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ORGANIZATION AND ANALYSIS OF PSYCHOLOGICAL AND PEDAGOGICAL RESEARCH OF THE SCORE-RATING SYSTEM

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Abstract

This article is devoted to the organization and analysis of psychological and pedagogical research, point-rating system as a means of internal evaluation of the quality of educational results of students of the Universities. The article presents: a description of the psychological and pedagogical research; the main provisions of the score-rating system; the variants changes the score-rating system; the dynamics of changes in the structure of the score-rating system, taking into account attendance of students and has been staged at testacea; the analysis of theoretical aspects of the problem on the subject of the study and sample description of the subjects and stages of psychological and pedagogical research. The hypothesis of the study is that the point-rating system is a means of internal evaluation of the quality of educational results of students of the Universities, provided that the ito-d will be: increased student motivation; improved learning; improving co-statelnent in education; improving the educational process; promotion of systematic work; reducing the influence of random factors at the time of tests and EC-Semenov. Developed a survey questionnaire of students. When analysing the results of the survey on the use of point-rating system in educational process and the final results across the five groups of questions, 68% of students perceived the PRS as a means of internal quality assessment of educational outcomes, consider and realize as an element of professional training, can systematically adjust the individual ing educational path due to the self-evaluation of its results.

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1. Introduction

The organization of psychological and pedagogical research of the score-rating system (SRS) as a means of internal evaluation of the quality of educational results of students in higher education consists of several stages:

1. Analysis of the theoretical aspects of the problem on the topic of research on the basis of the clause on the SRS (Preston, Cox & Cox, 2000; Butin, 2010; Hahn, 2012; Masalimova, Levina & Platonova, 2017; Vyzhigin, 2016);

2. Selection of criteria for assessing the application of the score-rating system, adequate to the goals and objectives of the psychological and pedagogical research, and developing a questionnaire for students aimed at assessing their attitude to the SRS (Preston, Cox & Cox, 2000; Butin, 2010; Hahn, 2012; Masalimova, Levina & Platonova, 2017; Vyzhigin, 2016).

3. Processing and generalization of the results of psychological and pedagogical research of the SRS as an effective method of internal evaluation of the quality of educational results of students in higher education.

2. Problem Statement

2.1. The main provisions of the score-rating system

The previously strengthened system of knowledge control in higher education is currently entering into contradiction with modern requirements for the preparation of qualified bachelors, specialists and masters. Its main shortcoming is obvious - it does not contribute to the active and rhythmic work of students, including independent. Already at the initial courses, students begin to understand that it is not necessary to take home assignments on time, that you can bring everything and hand over in the last week. This "storming" not only increases the burden on the teacher and student at the end of the semester, but also leads to weak knowledge of the subject being studied (Vyzhigin, 2016).

The author on the department "Management and modeling of systems" of Moscow State University of Instrument Engineering and Informatics (now Federal State Budget Educational Institution "Moscow Technological University" based on Moscow Institute of Radio Engineering, Electronics and Automation and combined with MSIEI, Moscow Institute of Chemistry and Technology, Moscow Polygraphic Institute) made an attempt to improve the progress in the read disciplines by increasing the motivation of the students gradually. The first working electronic variant, on which the accumulation of information began, was tested in the autumn of 2006.

2.2. Dynamics of changes in the structure of the SRS

The structure of any SRS is affected by a number of factors that lead to the correction of individual elements, their scores (points), and even the structure of SRS itself. These factors include:

- the state educational standards approved at the current time;
- the curriculum developed by the university;
- the number of hours of discipline;
- the types of auditor and extra-auditor load;

- the working programs of the discipline developed by the department;
- the "quality" of the recruited entrants, their motivation, abilities, desire to learn and much other factors.

Due to the transition to educational standards of the second and third generations, the number of lecture hours allocated for discipline each time decreased by approximately 25-30%. The amount of material needed to study does not change. We had to rework the structures of the disciplinary texts, taking into account, among other things, the characteristics of a particular group or stream. This approach significantly enhances the creative and professional potential of any professor, allowing to adapt very quickly to the audience and correct the read material, both in the current lesson and later. This is possible only in the case when the professor masters the material at a sufficiently high and professional level.

3. Research Questions

The main research question is as follows: can the SRS be applied as a means of internal evaluation of the quality of educational outcomes of students in the university?

4. Purpose of the Study

The hypothesis of the research is that the SRS is a means of internal evaluation of the quality of educational outcomes of students in higher education institutions, provided that the result is:

- increasing the motivation of students;
- improving the quality of education;
- increased competitiveness in study;
- increased level of organization of the educational process;
- stimulation of systematic work;
- reduction of the influence of random factors during passing credits and exams.

5. Research Methods

In the considered SRS groups and streams of students are divided into sets 1, 2, etc. Each set describes a sequential study of disciplines in the 1st, 2nd, and 3rd semesters (from spring 2006 to autumn 2012) in one group or stream. Beginning from autumn 2012 to the present time, the dynamics was monitored for the 1st and 2nd semesters due to changes in the curriculum.

To study the opinions of students on the above criteria, a survey questionnaire on the application of a SRS in the educational process was developed, which included 21 questions.

Students from two universities received the questionnaires: the Moscow Technical University (MTU, 40 people), The Russian Presidential Academy of National Economy and Public Administration (RANEPA, 45 people).

MTU students are trained in the areas of "Software Engineering" - 27 people, "Information Security" - 13 people, students of the Russian Academy of Science and Technology, specialty "Customs" - 45 people.

Among the students enrolled in the direction of "Software Engineering" - 22 - male, 5 -female; "Information security" - 9 - male, 4 - female; on the specialty "Customs" - 14 - male, 31 - female. Total of 45 male and 40 female.

The 84 respondents have a complete secondary education, one person has a secondary special education (RANEPA, female).

The age categories of the questionnaires are presented below.

MTU: 17 years - 1 person (male); 18 years old - 13 male and 9 female; 19 years - 5 male and 2 female; more than 19 years - 9 male and 1 female.

RANEPA: 17 years - 0 male. and 1 female; 18 years old - 13 male and 22 female 19 years - 3 male and 6 female; more than 19 years - 0 aleen. and 0 female.

In total: 17 years - 2 persons, 18 - years -57 persons, 19 years - 16 persons, more than 19 years - 10 persons.

To carry out psychological and pedagogical research and selection, corresponding to the goals and objectives of the application of the BRS, the values of the criteria, it is suggested that these criteria be determined and normalized according to the answers suggested in the profile:

- yes / strongly / very effective - 4 points;
- Sometimes effective, sometimes not / hence - 3 points;
- I did not think / I do not know / does not mean - 2 points;
- no / no way / your option / not effective - 1 point.

6. Findings

6.1. SRS, option 0 (1995-2008)

The main provisions of the SRS developed by the author at the beginning of the teaching activity are presented in written sources (Vyzhigin, 2016).

The proposed SRS is effective in the following cases. First, it takes into account the current academic performance of the student and thereby significantly intensified his independent work; secondly, more objectively and accurately assess the knowledge of the student due to the use of a 100-grade scale of assessments; third, it creates a basis for students' differentiation, which is especially important in the transition to a multilevel system of education; fourthly, it allows to receive in-depth information about the fulfilment by each student of the schedule of his independent and classroom work.

The most important effect from the introduction of the SRS was a significant reduction in the "check" time of the professor for the conduct of the learning process due to the introduction of strict rules that instantly sober up the "relaxed" students.

The SRS was implemented from 2005-2006 academic year and already then gave its results: the number of students who did not go to the session, failed to get the credit on time or received unsatisfactory mark in the exam fell by about 20%. At the same 20%, the time spent on communicating with underachieving students has decreased, which is quite an effective motive in the practical work of any professor.

6.2. SRS, version 1.0 (autumn 2006 - autumn 2008)

Table 1 presents the types of work for semesters, the results of which were taken into account in the BRS. For each type of work, the number of classes or assignments is indicated, as well as the total number of programs that were required to be submitted as a report. Additionally, for each complexity was taken into account, broken into three categories - "light", "medium" and "high". Exactly from the degree of complexity depends the specific score in the SRS, which the student receives for this type of work. Completing each type of work, occupation, program, etc. is estimated in the range from 0 to 1. If any kind of work was performed creatively with the application of previously unexplored methods, technologies, algorithms, etc., the teacher can evaluate this work with an increased coefficient. Unlike option 0.0, the SRS began to take into account the attendance of students, and, depending on the term, both term paper and homework.

Table 01. Dynamics and changes in the indices of BRS

Types of work		Hours of work		Laboratory work		Homework		Testing	Interactive game		Coursework		Total	
Semester	Option BRS	the Number of classes/jobs	the Number of programme	the Number of classes/jobs	the Number of programme	the Number of classes/jobs	the Number of programme		the Number of classes/jobs	the Number of programme	the Number of classes/jobs	the Number of programme	the Number of classes/jobs	the Number of programme
1	1.0	4	4	2	7	9	9	0	0	0	0	0	15	20
1	2.0	6	14	2	7	9	9	1	0	0	0	0	18	31
1	2.1	6	14	1	2	9	13	1	0	0	0	0	17	30
1	3.0	6	12	1	2	9	13		1	2	0	0	17	29
1	3.1	6	12	2	12	11	15	1	1	2	0	0	21	42
2	1.0	4	4	2	20	0	0	0	0	0	5	5	11	29
2	2.0	4	4	2	20	0	0	1	0	0	5	5	12	30
2	2.1	4	4	2	20	0	0	1	0	0	6	6	13	31
2	3.0	4	4	2	20	0	0	1	0	0	6	6	13	31
2	3.1	4	4	3	27	0	0	1	0	0	6	6	14	38
3	1.0	2	2	2	20	5	10	0	0	0	0	0	9	32
3	2.0	2	2	2	20	4	4	0	0	0	0	0	8	26
3	2.1	2	2	1	1	4	4	0	2	2	0	0	9	9
3	3.0	2	2	1	1	4	4	0	2	2	0	0	9	9
3	3.1	2	2	1	1	4	4	0	2	2	0	0	9	9

6.3. SRS, version 2.0 (autumn 2008 - autumn 2010)

In this version, various types of tests on readable subjects are considered.

6.4. SRS, version 2.1 (autumn 2010 - spring 2014)

In this version, compared to the previous one, in the 1 st semester the number of laboratory works decreased from two to one, which resulted in a reduction in the number of tasks and written programs performed from seven to two. In addition to the standard test 4-hour auditoriums with 4 programs of

"medium" and "high" complexity, two "light" complexity auditor works were added, in which 10 small programs are required. In addition, the number of necessary programs increased from 9 to 13 for doing homework. In three tasks of the homework, students were asked to implement the tasks in two different ways and algorithms.

In the second semester, 6 tasks and, correspondingly, 6 programs were offered to the students for the course work. Previously, there were 5 assignments and 5 programs.

In the third semester, due to the insufficient number of hours for discipline, the number of laboratory works was reduced from two to one and, accordingly, the total number of tasks and programs carried out was reduced.

6.5. SRS, version 3.0 (spring 2014 - spring 2015)

In comparison with the version of the SRS 2.1 in the first semester, the number of auditor control works of light and medium complexity decreased from 10 to 8.

6.6. SRS, version 3.1 (spring 2015 - to the present time)

The peculiarity of this version of the SRS is the shift in emphasis in 1 semester to classroom practical work in the form of laboratory works, which became two with the need to write 12 programs instead of 1 laboratory work with 2 programs in the previous version of the SRS. Also, the number of assignments and programs implemented for this in the home work from 9 tasks and 13 programs (version 3.0) to 11 assignments and 15 programs has also increased.

In the second semester, the emphasis was also shifted toward increasing the practical classes - laboratory studies were 2, 3 became "medium" and "high" degree of complexity. Tasks and programs were 20, there were 27 all kinds of complexity.

Such changes in the direction of increasing practical classes are associated with the relocation of the department to another campus, where there is a significant number of computer classes.

Table 1 presents the dynamics of changes in the structural and quantitative indicators of various types of intermediate and current control.

6.7. Analysis of theoretical aspects of the problem on the subject of research and a description of the sample of subjects and stages of psychological and pedagogical research

The bulk of the questions and the survey data are presented in Table 2, where the parameters are calculated as a percentage of the total number of respondents and the total number of points.

Questions in the questionnaire can be divided into several sample groups:

1. increase the motivation of students (questions 8-11, 14, 15);
2. improving the quality of education (questions 7, 16-18);
3. raising the level of the organization of the educational process (questions 5, 19-21);
4. stimulating systematic work (questions 6, 10-13);
5. reduction of the influence of random factors when passing exams and examinations (questions 7, 19).

Table 02. The questions and results of the survey in % to total number of answers and scores

№	Question	The answer	Answer in units. (%)	The answer in points (%)
5	Do you understand the essence of the score-rating system (CRS) evaluation of students ' knowledge?	☐ Yes ☐ No ☐ Thought	77,65 3,53 18,82	88,29 1,00 10,7
6	In Your view point-rating system of knowledge assessment stimulates cognitive activity of students, stimulate them to learn better?	☐ Yes ☐ No ☐ Thought ☐ Your variant	50,59 24,71 22,35 2,35	73,82 9,01 16,31 0,86
7	How do You assess the results of implementation of PRS?	☐ Very effective ☐ Sometimes effective, sometimes not ☐ Quite effective ☐ Don't know	11,78 74,12 2,35 11,76	15,94 75,30 0,8 7,97
8	Do You think that taught You discipline is important in Your future professional activities?	☐ Yes ☐ No	82.35 17.65	94.59 5.41
9	Does Your teacher use a point rating system (CRS) as a tool for knowledge assessment?	☐ Yes ☐ No	56.47 43.53	82.76 17.24
10	Does the use of PRS in Your activity?	☐ Yes ☐ No	56.47 43.53	82.76 17.24
11	Does the use of PRS in Your activity?	☐ Yes ☐ No	65.88 34.12	88.54 11.46
12	Does the use of BRS for Your independence?	☐ Yes ☐ No	52.94 47.06	81.82 18.18
13	Does the use of PRS in Your interpersonal communication?	☐ Yes ☐ No	48.24 51.76	78.85 21.15
14	Stimulated is the use of BRS a teacher of Your activity in the study of materials courses taught?	☐ Yes ☐ No	47.06 52.94	78.05 21.95
15	As influenced by the application of BRS on Your results in General?	☐ Strongly ☐ Significantly ☐ Not much ☐ Does	4.71 28.24 49.42 17.65	8.56 38.50 44.92 8.02
16	If the material is taught in several semesters, as influenced by the application of BRS at You in the 1st semester?	☐ Strongly ☐ Significantly ☐ Not much ☐ Does	11.76 22.35 40.00 25.88	21.39 30.48 36.36 11.76
17	If the material is taught in several semesters, as influenced by the application of BRS at You in the 2nd semester?	☐ Strongly ☐ Significantly ☐ Not much ☐ Does	10.59 20.00 40.00 29.41	20.00 28.33 37.78 13.89
18	If the material is taught in several semesters, as influenced by the application of BRS at You in the 3rd semester?	☐ Strongly ☐ Significantly ☐ Not much ☐ Does	7.06 15.29 25.88 51.76	15.89 25.83 29.14 29.14

19	Whether presenting to You the difficulty of exams/tests with the introduction of score-rating system?	☐ Strongly ☐ Significantly ☐ Not much ☐ Does ☐ Undecided	9.41 11.76 40.00 38.82 0	19.63 18.40 41.72 20.25 0
20	Objective whether PRS?	☐ Yes ☐ No ☐ Thought ☐ Your variant	43.53 18.82 30.59 4.71	67.27 7.27 23.64 1.82
21	How You consider, whether there was an actual increase in the burden on You as a student, in connection with the introduction of the PRS?	☐ Yes ☐ No ☐ Thought ☐ Your variant	24.71 49.41 22.35 3.53	50.30 25.15 22.75 1.80

During analysing the answers to the first group of questions about increasing motivation in the application of the SRS, 82% of the students believed that the read disciplines are important in the future professional activity, which is 95% of the score. 57% of students (83% in points) consider the application of the teacher of the SRS as a knowledge assessment tool, while the remaining part does not consider SRS such a tool or even thought about it. 66% of students (89% in points) consider SRS an influential factor in the activation of training. For 47% of students (78% in points), the application of the SRS increased and stimulated activity in the study of the particular discipline taught. As a result, 33% (82% in points) of the respondents believed that the use of SRS significantly or strongly affected the learning outcomes, the rest or all the same (49%) or did not affect. On average, 82% of the students of the first qualification group support the application of the SRS in the learning process.

During analysing the answers to the second group of questions on improving the quality of education, 79% of students believed that the introduction of the SRS is significant or simple, which is 68% of the score. Only 35% of students (25% in points) considered the application of the professor as a significant tool for the assessment of knowledge if the discipline is read for the second semester in a row, while the remaining part did not consider the SRS such a tool or even thought about it. 23% of the students (18% in points) considered the application of the professor as a significant tool for the assessment of knowledge if the discipline was read for the third semester in a row, with the remainder not considering the SRS as such a tool or even thinking about it. On average, 45% (36% of the ballots) of the respondents from the second qualification group believed that the use of SRS significantly or strongly affected the learning outcomes, the rest or still (30%) or not affected.

During analysing the answers to the third group of questions on raising the level of the organization of the educational process, 78% of the students believed that they understand the essence of the SRS, which is 88% of the score. 21% of the students (19% in points) believed that the use of the SRS by the professor is a complicating factor in the conduct of ongoing monitoring in the session, while the rest does not consider the SRS such a tool (39%) or even did not think about it (40%). 44% of students (66% in points) considered SRS an objective means of assessing knowledge, while the rest does not consider SRS such a tool (24%) or even did not think about it (31%). For 24% of students (49% in points), the application of the SRS actually increased the training loads. The rest did not consider the SRS to be such an instrument (52%) or did not even think about it (22%). On the average, 51% of the students

of the third qualification group supported the use of BRS in the learning process or considered it not a very burdensome means, significantly increasing training loads.

During analysing the answers to the fourth group of questions on stimulating the systematic work of students in the application of the SRS, 78% of the students believed that the SRS significantly stimulated the students' cognitive activity, increased the desire for study, which is 81% of the scores. 65% of the students (88% in points) believed that the application of the SRS by the professor significantly enhanced the educational activity. 52% of students (82% in points) believed that the SRS was an influential factor in the activation of independent learning, with the remaining 48% saying quite the opposite. For 48% of students (78% in points), the use of BRS increased and stimulated self-organization. On average, 57% of the students in the fourth qualification group supported the application of the SRS in the learning process (82% in points).

During analysing the answers to the fifth group of questions on reducing the impact of random factors in passing exams and examinations, 74% of students believed that they effectively evaluated the results of the introduction of the SRS (75% of points). 21% of the students (19% in points) believed that the use of the SRS by the professor was a complicating factor in the current control in the session, while the rest did not consider the SRS such a tool (39%) or even did not think about it (40%). On average, 52% of the students in the fifth qualification group supported the use of SRS.

7.   Conclusion

The article proposes the main provisions of the SRS, developed by the author, the dynamics of the development and changes in the structure of the SRS variants are shown and described. Also samples of subjects and stages of psychological and pedagogical research are described, an analysis of theoretical aspects of the problem on the topic of the study is made, a questionnaire on the application of the SRS in the educational process is offered, and the characteristics of the respondents who participated in the survey are described.

The analysis and interpretation of the results of psychological and pedagogical research of the SRS as a means of internal evaluation of the quality of educational outcomes of students in the university are analysed. During analysing the results of the questionnaire on the application of the SRS in the learning process and summarizing the results for all five groups of questions, 68% of the students perceive the SRS as a means of internal evaluation of the quality of educational outcomes, they are considered and recognized as an element of professional training , allowing to adjust systematically the individual educational trajectory due to self-evaluation of its results; consider as an organizational component of a competence approach with clear requirements and a schedule that regulates educational activities.

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