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T. Neroda, Candidate of Engineering Sciences, UAP, Lviv

MODELLING EDUCATIONAL DOCUMENTATION IN THE ENVIRONMENT OF COMPUTERIZED LEARNING SYSTEM

Proved the expediency, due to functional components and developed an analytical unit of modelling the typical kinds of educational documents, suitable for integration into computerized learning environment КоНаС.

Since its appearance, the information technologies not only have become the object of study themselves, but also opened the ways for the effective acquisition of competencies in various fields, including full involvement of computational tools in the educational process. To expand the boundaries of the introduction of such processes, today the means of knowledge representation in a convenient form for the student are actively being sought. Starting with the first text documents and then – hypertext and postscript documents, and ending with full network computer training systems with intelligent technology of presenting the information and analysis of learning results in environment of cloud computing services [8].

Meanwhile, National Strategy for the Development of Education in Ukraine further notes the slowdown of normalization of educational system, caused by the lack of unification of documentation in educational institutions in accordance with the principles of the Bologna Process, that deter the development of educational sector, suitable for current historical era [7]. Despite the fact that most part of the real academic documents belongs to the Commercial-printed blank production and that it's maintenance should be subject to the stringent requirements provided by state standards of Ukraine's documentation [4], the vast majority of similar types of specialized documentation of internal use of educational institutions continues to abound plenty of configurations, preventing in terms of integration of educational area to reduce the amount of unproductive repetitive, manual, but algorithmically salable actions [1].

Scientific and pedagogical aspects regarding the implementation specific of e-learning systems in higher education are discussed in works of scientists, such as: W.J. Hasson, H. Bekker, V. Bykov, R. Hurevych, A. Lytvyn, Y. Mashbyts, D. Riel' and others. But specialization features of information and communication technologies in such areas are still underdeveloped: first of all, it refers to the structuring of environment modelling of typical educational materials by available resources. Despite the fact that the issue of standardization of documentation in the fields of informatization and analysis on the integration of educational material in higher school was illustrated in researches of A. Yermolayeva, S. Kuleshov, K. Meteshkin, H. Rakovsky, A. Shelestova, V. Shynkaruk, Y. Yukhimenko, the problem of making a unified model of the circulation of similar types

of documents for further processing of amassed data of educational nature with the help of hardware, needs thorough study.

The analysis of means of documenting that are available in learning management systems used by many institutions [1], has shown a lack of affordable enough for today, uniform and widespread way of automated processing of complex training documentation with further preparation of commercial-blank printed materials in accordance with state standards [6]. That's why, the purpose of the presented study is to design an analytical apparatus that models the typical kinds of educational documents, an is suitable for integrating into the educational system ***KoHaC*** designed at the Department of Automation and Computer Technologies of Ukrainian Academy of Printing [1, 2, 8].

In such a client-server software environment of educational system, students are able to receive educational services of comprehension the required information components of the current discipline [3]: lectures, theoretical information to perform practical and laboratory works or a course / graduation projects. At the end of each unit of theoretical information are introduced the means of current control of student's competences according to the results of the study of the educational material including each content category, control means of student's mastering of theoretical part of the integrated knowledge from specific semantic module (modular control measure), introductory, semester control and residual knowledge control.

Thus, the components of *THE KNOWLEDGE BASE* used by the student, the academic *DATABASE* used for authentication and *BASIS OF DOCUMENTS* (figure) provides a computerized training system ***KoHaC*** all necessary information resources for modelling and subsequent printout of publishing and commercial-blank products of educational nature [9], in accordance with the approved documentation standards for educational institutions [4].

To generate the whole variety of types of educational editions and specialized accompanying printed materials in accordance with the accepted classification [3, 8] it was decided to integrate an appropriate procedural composing modules of educational documentation into the environment ***KoHaC*** (figure), coordinated with the help of cross-platform system interface based on cloud computing [1].

In particular, the projected *composing module of organizational documentation* is intended to include in the processes of academic documentation the operational information about the results of the student's certification due to the provided control measures in accordance with the existing categories of educational documents. Its main functions are based on generation algorithms of reduced and extended journal of students' certification, generating a report of the current success of students during the performance of each task with a detailed set of given and correct answers, modelling and farther printing of extended journal of certification – accidents with a list of the best results of evaluation of knowledge of each topic in particular and the total student's rate in general, in organized calendar grid by key dates, which is consistent with the normative sample [4] of documentation appropriate for educational institutions.

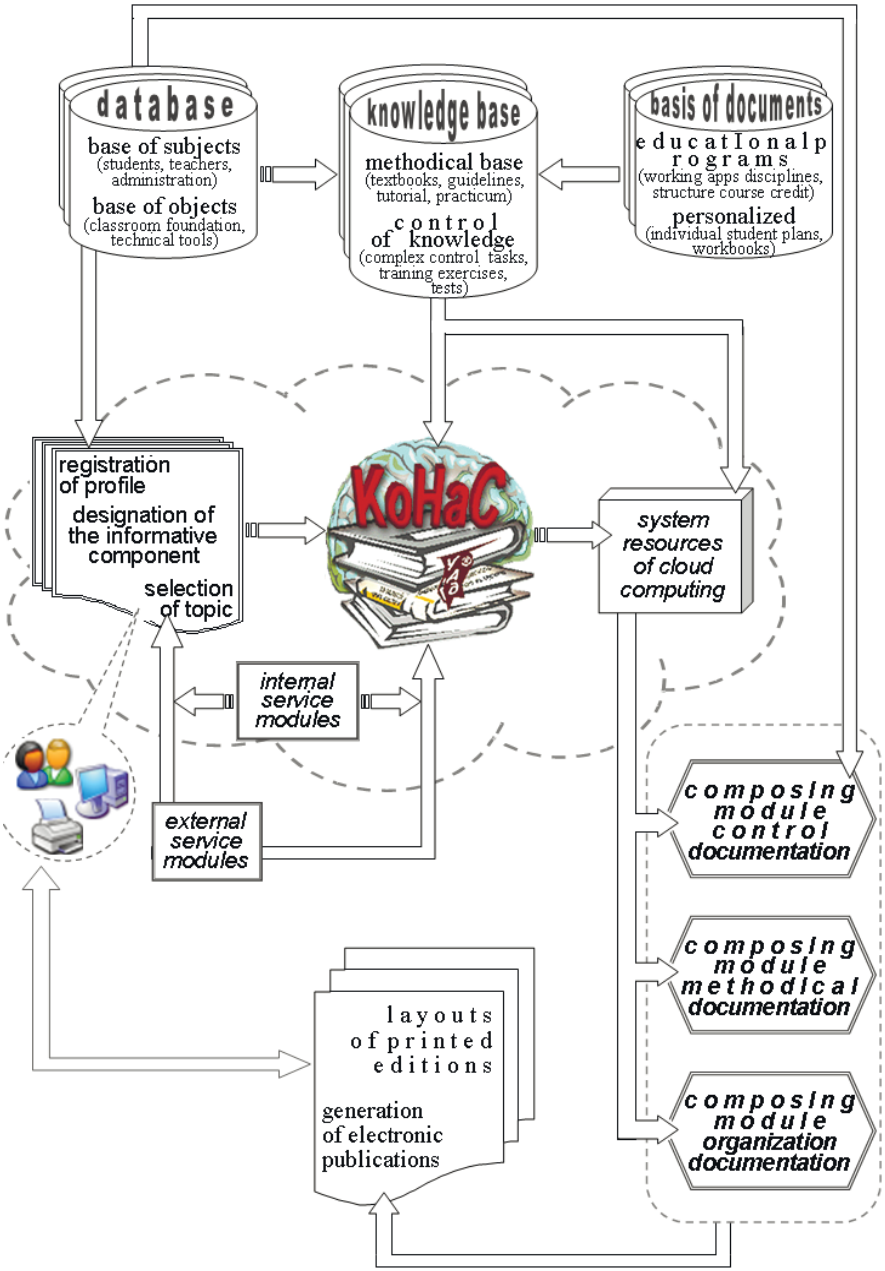

Fig. Structural scheme of analytical apparatus of the educational documentation's modelling

In the case of final control measures, whose organizing require documentation of materials, this procedural module implements a printout of the results of evaluation of knowledge with a list of code, weight, student's given and correct answers indicated for each task, and also with a total accumulated bonus and calculated according to him mark received on control measure [2, 3]. Printed paper document signed by the student and the teacher in accordance with applicable law kept beside written works in the archives of institution [6]. Projected software interface of *composing module of organizational documentation* must also provide end-user a preparation and printing of various excerpts, attachments and details of the success as a commercial-blank printing products according to the existent list student's marks in obedience to his individual curriculum.

The next component of the analytical apparatus of computerized training system *KoHaC*, *the composing module of methodical documentation* in accordance with the results of the original algorithm used to analyze the content of text arrays [8] provide great opportunities to adapt the explored material to the students' knowledge, resulting in the improvement of perception and memorizing of information: this adaptation is based on the use of the multilevel structure of educational edition: according to the results of the entrance test the package of materials is automatically generated for the student with available levels – basic and intermediate, and it represents the amount of his knowledge, with further automated control [1]. Later a model of such individual package of materials created with the help of educational system will be provided to the recipient in form of abstract. If it is more convenient for user to work not with a paper copy, but on a computer, but access to the knowledge base is not possible for some reason, the mathematical apparatus of *composing module of methodical documentation* can pre-prepare a "mirror" of discipline's site preserving the catalogs' structure for further careful study offline.

The main difficulty in the educational process is usually preparation of control knowledge. As noted, the considered educational environment *KoHaC* ensure the implementation of control measures at all levels of the previously prepared tasks, stored in the form of the original structure of the data in a general knowledge database. Appropriate processing of this data structure will allow simulating a full list of training exercises or a complex package of individual variants of tasks.

Considering that such variants should contain a set of single-type training exercises, the *composing module of control documentation* is based on the developed algorithm for the qualitative analysis of informative content of educational exercise including the interconnections of content elements and their relative importance in the structure of the text, and as a result, number of categories stands out. Thus, it is conducted the assembly of modelled frames, the optimization of its locating on standard-sized A4/A3 sheet's headlines according to the parameters of an existing printer [9]. Further folding and trimming can be performed in office conditions.

As follows, the reasonable procedural modules and designed software interface of analytical apparatus of modelling of the training documentation (figure) realizes the preparation of personally-oriented methodical maintenance and commercial-blank printed materials of educational quality control, that provides the automation of documentation and speeds the reporting and clerical work in the information system of educational institution.

The use of cloud computing services in this project coordinates the operational preparation of the set of training documents using modern mobile hardware in the local services of social infrastructures, regardless of the location of the recipient.

In further studies attention should be paid to improving the algorithm of semantic and morphological analysis of unstructured text sources methodical maintenance for modelling of educational documentation of innovative educational techniques – crosswords on the topic of the course, situational exercises (cases, quests) also the operative selection of adequate distractors and definition of criteria of virtual environment of interactive group projects.

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