A. I. Vlasiuk, Cand. Sc.(Eng.); M. V. Znatnova; O. V. Burdeina

THE RESULTS OF IMPLEMENTATION OF TEST SYSTEM OF STUDENTS KNOWLEDGE AND SKILLS EVALUATION WHILE SUMMING UP OF PRODUCTION ACTIVITY AFTER THE COMPLETION OF PRACTICAL TRIMESTER

The paper considers principles of students' knowledge evaluation upon the results of working trimester on the base of computer testing technology. The authors analyze the structure of the developed computer tests and study its influence upon the final evaluation of subjective factors.

Key words: *technology of computer testing, pedagogical measuring.*

Introduction

One of the important factors in training modern specialists is the integration of training and practical work at production facilities. Vinnytsia National Technical University developed and introduced modern high efficient technologies, favoring more advanced perception of the chosen speciality as well as quick adaptation of graduates to work in conditions of market economy [1]. Such integration technologies allow students to obtain practical skills along with theoretical training, having mastered one of 18 professions which corresponds to their future engineering speciality. The technology of obtaining working profession by University students however differs from that of Professional Technical Institutions. This is stipulated for by the fact that the first year students along with the subjects of working professions study the fundamentals of the future engineering speciality.

Thus, there exists the possibility to carry out greater part of classes in working profession in the form of self-sustaining activities applying the latest technologies for organizing the training process, in particular, tests, for evaluation of students' knowledge.

It should also be noted that testing methods for measuring students abilities and knowledge level started to be introduced in the United States of America at the beginning of the previous century (Dzh. Kettel, Eduard Li Thorndike etc.). Up to the year of 1961 there had been created 2126 of standardized tests (it is difficult to calculate their present number, considering the development of the latest informational technologies). And, despite the common disadvantages (complicated evaluation of high level competences, as skills of analysis, synthesis, information evaluation etc.), the use of testing systems caused neither degrading nor non-competitiveness of the graduates in American institutions for higher education, but vise versa. The achievements of the Educational Testing Service, created in 1947 are now being widely used all over the world [2].

The objective of the work is to invstigate the testing system which evaluates the level of students' skills and knowledge upon the results of working trimester, which had been introduced by the Information and Analytical center in the Institute for Training and Production Integration of VNTU. The final evaluation is suggested to be done using the computer-based testing techniques, avoiding the interference of human factor in the evaluation process.

Materials and results of research

The University information and Analytical Center has been using computer testing technologies for more then 10 years having proved its efficiency and objectiveness.

Testing today is used during the examinations on the following specialities: computer keying operator, electrician and laboratory assistant of chemical analysis. The process of testing these specialities has its own peculiarities: the own approach to the formation of test questions and the order of knowledge evaluation.

The students of the speciality "computer keying operator" are in demand within the range of the enterprises (telecommunication companies, engineering enterprises, state institutions etc.) It is very

difficult to evaluate students work proceeding from the enterprises profile. Therefore the Information and Analytical Center developed the set of test questions, available to those with sufficient skills in operating a computer. The set of the questions is under constant revision considering the development in information technologies.

Testing method allows to evaluate knowledge of 6-7 students within 15 minutes. This minimizes the human factor and improves the objectivity in knowledge evaluation.

The set of questions includes about one hundred questions with three answers to each, among which one answer is correct (Fig.1).The questions are of equal complexity and cover the main curriculum in the working profession. The width of spectrum of topics allow to evaluate the knowledge efficiently.

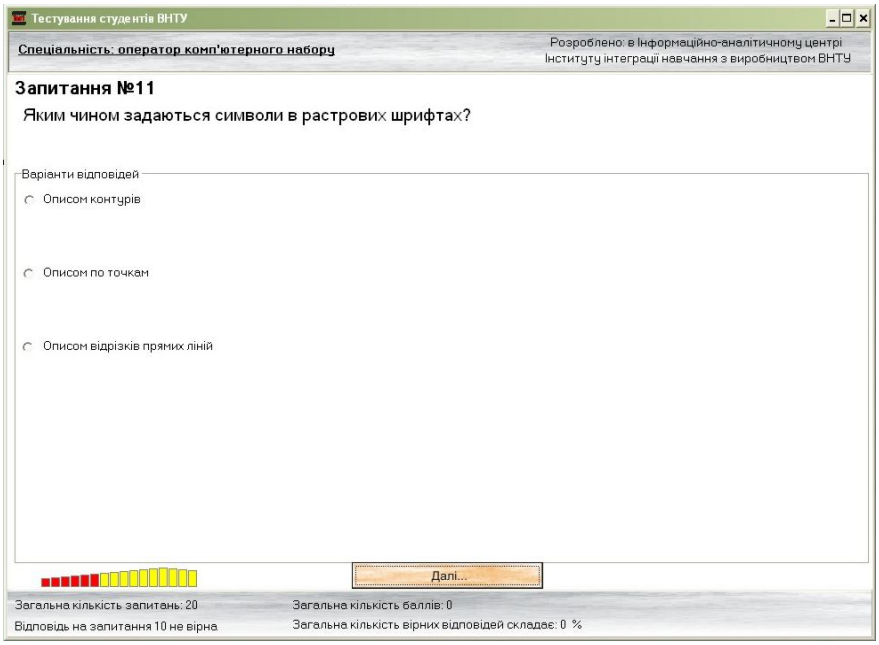

Fig.1. The view of the testing window

The student must know the operating principles of Windows, MS office, differentiate the main types of files, have a good command of computer terminology, skills for operating the network etc., which enable him to pass the test successfully.

The questions are laconically composed and are easily understood. The student may concentrate on thinking over the answers, spending little time on understanding questions.

The set of the tests is formed from the general set randomly and consists of 20 questions. Time limit for each question – 1 minute. The student may view the results upon the end of the test. The mark is given in accordance with the percentage scale, based on the standard percentage scale of the subject's labor coefficient (Table 1).

Besides the evaluation and the percentage of correct answers, the screen presents the full report including the list of questions, which were not answered correctly by the student. Below each of such question there is the wrong answer, chosen by the student, and the correct one. The analysis of the reports allows the student to fill in the gaps in knowledge (Fig.2).

During the examination in winter working trimester of the 2011-2012 academic year, more than half of the students got the mark "good" demonstrating good command of computer operation within the frame of working profession.

Table 1

Percentage scale of evaluation

$97\% \le Б \le 100\%$	100%	5+	excellent	A
$94\% \le Б < 97\%$	95%	5		
$91\% \le Б < 94\%$	90%	5-		
$85\% \le Б < 91\%$	85%	4+	good	B
$80\% \le Б < 85\%$	80%	4		C
$75\% \le Б \le 80\%$	75%	4-		
$71\% \le Б < 75\%$	70%	3+	satisfactory	D
$68\% \le Б < 71\%$	65%	3		E
$65\% \le Б < 68\%$	60%	3-		
$0\% \le Б < 65\%$	$\le 59\%$	2	-	-

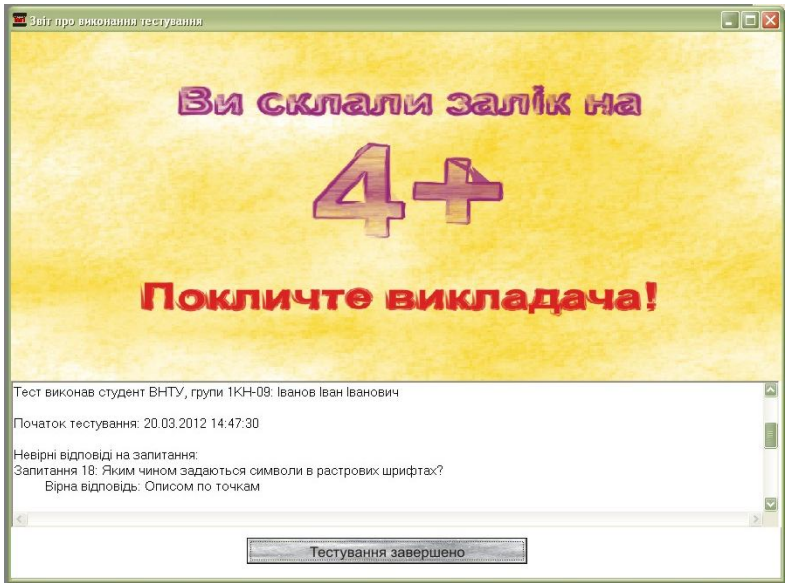

Fig. 2. The view of the window with testing result

Let us consider the peculiarities of evaluation of working trimester results of electricians and laboratory assistants of chemical analysis.

The final result of working trimester for electricians and laboratory assistants for chemical analyses shall be formed from two components: computer test and interview with members of the examination board, who give marks for the work on the enterprise. Analyzing the correspondence between the marks and the data of the test, we compare the changes in the level of student knowledge, influenced by the human factor.

The system of the test tasks consists of the set of the questions of the closed type, each accompanied by the set of two or more variants of answers , one of which is correct. The set 12 (for electricians), 20 (for laboratory assistants for chemical analysis) of test tasks is randomly formed from the questions of the data base. The received mark is fixed and saved.

Table 2 presents the examination results of the working trimester.

As it is seen, the introduction of the human factor- interviewing by teacher – significantly changes the conclusions regarding the level of knowledge which is seen on the example of the results in the group 2EKO-09, the students of which got equally high marks after being interviewed.

Table 2

The results of working trimester examination of students from the Institutes of Electric Engineering and Ecology

Group	Mark "5"		Mark "4"		Mark "3"		Mark "2"	
	comp.	teacher.	comp.	teacher.	comp.	teacher.	comp.	teacher.
1EC-09	8	6	7	12	4	3	0	3
2ECM-09	4	10	8	9	7	1	1	0
3ECM-09	7	6	1	6	2	0	0	0
4ECE-09	5	16	8	5	7	0	1	0
5EM-09	4	11	7	11	11	0	0	0
1EMт-09	1	10	12	5	0	1	3	0
2EMп-09	3	3	8	10	0	6	8	0
1EKO-09	8	14	4	1	2	0	0	0
2EKO-09	15	17	2	0	0	0	0	0

Such a difference, on the one hand, may testify poor quality of testing tasks preparation, the use of which doesn't allow to determine the level of knowledge, that is, no-validity of the test content[3]. This means that the testing tasks must be changed, their complexity and correspondence with the curriculum of the working profession must be analyzed .

On the other hand, the appearance of the human factor component is possible at the final stage of evaluation of the level of students' knowledge during the examination, the elimination of which is the aim of computer testing.

Conclusions

Analytical and information centre of the Institute of Integration of Education with Production during the examinations in the working trimester carried out polling concerning what the evaluation method of knowledge level students believe to be the most objective, i. e. the method where the received mark is independent from the influence of the subjective factors. It should be noted that the polling was not valuable sociological polling, during which specific scientifically grounded methods of information collection and results processing are applied.

However, the polling showed that students of the third year hold the opinion that computer testing is on the first place regarding the level of objectiveness during knowledge evaluation testing (50.8% of those questioned).

Hence:

1) the system of computer testing, used during the examinations in working trimester should be applied in all working professions. That is, it is necessary to develop the set of testing tasks in accordance with the curricula of the working professions for the 1 and the 2 academic years. It is necessary to take into account the peculiarities of the students production activities during the working trimester.

Using the tests for the evaluation of students knowledge gives the evaluation process the following features :

– impartiality(the influence of human factor(teacher or student) is minimized),

– comparability (it is possible to range the students sampling according to the level of subject comprehension),

– completeness (cut of knowledge is evaluated in all the topics of the subject).

2) Testing results inform the teacher of the teaching quality, reveals the topics which require additional improvement, etc.

3) Students, evaluating their own academic achievements by computer testing get the access to the knowledge measuring tool – a reliable and the objective one.

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Vlasiuk Anatoliy – Cand.Sc.(Eng), Assist. Prof., Department of Integration of Education with Production.

Znatnova Maryna – Head of Information Analytical Centre of the Department of Integration of Education with Production.

Byrdeina Olena – Engineer, Department of Integration of Education with Production.
Vinnytsia National Technical University.