The structure of fuzzy multiple model of assessing students' knowledge, skills and qualification in higher education

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Abstract: ***Teaching students with modern knowledge, the formation of independent learning skills, the creative application of acquired knowledge is one of the main issues of modern education. Experienced educators are increasingly focusing on the creation of pedagogical technologies or teaching technologies, rather than continuing to look for ways to reform the teaching process. The term "pedagogical technology" appeared in foreign countries in the early 60s of the last century. has been published in the series.***

In order to improve the quality of education, it is necessary to update the system of student assessment, that is, to develop personality, broaden the imagination, enrich thinking and create a system of assessment management in the subject, based on solid mathematical methods.

The article develops an algorithm for solving the problem of taking students to the new stage of the assessment process, that is, the algorithm of the assessment system.

The relationship between the criteria of assessment in decision-making in teaching and assessment of students of higher education institutions in the context of a large amount of information that is not fixed, the solution of the problem of improving the system of knowledge assessment.

An algorithm for the selection and evaluation of methods for the organization and effective teaching of computer science differentiated according to the type of education system and the choice of forms and methods of teaching computer science, the organization of teaching, methods of teaching computer science, forms and methods of teaching computer science.

Key words: ***Indefinite-set, indefinite functions, indefinite term-set, indefinite base, indefinite equations, maximum value.***

Introduction: Problem-based learning is based on the problem (Greek "obstacle", "difficulty") or problem situation, and problem-based learning technology serves to find their solution (Advanced pedagogical technologies. – Tashkent Uzbekistan .:Teacher. 2004).

Students' knowledge of the specific subjects, including Mathematics, depends on many factors, including lectures and practical exercises, as well as the extent of homework and labs. It is advisable to make a decision on how to assess students' achievement based on a vague evaluation of students' attendance and students' performance. (Bottino R.M., Forcheri P., Molfino M.T. Technology Transfer in School: from Research to Innovation // British Journal of Educational Technology. 1998.)

Materials and methods. Based on the aforementioned, students can present the structure of the absorptive diagnostic model-collection model as follows (Figure 1):

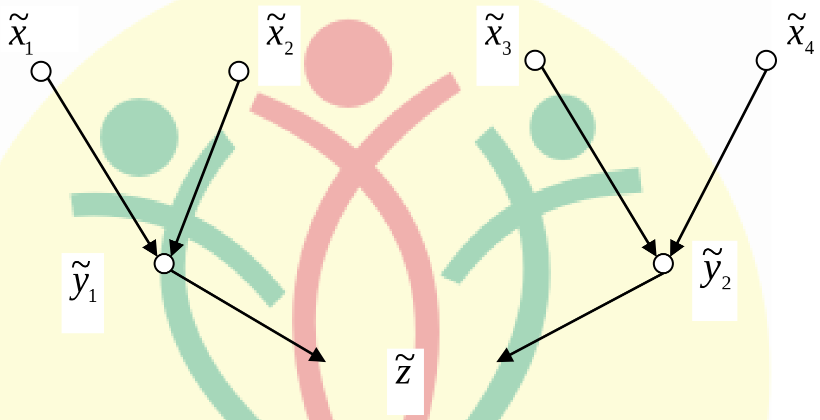

Figure 1. Structure of the model of non-specific set of students' diagnostics on the subject "Computer Network" (ACADEMICIA: An International Multidisciplinary Research Journal. 2021).

Here are: - attendance at lectures and workshops;

- control and laboratory work;

- Uncertain functions that characterize the intensity and efficiency of student activity on non-specific functions:

$$\tilde{y}_1 = \tilde{f}_1(\tilde{x}_1, \tilde{x}_2),\ \tilde{y}_2 = \tilde{f}_2(\tilde{x}_3, \tilde{x}_4) \qquad (1)$$

The final evaluation - the diagnostics of mastering is determined by the following link:

$$\tilde{z} = \tilde{f}_3(\tilde{y}_1, \tilde{y}_2) \qquad (2)$$

The implementation of uncertain functions (1) and (2) is performed as follows:

- For Linguistic Characteristics LP indefinite term is entered $\tilde{x}_1, \tilde{x}_2, \tilde{x}_3, \tilde{x}_4, \tilde{y}_1, \tilde{y}_2, \tilde{z}$

For convenience, we are introducing here a single system of terms:

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Low - NZ,

Average -SR,

Good - HOR,

High - VS.

- Development of an indefinite database of knowledge for (2) and (1).

- Development of a system of indefinite equations, which combines (2) and (1) on a vague base of knowledge.

- Implementation of systems of uncertain models (1) and (2) and performing computational experiments on the basis of decision-making [3-5].

Let's create a database (Table 1).

Table 1. Uncertain knowledge base for assessing student performance

$\tilde{x}_1$	$\tilde{x}_2$	$\tilde{x}_3$	$\tilde{x}_4$	$\tilde{z}$
NZ	SR	SR	SR	
SR	NZ	NZ	SR	S 0
SR	SR	SR	NZ	
SR	SR	HOR	SR	
SR	HOR	SR	SR	S 1
SR	SR	HOR	HOR	
SR	HOR	HOR	HOR	
HOR	SR	HOR	HOR	S 2
HOR	HOR	SR	SR	
HOR	HOR	VS	HOR	
HOR	HOR	VS	HOR	
VS	HOR	VS	VS	S 3
HOR	VS	HOR	VS	

Diagnostics of students is presented according to the table 1:

$$\mu^{S_0}(z)=\left[\mu^{NZ}(\tilde{x}_1)\wedge\mu^{SR}(\tilde{x}_2)\wedge\mu^{SR}(\tilde{x}_3)\wedge\mu^{SR}(\tilde{x}_4)\right]\vee$$
$$\left[\mu^{SR}(\tilde{x}_1)\wedge\mu^{NZ}(\tilde{x}_2)\wedge\mu^{NZ}(\tilde{x}_3)\wedge\mu^{SR}(\tilde{x}_4)\right]\vee$$
$$\left[\mu^{SR}(\tilde{x}_1)\wedge\mu^{SR}(\tilde{x}_2)\wedge\mu^{SR}(\tilde{x}_3)\wedge\mu^{NZ}(\tilde{x}_4)\right];$$

$$\mu^{S_1}(z)=\left[\mu^{SR}(\tilde{x}_1)\wedge\mu^{SR}(\tilde{x}_2)\wedge\mu^{HOR}(\tilde{x}_3)\wedge\mu^{SR}(\tilde{x}_4)\right]\vee$$
$$\left[\mu^{SR}(\tilde{x}_1)\wedge\mu^{NOR}(\tilde{x}_2)\wedge\mu^{SR}(\tilde{x}_3)\wedge\mu^{SR}(\tilde{x}_4)\right]\vee$$
$$\left[\mu^{SR}(\tilde{x}_1)\wedge\mu^{SR}(\tilde{x}_2)\wedge\mu^{HOR}(\tilde{x}_3)\wedge\mu^{HOR}(\tilde{x}_4)\right];$$

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$$\mu^{S_2}(z)=\left[\mu^{SR}(\tilde{x}_1)\wedge\mu^{HOR}(\tilde{x}_2)\wedge\mu^{HOR}(\tilde{x}_3)\wedge\mu^{HOR}(\tilde{x}_4)\right]\vee$$
$$\left[\mu^{HOR}(\tilde{x}_1)\wedge\mu^{SR}(\tilde{x}_2)\wedge\mu^{HOR}(\tilde{x}_3)\wedge\mu^{HOR}(\tilde{x}_4)\right]\vee$$
$$\left[\mu^{HOR}(\tilde{x}_1)\wedge\mu^{HOR}(\tilde{x}_2)\wedge\mu^{SR}(\tilde{x}_3)\wedge\mu^{SR}(\tilde{x}_4)\right]\vee$$
$$\left[\mu^{HOR}(\tilde{x}_1)\wedge\mu^{HOR}(\tilde{x}_2)\wedge\mu^{VS}(\tilde{x}_3)\wedge\mu^{HOR}(\tilde{x}_4)\right];$$

$$\mu^{S_3}(z)=\left[\mu^{HOR}(\tilde{x}_1)\wedge\mu^{HOR}(\tilde{x}_2)\wedge\mu^{VS}(\tilde{x}_3)\wedge\mu^{HOR}(\tilde{x}_4)\right]\vee$$
$$\left[\mu^{VS}(\tilde{x}_1)\wedge\mu^{NOR}(\tilde{x}_2)\wedge\mu^{VS}(\tilde{x}_3)\wedge\mu^{VS}(\tilde{x}_4)\right]\vee$$
$$\left[\mu^{HOR}(\tilde{x}_1)\wedge\mu^{VS}(\tilde{x}_2)\wedge\mu^{HOR}(\tilde{x}_3)\wedge\mu^{VS}(\tilde{x}_4)\right];$$

Hereby $\mu^{NZ},\mu^{SR},\mu^{HOR},\mu^{VS}(x_i)$ are related functions:

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