

MONITORING AND QUALITY ASSESSMENT OF TEACHERS' WORK

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Abstract: *Modern universities do not offer effective methods for assessing the quality of teachers' academic work. The aim of the research is to increase the objectivity of assessing the quality of training students. The article proposes a structural block diagram of a computer network for monitoring the academic work of university teachers, including a central computer designed for processing and storing information, and personal computers of teachers and training support departments for entering information. Criteria and indicators for assessing the quality of the teaching work are offered, as well as analytical expressions for calculating the individual indicator of the quality of teachers' work, of students' discipline, and the effectiveness of the department. To increase the objectivity of teaching work evaluation, students' knowledge should be assessed not only during examinations, but also during in-term certifications. In addition, when assessing the quality of mastering a subject, students are asked to consider the scope of classroom activities and the qualifications of teachers in this subject. The proposed method of quality assessment of teachers and the department will provide an objective evaluation of the quality of the students' training not only in one subject, but also in their field of discipline. In addition, the proposed ways of quality assessment of students' knowledge and the effectiveness of teaching activities will allow making prompt changes in the organization of the educational process and the content of the curriculum, changing the content and technology of teachers' professional development, which in combination will improve the quality of training and the level of demand for university graduates in the labor market.*

Keywords: *teacher, educational work, quality of discipline mastering, work efficiency.*

Introduction

The science and technology development pace require searching for new forms and methods of improving the quality of training specialists with higher education. Almost all the countries carried out various educational reforms on a large scale, investing large amounts of money in them. These transformations acquired the status of a state policy, since states began to realize that the level of higher education in the country determines its future development. In connection with this, in modern conditions the quality of education of graduates is one of the most important indicators of the competitive advantages of a higher education institution [2, 12, 13]. Thus, the current issue is developing effective methods for assessing the quality of the teaching work on which the quality of graduate training depends. However, modern universities do not possess effective methods for assessing the quality of academic work of teachers, while

availability of such technologies would significantly improve the quality of education of university graduates [1-5, 9-11]. The article deals with the way of organizing and implementing the monitoring and quality and effectiveness assessment of the academic work of university teachers. Periodic monitoring of the results of academic work of teachers will let assess the quality of students' training and improve the quality of teaching, including the improvement of educational, methodological and material support of academic disciplines [6-8].

Materials and Methods

Monitoring the academic work of university teachers involves the use of a computer network consisting of a central computer (CC), communicating through special channels with personal computers (PCs) of teachers and staff of the university departments that support the studying process (Figure 1) [18]. The central computer includes the blocks 'Personal teacher card' and contains information about each of the teachers of various subjects and profiles of the university students. This information is distributed on the following blocks of the 'Personal teacher card' (Figure 1):

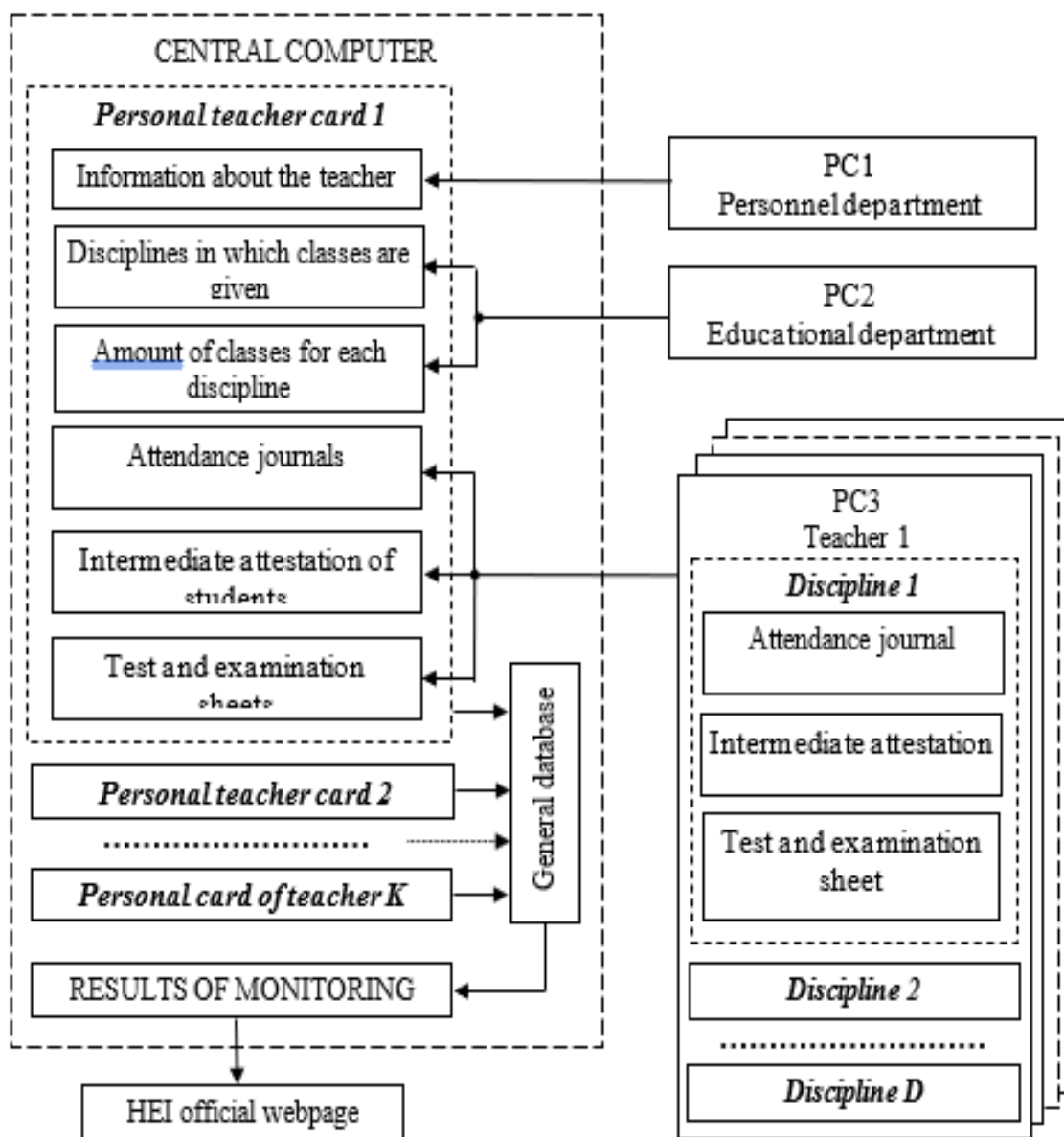


Figure 1 - The structural block diagram of the computer network monitoring the academic work of teachers

- 'Information about the teacher': surname, name, patronymic, position, academic degree, academic rank, work experience;
- 'Disciplines in which classes are given': the information about the academic disciplines that the teacher was giving classes in during the current and previous academic years;
- 'Amount of classes'. Here, information is provided on the amount of all types of classes given by the teacher in hours and relative units (percentages). For example, the number of lectures in one subject per training group is 24 hours, and of practical classes - 16 hours, which makes 40 hours as a whole and is equal to 1 (100 %). The teacher gave 10 hours of practical classes, that is, 0.25 or 25% of classroom hours from the total number;
- 'Attendance journals'. These include students' attendance of different subjects and training profiles, including the total number of skipped classes and the percentage;

– ‘Intermediate attestation of students’: the assessment received by the students for tests and assignments are given. Moreover, the information can be presented separately for each student and as an average arithmetic indicator of the group (course) and qualification (profile);

– ‘Test and examination sheets’. This block contains the final assessment of students in a discipline (group, course).

At the same time, the data to the Central Computer block ‘Information about the teacher’ is entered from the personal computer (PC1) of the personnel department, and to the blocks ‘Disciplines in which the classes are given’ and ‘Amount of classes for each discipline’ from the personal computer (PC2) of the educational department. Information to the blocks ‘Attendance journals’, ‘Intermediate attestation’ and ‘Test and examination sheets’ is entered from the personal computers of teachers. The CC block ‘General Database’ is focused information on subjects and training profiles, as well as on faculties and departments. In the CC block ‘Results of Monitoring’, processing and ranking of the results of the academic work presented by teachers and departments, individually for each teacher, subject, profile and student qualification, as well as for departments and faculties, is carried out. The results of the academic work of teachers, departments and faculties are posted on the website of the university. The results of the academic work of teachers, departments and faculties are posted on the website of the university. Individual coefficient of the quality of academic work of the teacher (C_{AWT}) is defined as the arithmetic mean, taking into account the number of disciplines for which the teacher conducted classes (D_c), the amount of classes for each discipline in relative units (A_c) and the quality coefficient of discipline acquisition by students (C_{DA}):

$$C_{AWT} = \frac{1}{D_c} \sum_{i=1}^{D_c} (A_c C_{DA})_i, \quad (1)$$

where

$$C_{DA} = \frac{1}{3} \left(G + AS + \frac{Iq}{20} \right), \quad (2)$$

G is the general score for the discipline received by the students’ group; AS is the average score received by the students for the exam or test; IQ is the indicator of the education quality defined as the percentage of good and excellent marks received by the students for an exam or test. To determine CDA, the general score is determined in accordance with the data presented in Table 1. The average score of marks obtained for the exam or test is the sum of all the assessments divided by the number of students present at the exam or test. CDA in a group or course is expedient to be determined considering three total indicators of the examination or test results according to the following criteria: G; AS; IQ [12, 13].

Table 1 - Criteria for the general assessment of the group (course)

General score	Assessment criteria
A	90% of students have positive grades (A, B, C), while 50% of students have A
B	90% of students have positive grades, while 50% of students have A and B
C	80% of students have positive grades
D	Criteria for getting D are not met

Introducing the three indicators to determine the quality of student training is appropriate for the following reasons [12, 14-16]. Firstly, the average score cannot determine how many students have A, and how many did not study the discipline at all, thus receiving D. In addition, with the same average score in the group (on the course) there may be a different number of students who have A and those who have D, or there may not be any. Second, introducing the assessment of student training quality along with G , the average score AS and the indicator of quality I_Q will provide an overall assessment of the quality of the group's (the course's) training preparation, including the profiles and training areas. Thus, C_{DA} , as well as C_{AWT} , is defined as the arithmetic mean, considering three total indicators of the results of the exam (test) according to the criteria: G , AS and I_Q . In the CC block 'Results of monitoring' the results of the training are ranked based on the calculations in accordance with Formulas (1) and (2). The threshold values of C_{AWT} and C_{DA} are established by the university management department based on statistics on previous years of training and employer feedback. Practice showed that after the first application of the above method of assessment the following threshold values of C_{AWT} are expedient: less than 3.4 – the quality is not satisfactory, 3.4-3.8 – satisfactory quality, 3.9-4.4 – sufficient quality, and 4.5 – high quality. The threshold values of C_{DA} are as follows: less than 3.0 – not satisfactory, 3.0-3.5 – satisfactory, 3.6-4.2 – good, 4.3 and above – excellent.

Results

In Table 2, as an example, the criteria and indicators of C_{DA} are given, as well as the rating of three study groups with an equal number of students (25 people). As can be seen from Table 2, Group 1 has an average score of 3.6 and Group 3 has a score of 3.52; however, given G and I_Q , Group 3 has a higher rating than Group 1.

Table 2 – Criteria, assessment indicators and rating of groups for C_{DA} in 'Electrical Engineering'

Group, number of students	Grades, number				Критерии и показатели					General score
	A	B	C	D	Score	AS	I_Q	C_{DA}	Rating	
Group 1, 25 people	6	6	10	3	3	3.60	2.4	3.0	III	C
Group 2, 25 people	3	14	6	2	4	4.04	3.4	3.81	I	B
Group 3, 25 people	1	12	11	1	4	3.52	2.6	3.37	II	C

In Figure 2, three coordinates are shown on the plane: G , AS and I_Q . The vertices of the triangles correspond to the indices given in Table 2 for the three study groups. The area of the triangles clearly reflects the value of C_{DA} – the larger the area of the triangle, the higher the value.

Discussion

To increase the objectivity of assessing the quality of discipline acquisition, it is necessary to consider the grades obtained during intermediate attestations (test papers, test tasks, etc.). This is appropriate for the following reasons [13, 22, 23]: assessment is in accordance with current grades. Teachers, as a rule, artificially underestimate these assessments to interest students in their increase (i.e., to deepen the quality of knowledge), yet they track the general trend – 'weak', 'average', 'strong' level; when assessing the students, the teachers also consider their attitude to the discipline, behavior

in class, attendance, timely delivery of reports; during test and examinations teachers tend to give higher grades since their own performance depends on it; moreover, exceeding the established limit of unsatisfactory grades in the group leads to expelling students and reducing the staff rates of teachers.

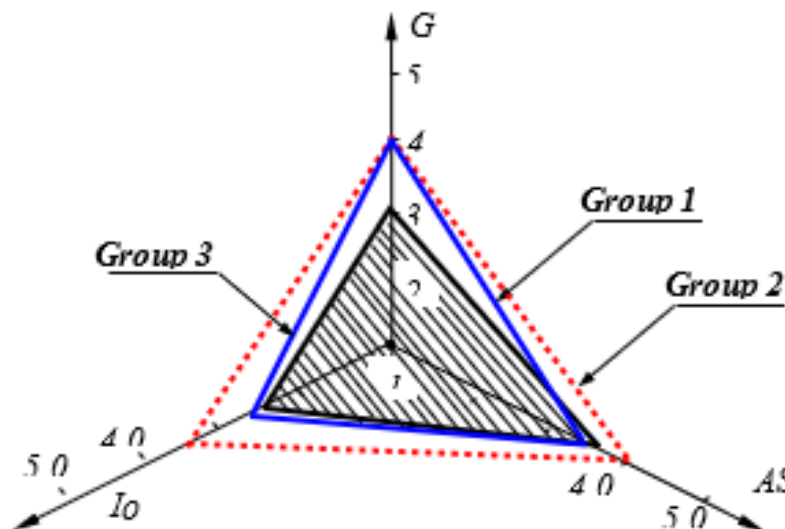


Figure 2 - Diagram of C_{DA} triangles

Thus, Formula (2) becomes:

$$C_{AWD} = \frac{1}{2} (AS_A + AS_{E(T)}) \tag{3}$$

where AS_A is the average score for intermediate attestations and $AS_{E(T)}$ is the average score of exams and tests (G , AS and I_0). In general, the final assessment for a certain discipline is not objective, since the teachers perform both processes – training students and evaluating their knowledge [19, 21]. It is possible to significantly increase the objectivity of evaluating the effectiveness of the academic work of teachers if the assessment is guided by the classical concept of ‘efficiency’. Its indicator is the ratio of the result of activity to the effort spent on obtaining said result. The result is the knowledge of students, and the efforts the knowledge of the teachers passed on to students [17, 20, 24, 25]. Thus, the effectiveness of academic work of teachers (E_{AWT}) while teaching one discipline can be determined by the following formula:

$$E_{AWT} = \frac{\frac{1}{n} \sum_{i=1}^n \left(\frac{1}{2} (AS_A + AS_{E(T)}) \right)_i}{\frac{1}{p} \sum_{j=1}^p (G_{AK} G_T)_j} \tag{4}$$

where n is the total number of students whose teachers have conducted classes; p is the total number of teachers who conducted classes in a discipline; G_T is the grade given by the teacher for test tasks. To determine the level of qualifications of teachers in the department for each discipline test tasks are developed [12, 13]. Evaluation of the

effectiveness of the academic work of teachers of the department in the semester (academic year) is determined by the formula:

$$E_{AWD} = \frac{1}{m} \sum_{i=1}^m E_{AWTi}, \quad (5)$$

where m is the total number of teachers at the department.

Conclusion

Thus, the proposed method for assessing the quality of the academic work of teachers and the department as a whole will increase the objectivity of assessing the quality of students' training not only in one discipline, but also in the qualification or profile of training. In addition, the proposed ways of assessing the quality of discipline acquisition and the effectiveness of teaching activities make it possible to promptly make changes in the organization of the educational process and the content of the curriculum, and to change the content and technology of teacher training, which in a complex will help improving the quality of training and the level of demand for graduates of the university in the labor market.

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