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

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Annotation. It is considered the innovative unique cognitive modeling technology for the system analysis and the increasing of efficiency of the information-educational environments – the technique of its use, the algorithm of formation of the structure of the cognitive model, the techniques of research of the parameters of the cognitive models of the subject and means of training, the algorithm of processing of a posteriori data (results) of testing (research) and the complex of programs for the automation of research tasks (the system analysis), and also for the financial analysis and the increasing of efficiency of the organizations and enterprises – the technique of its use, the algorithm of formation of the structure of the cognitive model, the technique of formation of the information basis of the financial analysis of the organization, the technique of formation of the regulatory-legal basis of the financial analysis of the organization, 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 on the basis of the primary registers of accounting in the context of the approved accounting policy and the complex of programs for the automation of research tasks (the financial analysis).

Keywords: information-educational environment, cognitive model, automated (remote) training (at distance) system (environment), (unique) cognitive modeling technology, system analysis, financial analysis.

Аннотация. Рассмотрена инновационная единая технология когнитивного моделирования для системного анализа и повышения эффективности информационно-образовательных сред – методика ее использования, алгоритм формирования структуры когнитивной модели, методики исследования параметров когнитивных моделей субъекта и средства обучения, алгоритм обработки апостериорных данных (результатов) тестирования (исследования) и комплекс программ для автоматизации задач исследования (системный анализ), а также для финансового анализа и повышения эффективности организаций и предприятий – методика ее использования, алгоритм формирования структуры когнитивной модели, методика формирования информационной основы финансового анализа организации, методика формирования нормативно-правовой базы финансового анализа организации, методика формирования рабочего плана счетов, методика формирования модели бухгалтерского учета, методики проведения вертикального, горизонтального и трендового финансового анализа на основе первичных регистров бухгалтерского учета в рамках принятой учетной политики и комплекс программ для автоматизации задач исследования (финансовый анализ).

Ключевые слова: информационно-образовательная среда, когнитивная модель, система (среда) автоматизированного (дистанционного) обучения (на расстоянии), (единая) технология когнитивного моделирования, системный анализ, финансовый анализ.

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The informatization of the information environments of the educational establishments and the information centers of the automated training is considered as the complex scientific problem, which causes the need of accounting of a large quantity of diverse factors (parameters) relating to the organizational, technical, program, methodical, personnel, statistical, economic, legal, consulting and other support, that initiates the creation, introduction and use of the approaches, methods and technologies for the system and financial analysis and the increase of functioning efficiency of their infrastructure.

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

The distance education represents inside the difficult complex of educational services provided at the certain geographically distributed territory by means of using of the automated training means and environments based on the innovations in the field of the information and communicational technologies, makes it possible directly to generate and support the traditional, automated or virtual information-educational environment, oriented on the end trainee by means of using of the linear, branched, hierarchical and adaptive models and algorithms of training.

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

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

The information basis has the essential value for the specialists (experts) [1].

As the information basis for the organization and realization of the complex analysis of the information-educational environment and the automated training system are used the data about the testing of academic-performance and the diagnostics of the individual features of trainees [2], and also the primary reporting documents and registers with the facts of financial-economy activity of the educational establishment or the scientific (information) center [3].

The developed cognitive modeling technology directly provides the complex system [2] and financial [3] analysis of the object of research in the environment of its functioning, includes the preliminary formed modifiable set of the cognitive models, techniques and algorithms, having the scientific justification in the context of the various subject areas.

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

In the process of carrying out of the system and financial analysis it is possible to expand and reduce the developed apparatus of the (unique) cognitive modeling technology by means of adding, modifying or removing of the certain technique or algorithm in its basis.

The selection of the techniques and algorithms in the basis of the (unique) cognitive modeling technology is carried out taking into account of the features of the process of research and the initial data of analysis: a set of purposes, tasks and restrictions; the formed conceptual scheme (diagram); the structured data characterizing the object, process or phenomenon of research; the created or reconstructed defined parametrical cognitive model; the selected set of portraits (scientific justifications), the kinds of properties and elementary properties, the vectors of parameters and elementary parameters (the first and second levels of hierarchy); the quantity of important information links in the environment of functioning (using); the possibility of expansion or reduction of the actual set of information elements; the features of selection of the methods of statistical analysis and the scientific justification of results.

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

For the support of the potential possibility of building of the structure of the cognitive models it is recommended to use the algorithm of formation of the structure of the cognitive model based on the classical formal (the logical, production and corteges on domains) and nonformal (the frame, semantic network and ontology), or one of the proposed innovative models of presentation of the previously structured data (the oriented graph, combining the theory of sets, the multilevel structural scheme and others).

For the realization of the system analysis and the increase of functioning efficiency of the information-educational environment the basic elements of the created technology are proposed: the technique of use 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 and the algorithm of processing of a posteriori data [2].

For the realization of the financial analysis and the increase of functioning efficiency of the information-educational environment the basic elements of the created technology are proposed: the technique of use of the technology, the algorithm of formation of the structure of the cognitive model, the technique of formation of the information basis of the financial analysis of the organization, the technique of formation of the regulatory-legal basis of the financial analysis of the organization, the technique of formation of the working plan of accounts, the technique of formation of the model of accounting, the technique of carrying out of the vertical, horizontal and trend financial analysis on the basis of the primary registers of accounting in the context of the accepted accounting policy [3].

The system and financial analysis of the automated training environment involves the consideration of a row of questions related to the creation, support, modernization and the increasing of functioning efficiency of the infrastructure of the automated training system and its components based on the innovative parametrical cognitive models block, moreover, it is actualizes the need of consideration of the various scientific provisions of the theory of systems, mathematical statistics, the theory of automatic control, cognitive informatics, private physiology of sensory systems, cognitive psychology, applied linguistics, and also the financial analysis, accounting, and audit of the highly-integrated organizations.

The actual tasks of research (the system and financial analysis) should include: the revealing of the external and internal counterparties and factors of influencing on the process of functioning of the educational establishment or the scientific (information-educational) center; the analysis of the efficiency of the each of 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 based on the resultativity of the formation of knowledge of the contingent of trainees and the results of the financial-economy activity of the organizational structure of the establishment; the carrying out of the vertical, horizontal and trend financial analysis of the organization on the basis of the data of the primary registers of accounting and financial reporting; the creation and implementation of the adaptive individually-oriented means and environments of 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 the hardware, software and brainware and other support in the basis of the architecture of the adaptive and individually-oriented means of training;

the specifics of application of the created adaptive means of training (the electronic textbook) based on the adaptive representation of the sequence of information fragments processor; the features of development of the procedures of diagnostics of the parameters of the cognitive models of the subjects of training by means of use of the applied diagnostic module; the specifics of organization of the testing of the level of residual knowledge of the contingent of trainees by means of use of the developed basic diagnostic module; the selection and improvement of the various statistical methods of mathematical processing of a posteriori data for the revealing of different tendences, dependencies and regularities; the development of recommendations on the improvement of the infrastructure of the educational establishment, the scientific (information) center and the technical means of automation of training (at distance).

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

The list of used sources

1. Vetrov A.N. The features of evolution of the theory of information and information technologies on a threshold of the XXIst century [Text]: the attestation work in the form of scientific monography on the rights of manuscript (philosophical sciences) (spec. 01.02.01, 05.13.01, 05.13.10, 19.00.02 (19.00.03), 08.00.10) "To the 60th anniversary of "The Victory in GPW 1941-1945 y."" / A.N. Vetrov; "SPbSETU "LETI"". – SPb.: "SPbSETU "LETI"", 2004, M.: ""VINITI" of "RAS"", 2004, M.: "RAS", 2007, Riga: "The Lambert academic publishing" ("The OMNI Scriptum publishing group"), 2018. – 141 p.
2. Vetrov A.N. The environment of automated training with the properties of adaptation based on the cognitive models [Text]: the dissertation – the attestation work (in the form of scientific monography) on the rights of manuscript (techn., phys.-mathem. and med. sciences) (spec. 05.13.01, 05.13.10, 19.00.02 (19.00.03)) / A.N. Vetrov; "The S.-Petersburg.st.un-ty". – SPb.: "SPbSETU "LETI"", 2005, M.: "RAS", 2007, SPb.: "SPbSU", 2018, 2020. – 272 p. (256 p.).
3. Vetrov A.N. The cognitive modeling technology for the financial analysis and audit of the organization [Text]: the attestation work in the form of scientific monography on the rights of manuscript (economic sciences) (spec. 08.00.10, 08.00.12, 08.00.13, 08.00.14) / A.N. Vetrov; "SPbSETU "LETI"". – SPb.: "SPbSETU "LETI"", 2004, 2007, 2010, "IBI", 2004, 2007, 2010, "SPbSUE and F "FINEC"", 2004, 2007, 2010, "SPbSU", 2010, "SPbSEEU "INGECON"", 2010. – 352 p.
4. The scientific-educational portal of "AUT CMT SFA" Vetrov A.N. www.vetrovan.spb.ru [Electronic resource].