Visualization of Rating System to Increase Student Motivation Using Electronic Resources

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Abstract. The rating system is used quite actively in the current assessment of student performance, allowing students to be motivated during the inter-sessional period. However, it is not always tied to the e-learning system. Using the principles of the rating system and information visualizing the dynamics of learning at the level of electronic courses allows students of higher education to plan audit and independent work more effectively. The integration of the test system into the educational environment within the framework of electronic resources allows in the training mode to adjust the mastery of professional requirements to the level of competence and to change the software development life cycle (SDLC). Visualization of the assessment of the level of achievements in e-learning allows the student to react more quickly to deviations from the performance of tasks online and to make changes to the schedule of works.

Keywords: information visualization, integration testing, software development life cycle (SDLC), electronic educational resources, higher education, ballroom-rating system, e-learning.

1   Introduction

Please note that the first paragraph of a section or subsection is not indented. The first paragraphs that follows a table, figure, equation etc. does not have an indent, either.

The deployment of new education technologies implies the transfer of part of the training hours to electronic resources. At the same time, the methodological support, including approaches to the rating system of assessment, should change.

Electronic resources are data in electronic form (information in the form of symbols, letters, numbers or combinations of them), computer programs (operators or subroutines that perform certain tasks, including data processing) or various combinations of these types in one resource.

Electronic educational resource (EDR) is a block of various information resources (sources and tools), formed in a special way and intended for using in the educational process, for the functioning and reproduction of which information technology and computer technology are necessary.

Currently, the EIE is able to provide:

- support of all stages of the educational process such as practical training, obtaining information, certification and monitoring of students ' achievements;
- increase the ability of students to work independently;
- changing the roles of the teacher (provision and coordination of the educational process) and students (active participation in the educational process);
- ability to manage the course of events and responsibility for the result;
- transition of the student from simple perception of the information presented by the teacher to acceptance of active participation in educational process;
- application of fundamentally new methods and forms of education, including independent learning.

The following categories of EDR may be used in higher education institutions:
- resources of educational portals of the country provided for non-commercial use in the education system of the Russian Federation;
- resources of commercial educational portals and electronic educational publications on magnetic media purchased by educational institutions to refill electronic libraries at their own expense;
- educational resources of regional portals;
- resources developed by teachers.

Accordance with general requirements for training resources:
- Accordance (compliance) with the goals and objectives of the educational program, correlation with the educational results to be achieved with the use of this EDR;
- the focus on modern learning objectives, competency-based approach;
- compliance with modern scientific concepts in the subject area;
- ensuring continuity of education content;
- compliance with modern forms and methods of organization of the learning process;
- compliance with age and psychological characteristics of students;
- ensuring the optimization of the workload;
- ensuring cross-subject communications;
- ensuring the possibility of using the developed materials in various forms (full-time, correspondence) and technologies of training (distance), as well as using various devices;
- optimality of labor costs for the creation of EDR, including minimum and sufficient composition of EDR, adequacy of selected technologies and tools.

E-course structure
- Working program of discipline: is made in accordance with the form approved by the decision of the Academic Council of the University. The work program necessarily contains information about the features of building a course for distance learning technology.
- Calendar-thematic plan: contains information about all types of work with reference points, tied to the training and production schedule.
- Guidelines for the study of the course: there are described the methods of studying the discipline, it is desirable to pay attention to the most important provisions,

indicate ways of studying complex material, show the relationship of the discipline studied with the previously studied. To focus students ' attention on the practical importance of individual sections, the place of discipline in the formation of a competent specialist.

- Materials for the final assessment: the form of the final examination for the discipline is determined by the department; in case of using the test control, the Bank of test tasks must meet the requirements of the center for testing and monitoring the quality of education and contain at least 300 test tasks. In the case of final control in the form of an oral or written exam (test), a list of questions for the exam (test) is placed in the online course; the final assessment procedure itself can be organized in the form of a video conference.
- Additional materials: Glossary, annotated bibliography, video clips, animation sequences, anthology, additional literature, reference books, materials from related courses ("what you need to remember").

2 Theoretical background and hypotheses

The analysis of the methodological support of vocational education, traditionally used for preparation of specialists [1], and methodologies developed in the period of modernization of system of vocational training, allowed to identify invariant and variable blocks in the composition of the methodical providing of information and the environmental approach to modernization of professional education [2].

The table presents only the leading components of invariant and variable blocks of methodological support. Moreover, the development of an invariant block of methodological support as a process of planning regulatory documentation and educational technologies has a progressive character from the upper to the lower level in the hierarchical system of education. This fact points to rigid structure of methodical maintenance of professional training of experts in the information and educational environment [2]. And the development of a variable block of methodological support as a planning process is nonlinear. It is caused by multilevel educational and professional interactions of subjects of the information environment that testifies to dynamic structure of methodical maintenance of professional training of experts in the information and educational environment.

Table 1. The composition of the methodological support.

Levels of IOS software (Levels of development MP)	Invariant block MP (traditional teaching)	Variable block MP (training in the information environment)
Federal	GEF SanPiN The development program of software of the country	The informatization program of software of the country The Federal bank of EDR
Regional	The development program of software of the region	The informatization program of software of the region
Institutional	The development program of educational institution of software The main educational program on specialties	The informatization program of educational institution of software EDM system of educational institution of software Information and educational environment of educational institution of software The bank of EDR of educational institution of software
Subject	EMC complex for each discipline	Subject EDR IT-learning tools and exercises Subject information and educational environment
Personal	Personal requirements for the teacher and student	The requirement of readiness of the person to productive information activity

Education				
External structural changes	**Levels IEE**	**Structure of methodical providing**	**Internal structural changes**	**Subjects IEE**
	Federal	Education act general competences		Educational authorities of the country, the region
	Regional	Algorithms of scientific and technical cooperation special competences		
	Institutional	Organization of scientific activities and production practices Bank of EER Instructions for working with the EIE		Administration, dean's office, departments
	Subject and disciplinary	EMC of educational disciplines IT tools of training Methodical recommendations Network algorithms of interaction between teachers and students		Teachers
	Personal	Requirements to the identity of subjects EIE Motivation of activity of subjects EIE		Students

(Left vertical label: Science and Production)

Fig. 1. Composition and structure of methodological support of information and educational environment.

There are presents the priority components for the information-environmental approach of the composition of its methodological support, as well as dotted lines indicate the structural changes in the methodological support due to the educational activities of the subjects of the information-educational environment of vocational education see [3]. Thus, the external structural changes are manifested as follows: on the disciplinary level of the information-educational environment in the part of methodological support is added components that describe the IT-tools in teaching and learning algorithms and network interactions used by the subjects of the environment; and on a personal level in the requirements for the individual entities of the environment includes the claims for information operations activity in the educational environment and the requirement of responsibility for this activity. Internal structural changes of methodological support of the information and environment approach are manifested in the participation of advanced students in the development of electronic educational resources and filling the EDR Bank with them, in the development and testing of network algorithms of interaction between students and teachers, as well as methodological recommendations to them.

There are objective and subjective factors that determine the needs, interests and motives of students' inclusion in independent work for the development of theoretical and practical material.

Often students ignore homework and tests, or perform them by copying classmates, without thinking about the quality of the task.

3 The method and the empirical results

We conducted a study to identify the causes of low motivation of independent work among full-time and part-time students. During the study, 250 students of different courses, forms and technologies of training were interviewed.

Using the method of brainstorming, causal relationships were established and thirteen main activities were identified, which, according to experts, will improve the quality of training at the University see **Ошибка! Источник ссылки не найден.**.
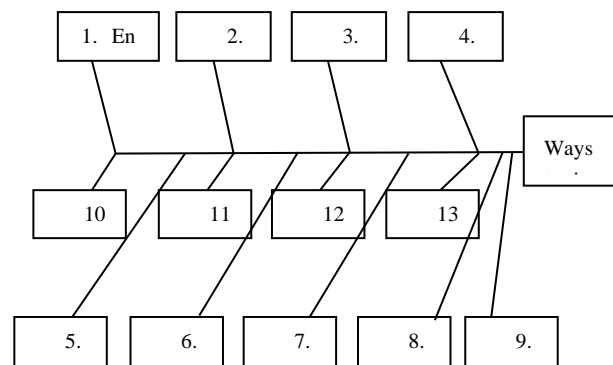
Fig. 2. Cause and effect diagram.

We revealed the following factors influencing the quality of students' knowledge:
1. Ensuring of methodological resources
2. On-line consultations
3. Obtaining access to assessment measures
4. Execution of project tasks
5. Teamwork
6. Control and thematic planning
7. Assessment of students ' works
8. Public defense of projects
9. Acquaintance of students with the profession
10. The load distribution in the semester
11. Increasing the percent of practical training
12. Organization of classrooms (places) for independent work
13. "Automatic" marks

The expert evaluation was carried out by the method of pair comparisons for ranking the expert evaluation [5].

Table 2. Expert evaluation of students' answers.

№	Activity	Rating mark	Rating mark	Rating mark	Rating mark	Rating mark	Rating mark	Rating mark	Rating mark	Total
1	Ensuring of methodological resources	1	2	1	1	1	6	11	11	4
2	On-line consultations	8	3	12	6	6	7	13	10	8
3	Access to control measures	11	12	13	8	5	8	10	4	9
4	Project tasks	10	7	5	3	11	9	9	6	8
5	Teamwork	2	1	8	7	10	12	4	12	7
6	Control and thematic planning	7	6	10	11	4	4	8	9	7
7	Assessment of students ' works	9	8	7	13	3	5	2	2	6
8	Public defense of projects	13	4	4	10	12	11	1	5	8
9	Acquaintance of students with the profession	5	9	11	5	9	3	12	13	8
10	The load distribution in the semester	4	5	3	2	7	10	5	8	6
11	Increasing the percent of practical training	3	11	6	9	8	2	6	3	6
12	Classrooms for independent work	12	10	9	12	13	13	7	7	10
13	"Automatic" marks	6	13	2	4	2	1	3	1	4

Within the framework of UrFU was developed and approved "Educational policy in terms of implementation of educational programs of bachelor, specialty and master" [3]. If we compare the main directions of the University's educational policy with the studies conducted among experts in the direction of 38.03.05 Business Informatics, it is obvious that the opinions of students and the University's policy in the main directions are almost identical to the activities in table 3.

Table 3. Main directions of development of educational programs.

Educational policy of UrFU	Experts opinion
Unified modules	Ensuring of methodological resources
Networking and use of open courses	On-line consultations
	Control and thematic planning
Students` project activities	Project tasks
	Public defense of work
	Teamwork
Independent monitoring of learning outcomes	Assessment of students' works
	Access to control measures
	"Automatic" marks
Creation and implementation of educational programs with the participation of enterprises and organizations	Increasing the percent of practical training
	Acquaintance with the profession
Mixed education	The load distribution in the semester
	Classrooms for independent work

As can be seen from the table, the opinion of experts coincides with the main directions of development of educational programs of UrFU. At the same time, the development of electronic educational resources (EER) allows to combine most of the factors that can affect the efficiency of the educational process and without additional costs to move to the training of students on educational trajectories.

The main principle of the organization of quality control of the educational process, due to the systematic approach to the problem of knowledge assessment – is the complexity of the application of various types of control, distributed over time and in the disciplines studied [4].

Regular assessment of the results of exam task of students is the feedback between teachers and students, which allows not only to record the degree of learning for each student at the moment, but also to determine the adequacy of teaching methods with modern requirements, as well as identify trends in the development of the learning process.

The results of the monitoring of academic work by students may be used to adjust the organization and content of the educational process, to promote successful students, develop their independence and initiative in learning and acquiring professional knowledge and skills the methodology of data entry is given in the article [5].

The basis of the rating system of knowledge assessment is the modularity of work programs, the educational process itself. The module is a part of the working program of discipline which has logical completeness and bearing a certain functional load.

The modular principle of the educational process allows to build a clear, comprehensive and multi-level system of assessment of students ' knowledge, which includes current control and intermediate certification.

Current control of students' knowledge can have the following traditional types:
– oral questioning during lectures, practical lessons and seminars;
– verification of compliance with written assignments, and calculation and graphic works;
– defense of laboratory work;
– control works;
– testing (written or computer);
– conducting of colloquiums (in written or oral form);
– examination of independent work of students (in written or oral form).

There are other types of current examination of knowledge, which are determined by the lead teachers in agreement with the departments.

The study of each module is completed by a control point (boundary control), carried out in the form of a test, control work or colloquium. The teacher himself/herself determines the forms and methods of examining each module.

4 Conclusion

A detailed study in showed that the information visualization of the rating system allows students to be motivated. The question with which the first lesson on the subject begins: "Will the machines be?" falls off itself. Visualization of the rating system within

the e-course significantly increases student activity. Setting and determining the rules of rating points at the beginning of the semester motivates the independent work of students in preparation for classes and passing control events during the semester, rather than on the last day before the beginning of the examination session. Inspection of the part of the training material studied after the last test point in the semester allows to change electronic materials within the SDLC.

Examination of the portion of the educational material studied after the last assessment in the semester can be submitted to the test or examination at the opinion of the teacher.

The visualization of the rating system during the organization of the educational process allows to carry out continuous control of the development of the material by students, when using ESM. Activates the development and introduction of new methods of education, which motivate the active creative work of both students and teachers of the university as much as possible. The process of continuous updating of e-course information is streamlined and structured. It is possible to predict student performance. It is possible to predict student performance. Changes in the information support of the training process in accordance with the program objectives and taking into account its results at the control points. Encourages students to actively acquire knowledge and allows them to allocate their temporary, physical and mental resources rationally. Enhance the development of new methodologies in the development and development of electronic materials within the SDLC. Creates favourable conditions for students of higher school to gain knowledge to solve interdisciplinary problems.

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