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RESEARCH ARTICLE OPEN ACCESS

Interrelationships of Functional Indicators in The Learning Process

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ABSTRACT

The article is devoted to determining the interrelationships of a functional set of indicators in the learning process using ergonomics in calculating the quality of learning.

Keywords: Quality, ergonomics, mathematics, modeling, knowledge acquisition, design, functional, indicators, level, system, analysis, synthesis.

INTRODUCTION

The purpose of this research paper is to determine the functional relationships of the indicators involved in the design of educational systems using ergonomic modeling to calculate the quality of acquired knowledge.

Designing an educational process management system is one of the complex tasks that requires an opinion "from in female to suprema ale", i.e. "from the verbal level to the lower" of the learning system, determining the functional relationships of the indicators involved, for its implementation.

In the process of analyzing and synthesizing the educational process, in order to develop and create a system for optimal management of the educational process, in order to calculate the quality of knowledge acquisition, it is necessary to conduct research and determine the participation of components at all levels and stages of management.

Materials: This study needs to be conducted at four levels:

- at the first level of the training system, it is necessary to determine the topics, disciplines, and courses used in the educational process to train a specialist;

- at the second level, to establish functional relationships between the participating indicators: factors, properties and parameters for the organization of the learning process;

- at the third level, to establish a logical scheme of interrelation (LSV) between the studied topics, disciplines, courses;

- at the fourth level, establish an information relationship that will accumulate the acquired knowledge of students in the learning process.

To implement the above, it is necessary to systematically determine their relationships by levels in the system and theoretically prove their location using the theory of systems [1], their interrelationships [2].

And this requires the definition of the functional interrelationships of all the involved indicators of the learning process in the acquisition of knowledge, at each stage of the learning system, which: determines, finds, presents the necessary information for timely and accurate calculation of the quality of the acquired knowledge of the learner.

From the above, the design of the learning process should be based on a systematic approach [2,3], where, after analyzing the learning process, the information relationship between the topics, disciplines and courses of the entire learning process is determined.

METHODS

In the process of researching the education system in the training of specialists, synthesizing the process of acquiring knowledge, we determine by the levels of the learning system and using a logical relationship from the lower level from the 1st year to the verbal through the 4th year, i.e. the entire learning process at the university.

The system of the educational process can be represented as in Figure 1, where the connection between the elements and subsystems is carried out by acquiring knowledge from the lower to the verbal level.

There are the following transitions:

- from one state of the learner to another, i.e. the acquisition of new knowledge;

- each subsequent lesson leads to the acquisition of new knowledge;

- from one level to another, i.e. the transition from course to course, etc.

In solving this problem, it is necessary to develop a research methodology for the educational system of quality management of the learning process in the acquisition of knowledge, which can be described using the theory of systems [1] and system analysis [2].

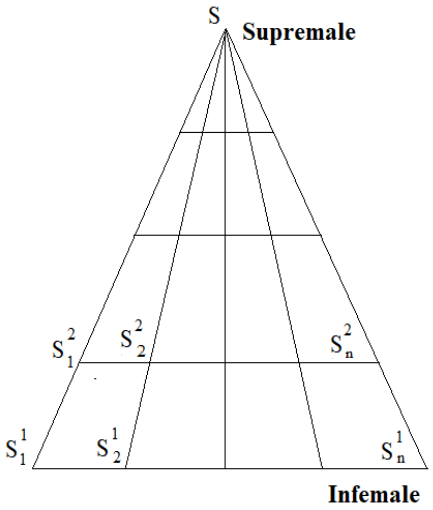

Figure 1. Structural diagram of the education system.

If the educational system is represented in the form of a pyramid (Figure 1), consisting of MєM models [8] (subjects of study), acquired knowledge across the entire level of the Mlєs system, then the transition from course to course is carried out, covering all acquired knowledge of the suprele in specialist training.

RESULT

In conducting research on the learning process, using set theory and mathematical logic, we will describe the educational process system in the following terms, for example: topics and disciplines studied in the process of training in specialist training - S, teaching methods using pedagogical technologies – T, simulation models of the topics and disciplines studied – M [8-11], input data, (i.e.

the topic being studied, after each lesson) – A, output data, i.e. acquired knowledge after each study of the topic, discipline by the trainees – R.

From the point of view of formalizing the education system, capitalizing many functions, the process of acquiring knowledge, is presented in the following form

< S, M, T, R > (1).

For the complete functioning of the management system, it

is necessary to enter input data - A, at all levels of the learning process, i.e. topics, discipline, etc., taking into account formula 1, which can then be rewritten as follows

< S, A, M, T, R > (2).

Since all the parameters involved in the acquisition of knowledge are variable, which depend on the disciplines studied (depending on their specialization), it is necessary to take into account the restrictions imposed by them – C, in terms of: time, volume of allocated hours, workload, disciplines, then formula (2) will be rewritten as follows

< S, A, C, M, T, R> (3).

This formula (3) is complete, since all the functions and parameters of the education quality management system are taken into account, and on the basis of which it is possible to develop a logical scheme for the relationship of topics, disciplines, courses, formula 4.

< S > <A,C > <M,T > < R > (4).

When conducting research in the form of a complex educational system, taking into account the factors involved, properties and parameters, formula 4 is written in the following form (formula 5), where the participating subsystems of the research object, i.e. the learning process

< Sєs > <Aєa, Cєc > <Mєm, Tєt > <Rєr> (5).

where: - a is input information, i.e. data on the topic of the discipline being studied, - r is output information, this is acquired knowledge after studying each topic of the lesson, m is a simulation model of each topic included in the discipline, t is teaching methods (pedagogical teaching technologies), c is imposed restrictions (on the number of hours, by subjects, by semesters, etc.) for each conducted topic - s.

DISCUSSION

In designing the learning process (in the quality management system), it is necessary to determine the continuity of connections between the topics of disciplines and courses, taking into account the graduate specialist or specialization, then we will write the formula in the following form

S1 □ S2 □ S3 □ ... Sn-1 □ Sn (6).

It is also necessary to determine the information relationships between the classes being taught - the subjects being studied S according to the levels of the S 1n system, i.e. the continuity /continuity between courses, for example, for the first level it will be defined as follows

S11 □ S 12 □ S 13 □ ... S1n □ S1n (7).

Also, we will keep records of classes on each topic and on the disciplines of the learning process using formula 5

Snєs, Anєa, Cnєc, Mnєm, Tnєt, Rnєr, Knєk (8).

Since the education system being developed is multilevel and multifaceted, we will rewrite formula 8 taking into account the interrelationships between levels 1-4 courses, as well as the disciplines studied.

Snlєs, Anlєa, Cnlєc, Mnlєm, Tnlєt, Rnlєr, Knlєk (9).

For the study of classes of the learning process, you need to enter input data – knowledge - and to choose the model - following subject – m, to choose the method of learning - t, for a given imposed restriction, and the result – acquired knowledge - r.

The design of the subsystem of quality management of the educational process [3] in the acquisition of knowledge is the theoretical part of the management system, which determines the relationship between topics, disciplines and courses.

Based on the above, in order to conduct classes, it is necessary to build a logical knowledge acquisition scheme (SDR), with which classes are conducted Figure 2.

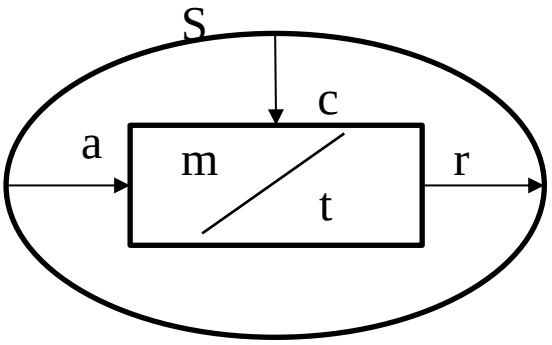

Figure 2. Logical scheme of knowledge acquisition.

The logical scheme is designed to carry out only one topic of the discipline, in the process of functioning of the quality management system using this scheme, it can similarly continue for the next topic. To acquire knowledge of the next topic of the learning process, the learned result from the first lesson, r1, will be the input information for the next topic, i.e. r1–a2, and so on in stages until the completion of the study of the discipline, which will be cyclically repeated (the learning process Figure 3).

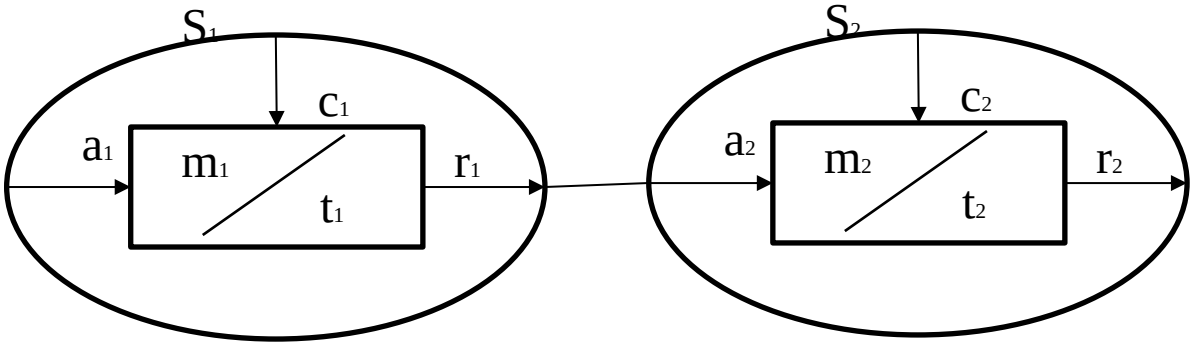

Figure 3. A logical diagram of the interrelationships of topics/disciplines in the acquisition of knowledge.

And thus, the entire cycle of classes will continue in the same way, with the following topics of the discipline.

Since the developed subsystem of the UKOP is an integral part of the automated control system of an educational institution, the managing and integral part of the program must meet all the requirements of the customer, i.e. HEU, because of this, he must take into account all its requirements. When developing such a system, it is also necessary to take into account the life cycle (LC) of the control system at all its levels, i.e. periodic adjustment of the control system at the request of the customer, due to which it will be increased.

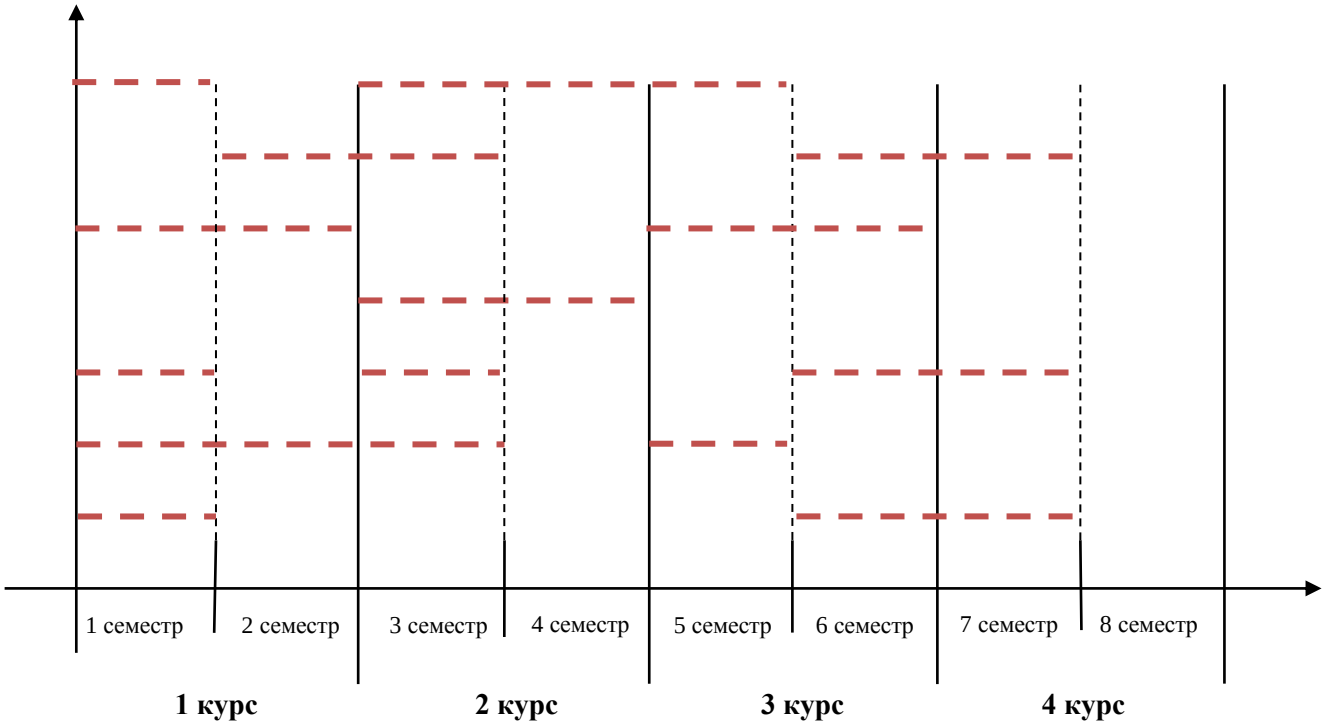

Figure 4. The dynamics of the education process in HEU

In the educational system, one of the important factors is continuity in education, which is associated with the periodic variation of the disciplines studied in the training of specialists, which is shown in Figure 4.

This is determined during the operation of manufactured products in production, where various defects /

malfunctions appear, which, with the help of calculations, the manufacturer completes his shortcomings / gaps, because of this, the customer offers the educational institution in advance the introduction of new disciplines and courses into the educational process.

From Figure 4, it is possible to imagine the dynamics of the variation of the learning process in the training of HEU specialists, where it is necessary to take into account the adjustment of the "customer" in the training of specialists. Logically, depending on the design and training of the specialist, the sequence of the studied disciplines of the learning process will be designed in such a way that it will be oriented for the training of future specialists on request. From this figure, it can be seen that on the part of the methodologist, the scientific organization presents knowledge to the student, sequentially one after another according to the principle "from simple to complex" with increasing knowledge acquisition and taking into account the introduction of new disciplines, is periodically carried out by order of the employer.

CONCLUSION

Currently, the design of modern education systems is a time requirement in order to promptly answer all the questions of the "customer" in the training of specialists for various purposes.

And this, in turn, requires a systematic approach, and through analysis and synthesis of the object of research, i.e., education as a whole, which will enable periodic forecasting and adjustment of the management system.

Currently, the opening of new educational institutions of various fields and specialties is becoming "competitive". With the help of a systematic approach, over time, it will gradually find its solution, and analysis and synthesis will help in this in the training of sought-after specialists in various fields.

REFERENCES

Takahara E.Theory of Systems. Moscow: Mir Publishing House, 1971, p. 187.

Zhuk K.D. System research of logic–dynamic management systems. Kiev. Naukova Dumka Publishing House. 1977 180 p .

Zhuk K.D., Timchenko A.A. Computer–aided design of logical-dynamic systems. - Kiev, Naukova Dumka, 1981, p. 317.

Kabulov V.K., Kabulov A.V. Arithmetic, logical, and algorithmic foundations of computers. –T: "Fan va texnologiya". 2017, p. 300.

Buslenko N.P., Kalashnikov V.V. Modeling of complex systems. Moscow: Nauka Publ., 1978, p. 355.

Kalashnikov V.V. Organization of modeling of complex systems. Moscow: Znanie Publ., 1982.

Voronina E.P. Pedagogical ergonomics. The monograph. Voronina E.P. – Ishim: IGPU Publishing House, 2006, 122 p.

Khaldarov H.A. A program for modeling the learning process. Agency for Intellectual Property of the Republic of Uzbekistan. Certificate no. DGU 29085. Tashkent, 11/14/2023.

Khaldarov Kh.A., Primkulova A.A., Jabbarova I.R. Building a mathematical model of the learning process using ergonomics. Proceedings of the international interdisciplinary conference GLOBAL TECHINNOVATIONS, Samsun, Turkey. October 31, 2020, pp. 114-118.

Khaldarov Kh. A., Primkulov A. A., Jabbarov I. R. MATRIX METHOD IN THE STUDY OF THE LEARNING PROCESS USING ERGONOMICS. International Innovation Magazine. Engineering and management studies. A peer-reviewed international open access journal. ELSEVIER Magazine, November 19, 2020 Volume 09, issue 11, Pages: 77-80.

Khaldarov Kh. A, Primkulova A. A., Urakova Sh. B., THE CONSTRUCTION OF THE MATHEMATICAL MODEL OF THE LEARNINGPROCCESS WITH THE HELP OF ERGONOMICS. International Journal for Innovative. Enjineering and Management Research. A Peer reviieved Open Access International Journal. ELSEVIER SSRN. 19th Nov 2020. Volume 09, Issue 11, Pages: 72-76.

Khaldarov H. A. Research of sensitivity to external parameters the learning process with the help of ergonomics in the acquisition of knowledge. Technical sciences № 1(2021) DOI http://dx.doi.org10.26739/2181-9696-2021-1, volume 4, issue 1, p. 50-55.

Халдаров Х.А., Примкулова А.А., Жаббарова И.Р. Исследование приобретение знаний с помощью эргономических моделей. SCINTIFIC IDEAS OF YOUNG SCIENTIFIC. POMYSLY NAUKOW MLODYCH NAUKOWE. SCITNTIFIC AND INTERNATIONAL CONFERENCE, 2021, MARCH-APREL, WARSAW, POLLAND-P. 49-51.

H.Khaldarov., About one approach to determining audience voiced in the process of learning with the help of ergonomics. Word Bulletin of Social Sciences (WBSS) Available Online of: https://www.scolarexpress.net vol.8,March,2022. p.87-91.

H.Khaldarov., Calculation of the radial type of audience in the process of learning with the help of ergonomics. Word Bulletin of Social Sciences (WBSS) Available Online of: https://www.scolarexpress.net vol.8,March,2022.p.92-97.

Grunberg J., Summers M. Computer innovation in schools: a review of selected research literature // J. Of Inf. Technol. For Teacher Education. 1992. V.1.PP.255-276.

Sharples M, Taylor J, Vavoula G. A theory of learning for the mobile age. In: Medienbildung in Neuen Kulturräumen. VS Verlag für Sozialwissenschaften; 2010. pp. 87-99 .

Халдароов Х.А. Моделирование кольцевого вида процесса обучения с помощью эргономики. Sentific Journal, SCHOLAR, (ISSN 2181 - 4171) Volume 2, Issue 1, January, 2024/1, p. 4