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This book includes abstracts of the 11th International Conference "Information Technology and Implementation (Satellite) – 2024". Philosophical, theoretical and applied aspects which describe the results, problems and prospects of the creation and use of intelligent computing methods and creating of information systems and technology on their basis are reviewing.

Main tracks of the conference are: Artificial Intelligence Technologies and Data Science, Cyberspace Protection Technologies, E-government, E-commerce and E-learning Technologies, Network, Internet and Smart Technologies, Software Engineering, Data Structures and Computing.

До цієї збірки увійшли тези доповідей 11-ї Міжнародної конференції «Інформаційні технології та впровадження (сателітної) – 2024». Розглядаються філософські, теоретичні та прикладні аспекти, які описують результати, проблеми та перспективи створення і використання інтелектуальних обчислювальних методів та створення на їх основі інформаційних систем і технологій.

Основні напрямки конференції: Технології штучного інтелекту та Наука про дані, Технології захисту кіберпростору, Електронне урядування, електронна комерція та Технології електронного навчання, Мережеві та Інтернет-технології, Розумні технології, Розробка програмного забезпечення, Структури даних та Обчислення.

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^{1,2} LLC "TECHNICAL UNIVERSITY "METINVEST POLYTECHNIC", Ukraine³ Donbas State Engineering Academy, Ukraine**CATEGORICAL-ONTOLOGICAL APPROACH TO THE MODELING AND FORMATION OF THE EDUCATIONAL PROGRAM "COMPUTER SCIENCE AND DIGITAL INTELLIGENCE"**

Abstract. The work is devoted to solving the problem of creating educational IT programs that meet both the requirements of the employer and the complex requirements of production. Improved traditional ontology modeling (which can be subjective) by applying category theory to add mathematical rigor and verifiability to ontological models. A model and algorithmic support was developed for the automation of the educational program formation for the master's degree in "Computer science and digital intelligence".

Keywords: categorical-ontological approach, modeling, educational program, computer science.

Modern educational programs, including in the field of information technologies, represent a complex conglomerate of disparate elements of educational content. Such programs are developed and operate in equally complex conditions to meet the demand of employers for the competence of future specialists and to meet the increasingly complex and demanding requirements of the production environment at the same time [1]. The educational program "Computer Science and Digital Intelligence" at the master's level requires saturation of its educational components with modules that, based on the results of their study, will enable masters to apply their understanding of the role and capabilities of information technologies and modern algorithmic support to solve complex problems of digitalization of business processes.

To develop and improve the educational program, the project group applied an ontological approach to modeling the subject area of educational activity [1]. The ontological approach is currently actively used by scientists and practitioners to formalize knowledge about the subject area [2]. However, its classical use causes a few problems. The results of ontological modeling are highly subjective, and the models themselves are often used simply as thesauruses or taxonomies. The purpose of the work is to use an ontological approach to the formalization of knowledge about the educational process during the formation of an educational program for training masters with various mini-specializations (minors) of training.

The development of the content of master's training in the field of IT requires the following tasks to be consistently performed: the formation of typical production functions according to the classifier of professions and economic activity types; determination of masters preparation level for the performance of the specified

functions and key competencies at this educational and qualification level; development of these competencies for the field of professional activity; the formation of skills that differ from the requirements for the skills of the bachelor; mastering the composition and content of disciplines, within which the necessary knowledge and skills are formed. To solve these problems, the results of the analysis of the subject area were presented in the form of a taxonomy of educational activities with selected signs of concepts. It became the first step on the way to building an ontological model for the formalization of goals, processes and objects of educational activity. At the same time, the ontological model, built in general form on the basis of accumulated information about the work of the subject area, has a number of significant shortcomings. When designing it, the analyst is not obliged to follow formal rules and restrictions. The quality of the ontological model depends on the effectiveness of the applied practices and is very subjective. Category theory (CT) has the most important opportunity to introduce mathematical foundations, verification of results, and demonstrative power of topological design patterns into the process of knowledge engineering. The mathematical apparatus of this theory allows you to develop commutative diagrams, including for the formalization of knowledge. According to the proposed approach, a categorical-ontological model of educational activity was developed using various objects and theorems of category theory. In part, this model was used to build an ontological model of the necessary knowledge, abilities and skills to formalize the content of education. The disciplines and their modules were used as specific content for master's training in the field of information technology development, formation and use of digital intelligence. This model has been populated with entity instances. Then, to its formal description, in the OWL/RDF language, queries in the Semantic Query Web Rules Language - SQWRL were applied. The use of such requests makes it possible to effectively form the list and content of disciplines and modules for teaching students the necessary competencies.

Conclusions. A competent approach to the organization of the educational process requires the development of a complex model of learning processes and objects participating in them, based on high-level abstractions. Representation using the categorical ontological approach of competencies, abilities and skills for the implementation of the educational process made it possible to systematize the plans and content of education. The methodology of information provision of educational and engineering activity received further development on the basis of construction and use of relevant ontologies and knowledge bases, organization of the educational process and standardization of education based on the categorical-ontological approach.

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