit:

- the types of individual educational trajectories (developing IEE, creative IEE, adaptive IEE);
- criteria for the designing of formation of competence of the teacher;
- as a result, effective organization of teachers training courses in the conditions Information educational environment (Figure 1).

Theoretical methodological bases for individualization the system of professional development in conditions of Information educational environment. (IEE)							
	scientific activity approach		competence-based approach			student-centered approach	
	Principles of designing individual educational path of the teacher						
	appropriate training objectives and types of professional activity	Outrun education	humanization and learning motivation	professional and personal teacher development	the gradual formation of skills	creative professional and practical orientation	continuity of integration and individualization
	Purpose: effective organization teacher's professional development in conditions of Information educational environment improving their information-communicative competence						
	Tasks						
	Effective design by teachers individual educational path of teacher's professional development in conditions of IEE			Teachers supply by IET knowledge		Updating the content of training courses, modules, programs and conditions of the Information educational environment	
	Organization and pedagogical conditions for designing individual educational path of teacher's professional development in conditions of IEE						
	Subject-personality (satisfaction of the professional and personal needs of teachers; ensuring the promotion of the teacher on IEE; development of subject activity in the performance of search and research on modeling of IEE and others)		Pedagogical (implementation by teachers algorithm of structural and functional models for designing individual educational path of teacher's professional development and implementation of opportunities of Information educational environment; use the designing model of competence and diagnostic tools assess the level of formation of competences, introduction of methodological support design individual learning paths of teacher's professional development in conditions IEE)			Resource (modeling the content training of distance learning courses, their methodical software in competence format (technique and technology design and implementation of modular distance education programs, etc., development of human resources training system and others), logistical support of the educational process)	
	Algorithm design individual learning paths teacher						
Meaningful	Substantial step invariant module → profile module →				Operationally-activity stage Development and		Assessment and effective stage → intermediate control

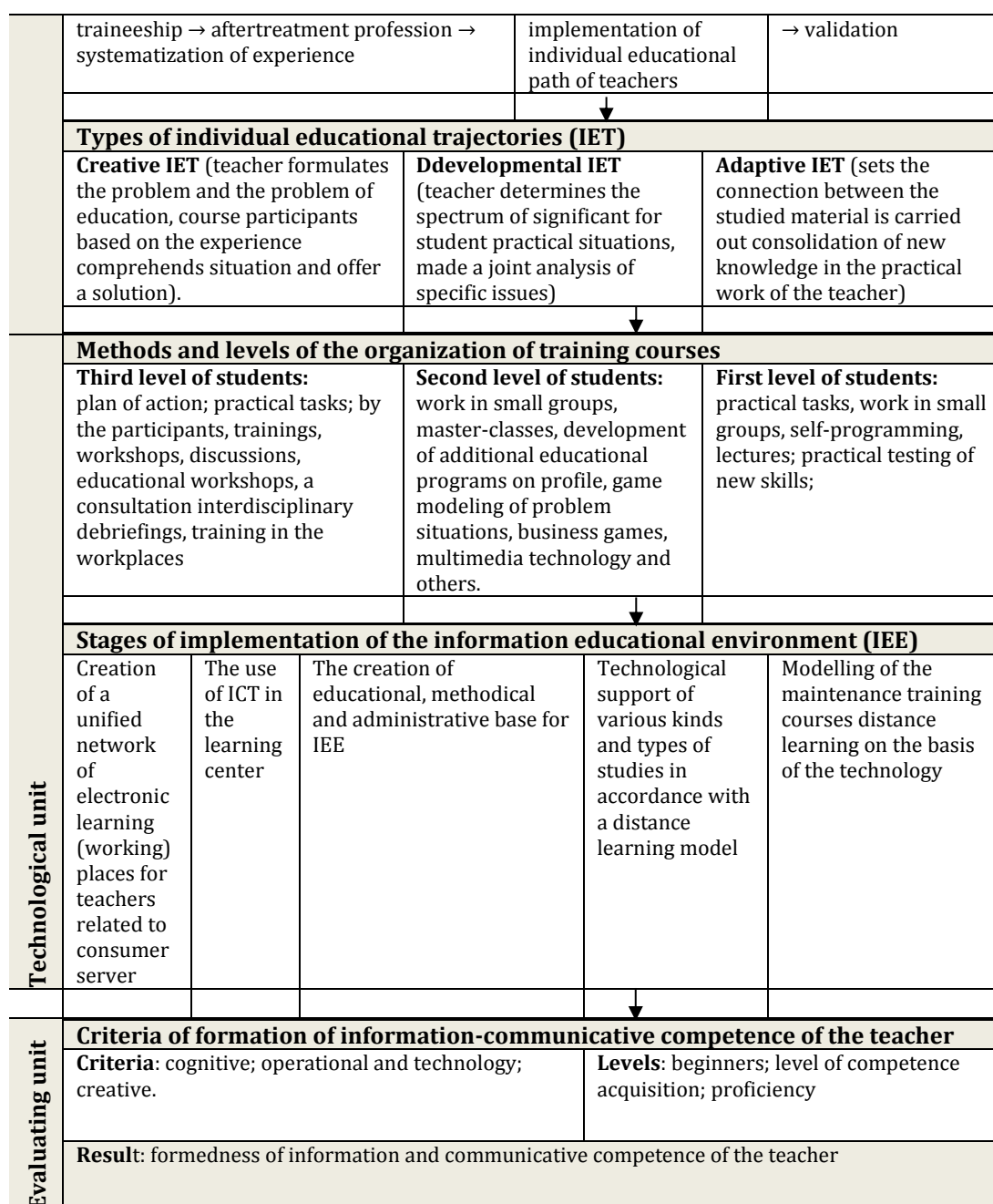


Figure 1. Structural-functional model for designing individual educational path of teacher's professional development and implementation of opportunities of Information educational environment

Thus, in the present model shows a set of interrelated and interdependent units. The main feature of this model is that it is a reference implementation of pedagogical conditions for designing individual educational path of teacher's professional development with optimal use of opportunities of Information educational environment as a means of intensification and optimization of the process of self-education and training and allows improving the level of teacher's competence of engineering design (Babanskii, 1982). The developed model helps teachers to choose optimal forms and modes of Trainings, program and program modules, assess and adjust their pedagogical skills.

Model of information educational environment of system of teacher's professional development

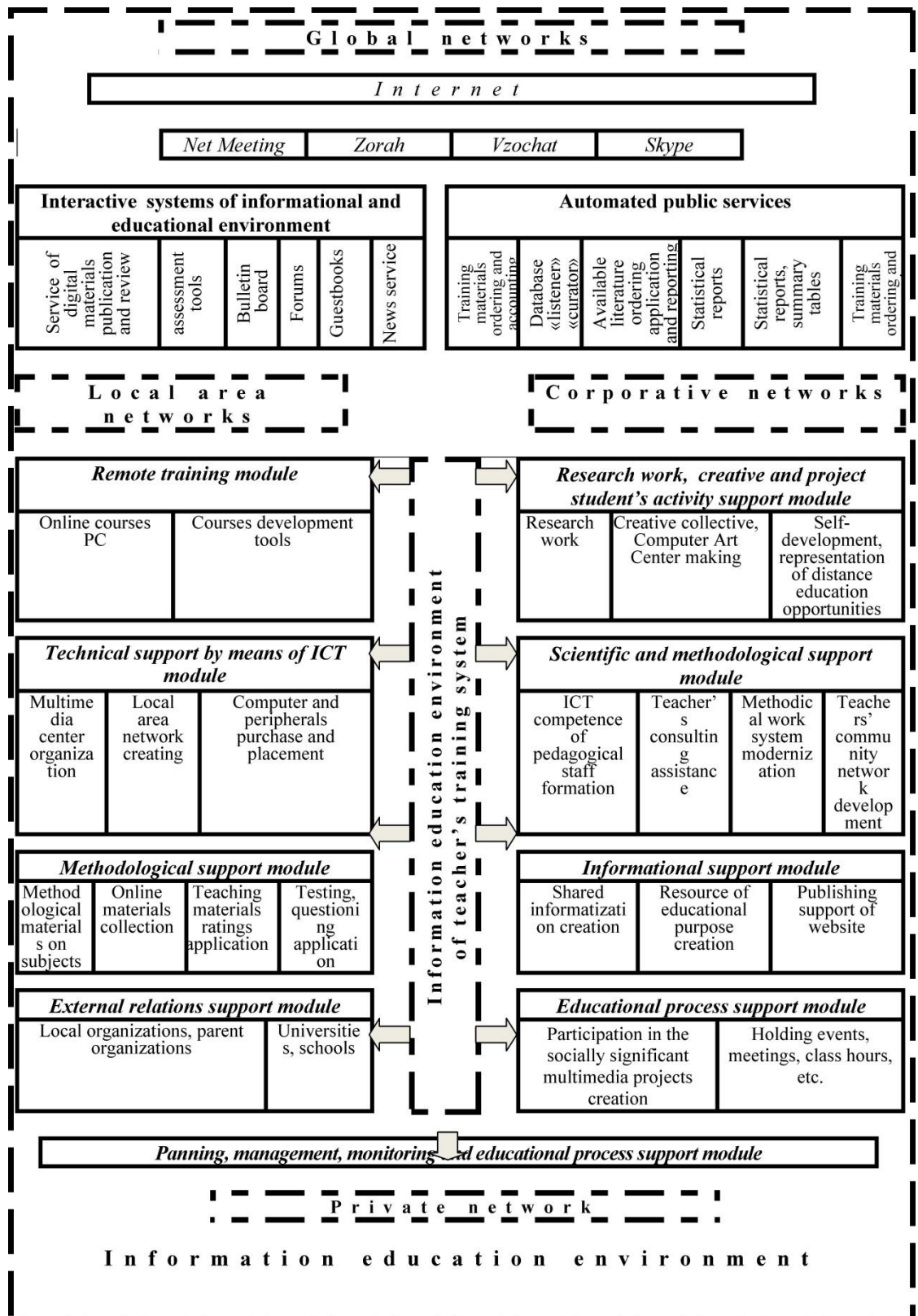


Figure 2. Model of information educational environment of teacher's professional development

Structural and functional model of designing individual educational path of teacher's professional development includes a model of optimal information educational environment, associated with the introduction of distance and communication technologies in the educational process. (Figure 2).

Under the educational information environment of teacher's professional development system we understand information content and communication possibilities of local, corporate and global computer networks generated and used by participants in the educational process for the development of effective communication.

The main objective of the creation of information educational environment in the teacher's professional development system is the formation of the designing of their competence by means of credit-modular training using interactive forms, methods and technologies of distance development of the information environment as a system of signs and symbols, information links forward and reverse character, diagnostic tools to identify the level of formation of the designing competence of teachers, rational organization of labor through the use of modern software tools of information in their professional activities.

Information system and database, presented in Figure 2 allow going over to a new paradigm «Education on the place of residence» and allows observing individual character education, geographical autonomy and operational cheapness.

The model is based on the presented above principles and functional roles and includes modules: the module of interactive services (enables a group of teachers work remotely on the texts and realize their need for communication tools); remote module of professional development (allows organizing professional development of teachers across the province (region, country); system of methodological support of teachers (provides them with diagnostic tools and teaching materials, testing system); services automation system of general education (provide process optimization and operational support of management information); automated functioning system (allows to organize the process of teacher's professional development from planning to issue certification documents) (Figure 2).

DISCUSSION

Theoretical analysis of pedagogical, psychological and normative documents; comparative analysis of the existing practice of continuing education; analysis design of pedagogical systems of teacher training allowed to come to the conclusion that the main problems impeding teachers to choose individual educational trajectory of professional development in conditions of Information educational environment are:

- lack of theoretical and methodological basis of the organization teacher's professional development in conditions of Information educational environment;
- insufficient level of development of the designing competence of teachers;
- unavailability of the existing system of training teachers for competence-oriented education in conditions of Information educational environment.

In addition, analysis of the existing forms of teacher training showed that this process is carried out in different educational institutions unsystematically. To date, there are no sufficiently effective methods for designing individual educational path of teacher's professional development in conditions of Information educational environment, including basic training and learning mode, specialization and profile, professional difficulties and their individual priorities.

The correction described shortcomings hinder prevailing in modern society socio-economic conditions consisting on the contradictions between:

- rapid development of information technology (hardware and software), potential of universities in technical support and the lack of educational

environment, which is aimed at the development of appropriate pedagogical techniques teachers;

- the desire of the majority of teachers study on a selected individual educational trajectory the existing system of professional development
- the need to build the system of teacher's professional development in conditions of Information educational environment and insufficient theoretical, organizational and methodological support of this process.

The above contradictions determine the relevance of this research to substantiate construction of structural and functional model for designing teacher's professional development in conditions of Information educational environment and its constituent elements.

CONCLUSION

The need for this study evolved from many years of work experience in the system of teacher's professional development. In which identified the theoretical and methodological, psychological and pedagogical background need for development of structural and functional model of designing individual educational path of teacher's professional development in conditions of Information educational environment. It was implemented design technology of designing individual trajectory of teacher's professional development with optimal use of opportunities of the information educational environment as a means of intensification and optimization of the process of self-education and training and its constituent units. We have experimentally confirmed the effectiveness of its influence on the development of a whole range of teacher's professional competencies: information and educative, social and pedagogical, functional and methodical, diagnostic and consultative, constructive and creative, research, forecasting. Structural and functional model of designing individual educational path of teacher's professional development in conditions of Information educational environment which also includes model information educational environment activates the processes of self: self-education, self-knowledge, self-determination, self-government, self-improvement, self-realization, and self-development. That allows the teacher effectively carry out independent educational activities for progressive creative self-development.

ACKNOWLEDGMENTS

The work is performed according to the Russian Government Program of Competitive Growth of Kazan Federal University

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