

# DIDACTIC ASPECTS OF ASSESSMENT TECHNOLOGIES SYSTEMATIZATION IN EDUCATIONAL SYSTEMS OF ENGINEERING INSTITUTIONS

Yulia Vetrova<sup>1</sup>, Galina Meleshkova<sup>2</sup>, Viktor Romanov<sup>3</sup>

*Analysis of scientific and methodic literature on the problem of theoretic fundamentals of assessment in educational systems of engineering institutions shows that in spite of considerable number of research works on learning outcomes measurement there are a lot of "open" problems and professional complications for lecturers in higher education school nowadays. One of them is absence of universal classification of control technologies and corresponding literature. The second one is conjugation of qualitative and quantitative evaluation, understanding of psychological essence of pedagogical evaluation. The cause of such state consists in a lack of systematization and dissemination of scientific information on the present aspect and in an absence of stimulus for implementation of innovative pedagogical technologies into educational process. Invaluable contribution to understanding of pedagogical control essence made by such distinguished educators, teachers and psychologists of the 20<sup>th</sup> century as B.G. Ananiev, N.F. Talizina, N.V. Kuzmina, A. Melezinek. Psychological factor should be taken into account in creation and systematization of innovative control technologies. Correct and adequate pedagogical evaluation carrying out functions of management and stimulation in the process of development and improvement of students learning and also essentially influences on a quality and resultativity of educational systems in higher engineering institutions. Process and result of training and cognitive activity of engineering institution students evaluation is suggested to carry out with taking into account following didactic principles: purposivity, expediency, depth of training information understanding, systemacy, realization, adequation to social-pedagogical and human situations, consistency, physiological ensuring of perception and understanding processes, feedback and forecasting of a new knowledge and forms of activity. International aspect of assessment of student learning is very important. Brief comparison of assessment technologies in some Universities of Great Britain, France, Germany and Russia has been done and comparison of Grading Scales applied in the Universities is presented. Such research could be made after work on Joint European Project TEMPUS (TACIS) in collaboration with Universities of Great Britain, France and Germany and due to direct international links between Saint-Petersburg State University of Technology and Design and Universities of Europe.*

The assessment technologies, as a rule, are components of any educational technology and pedagogical system. There are some classifications of assessment technologies, which essence depends on the chosen criteria of available data systematization. So, in view of the temporary factor of study of the certain discipline or course the assessment can be entrance, current and final. Depending on the form of assessment it is possible to allocate qualitative and quantitative technologies. The functional bases of assessment technologies allow to allocate diagnostic and prognostic assessment, subjective, relative and absolute.

Despite of significant number of theoretical and practical works on measurement of learning outcomes both current, and final, for today in this area there are many open problems and professional complexities for the lectures of a higher schools. One of them is absence of universal classification of assessment technologies and appropriate reference literature.

The modeling of concrete assessment technologies depends on understanding by the lecture of essence, methods and forms of the assessment. Any assessment technology includes informational-didactic and psychological components. A choice of a method of the assessment, and hence, the technologies, are defined by such

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<sup>1</sup>Yulia Vetrova, Saint-Petersburg State University of Technology and Design (SPSUTD), Russia, [Yulia.Vetrova@pobox.spbu.ru](mailto:Yulia.Vetrova@pobox.spbu.ru)

<sup>2</sup>Galina Meleshkova, SPSUTD, 18 B. Morskaya str., Saint-Petersburg, 191186 Russia, Tel.: +7 (812) 315 06 47

<sup>3</sup>Viktor Romanov, SPSUTD, Phone: +7 (812) 315 75 25 , Fax: +7 (812) 311 95 84, [rector@sutd.ru](mailto:rector@sutd.ru)

pedagogical variables, as the purpose of teaching, educational perceivable information, methods and means of training, psychological and sociological features trained and trainees.

The assessment is always connected to control process of educational activity trained by the lecture. Considering certain subjectivism of a pedagogical evaluation, it is not necessary to aspire to replace a supervising role of the person of the lecture by modern means and standard tests. The lecture himself/herself should determine a set of means of the control, design thus training and educational results of a pedagogical evaluation.

The understanding of assessment and control nature allows in a significant measure to improve a management system and system of training of specialists in professional educational institutions of all levels - from Lyceums, Colleges up to Universities and Faculties of Improvement of Professional Skills. Fixing result of educational activity in points, the mark becomes the basis for acceptance of the decision about pedagogical and administrative influence on trained.

Mentioning emotional - strong-willed sphere of the person and its status the assessment technologies influence on motivation, needs and interests of all participants of educational process. In this connection becomes to a topical question about pedagogical expedient requirements and creation of scales set for exact measurement of learning outcomes. The problem consists of necessity of adequate measurement of learning outcomes with taking into consideration of psychological and sociological value of a pedagogical evaluation. It is necessary to find optimum conformity between a quantitative evaluation and qualitative description of results of educational activity.

We carried out comparison of used assessment technologies at universities of Great Britain, France, Germany and Russia. There are certain differences in technology of pedagogical evaluation in Russia and in the countries of Europe. In Great Britain, for example, 100 % grading scale and levels A, B, C, D, and now even at many universities there are levels: A+, A, A- and etc. In France there is "20" - points grading scale, in Germany - "15" - points. To one group of points in a concrete interval of a grading scale corresponds the definite qualitative characteristic, which is developed by lecture with taking into consideration of above-stated pedagogical variables. In Russia, basically, "4" points grading scale is used - which does not allow to receive an exact and reliable evaluation of results of activity trained.

The comparative analysis allows to make a conclusion that at modeling of assessment technologies it is necessary for the lectures of high schools be oriented on differential control and creation of smoother grading scales, which provide the correct and adequate form of pedagogical assessment process, authentic of result, reliability of a assessment technique.

The authors offer to evaluate of quality and productivity of educational perceptive activity of the students of engineering institutions in view of following didactic principles: purposefulness, expediency, depth of understanding, scientific character, systemacy, realization, adequacy of assessment to social - pedagogical and general humane situations, sequence and psychological maintenance of processes of perception, understanding, feedback both forecasting of new knowledge and forms of activity. The psychological - pedagogical analysis of knowledge from the point of view of their obligatory and prime mastering assumes allocation of subject, logic and

psychological components. The regularities, facts and methods of concrete scientific discipline relate to the first component, to second - logic operations and receptions of logic thinking, to third - skill concern to plan activity, to control its course, to bring in corrective amendments and evaluate final result from positions of its conformity to actual task. Within the framework of these principles it is necessary to formulate criteria and most important attributes, in view of which the assessment technologies and pedagogical tests can be created. Testing is a part of assessment activity of teaching staff in engineering institutions. It is necessary for lecture to evaluate of knowledge, as a process of objective measurement, and results of such measurements to process by standard mathematical methods and to accompany by the standard accuracy characteristics. It is possible to consider the pedagogical test in comparison with usual control work, as the original measuring tool of the certain resolution and accuracy. It is impossible only to overlook, that object of measurement (volume of knowledge, depth of understanding, level training to work with the scientific information and skill to get new knowledge) - are extremely specific, and consequently the results essentially depend on opportunities of reasonably formalize the given object.

Significant methodological work in the field of pedagogical testing is the work the Danish mathematics G. Rasch of 1960 year edition. On its fundament the theoretical base of testing and theory under the name Item Response Theory (IRT) is developed. The first information on this theory in Russian has appeared in 1995 in work M.B.Chelishkova. Nowadays teachers can involve a wide arsenal of mathematical methods, both for designing the tests, and for processing and analysis of testing results. Introduction in the specified theory for the lectures of the Russian engineering institutions is the work of Yu.M. Neiman and V.A. Hlebnikov of 2000 year edition.

The pedagogical testing involves the increasing amount of the supporters. However, it is necessary to understand that it can not replace really existing innovative assessment technologies in engineering education. As marks Prof. A. Melescinek in the work "Engineering Pedagogics", amount of open problems in the theory of the assessment behind result of training and its measurements are greater, than what have received the positive decision.

The authors consider that the essential contribution to the theory of creation of the pedagogical tests can be brought by the scientific items of information from area of psychological testing. The psychological factor will allow to take into account the subject - subject, emotional - strong-willed and intellectual properties of all participants of educational process, including pedagogical testing in methodological, process - productive aspects. The level of educational and professional training is defined with the help of assessment technologies in view of psychological readiness of the person for his/her activity. The experience of such testing is got the post-graduate students and lectures of engineering high schools during carried out in SPSUTD training course directed on improvement of professional skills of scientific - pedagogical staff according to the requirements of the International Society of Engineering Pedagogics (IGIP).

In summary it is necessary to note, that a correct and adequate pedagogical evaluation, innovative assessment technologies render essential influence on quality and productivity of educational systems in engineering institutions.

## THE LITERATURE

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