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METHOD OF INFLUENCING A STUDENT'S ATTESTATION RESULTS THROUGH EXTRACURRICULAR ACTIVITIES

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Introduction

It is impossible to imagine a modern educational system without the use of computer technologies.

Digital technologies are part of a new knowledge infrastructure that is now steadily integrated into everyday life. This knowledge infrastructure is "a reliable network of people, artifacts, and institutions that generate and maintain the informational resources necessary for humans" [1]. For the new generation of "digital natives", the Internet is becoming not just a source of information, but also a sphere of entertainment, a field for acquiring new skills, improving one's skills, and building a career [2].

Digitalization of education is an integral part of the training of modern specialists. These trends are associated with a repeated increase in the importance and volume of information, and an increase in the number of interdisciplinary research and projects. Surveys show that students today realize the need to increase their competence in the field of artificial intelligence, processing and analysis of big data, information and communication technologies [3].

The transition to a digital society imposes fundamentally new requirements both to new competencies of specialists and to the process of forming these competencies The education based on innovative future breakthrough technologies increases the "market value" of a specialist in the labor market [4] In this regard, the need for the introduction and analysis of new approaches in the education system, the transformation of existing forms, methods and technologies of training is becoming particularly relevant [5].

There are numerous educational management systems for the educational process, which are successfully used by various universities. For example, the Azerbaijan Technical University uses the KOICA system, which was jointly adapted by Korean specialists. This system has been developed at such a high level, both technically and as a result of computer modeling, which makes it possible to form a better educational process by eliminating the negative consequences of the educational process by timely identifying emerging problems.

Of course, the basis of any educational system is the educational process. The main basic element of the modeling of the educational process is the modeling of the student's activity. First of all, this activity includes participation in the organization of lectures, practical and laboratory classes, assessment of the student's knowledge during the semester with seminar assignments, control and colloquium exams through joint work and, finally, semester exams. The system can create a student's academic profile through specific assessments of each student's performance during the academic year [6-7].

Although the results of the student's attestation are an indicator of his general competence level, the influence of his extracurricular activities on these results is of great importance. When preparing a student for any certification exam, the grade they receive depends on the characteristics of the student's computer proficiency, their motivation, the way they study the materials, etc. The formation of each of these characteristics depends on the student's activity in both academic and extracurricular activities.

Problem statement

It is necessary to create models for assessing the impact of a student's extracurricular activities on his competence in the specialty.

Method of solving the problem

Since the student's extracurricular activities are a rather complex process, and their components are interrelated and accompanied by uncertainty, the model can be built using the Bayesian approach. There are many studies that use the Bayes approach in modeling processes with different [9-11] characteristics. In order to apply the Bayes approach, we first assume that the student's extracurricular activities depend on the events $H_1, H_2, H_3 \ldots H_n$. Here H_1 is the student's participation in various courses, H_2 is participation in olympiads or conferences, various scientific competitions, H_3 – teaching students using additional libraries, the Internet, etc.

Thus, we believe that a learner's learning success (T) is determined by the occurrence of any of these events. Suppose that a student has passed the assessment, and the event has occurred that he or she receives an $H_1, H_2, H_3 \ldots H_n$ grade. In other words, the probability of P(T) is known as a priori. In this case, the occurrence of event T is determined by the occurrence of any event H_i. In other words, we assume that a student's success is determined by a combination of his academic and extracurricular activities. We mean that:

$$T = T_1 \cup T_2.$$

Here, T_1 – learning activities.

This is a mandatory activity of the student T_2 – it is the activity of the student of the extracurricular process. Because in this case:

$$T_1 \cap T_2 \neq \varnothing.$$

$$P(T) = P(T_1) + P(T_2) - P(T_1)P(T_2). \quad (1)$$

According to our hypothesis, $P(T_1)$ and $P(T)$ are given apriori. In this case, we get:

$$P(T_2) = \frac{P(T) - P(T_1)}{1 - P(T_1)}. \quad (2)$$

According to the formula of full probability, for event $H_1, H_2, H_3 \ldots H_n$ we obtain that events T depend on the occurrence of one of them, then:

$$P(T) = P(T/H_1)P(H_1) + P(T/H_2)P(H_2) + \ldots + P(T/H_n)P(H_n). \quad (3)$$

By the same rule, we can determine the probability of $P(T_2)$.

$$P(T_2) = P(T_2/H_1)P(H_1) + P(T_2/H_2) \cdot P(H_2) + \ldots + P(T_2/H_n)P(H_n). \quad (4)$$

Using formula (4), it is possible to estimate the impact of each of the events H_i on extracurricular activities as a whole:

$$P(H_i/T_2) = \frac{P(T_2/H_i)P(H_i)}{P(T_2)}. \quad (5)$$

$$P(H_i/T_2) = \frac{[P(T_2/H_i)P(H_i)]}{P(T_2/H_1)P(H_1) + P(T_2/H_2) \cdot P(H_2) + \ldots + P(T_2/H_n)P(H_n)}. \quad (6)$$

Using formula (6), it is possible to estimate the impact of a student's extracurricular activities on his or her overall academic performance.

Computational experiment. Let us assume that students are engaged in three types of extracurricular activities. The prior probabilities associated with this activity are computed by:

$$P(H_i) = \frac{m_i}{N} i = 1,3, \quad (7)$$

here, m_i – is the number of students engaged in the i-th activity, N is the total number of students.

Let's denote by N_1 the number of students engaged in extracurricular activities. In this case, we can determine the prior probability:

$$P(T_2/H_i) = \frac{m_i}{N_1}. \quad (8)$$

On the basis of tab. 1, calculations were made according to formula (6). Let's assume

that the probability that students will pass the assessment is $P(T) = 0.90$.

Indicators of student involvement in extracurricular activities are shown in tab. 1.

Calculations using formulas (4)-(8) are shown in tab. 2. The results are presented in tab. 3. Based on these results, we get that $P(T_1) = 0,04588$ və $P(T_2) = 0,2919$.

Table 1. Indicators of Student Engagement in Extracurricular Activities

	Activity type	Total Quantity	Those who are successful
H_1	Participants in various courses	70	60
H_2	Participants in Olympiads, conferences and competitions	10	8
H_3	Used resource libraries, on the Internet.	120	100
T_1	Prepared with training materials.	320	300

Table 2. Extracurricular activities of students

	Activity type	Total Quantity	Those who are successful	$P(H_i)$	$P(T/H_i)$	$P(T_1/H_1)$
H_1	Participants in various courses	70	60	0,135	0,857	0,056
H_2	Participants in Olympiads, conferences and competitions	10	8	0,019	0,800	0,0011
H_3	Used resource libraries, on the Internet.	120	100	0,231	0,833	0,165
T_1	Prepared with training materials.	320	300	0,937		

Table 3. Calculation results

Events H_i	Event Probability $P(H_i)$	Prior probability $P(T/H_i)$	$P(T_1/H_1)$	$P(H_i/T)$
H_1	0,135	0,857	0,056	0,35896
H_2	0,019	0,800	0,0011	0,04716
H_3	0,231	0,833	0,165	0,5971

Thus, according to the above statistical indicators, the participation of students in courses, Olympiads or additional events does not exceed 30% of their total academic performance. Of course, this effect should not be very high, since the knowledge of any student is assessed directly from educational and methodological materials.

Conclusions

1. The article systematically analyzes and systematizes the influence of students' extracurricular activities on educational indicators and identifies the main characteristics.

2. A methodology has been developed for assessing the impact of students' extracurricular activities on educational indicators using the Bayesian approach.

3. Using the proposed methodology, a computational experiment was conducted based on priori data and the influence of students' extracurricular influences on their success rates was assessed. Based on the a priori data obtained, it was determined that this effect does not exceed 30%.

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METHOD ESTİMATİON THE INFLUENCE ON A STUDENT'S ACADEMIC INDICATORS THROUGH EXTRA-CURRICULAR ACTIVITIES

The article systematically analyzes, systematizes the impact of extracurricular activities of students on educational indicators and identifies the main characteristics. A methodology for assessing the impact of students' extracurricular activities on educational indicators using the Bayesian approach has been developed. Using the proposed methodology, reports were compiled based on a priori data and the impact of students' extracurricular activities on their success rates was assessed. Based on the a priori data obtained, it was determined that this effect does not exceed 30%.

Keywords: educational system, educational process, extracurricular activities of the student, assessment of the student's academic performance.

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МЕТОДИКА ОЦІНКИ ВПЛИВУ НА АКАДЕМІЧНІ ПОКАЗНИКИ СТУДЕНТА ЧЕРЕЗ ПОЗАКЛАСНУ ЗАНЯТТЯ

У статті системно проаналізовано, систематизовано вплив позаурочної діяльності студентів на навчальні показники та визначено основні характеристики. Розроблено методику оцінки впливу позааудиторної діяльності студентів на освітні показники з використанням байєсівського підходу. За допомогою запропонованої методики на основі апріорних даних було складено звіти та оцінено вплив позакласної діяльності студентів на їхню успішність. На основі отриманих апріорних даних встановлено, що цей ефект не перевищує 30%.

Ключові слова: система освіти, навчальний процес, позааудиторна діяльність учня, оцінювання успішності учня.