

Pedagogical measuring of education quality

B.A. Zhigalev¹, M.A. Vikulina¹, K.E. Bezukladnikov²

¹Linguistic University of Nizhny Novgorod, Nizhny Novgorod, Russia

²Perm State Humanitarian Pedagogical University, Perm, Russia

Abstract. The article highlights the problem of testing as one of the most actual aspects of training quality control management and assessment means in pedagogical diagnostics. The theoretical principles of testing, its development and application at education process and approaches to testing in Russia's and foreign education paradigms are touched upon. The authors also concentrate on investigating its complementary structural components and functions. This research allows classifying tests applied in education into a number of categories.

[Zhigalev B.A., Vikulina M.A., Bezukladnikov K.E. **Pedagogical measuring of education quality.** *Life Sci J* 2014;11(7s):356-359] (ISSN:1097-8135). <http://www.lifesciencesite.com>. 76

Keywords: education management, training quality control, education system, pedagogical measuring, progress assessment, self-education, testing, test types, test functions, task application, task development.

Introduction

One of the crucial challenges the education system improvement is facing nowadays is the provision of modern education quality based upon preserving its fundamental nature in accordance with the actual and perspective needs of a person, society and state. The management and education quality control are the major directions in the activity field of an educational establishment.

In different time testing attracted the researchers' attention. Domestic authors B. A. Zhigalev [1], M. A. Vikulina [2] contributed in the development of the Russian testing science. Testing genesis has also been thoroughly studied by foreign scientists (R. N. Dubois, G. Chensi and D. Dobbin, A. Anastazi, G. A. Miller) [3].

The main part

Pedagogical measuring by V. S. Avanesov [4] is an individually focused qualities display process represented by numerous levels of their manifestation. The principal object of the existing general pedagogical theory of measurement is the task development and its application in a test form for educational process activating, self-assessment test form scientific organizing in the course of self-education.

A test is the most appropriate means of pedagogical measuring representing a specific form of increasing difficulty tasks system aimed at effective measuring the level and assessment of the examinees' readiness result structure.

V. M. Kadnevsky [5] defines **testing** as a set of methodical and organizational actions providing the development of independent and objective education quality assessment means; preparation and carrying out, on its basis, of the standardized procedure of measuring and assessing the level of examinees'

individual abilities and education development; processing and analysis of the received results.

The main functions of testing have been pointed out. These are: abilities, training progress and control level assessment. The most important of them are: diagnostic, didactic (training), developing, organizing, differentiating, educational, administrative, etc.

Diagnostic function is revealed in obtaining initially valid information on knowledge quality, skills and trainees' psychological qualities for making administrative decisions to be used in educational monitoring.

Didactic (training) function is realized when using tasks in a test form for identifying gaps in knowledge, their fixing, forming trainees' ability to work with tests and test culture.

Developing function is manifested in creating additional reflection and training motivation at identifying insufficient productive results while analyzing the score of progress level testing for achieving steadier knowledge by the next testing.

Organizing function is revealed in changing the structure of the educational process by the teacher by means of including a bigger number of test tasks at training, current control running, programs reviewing, etc.

Educational function of tests is connected with the increase in educational motivation and needs to receive better results and formation of a person's responsibility for the educational work results, demands for cooperation, self-organization and self-study.

Administrative function is connected with the analysis of testing results and providing conditions for making more competent decisions on the basis of objective, reliable and verified information on the level of trainees' educational achievements.

The following main directions of testing didactic materials use are specified:

- **entrance testing** (allows assessing the degree of students competence, existence of gaps in knowledge; planning the program both with the student and for the student for providing the National Curriculum requirements);

- **final testing** (gives the real possibility of an objective assessment of a student and teacher's work results; determination of teaching and educational process efficiency and applied didactic systems, training and development methods);

- **consequent (correcting) control of the knowledge acquired** allows the teachers during instruction to find out directly how intelligibly, clearly they deliver the information, whether conventional abstraction is perceived by the student; to estimate the degree of the academic material understanding and eliminate any misunderstanding in case of necessity;

- **current and progress control** (with the leading function of training, but not control).

The specified types of control, unfortunately, are not aimed first of all at identifying of the reasons of ignorance, elimination of gaps in knowledge, but assessment of knowledge available acquired by the student:

- admission to laboratory works (student's knowledge of theoretical material according to the content of laboratory works);

- defending of laboratory works (student's knowledge of theoretical material and their ability to put it into practice);

- self-assessment of the degree of studied material comprehension at the course of self-education;

- ensuring systematic repetition and control of the degree of earlier studied material comprehension.

Two main types of tests are well-known:

- traditional pedagogical test (represents the integrity of, at least, three systems):

- substantial system of knowledge described by the means of the subject matter being checked;

- formal system of increasing difficulty tasks;

- statistical characteristics of the tasks applied and results of examinees.

Homogeneous and heterogeneous tests are also referred to this type. The homogeneous test as the most applicable one in the educational practice represents the system of increasing difficulty tasks, specific form and definite contents (the purpose: objectivity, quality and efficiency of the assessment method of the structure and measurement of the student's level of readiness based on one subject matter or its section). The heterogeneous test includes the system of increasing difficulty tasks, specific form

and definite contents (the purpose: objectivity, quality and efficiency of the assessment method of the structure and measurement of the student's level of readiness based on several subject matters). Quite often such tests also contain psychological tasks for assessing the intellectual development level.

- Unconventional tests are represented by the integrative and adaptive tests.

The integrative test consists of a system of tasks meeting the integrative contents requirements, test form and increasing difficulty of such tasks where answers demand synthesized (generalized and obviously interconnected) knowledge of *two and more subject matters* (the purpose: generalized total diagnostics of an educational institution graduate's competence). Creation of such tests is given only to those teachers who are competent in a number of educational disciplines, understand the important role the interdisciplinary communications play in the training process; who are capable of developing tasks where answers demand proper knowledge of various disciplines and abilities to apply such knowledge.

The adaptive test is a variant of an automated testing system (in the form of computer generated tasks bank ordered according to the target characteristics of tasks) where the difficulty parameters (each task is empirically approbated on a rather large number of typical students) and each task differentiating criteria are well known. The repetition tests combined of different types tasks are referred to the adaptive type and intended for mass testing.

The possibilities of tests and their application alongside with the existence of various methodological bases used by different authors, allow their classifying in the field of education:

- *diagnostic tests, or general knowledge tests:* tests of special abilities; academic progress tests; special abilities being trained detection tests (memory, personality, creativity, etc.);

- didactic tests: progress, special abilities, general knowledge level, competence;

- tests on the contents and structure: homogeneous, heterogeneous, integrative, adaptive, etc.;

- target orientation tests: criteria focused, standard focused, content focused (definition of the initial knowledge level, differentiating on the training progress: good, poor, etc.);

- target tests: topic, progress, final, training, developing, controlling knowledge;

- tests on means of presentation: paper based tests with filling in special forms for answers, computer based tests with consequent presentation of each task on the monitor and program methods result fixing.

Another classification based upon the basis-level system approach of describing the achievements of students is also well known. This allows grouping the progress results depending on the levels of training.

Levels of training material acquisition:

A) Reproduction of knowledge:

- requirements to the students' achievements (training level) in generalized terms (to know the terminology, specific facts (dates, events, names of people, etc.), categories, methods, principles, laws, theories etc.);

- formulation of requirements in terms of external activity (to give a definition, formulate, describe, to match (the term to its definition) to show (to find), to retell, to list (features), to choose, etc.).

B) Comprehension and application of knowledge in a familiar situation:

- requirements to the students' achievements (training level) in generalized terms (to understand the facts, laws, principles, criteria, theories; to understand texts after reading; to apply knowledge at explanation, comparisons, solution of qualitative and quantitative tasks; to use methods, algorithms, procedures; to make schedules, charts, tables in a correct way etc.);

- formulation of requirements in terms of external activity (to explain, correlate, characterize (to provide characteristics) to compare, establish (distinction, connection, reasons), to allocate essential signs, to calculate (to determine by formulas or algorithm), to solve, make something according to the scheme, to act according to rules, to show, measure, continue/finish (thought, statement), to fill in the missing words (letters), etc.

C) Application of knowledge in a changing or unfamiliar situation:

- requirements to students' achievements (training level) in generalized terms (to integrate knowledge from various sections for solving various problems, to analyze, generalize, estimate, design, to plan an activity, to experiment);

- formulations of requirements in terms of external activity (to make an oral or written answer to a problem question in situations of professional discourse[6], to write a composition, to conduct a research, to formulate a hypothesis (conclusions), to prove own or author's point of view, to predict consequences, to distinguish the facts from opinions (judgments), the facts from hypotheses, conclusions from provisions, to analyze information, to find a mistake, to give a response or review, to state a judgment, an opinion on the compliance of conclusions and facts, value (role) of ideas, accuracy (measurements), quality (accuracy, efficiency, profitability) of the done work, chosen way of problem solving or used methods, to create a model

(to change model), to reconstruct, make the plan of an experiment, story, solution, to change the plan, etc.).

The first level is connected with the direct contents reproduction of the studied material and its recognition from memory. The second level assumes understanding and application of knowledge in a familiar situation on a sample, performance of actions with accurately designated rules. The third level includes application of knowledge in a changing or unfamiliar situation. In our opinion, it is possible to add the ability to devise synthesized knowledge from heterogeneous (covering some subject matters) tests.

Creation of a test intended for pedagogical control, also takes much time and is carried out as a model in some stages [7]. The very first stage according to the testing purposes (progress or final) – is the choice of a test type, its duration, time for completing, structure (according to the contents, task forms and other parameters).

The second stage includes the development of the test specification (standard for all the options), which has to contain a number of obligatory parameters on the extent of a subject matter coverage, quantity of tasks, in the form of their representation according to the contents of sections, instructions for teachers and examinees.

At the third stage according to the developed specification the selection of tasks (from the acquired base) in the test is carried out on the basis of the preliminary esteem of predicted difficulty.

It is possible to name the fourth stage of a test creation as the approbation one. It includes the development of a testing technique, allocation of time necessary for approbation, instruction preparation for students and the teachers responsible for its approbation, copying of materials and carrying out the approbation itself. After being carried the stage of pedagogical test completion begins.

At this stage the statistical processing of testing results and test correction according to the results obtained are carried out: ranging of tasks on the increasing degree of difficulty principle, replacement of distractors in separate or entire tasks themselves if necessary; and repeated approbation.

Thus, the creation of a quality pedagogical test intended for different types of control is a rather complicated and time-consuming process (sometimes it takes several years). Besides, it must be kept in mind that the problem of creating a quality test matching the scientific criteria, does not have a single decision. In a sense the development of a quality test can be compared with a two-way traffic street where not everything depends only on the quality of testing materials created by a skilled developer. Much depends on the training level of students. The tasks that work well at one selection of students, may not

provide even the minimum statistical results, on another [8].

In order to make *the complex of test tasks* an adequate instrument of students' level and structure of knowledge assessment it is necessary to fulfill *the following requirements*:

- uniform coverage of all the discipline sections according to the training program i.e. to be representative according to the contents;

- provision of wide tasks distribution based on their difficulty degree according to each section of studied discipline;

- existence of high degree of adequacy, i.e. results of testing have to differentiate students on the level of knowledge effectively;

- high stability (to reveal the knowledge based on profound comprehension of the subject matter, instead of mechanical storing of separate facts);

- "distraction stability" (absence of influence of probabilistic factors on the testing result, in particular, influence of multiple-choice options resulting in answers "at random");

- sufficient dimensions to exclude possibility of "coaching";

- sufficient variety of task forms and formulations (gives the chance to avoid fast fatigue of students);

- high degree of a validity (results of testing have to reflect that knowledge and skills of a student which are not only necessary for further training progress, but also would characterize them as future experts).

Test tasks differ in answer forms as tasks with the choice of correct answers (one, multiple, one most correct); an open form communication, correct sequence [9].

To check the test properties of tasks the matrix (a compact form of record of the elements connected by some integrity of the contents) of the testing results of all the tasks being checked is used. The matrix is a number of lines that is equal to the number of examinees, and columns equal to the number of tasks. Two grades are used: 1 and 0. These reflect the interaction results between a great number of examinees and a set of tasks within a matrix of any size. The summary of the matrix elements in the lines and columns is of great pedagogical value: the more the correct answers to a task are, the easier it is for the group of examinees. For example, all the examinees coped successfully with the first task, while only one examinee did it with the third one, because it is the most difficult [10].

5/8/2014

Conclusion

Thus, a modern pedagogical test meeting all the requirements of the theory of pedagogical measurement allows not only receiving objective information on the students' knowledge level, but also serves as an element of public stability because it allows distributing graduates of educational institutions in compliance with their individual abilities and interests of society.

Created within the project 036-F of Strategic Development of Perm State Humanitarian Pedagogical University.

Corresponding Author:

Dr. Zhigalev B.A.

Linguistic University of Nizhny Novgorod, Nizhny Novgorod, Russia

References

1. Zhigalev, B.A., 2012. The system of education quality assessment in a linguistic higher educational institution, D. thesis, Shuya State Pedagogical University, Shuya.
2. Vikulina, M.A., B.A. Zhigalev and O.I. Fedoseeva, 2012. Methodical Provision of Education quality monitoring at a higher educational institution. *International Journal of Experimental Education*, 12 (1): 173-175.
3. Raven, J., 1991. *The Tragic Illusion: Educational Testing*. New York: Trillium Press; Oxford, England: Oxford Psychologists Press.
4. Avanesov, V.S., 1994. *Scientific problems of knowledge testing control*. Moscow, pp. 135.
5. Kadnevskij, V.M., 2007. *Genesis of testing in the history of domestic education*, D. thesis, Ural State Pedagogical University, Ekaterinburg.
6. Bezukladnikov, K.E and B.A. Kruze, 2012. An Outline Of an ESP Teacher Training Course. *World Applied Sciences Journal*, 20 (Special Issue of Pedagogy and Psychology): 103 – 106.
7. Bezukladnikov, K.E., A.N. Shamov and M.N. Novoselov, 2013. Modeling of Educational Process Aimed at Forming Foreign Language Professional Lexical Competence. *World Applied Sciences Journal*, 22 (7): 903 – 910.
8. Bezukladnikov, K.E., B.A. Kruze and M.A. Mosina, 2013. Interactive Approach to Esp Teaching and Learning. *World Applied Sciences Journal*, 24 (2): 201-206
9. Waters, A., 2010. Review of Professional encounters in TESOL: discourses of teachers in teaching. *ELT Journal*, 64(2).
10. Richards, J.C. and A. Burns, (Eds.), 2009. *Cambridge Guide to Second language Teacher Education*. New York: Cabridge University Press.