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THE FEATURES OF THE ANALYSIS OF THE INFRASTRUCTURE  
OF THE INFORMATION-EDUCATIONAL ENVIRONMENT BASED ON  
THE COGNITIVE MODELING TECHNOLOGY AND THE COGNITIVE MODELS

The informatization of the information environments of educational establishment and information centres of automated training is considered as a complex scientific problem, which causes the necessity of taking into account of a large quantity of diverse factors, related to the organizational, technical, program, methodological, personnel, statistical, economic, legal, consulting and other support, which initiates the creation and introduction of approaches, methods and technologies for the realization of the analysis and the increasing in the efficiency of functioning of their infrastructure.

The infrastructure of the modern information-educational environments of automated training is realized by the block-modular principle and is represents the integral set of various components directly interconnected with the traditional divisions of educational establishments of the higher professional education, in particular: the apparatus of rectory and its secretariat, the scientific and methodological council, the learning-methodical and the planning-analytical association, the dean's office, the chair, the learning and scientific-research laboratory, the library, the accounting and the personnel department.

The distance education represents the complex of educational services, provided on a certain geographically distributed territory by means of use of the means and environments of automated training based on the innovations in the field of information and communication technologies, allowing directly to generate and support the traditional, automated or virtual information-education environment, oriented on the end trainee by means of use of the linear, branched, hierarchical and adaptive models and algorithms.

The automated training is considered by many specialists as the difficult technological process of controlled formation of knowledge of the contingent of trainees, consisting in the generation of a sequence of information fragments in one or several subject areas, providing the increasing of the threshold value of the level of awareness taking into account the vector of various purposes, requirements, tasks and restrictions.

The developed cognitive modeling technology directly provides the complex system analysis of the object of research in the environment of its functioning, includes the previously formed modifiable set of the cognitive models, methods and algorithms, having a scientific justification in the context of various subject areas.

The iterative cycle of cognitive modeling technology includes the ordered sequence of stages of the system analysis: the identification (highlights the features of the object of research), the conceptualization (the conceptual and information model), the structuring (the scheme and structures of data), the formalization (the cognitive model), the system analysis (the first level of the structure of the cognitive model), the parametrical analysis (the second level of the structure of the cognitive model), the realization (the integration of the model into the environment of its use), the modeling (the modeling on a holistic approach), the analysis (tendencies, regularities and correlation) and the interpretation (the scientific justification of a posteriori data).

In the process of carrying out of the multi-view system analysis it is possible the expanding and reducing of the apparatus of the cognitive modeling technology by means of adding, modifying or removing a certain technique or algorithm based on its basis.

For the providing of the potential possibility of building of the structure of the cognitive model is recommended to use the algorithm of formation of the structure of the cognitive model based on the classical formal (the logical and productive models and corteges on domains) and nonformal (the frame model, the semantic network and the ontology), or one from the proposed innovative models of presenting of the previously structured data (the oriented graph, combining the theory of sets and the multi-level structural scheme).

The system analysis and the financial analysis are based on the information and system approaches, aggregate an extensive scientific theoretical and practical base for the organizing of the iterative process of research and the subsequent processing of a posteriori data.

As the information basis for the organizing and realizing of the complex analysis of the information-educational environment and the automated training system the data about the academic-performance and the testing of the individual features of the contingent of trainees, and also the primary reporting documents and registers with the facts of financial and economic activity of the educational establishment or the information centre.

The selection of techniques and algorithms in the basis of the cognitive modeling technology is carried out with taking into account the features of the process of research and the initial data of analysis: a set of purposes, tasks and restrictions; the formed conceptual scheme; the structured data, characterizing the object of research; the created or reconstructed cognitive model; the selected set of portraits; the kinds of properties and properties; the vectors of parameters and elementary parameters; the quantity of information links in the environment of usage; the possibility of expansion or reduction of the actual set of elementary parameters; the features of the methods of statistical analysis and the selection of scientific justification of the results.

The cognitive model represents the reconstructed (in width and depth) repertoire of parameters, echeloned on a set of portraits and stratified on a row of sets, which are located on two levels of the selected hierarchy: the first level – the kinds of properties and properties; the second level – the vectors of parameters and parameters.

For the system analysis and the justification of the efficiency of functioning of the information-educational environment the main elements of technology are proposed (the technique of using of the technology, the algorithm of formation of the structure of the cognitive model, the techniques of research of the parameters of the cognitive models, the cognitive model of the subject and means of training, a row of the additional cognitive models, the algorithm of processing of a posteriori data), and also a row of additional elements (the technique of formation of the regulatory base of the financial analysis, the technique of formation of the working plan of accounts, the technique of formation of the model of accounting, the techniques of carrying out of the vertical, horizontal and trend financial analysis based on the primary registers of accounting and accounting politics).

The system analysis of the automated training environment involves the consideration of a row of questions, related to the creation, servicing, modernization and the improvement in the efficiency of functioning of the infrastructure of the automated training system and its components based on the parametric cognitive models, actualizes the need of consideration of the scientific provisions of the theory of systems, mathematical statistics, theory of control, cognitive informatics, physiology of sensory systems, cognitive psychology, cognitive linguistics, the financial analysis, accounting and auditing.

The actual tasks of research should be includes: the revealing of the external and internal counterparties and the factors of influence on the process of functioning of the educational establishment or the information-educational centre; the analysis of the efficiency of work of each from the divisions of the organizational structure of the establishment; the analysis of the efficiency of functioning of the infrastructure of the automated training system and its components on the basis of the resultativity of the formation of knowledge of the contingent of trainees and the results of the financial-economy activity of the organizational structure; the carrying out of the vertical, horizontal and trend financial analysis of the organizational structure based on the data of the primary registers of accounting and reporting-documents; the creation and introduction of the adaptive individually-oriented means and environments training; the revealing of the physiological, psychological, linguistic and other factors of influence and the analysis of the efficiency of information interaction of the subjects and means of training; the modernization of hardware, software and brainware in the basis of the architecture of the adaptive and individually-oriented means of training; the specifics of application of the created electronic textbook based on the adaptive representation of information fragments processor; the features of development of the procedures of diagnostics of the parameters of the cognitive models in the basis of the applied diagnostic module; the specifics of the organization of testing of the level of residual knowledge of the contingent of trainees; the selection and improvement of the statistical methods of mathematical processing for the revealing of tendencies and dependences; the development of recommendations on the improvement of infrastructure of the educational establishment, the information centre and the technical means of training.

The practical use of cognitive modeling technology showed the relatedness of the system technical and the financial economic analysis, its potential possibility of application for the realization of the analysis of an arbitrary object, process or phenomenon in the various subject areas and problem environments (the infrastructure of the information-educational environment, the information interaction of the subjects and means of training in the automated training system, the influence of diverse factors on the efficiency and resultativity of the process of the formation of knowledge of the contingent of trainees).

The application of the cognitive modeling technology in relation to a certain object of research is carried out on the basis of the proposed technique of its use.

At the stage of identification the primary analysis of the information-educational environment is realized: the regulatory-technical documentation and experts are selected for the support of possibility of the system analysis and the scientific justification of received results, and then the primary information model or process diagram is developed.

At the stage of conceptualization the information model is structurally decompressed on a set of interconnected components, performing a certain functions and solving a different problems, and then a certain quantity of portraits, having a various scientific justification for the forming of the structure of the cognitive model.

At the stage of structuring the potential significant connections between diverse elements of the information model are carried out and the structural schemes of components of the information-educational environment as the objects of research are formed.

At the stage of formalization one from the classical or innovative models of presenting of the structured data is selected with the purpose of formalization of the obtained structures by means of the cognitive models for the providing of correct visual and analytical interpretation, and each cognitive model includes a theoretical set of portraits, the kinds of properties and elementary properties, the vectors of parameters and elementary parameters.

At the stage of structural analysis the verification and reconstruction of the first level of the structure of the cognitive model is provided: a set of portraits, the kinds of properties and properties.

At the stage of parametric analysis the verification and reconstruction of the second level of the structure of the cognitive model is realized: the vectors of parameter and elementary parameters.

At the stage of realization the formation of the actual set of parameters in the basis of the practical cognitive model is carried out, its integration into the basis of the environment of research or modeling environment and the subsequent diagnostics of the values of all its parameters is provided.

At the stage of modeling the modeling, based on a holistic approach is realized.

At the stage of analysis the mathematical methods for the statistical processing of data are selected, the statistically valid tendencies, regularities, dependences and relationships are selected.

At the stage of interpretation the presentation of the cognitive models and a posteriori data to the competent experts and scientists in the context of different subject areas are carried out.

At the stage of synthesis the significant and scientifically justified tendencies, regularities, dependences and relationships for the realization of modernization of the object of research are aggregated.

Since 2003 y. in the course of scientific-research work it was possible to independently systematize a posteriori data and to form the apparatus of the cognitive modeling technology: it was prepared the dissertation and the report on SRW (2006 y.) and two monographies "The features of evolution of the theory of information and information technologies on a threshold of the XXI<sup>st</sup> century" (2004 y.), "The environment of automated training with the properties of adaptation based on the cognitive models" (2005 y.). The apparatus of the obtained technology and the mathematical processing of data using the statistical methods allows to obtain a row of equations of multiple regression and the graphs of functions, characterizing the degree of contribution of the factors into the dependent variables.