THE MINISTRY OF DEVELOPMENT INFORMATION TECHNOLOGIES

AND COMMUNICATION OF REPUBLIC OF UZBEKISTAN

TASHKENT UNIVERSITY OF INFORMATION TECHNOLOGIES

Admitted to the defense
Head of department
"Information educational technologies"

_____

« » _____2016 y.

FINAL QUALIFYING WORK

on subject:

«DEVELOPMENT OF ADAPTIVE TESTS FOR THE COURSE
"INTRODUCTION TO THE PROFESSIONAL AND EDUCATIONAL
ACTIVITY»

Graduate	_____	Sharapova T.R.
	signature	
Consultant	_____	Akhatova R.Yu.
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Consultant of SVA	_____	Amurova N.Yu.
	signature	
Reviewer	_____	Nabiulina L.M.
	signature	

Tashkent 2016

Faculty   Professional education in sphere ICT
Department "Information educational technologies"
Direction   5111000 "Professional education: Informatics and information technologies"

CLAIM
Head of department
"Information educational technologies"

_____
« ___ »_____ 2016 y.

TASK

for final qualifying work of

Sharapova Tanzilya Rafkatovna

on subject: «Development of adaptive tests for the course "Introduction to the professional and educational activity»

1. The subject was claimed with order of university «15».12.2015 № 1324-20

2. The deadline of delivery finished work 25.05.2016

3.Raw data for work lecture, books, methodical applications, articles, web-sites, multimedia applications

4. The content of settlement and explanatory notes (list of the subjects, which are to be developed), abstract, introduction, Chapter 1, Chapter 2, Chapter 3, conclusion, list of references, the application

5. The list of graphics drawings, diagrams, tables, screenshots.

6. The date of issue the task 24.12.2015

Consultant _____

signature

Task taken _____

signature

7. Consultants of separated sections of the final qualification work

Name of the part	Consultant	Signature, the date of issue	
		Task given	Task received
MAIN PART	Akhatova R.Yu.	25.12.2015	25.12.2015
SAFETY OF VITAL ACTIVITY	Amurova N.Yu	02.02.2016	02.02.2016

8. Graph of the performing the work

№	Name of the part	Execution date	The signature of consultant
1.	Introduction	25.12.2015	
2.	Theoretical foundations of the use of adaptive test items	30.01.2016	
3.	Development of an adaptive test items	08.04.2016	
4.	Life safety	15.05.2016	
5.	Preparation presentation	17.05.2016	
6.	Report	19.05.2016	
7.	Provisional protection	20.05.2016	
8.	Protection	31.05.2016	

Graduate   Sharapova T.R.   «____»_____ 2016 y._____

Consultant Akhatova R.Yu.   «____»_____ 2016 y. _____

This final qualification work is devoted to the development of adaptive tests for the course "Introduction to the professional and educational activity". There are describe theoretical information about adaptive tests, analysis software for the development of adaptive tests as well as application features an adaptive test tasks in the learning process. Also describes in detail the stages and technology development adaptive test items. Health and safety issues are also considered.

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Ushbu bitiruv malakaviy ishida «Kasbiy pedagogic faoliyatiga kirish» fanida adaptiv test ob'ektlarni rivojlantirishini ko'rib chiqildi. Adaptiv test haqida nazariy ma'lumotlar, adaptiv test dasturiy tahlili rivojlantirish uchun ma'lumotlar, shuningdek, o'quv jarayonida adaptiv test ob'ektlar qo'llash xususiyatlari haqida nazariy ma'lumotlar, imkoniyatlar korib chiqildi. Asosiy qismi batafsil texnologiyalar ishlab chiqish va adaptiv test ob'ektlar bosqichlarini ko'rib o'tilgan.

***

В данной выпускной квалификационной работе рассматривается разработка адаптивных тестовых заданий по курсу «Введение в профессионально-педагогическую деятельность». Рассмотрены теоретические сведения об адаптивных тестах, анализ программного обеспечения для разработки адаптивных тестовых заданий, а также особенности применения адаптивных тестовых заданий в учебном процессе. В основной части подробно описываются этапы и технология разработки адаптивных тестовых заданий.

CONTENT

INTRODUCTION

Computerization today is considered as one of the main ways of modernization of the education system. It is connected not only with the development of technology and technologies, but above all, with the changes caused by the development of the information society, in which the main value is information and the ability to work with her. One of the main tasks of the modern education system is to develop projects and programs that contribute to the formation of man of modern society. The main goal of teachers is to create conditions for identification and development of abilities of each child, formation of the person with strong basic knowledge and able to adapt to the conditions of modern life.

The informatization of education should be seen as one important means of achieving the goal. While referring to the decision of a number of sequential tasks: technical equipment, creation of didactic tools, development of new learning technologies, etc. that define the stages of the modernization process. The development of information technology and telecommunications technology provides the basis for the implementation of scientific and educational programs at a qualitatively new level. The creation of high-speed telecommunications and the development of real-time technologies gives the possibility of implementing models of distributed educational environment, built on technologies of remote access to information resources and computer communication.

Telecommunication resources is firmly established in the practice of educational institutions. E-mail, which ten years ago would have been significant advances in communication technologies have changed the on-line technology. A unique laboratory of experimental and computational complexes have become available by means of automation and computer control technology at a distance. The use of laboratory equipment allows to organize real-time staging a demonstration experiment that increases the understanding of the material and its assimilation.

Development and approval of the Cabinet of Ministers of the Republic of Uzbekistan **"program of development of computerization and ICT for 2002-2010"** (decision of the Cabinet dated June 6, 2002 № 200) confirm that the state began to play a significant and decisive role in creating and promoting enabling environment for ICT development in Uzbekistan [1]

The relevance of the work. In today's dynamic development of society information technologies to create, store, process and provide effective ways of presenting information to the consumer, have become an integral part of life and a means of increasing the efficiency of all spheres of public activities. Development of test programs on the basis of adaptability is currently a topical area in the development of information technology designed to help the teacher and student in the educational process.

The use of ICT in the education system actualizes their communicative component. The penetration of computer telecommunications in education initiated the development of new educational technologies, when the technical component of the educational process leads to essential change in education. The development of computer telecommunications in education initiated the emergence of new educational practices, which in turn contributed to the transformation of the educational system as a whole. Border of educational sphere, localized institutional, temporal and spatial framework has been significantly enhanced through the introduction of telecommunication technologies in the educational process.

Common vision for the development of ICT and Internet in Uzbekistan are reflected in the speech of the President of the Republic of Uzbekistan at the session of Parliament in may 2001. In a wide-ranging statement, the President called on the government to develop a common strategy of ICT development in support of social, cultural and economic future of the country.

A special place in this series is the presidential Decree **"On further development of computerization and introduction of information and**

communication technologies" of may 30, 2002, aimed at improving institutions supporting ICT [2]

Currently, in accordance with the decree of the President of the Republic of Uzbekistan continues to work on improving the activities of the ICT sector. So, in the field of information and communication technologies, primarily computer software has been developed, created information databases, formed the Republican, sectoral and national information and communication network, organized the training of highly qualified HR specialists to carry out activities in the field of production of telecommunication equipment [3]

The purpose of the final qualifying work. Creating adaptive tests are able to improve the process of teaching of discipline "Introduction to the professional and educational activity".

The tasks are:

1. perform a special, pedagogical literature to identify the characteristics of an adaptive test;

2. consider and determine the stages of designing and creating adaptive tests;

3. develop a content adaptive tests: fully containing the material which is necessary and sufficient to perform the verification work on discipline "Introduction to the professional and educational activity".

The subject of the study. The study of modern means of teaching and monitoring of learning with the use of information technology.

The object of study. Electronic test ON products for optimization and control of the teaching process when studying discipline "Introduction to the professional and educational activity".

Practical significance. The course is designed to fully reflect the lecture material and can be used for lectures, laboratory classes and independent work learners.

The structure of the work. Final qualifying work consists of 83 pages, including an abstract, an introduction, three chapters, list of references, screenshots.

Chapter I. THEORETICAL FOUNDATIONS OF THE USE OF ADAPTIVE TEST ITEMS

1.1. Theoretical information about adaptive tests

With the establishment of the world education (the education ceases to be an internal affair of individual countries) should develop a common strategy in assessing the quality of educational services. The system of evaluating the knowledge and skills available in each country, is no longer a static, closed in on itself. However, the reform of education is impossible without reforming the system of assessment of education quality control.

Important at the present time becomes the **culture of evaluation and assessment of the quality of education**. Assessment - is the process of collecting and processing of effective and reliable information that allows the participants in the educational process to make decisions needed to improve work and achieve the best academic results. A kind of database for the evaluation are the state standards, programs for teacher and for student. **Mechanisms of monitoring and evaluation of the effectiveness of the educational process become tests.**

We all know that currently in the education system in parallel with the traditional system of evaluation and monitoring of learning outcomes has developed a new paradigm - testing. This is due to the need of society to get independent, objective information about the educational achievements of the students.

What is the test? The word «test» invokes the most different views. Some believe that this is a question or problem with one ready answer, which must be guessed. Others believe the test is a form of game or amusement. Others try to interpret it as the translation of the English word "test", (test, test, test). In General, for that matter, there is no consensus. Especially in the textbooks of pedagogy not write about it. Not coincidentally, the spread of opinions about the tests proves to be too wide: from the judgments of ordinary consciousness to attempt a scientific interpretation of the essence of tests.

Most often we meet with a simplistic perception of a "test" as a simple selection of one answer from several given to a question. Numerous examples of such seemingly "tests" are easy to find in newspaper and magazine periodicals in various competitions and in numerous book publications called "Tests". But this is often not the tests, but something outwardly similar to them. Usually this is a collections of questions and tasks, designed for the selection of one correct answer from among the offered. They are only on external appearances similar to the real test.

Pic.1. Testing Life Cycle

In this regard, the current understanding of the testing can be diluted at three levels:

The first is an "everyday" level when the test is understood as a set of choice questions, which is in line with crosswords and puzzles and is for entertainment and satisfaction of cognitive interests. The test will be very unreliable and limited [5]

The second level of understanding of testing is called "**dictionary**". There are the main components of the test, characterized by a discrepancy and a

contradiction in terms and definitions. Many concepts has not been fully defined, different authors interpret differently the same concept. Alexey Mayorov believes that this level is characteristic of the modern state of testology.

The third level of understanding is **scientific**. It is the most accurate, takes into account the peculiarities of tests and reflect requirements for them. This level of future development testing.

Under the **control of the adaptive test** a computerized system understand evidence-based examination and evaluation of learning outcomes with high efficiency by optimizing procedures, generating, presenting, and evaluating the performance of adaptive tests. The effectiveness of monitoring and evaluation procedures can be increased by using a multistep strategy for selection and presentation of tasks, based on algorithms with full-context dependency, in which another step is performed only after evaluation of the results of the preceding step. After performing the test of the next job each time there is a need in making decisions about the selection of difficulty of the next task in the matter was correct or incorrect was the previous answer. Algorithm selection and presentation of the job based on the principle of feedback when the correct answer of the test is selected the next task more difficult, and a wrong answer entails a presentation subsequent easier tasks than that for which the examinee was given the wrong answer. A precondition of implementation of such algorithms include:

- the presence of a Bank of calibrated tasks with stable estimates of their parameters, allowing to predict the success or failure of the test in the selection of the next job adaptive test.

- use software tools and computer programs for the individualization of algorithms of selection of the tasks, based generally on the estimated probability correct performance of educational tasks;

It may be noted that in recent years in the practice of education, a situation which is influenced by **traditional testi-regulation** carried out through standardized tests, gradually develops into a modern, more efficient form of **adaptive testing**, which are based on non-traditional theoretical and

methodological foundations, and other construction technologies and presentation of the tests.

Introduction the state educational standard of General education establishments, including the basic idea of the concept of mandatory planning of learning outcomes, focus on the unconditional achievement of all students in compulsory level of knowledge, in turn, implies the strengthening of the Supervisory activities in the educational process. In addition, we have shown its effectiveness of the problem control organization with strict regard to the elements of knowledge, which are checked more effectively the knowledge and skills of students. But the practice of activities of educational establishments proves that traditional forms of control are clearly inadequate in addressing these issues.

Most relevant in addressing these problems, we propose to develop and test methods for the learning outcomes, in particular the development of the computer adaptive test.

Today, computer systems of knowledge control are becoming increasingly popular due to their objectivity, availability and economic efficiency. The only question is that it is necessary to develop a universal system for creating and conducting a variety of tests and processing of test results.

Type of tool	Example
Planning	Tools for estimates, spreadsheets.
Change Management	Control of Requirements, System for changes control.
Configuration Management	Version control, building systems.
Prototype	Building User Interface.
Processing (Programming Language)	Compilers
Testing Tools and Debugging	Test data generation and code debugging

Pic. 2. Computer testing tools.

The basic requirements to such systems are: intelligence, openness, flexibility, adaptability in the organization of the testing process, the presence of friendly interface. Particular attention should be paid to the adaptability of the testing process. The feasibility of this type of control arises from the need to rationalize the traditional test [6]

Summarizing the work of researchers we can distinguish nine patterns of pedagogical testing: classic model, classic model taking into account the complexity of tasks, the model with increasing difficulty, the model with the division of tasks across levels of assimilation, the model based response time task model with a limited time to test the adaptive model, the model test scenario, the model fuzzy mathematics.

In recent years, traditional testing, which are implemented using standard tests, is gradually losing its relevance, because it does not always produce complete evaluation of each student's performance. Actively developing, it is converted into more effective intelligent form of adaptive testing. They are based on non-traditional theoretical and methodological foundations, and other technologies needed to build and playback tests.

Adaptive testing is a test which is based on the principle of feedback when next job is selected depending on the results of solving a disciple of the previous job. Such testing is more effective than traditional. This test allows you to diagnose the level of student's knowledge by using a significantly smaller number of issues.

Adaptive testing model is a continuation of the classical model taking into account the complexity of tasks. Called the adaptive test where the difficulty of the tasks varies depending on the correctness of answers of the test. If the student answers correctly on a test of task complexity of subsequent tasks is increased if wrong tone. There is also the possibility to ask additional questions on topics for a more detailed explanation of the level of knowledge in these areas.

Adaptive learning is a technological pedagogical system of forms and methods that facilitate effective individual learning. This system is better than the other takes into account the level and structure of initial training promptly monitors

the results of ongoing training. That allows efficiently to pick up assignments and exercises for further rapid advancement.

Thus, *adaptive test* is a variant of the automated testing system, in which known parameters and the difficulties of differentiating the abilities of each job. This system was created in the form of a computer Bank of tasks, ordered in accordance with the characteristics of jobs. The main characteristics of job adaptive test – the level of difficulty, obtained by experiment, that means: before you get to the Bank, each job passes empirical testing on a sufficiently large number of students interested in the typical contingent.

Adaptive testing is a set of processes for the collection, presentation and evaluation of the performance of the adaptive tests, which provide increase of efficiency of measurements by improving the selection of the main characteristics of the job order, their quantity and rate of issuance applicable to the specific preparation tested.

1.2. Analysis software for the development of adaptive test items
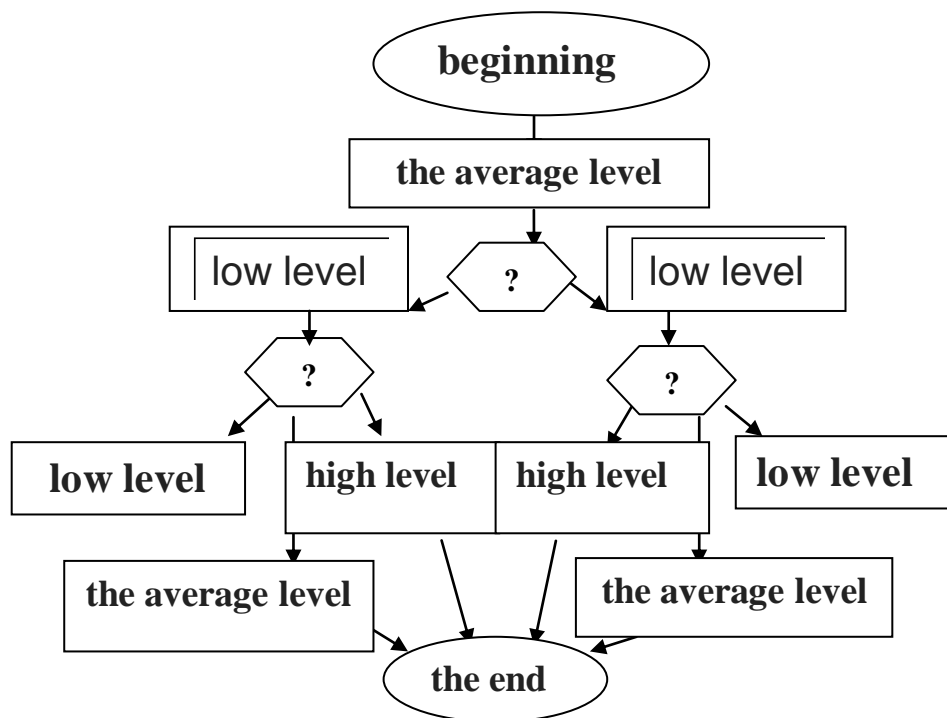
There are the following strategies of presentation of test items in adaptive testing: two-step and multi-step, according to which used different technology of formation of adaptive tests. The presence of the two phases suggests a two-step strategy. At the first stage all pupils are given the same input test. According to the results in the second stage is organized adaptive mode and adaptive tests are built.

As a result of development of modern test theory began to develop multi-step strategies of adaptive testing in which each student is moving along its individual trajectory in the process of performing tasks.

Multi-stage adaptive testing strategy depending on how the constructed multi-stage adaptive tests are divided into fixed-various branching, and-branching. If the same set of tasks with the same difficulty is used for all students, but each student moves through the set of tasks by individual, depending on the results of the execution of the next job, the strategy of adaptive testing is fixed-branching.

Job difficulties are usually placed at equal distance from each other or descending order respectively to increase the difficulty, allowing you to adjust the pace of the test student.

When creating a test used individual trajectory – trajectory is adaptive, which changes dynamically depending on the successes and failures of the learner. To create a database of the test questions and tasks were divided into 3 parts. The first part – a questions intermediate level, second part – simple questions for weaker students, the third part of their art. Testing begins with jobs of average complexity, then according to the results of the first few answers, testing continues on the second or third part. Parallel to the increasing complexity of the tasks is the complexity of the system in evaluating the responses.

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                        ┌──────────────┐
                        │  beginning   │
                        └──────┬───────┘
                        ┌──────┴───────┐
                        │ the average  │
                        │    level     │
                        └──────┬───────┘
        ┌───────────┐    ╱  ?  ╲    ┌───────────┐
        │ low level │         │ low level │
        └─────┬─────┘         └─────┬─────┘
           ╱ ? ╲               ╱ ? ╲
   ┌───────────┐ ┌───────────┐ ┌───────────┐ ┌───────────┐
   │ low level │ │high level │ │high level │ │ low level │
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  │ the average  │     the end      │ the average  │
  │    level     │                  │    level     │
  └──────────────┘                  └──────────────┘
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The basic requirements to such systems are: intelligence, openness, flexibility, adaptability in the organization of the testing process, the presence of friendly interface. Particular attention should be paid to the adaptability of the testing process. The feasibility of this type of control arises from the need to rationalize the traditional test.

When creating computer systems testing plays a special role in the algorithm of presentation of test items. According to the algorithm of presentation of tests in the classical theory of tests to distinguish the following strategies:

- a strict sequence, when the author self puts the task on the test;

- a random sample of the test task is selected from a sufficiently large test database that allows you to create equal difficulty options of tests, i.e. the test base is split into several groups of difficulty at the beginning are simple tasks, in the case of the correctness of their execution are transferred to the group of more complex tasks;

- adaptive algorithm in system testing, where an adaptive algorithm is used, each subsequent task is chosen based on answers to previous that allows you to more accurately test the knowledge, uses the minimum number of tests.

Creating adaptive tests is more complex than creating other types of tests. Adaptive tests are arranged in the testing process, require more basic tests and accurate calculations [7]

Given the above, in the system being developed it is necessary to organize the adaptive algorithm of presentation of the job. Adaptability this will is expressed in the change in relative proportions to produce light tasks, the tasks of medium difficulty and difficult depending on the number of correct responses recorded during the testing session.

Based on the analysis of existing systems of knowledge control, was developed a conceptual scheme of the automated adaptive testing system, the software part which is implemented as three separate modules:

- module test;

- module of creation and editing of tests;

- module statistics and analysis results;
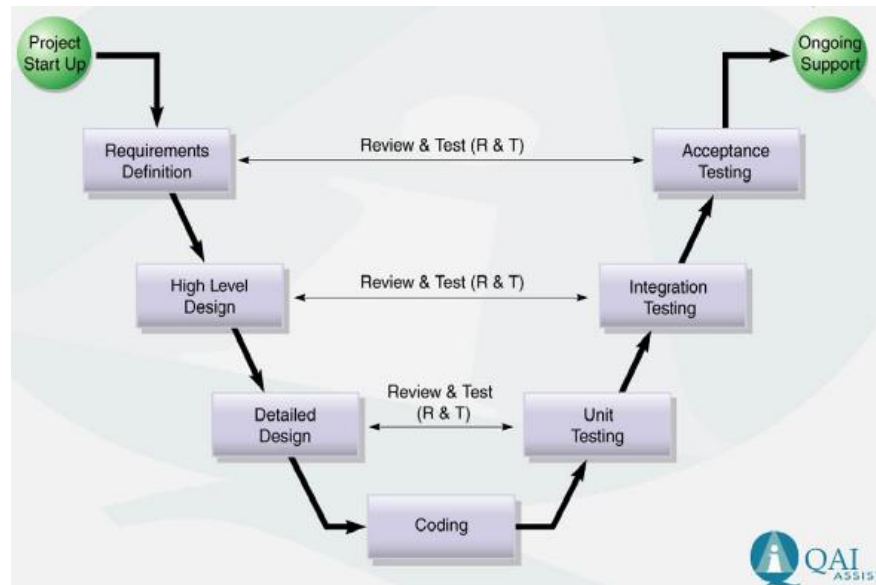
Pic. 3. Structural block diagram of the system of adaptive testing

Adaptive online testing system is an integrated environment designed to test the knowledge of students in various disciplines by means of adaptive testing. The main requirement for the developed system is its intellectuality, due to the adaptability of the testing process.

To build an adaptive system online testing the mathematical model, allowing to differentiate and individualize the procedure of knowledge control and trajectory of subsequent testing. In accordance with the mathematical model developed a detailed algorithm of functioning of an adaptive system online test.

One of the main conditions of the functioning of the test system is proper design of the test tasks.

For constructing test items, we first need to define learning goals, therefore, appropriate types of testing. Engineering test tasks, the authors first need to find out what learning elements (concepts, statements, methods) contains each job, how they coincide with educational goals, etc. secondly, the level of difficulty of the task depends on the number of correct, incorrect answers in the question, and from the logic of the choice of answers. For this reason, the experts of these disciplines, a database of pre-test items are divided into different difficulty levels: easy, medium, and high. For easy difficulty levels it is recommended to use only

questions with single-choice answers. For medium complexity it is recommended to use multiple choice questions with the addition weight according to the logic "OR", multiple choice questions on logic "And" and issues with a clear choice. For a high level of complexity used response units "OR" and "And".

Logic "And" is a rule that is charged to the maximum number of points, provided that the selected all correct options and no incorrect, the logic "OR" rule on interest points of the response, provided that the selected at least one correct answer and subtracted the scores of the answer if incorrect.

To assess the truthfulness of the answers to the questions of easy difficulty level applies the Boolean model. The truth of the answers expressed in two-valued logic, and can take the values "true" or "false": 1 – if the answer is correct , 0 otherwise.

The truth of the answers to the questions with single-choice answers jobs of medium complexity can take the values: 2 – if the answer is correct, -1 or 0 otherwise.
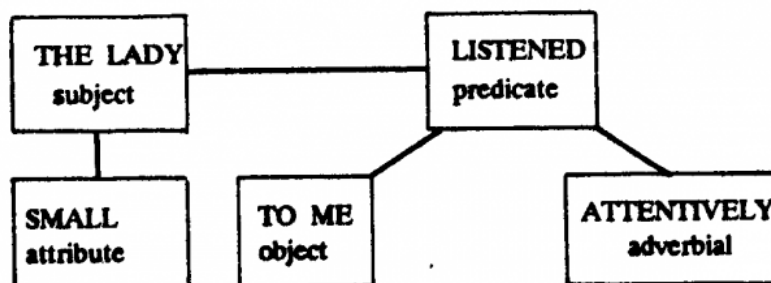
Pic. 4. Structural-logical scheme

Analysis software for the development of adaptive test items

Automated adaptive test is a broad class of programs that most directly intended, as its name implies, to implement computer-based testing. Examples of programs in this class are "Oprosnik" , "Qтест" , the "rapid test", "Test", "Knowledge" , AST-Test , TestMaker VVZ 2.6 , Auto Control 2.0, many "Constructors test", a computer environment evaluation of quality of knowledge, and many others [8]

The ancestor class can be considered as testing the wrapper. As practice shows, each Department of Informatics of the national higher educational institution has its author's testing a wrapper. If at the initial stage of this type of program was based on the principle of unambiguous recognition of the subject's answers and use text-only mode in the formulation of quests, more modern versions generally allow you to implement and multiple choice answers, the use of graphical material (figures, graphs, etc.), voice and video, as well as the ability to use Superscript and subscript characters with the formulation of tasks, which is especially important when developing computer tests in such disciplines as mathematics, physics, chemistry.

Consider the possibility of adaptive testing programs-shells on the example of the "Argop". It provides for creating Superscript and subscript characters required for a set of chemical formulas, mathematical expressions; accidental release of test items; automatic recording of test results; analysis of test results and the variation of testing time. The latter is important from the point of view of considering the individual characteristics of the learner.

The program runs in the dialogue mode with the learner: at the beginning of the work, the subject must enter his name and the group number, then the program displays the tasks of the test, offering to choose the correct answer from several options (the number of them for a specific job may be different). The entered response is analyzed, and on the screen appear evaluative comments. In the case of an incorrect response on the screen (at the request of the developer) is displayed correct answer and explanations to it. Thus, the test created in "Oprosnik" can carry the element of learning, promoting the systematization of the knowledge acquired trainees (test with training elements). On the other hand, all the subject of explaining why his answer is incorrect, removes the claim to the examiner (the test developer).

Implementation and control using tests created in test wrappers, as a rule, does not require the skills of computer work in subjects. Computer implementation of the test tasks usually does not cause difficulties even for the developers with the

initial user-level computer skills. At its core is a usually simple procedure to fill in the template blocks of test tasks by means of a text editor.

The development of this class of programs was linked:

• with the increase in the number of job types that can be implemented based on it. For example, if the "QTest" you can only create tests, AST-Test allows you to implement, along with the unique choice of response, tasks with multiple choices and enter your answer in the free design form;

• with the modernization of the test database. So, along with test a wrapper that allows you to create standalone tests, introduced new systems that allow us to extend our database of test items in sections, to implement the automatic generation of test randomly or in accordance with specific criteria. In some systems there is the possibility of specifying the "weight" of the task, characterizing its difficulty;

• with the expansion of the possibilities of statistical processing of test results, for example, automatic detection of tasks that cause most difficulty in the subjects and Vice versa; the identification of the dynamics of the success of the test;

• expansion of network capabilities by designing tests based on the technology "client-server".
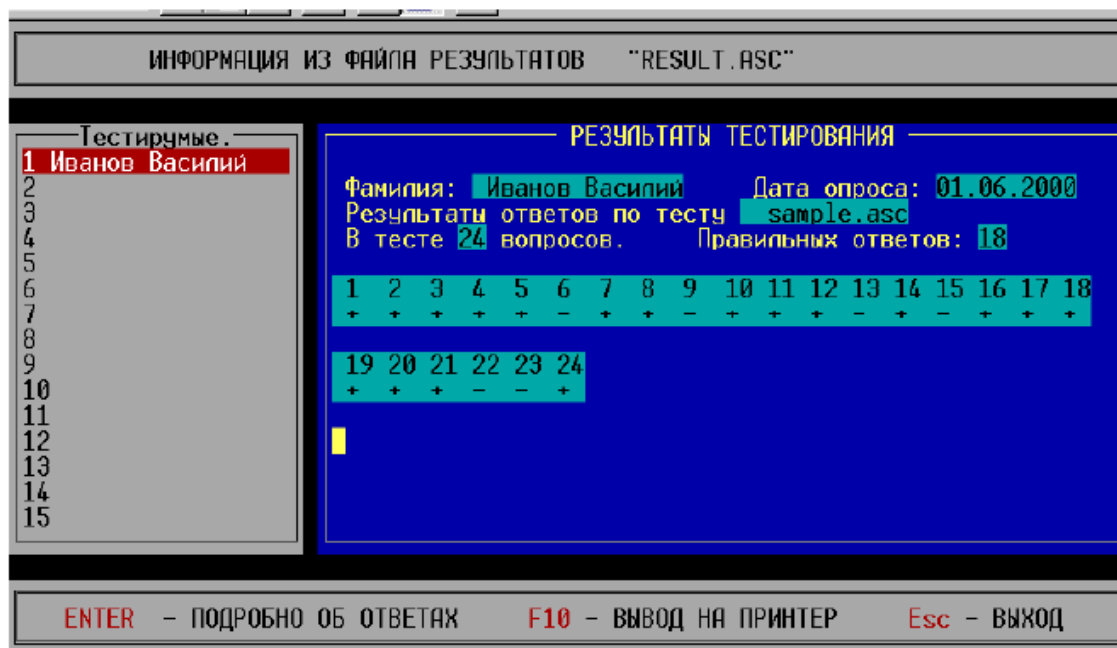
Pic. 5. Information from the file Protocol

With regard to the last-mentioned trends, in the Internet appeared specialized Web-sites that provide the available developer tools for test preparation, and organization of the testing and analysis of the results on the basis of Web-technologies. So on the website a possible implementation of the test tasks the selection type, answer in a sentence, multiple-choice, and also tasks with the enter answer in free form design, with possible installation of the size of the input field. When creating a test, the settings are as follows: specify the job that is required; setting the location of the answers; the conclusion answers are in random order.

The functionality of the analysis results comprises displaying the results in tabular form, with diagrams. Along with this it is possible to view the subject's answers on jobs enter answer in free form design. Another manifestation of this trend is the appearance on the market of a software product a series of so-called designers of websites, which usually include the constructor tests. As example below are several drawings relating to the development of the computer test in the Constructor of school sites E-Publish [9]
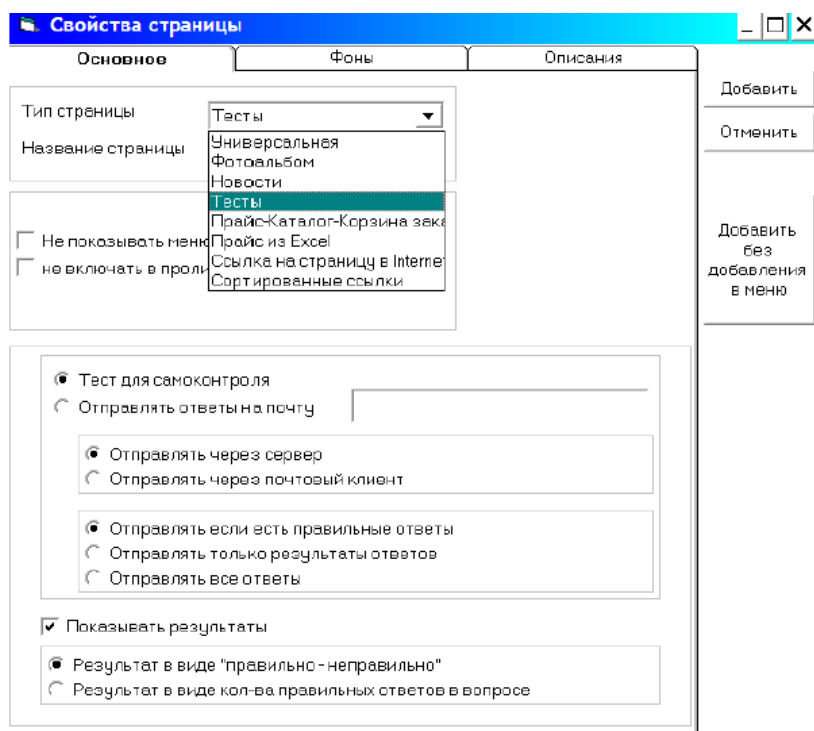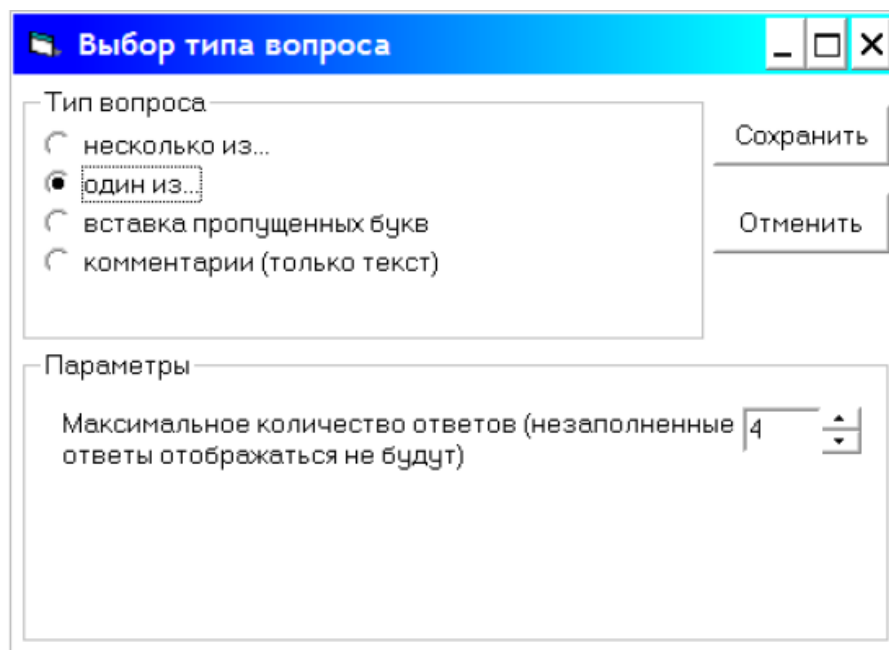
Pic. 6. Example of creating a Web page with tests designer test E-Publish

Pic.7. Select the type of the task in the constructor of the test E-Publish

The functional developer in this kind of designers, as well as in the wrapper is located on the above site available to the user with the initial level of proficiency in computer.

Test task type you selected is inserted on the page with the highlighted dotted areas for input and editing. You can add new blocks on the same page. Further blocks can be moved, changing the order of test tasks, delete, modify the types of questions and edit the content of jobs. In Fig.4 shows an example of providing the content blocks of test items of various types, and Fig.5 – the appearance of screen forms after the assignments.

Functional analysis of test results in programs of this type are usually narrow, however, to a certain extent easy computer implementation and testing procedures.

ТЕСТ ПО РУССКОМУ ЯЗЫКУ

ТЕСТ1

1. Вопрос: В каком слове на месте пропуска пишется НН?

Тип вопроса: несколько из...

Правильный: ☐ лебеди...ый пух

Правильный: ☐ вещь прода...а

Правильный: ☑ пресова...ое изделие

Правильный: ☑ маринова...ые грибы

2. Вопрос: Выберите грамматически правильное продолжение. Записывая математическое выражение,

Тип вопроса: один из...

Правильный: ◉ используйте только натуральные числа.

Правильный: ○ мною была допущена ошибка.

Правильный: ○ должны соблюдаться определенные правила расположения знаков и символов.

Правильный: ○ требуется внимание.

3. Вопрос: Вставьте пропущенные буквы: комиссия созда[н]а, непроше[н]ый гость, купле[нн]ая книга, полотня[н]ая ткань.

Тип вопроса: Вставка пропущенных символов

Примечание: Для выделения символов, которые требуется заменить на окна ввода, поместите их в квадратные скобки.

Pic.8. Example of filling the content of the test blocks

Pic.9. View screen form after performing the test tasks

Of great interest is the tendency of the classical integration of automated test systems as the creation of artificial intelligence as expert systems. So, this paper proposes a conceptual scheme of the "instrumental computer environment assessing the quality of students 'knowledge" (terminology of the author), which is designed to solve the following tasks:

• providing tools for creation of tests and their correction on the basis of empirical material;

• psycho-pedagogical diagnosis test anxiety subjects;

• support the decision of the diagnostician on the choice of the test type for the test based on the results of the diagnosis of anxiety;

• conduct testing on different stages of education;

• evaluation of the quality of knowledge of the subject.

From this it follows that according to the author such an environment must comply with the compositional, diagnostic, anti-stress, analytical and expert functions. The environment includes a block of psychological-pedagogical diagnostics, unit testing, and unit examination. The first of these blocks implements the psycho-pedagogical diagnosis test anxiety of the subjects as per standardized procedures. The testing unit consists of the designer of tests and module testing. Its main functions – the creation of new and editing of existing tests, saving the results in a data Bank environment; the organization of interface testing, the analysis of the results. The examination unit is an expert system for evaluating the quality of knowledge, which is the core of the developed environment. The main functions of this unit are analysis of results of psychological-pedagogical diagnostics; formation of recommendations to the diagnostician at the choice of the type of the test task for a particular student; generating a conclusion for the test and for teachers etc [10]

Thus, the range of automated systems of adaptive testing is very broad, from the relatively simple operation of the test wrappers intended for the local computer, to multi-unit systems based on technology "client-server" and expert systems, allowing to assess the level of training given the test anxiety of the test.

Analysis of instrumental opportunities of computer environments for the development of computer tests

In the context of the development of distance learning in this phase is designed and developed quite a large number of automated tools to support the educational process, implemented on the basis of Internet technologies. Of most interest are the shell, combining the tools for creating training courses, the management of educational process and organizes interaction between all participants in the learning process. Among the foreign funds of this type can distinguish Learning Space 4.0 (firm Lotus Development Corporation), WebCT. 3.6 (Corporation WebCT, University of British Columbia). Examples of domestic casings are system OROKS 2.0 (Moscow regional center of information technologies), Prometheus 2.0 (the " company "Prometey"), "AVANTA" (Vladivostok state University of Economics and service), eLearning Server 3000 (HyperMethod company), xDLS . Functionally similar systems and implement the technology of "client-server". To provide training in individual disciplines is most appropriate to use a system, Learning Space, WebCT, xDLS and "Prometheus".

In the system OROKS possible computer implementation of the tasks to select the answer from the available options and tasks with the enter answer in free form design (you perform validation by logical pattern, and keyword).

In the Designer, multimedia distance learning courses Distance Learning Studio possible implementation of the test tasks are of three types:

•with a choice of the proposed options;

•with the input string answer;

•on finding the match.

In General, the procedure of implementation of computer adaptive test items in this class of software is similar to the procedure described above for the designers of the tests.

As for the analysis of test results, typically, in these systems displays information about the number of correct answers.

Parameter	SunRav TestOfficePro	SunRav WEB Class
The main purpose	Testing on the local network	Online testing 1
Storing test results	In an encrypted file	In the MySQL database
Customize the appearance of	Several predefined styles	Built on Smarty templates - can be customized to any design
The separation of users into groups	yes	yes
The division of the tests into sections	yes	yes
A notification email with test results	Yes (using the mail client of the user)	Yes (automatically)
Import users from a text file	yes	yes
Import tests (Word, Excel, text)	yes	yes

System requirements

Testing	Windows XP and above	Any OS with a modern browser
Creating tests	Windows XP and above	Windows XP and above
Administration, reports	Windows XP and above	Any OS with a modern browser
Server	Any modern file server 2	WEB server (Apache/IIS) MySQL 4.1, PHP 5.0

Test

Types of tests	Control, psychological	Control, psychological
Adaptive test	yes	no
Test limit time	yes	yes
Limiting the number of tests one test	yes	yes
Mixing questions and answers	yes	yes
Adjustable display statistics during testing	yes	yes
Showing messages about your answer	yes	yes
Adjustable display	yes	yes

evaluation		
Custom display comments to the answer	yes	yes
The maximum number of evaluations for each topic/just for test	256	256

Questions

Types of questions	Single, multiple choice, open, ordering, matching	Single, multiple choice, open, ordering, matching
The number of questions/answers	Without restrictions	Without restrictions
The division of questions according to topics	yes	yes
Adjustable weight issues	yes	yes
The modified weight of answers (multiple choice)	yes	yes
The time limit for response	yes	no
File with additional information	yes	no
The showing of the tooltip	yes	yes
Image, flash, audio and video in questions and answers	yes	yes

Reports

The number of reports	Without restrictions	4: group, topics, matrix of responses by user
Visual report editor	yes	no
Export reports	PDF, Excel, CSV, Word, Open Document, HTML, BMP	CSV

1.3. The application features an adaptive test tasks in the learning process

When creating and working with an adaptive test and I've highlighted it the following advantages. This type of testing allows you to more accurately measure the knowledge of students, to measure the level of knowledge fewer jobs than in traditional models. Helps to identify themes which the learner knows is bad and allows you to ask them additional questions.

The disadvantages include the fact that it is unknown beforehand how many questions you need to ask the learner to determine his level of knowledge. And it may well be that the issues inherent in the testing system would not have to interrupt the test and to evaluate the result of the number of questions to which the student responded. Another disadvantage is the use only on computer paper letterhead because it is impossible to place so many questions and in the same order as in which they must be presented to the learner.

The accuracy and reliability of the adapted test in this case is high, as is adjusting to the knowledge level of the individual learner, which provides a higher knowledge score. This program can be used standalone to validate already existing and more effective assimilation of knowledge.

Thus, a high interest in the product, leads to a gradual rejection of the classical model of testing, which in some cases yields incorrect, biased assessment of the level of students ' knowledge. Replaced by the new adaptive testing model, which adjusts to the level of preparedness of students and allow you to quickly and effectively find out how well he has learned the educational material.

Furthermore, the use of computer adaptive testing gives you the ability to quickly solve complex of actual pedagogical tasks:

• education subject test databases and tools for automated processing of test results of groups of students,

• create individualized diagnosis with subsequent correction of the trajectory of learning

• creation of visual presentation and integration of test results when using the methods of statistical processing.

The tests nowadays are becoming the primary means of evaluation of knowledge of trainees. This is due to the development of information technologies and distance learning. There are various methods of computer testing, but more often they are massive and do not take into account the individual characteristics of the subjects. In this connection it is of interest the problem of increase of level of objectivity and individualization of computer-based testing and the implementation of their learning potential [11]

The aim of this work was to develop adaptive tests with tips for increasing individualization and objectivity of control of students in computer science. Adaptive testing is a broad class of testing techniques that change the sequence content and complexity of the proposed tasks in the testing process taking into account the answers of the test. In most adaptive tests jobs are classified according to the complexity and, depending on the response of the student, with feedback, are the task by its level. There's another way of taking into account the individual characteristics of the learner – the formation of a single job with different levels of complexity using tips.

To check the quality of the proposed jobs introduced two meter:

1. Measuring the objectivity of adaptive tests (comparison of estimates obtained with adaptive testing with the evaluation experts of the school);

2. Measuring the proficiency of students after passing the test (level of understanding of the material).

To measure the level of understanding was the initial diagnosis of students ' knowledge, carried out further adaptive test tips and final diagnosis knowledge. As a diagnosis, questions were developed on the understanding of the depth and completeness of knowledge on the subject.
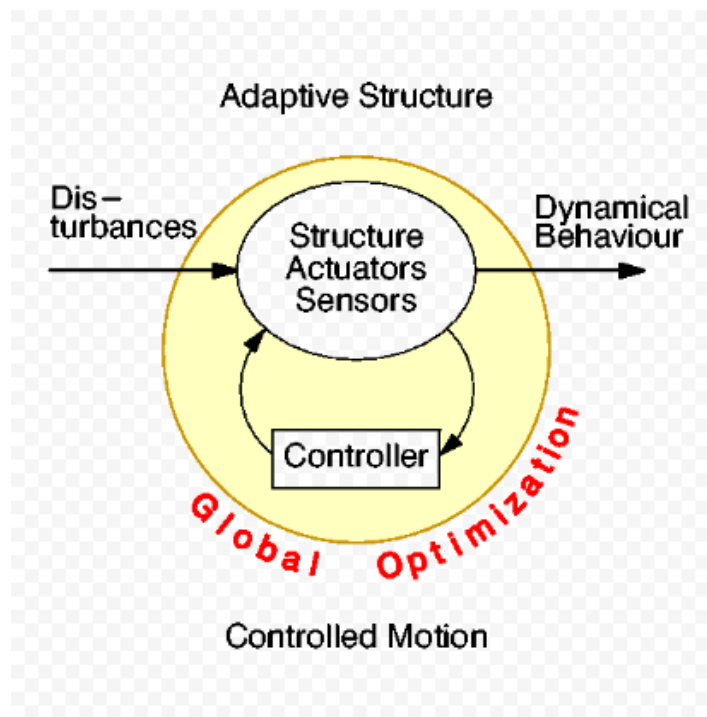
Pic.10. The analysis and the optimization **ofadaptive structures**.

The results of measuring the objectivity of adaptive tests showed:

– that the system of adaptive testing allows to qualitatively and objectively evaluate students in a shorter time;

– these tests adapt to the level of knowledge and individual characteristics of students.

Diagnostic understanding of the educational material showed that adaptive tests with tips are training, success in training students, was raised to a higher level. Automation of such tests is not difficult, can be carried out using the hypertext technology of the folding – unfolding of information. Thus, adaptive testing is a computerized system for evidence-based examination and evaluation of learning outcomes with high efficiency by optimization of procedures of generation. Moreover, this type of testing allows to provide the maximum information in question individually identify the quality of students ' knowledge of a certain level.

To summarize, we can say that the developed system meets the modern requirements of the class of such systems, as in the field of educational testing and in the field of information technology. It should be noted versatility of this system,

its modularity and, therefore, openness, that allows speaking about further modernization and optimization of all functional modules of the system. In the process of developing the tool system computer adaptive testing highlighted the following:

- placed the subject of the task depend on the results of his answers to the previous job; as a result, students presented far fewer jobs, preserving the diagnostic abilities of the whole volume of the test;

- ability to more accurately measure the level of proficiency;

- significant reduction of testing time;

- possibility of identifying the fact that the test doesn't know well, and the selection of appropriate tasks during testing;

- best security test, as every student gets its trajectory is the set of tasks during.

Adaptive learning will allow to learn without the usual, for mass education, numerous gaps in the individual training of pupils and students, to achieve the desired structure and the desired level of knowledge. The relevance of the test method due to its undoubted advantages over other teaching methods. Five main advantages:

1. High scientific validity of the test itself, allowing you to get objectified assessment of the level of preparedness of the subjects;

2. Workability test methods;

3. The accuracy of measurements;

4. The presence of the same, for all users, rules of carrying out of pedagogical control and adequate interpretation of the test results;

5. Compatibility testing technologies with other modern educational technologies.

6. Humanism monitoring procedures (principle of justice). All learners or students are equal (identical tasks, uniform criteria).

7. The ability of self-control for students.

Chapter II. DEVELOPMENT OF AN ADAPTIVE TEST ITEMS

2.1. The development stages of adaptive test items

Step 1. Define the content area, as measured intellectual skills and substantive testing purposes. The analysis of the content of the discipline and the content selection for the test. Initially the organizers and developers of the test should answer the basic and most important questions. To measure what is the test, that is, what is the scope of the contents, main measured intellectual skills and goals of testing? Who will be tested, i.e., what specific sample of examinees will participate in the test units? Who will be the user test results and the purposes for which they need the measuring information, that is, who is really interested resown in getting results on this test and what information you need to provide to users?

A careful definition of all aspects of data, testing purposes, which will be the test, absolutely necessary even when the content is precisely defined. Much more thorough detail details for testing purposes, it is necessary to conduct in the final tests to monitor the academic preparedness of students, which can be theoretical to exist significant discrepancies among the experts, the drafters of the tasks on the very basics of contents. Final, precise detailing and formalization of what the test is intended, and that it will measure the testing required and to assess the validity of the test itself [12]

Step 2. The definition of practical constraints and the range of approaches to the development process. Create specifications and test specifications of the test tasks. The main practical constraint facing the organizers and developers of the test, is a material and time resources that are at their disposal. In the case of mass educational testing is necessary to check a large number of examinees on the considerable number of disciplines, but the development time test, time test and the time interpretation is always limited. Limited resources and the costs of writing tests. If in the previous step were adequately identified all the parts, the creation of a test specification should not cause great difficulties. Full specification teaching test defines the scope of content (topics, sections, etc.), formulates intellectual

skills and the number of test items for each specification item. The specification of the test may be expressed in both linear and matrix (table) form. We can offer the following scheme to perform this step:

1. The definition of a specific region of the content and the information sources used. Typical sources of information about the content is educational standard, program subject, basic textbooks and scientific-methodical manuals and other training materials. Other sources of information is expert opinion on the content of the disciplines, faculty, Methodist. The task of the initiators and drafters of the test is to gather together all the obtained information and draw up a precise and specific model specification test.

2. You need to determine the number of parts (sections) in the test, the preliminary number of test items in each part and testing. To provide in a trial testing a special study to determine the exact time of testing and the exact number of tests - the test length. Naturally, when new tests or new types used in the test, it is desirable to conduct pilot testing for the study of how examinees respond to these tasks and at what time. Depending on the experience of the authors of test tasks, each type of test items used in the trial run, must be produced in quantities three times larger than necessary for the final test, and it is desirable that all these test (often referred to as tasks) were included in a pilot test or a trial in the Bank of test tasks.

3. For blank format of submission must identify the number of test versions to replicate and their characteristics: paper, number of pages, etc.

4. To determine the number accompanying the test documents, that such as response sheets, instructions for testing, handbooks, and tables for users of test and technical reports, administrative reports, test results, etc.

5. It is necessary to determine the types of tests and specifications image type of the test task.

6. To establish preliminary specifications and test. For example, the distribution of the values of the levels of difficulty of tasks, the criterion scores (or standards of assessment for criterion-oriented tests, etc.

7. You need to determine the number of parallel variants for a real trial and testing and the procedure for selecting test tasks from the Bank.

8. To determine the procedure of standardization (if available) and the definition of norms and scales used for this test. To establish a procedure for scaling and normalization.

9. To define the basic models for statistical studies on the reliability and validity of the test, and other test parameters and test items.

Step 3. Drawing up of test tasks. Drafting effective, valid (often use the term congruent) test items - is the second most important procedure after the preparation of adequate specifications of the scope of maintenance and testing purposes. Even carefully edited test tasks can be unsatisfactory, and naturally, as a Bank of test items may set a limit on the quality of the final versions of the test. Expert analysis of test items can not be the only means of determining defects in the assignments. It is necessary to conduct empirical statistical studies based on pilot testing and, if necessary, drafting new test items.

Step 4. Job analysis experts to assess the congruence of the jobs pane of the content and purpose of testing. Preparation of materials for pilot testing. After making a plurality of test items developers need to conduct an expert inspection of their quality. Each expert is requested to assess the degree of congruence of each job region contents and objectives of testing. From this stage directly depends on one of the most important characteristics of the test and content validity. After selecting the appropriate tasks from Bank developers make up the test (or its parallel variants) for pilot testing [13]

Step 5. The conduct of the trial (proven) testing and analysis of the results. One of the main problems when carrying out pilot testing is a lack of motivation among examinees (provided that they know that this testing is a trial). You must make some effort to adequate the motivation of the students in the trial testing was achieved. If this is not done, the information obtained during trial testing, will not be accurate adequate. One alternative solution to this problem is the inclusion of a trial jobs in already existing test.

Parallel versions of the test trial must be large enough, i.e. contain a sufficient number of jobs to provide acceptable reliability of test data and to provide ion the range of possibilities of the test in measuring such content. The sample of students needs to be statistically heterogeneous and adequately represent all groups of students by gender, age, regions, etc. Analysis of test tasks is very important in order to find hidden defects in the tests, to verify their effectiveness. Effective, well-functioning test items, are likely to be half or even less than half of the total Bank protective of jobs used in the trial testing. The staff that conducts a pilot test must record the time of the test, how many students graduated before the end of the testing time and comment on the conditions of the test. As experience shows, during testing the staff may notice significant flaws in the entire test or a specific problem with a test assignment.

Step 6. The selection criterion score (criteria or standards of evaluation) expert and (or) empirical methods. For the final criterion-oriented test standard selection assessment "satisfactory" - "unsatisfactory", or standards of evaluation in the traditional scale of "unsatisfactory - satisfactory - good - excellent" is an extremely important step in the development of the test. Ultimately, the correct standard of evaluation determines the criterion validity of the test. For expert choice of the standard is to use a modified method of Agnita (which has been repeatedly used by the author), according to which each expert is proposed to quantify the probability of performing each test task minimally prepared student. Summing up these probabilities it is possible to obtain approximate values of the standard evaluation of "satisfactory" - "unsatisfactory". Empirical selection of a standard of assessment recommended method of "contrasting groups."

The use of bloom's taxonomy and its modifications to develop test tasks

Bloom's taxonomy is probably the most widely used scheme is the identification of levels of cognitive processes (in the literature also used the term "cognitive processes") to create pedagogical tests. In the various modified versions of it is used in many widespread mass educational tests. In domestic practice of pedagogical testing in one form or another, bloom's taxonomy is also used by the

developers of the tests, however, sometimes they themselves do not realize it. The original work of bloom for the description and classification of mental processes has been widely recognized and successfully applied in educational measurement worldwide.

Taxonomy (or taxonomy and classification) of learning objectives bloom's allows us to formulate a list of several cognitive categories, typically measured in the pedagogical tests. These categories are listed in a hierarchical list in the Table. They include: Knowledge, Comprehension, Application, Analysis, Synthesis and Evaluation. If all of these categories (or some of them) - the intended learning outcomes, the tests to measure these categories should include an assessment of these categories.

Cognitive level (category)	Cognitive process (intellectual skill)	Key words (verbs, questions) for use in the basis of the test tasks
Knowledge	The recognition of facts, terms, conditions, concepts, definitions, principles	Define, list, identify, name. who? when? where? what?
Understanding	Explanation, interpretation of a familiar educational material	Explain, interpret, predict, print, summarize, convert, translate, give example, calculate, relate
Application	Use of concepts or principles to solve a problem (task) in familiar and specific situations	Apply, solve, show, use, modify, demonstrate, compute
Analysis	Restrukturiranje system on its component parts for identifying relationships and hierarchies, the organization of connections between parts	Differentiate one, compare distinct from, associate with, why?
Synthesis	Creating something new or original from component parts (elements)	Design, construct, razrwire, formulate, imagine, create, change to..., write an essay (short essay)
Assessment	The formation of judgments based on pre-ustanovlena the set of criteria	Design, construct, develop, formulate, imagine, create, those, change, so... What would be better?

Creation of test content

The tests should essentially be based on learning objectives instead of just repeating the samples of the training content. The adequacy of educational measurement takes place with the help of test items, reflect clearly articulated learning goal. This aspect remains Central in determining the content of test tasks.

The specifications of test tasks is usually designated as internal working document for developers of the test. They are not intended for the examinee or for users of the test. Specifications test items are designed primarily for authors jobs To make their work focused in that direction, which reflects the intentions of the test developer.

Table 1. Matrix specification for the Bank of test items

Section content	Category testing purposes						
	knowledge	understanding	application	analysis	synthesis	evaluation	Total number %
1.							
2.							
3.							
4.							
The total number of jobs %							100

2.2. The use of the software SunRav TestOfficePro

1.   The purpose and capabilities of the software product. The software package is designed for testing, self-study tests, processing test results. Part of the **SunRav TestOfficePro** package consists of three programs: tTester, tMaker, tAdmin.

2.   *tTester:* The program is intended for testing. Tests can be designed both to identify any features of character, intelligence, etc. (test Kettler, IQ Eysenck), and for inspection (control, self-control) any knowledge.

The program is used when carrying out examination and tests. It is applied as the testing part of the interactive learning systems to conduct professional testing for certification. Some of the features of the program tTester:

• All users are divided into groups. The number of groups and users is unlimited.

• All tests are divided into sections. The number of sections and tests is not limited.

• Convenient system of selection of the test and answers to the questions that requires minimal user skills of work on the computer.

• Alarm can notify about the end of the test.

• It is possible to hide and lock Desk during testing.

• It is possible to prevent the closure of the program as long as the test fails completely [14]

• Send test results via e-mail using the mail program installed by the user.

tMaker: With this program you can easily create tests on any subjects, any tests for narrowly professional testing, various psychological tests etc. In their test, you can use various fonts, formulas, schemes, tables, audio and video files, HTML documents and any OLE documents. Any question and answer can be fully formatted - different fonts, alignment, paragraphs, lists, superscripts and subscripts, etc. thus all information is encrypted with strong encryption methods. The program interface is multilingual.

The features of the program include:

• Import tests from text and spreadsheet files.

• Debug run the test Tester'e (except the WEB version).

• Built-in validation test for correct working before saving the test.

• Edit the test setups by default.

• Creation of "paper tests". Used to test students

• Change the order of questions by simply dragging and dropping them with the mouse.

• Manual/Automatic copy from a previous question answer options and properties question.

• Copy of font of question and answers to all other questions.

• Use mouse, keyboard and hotkeys.

• Localization for all languages.

• Work with the Windows clipboard

tAdmin: The program is designed for remote administration of users and processing test results. The features of the program include:

• Create, edit and delete users.

• View and print test results.

• Automatic and manual backups of files results.

• Create reports by user group.

• Create a matrix of responses by user group.

• Automatic and manual export of reports in various formats.

Limitations of the demo version:

• processing up to 10 users;

• treatment of no more than 3 groups;

• do not delete results of user testing.

The types of questions

Single selection
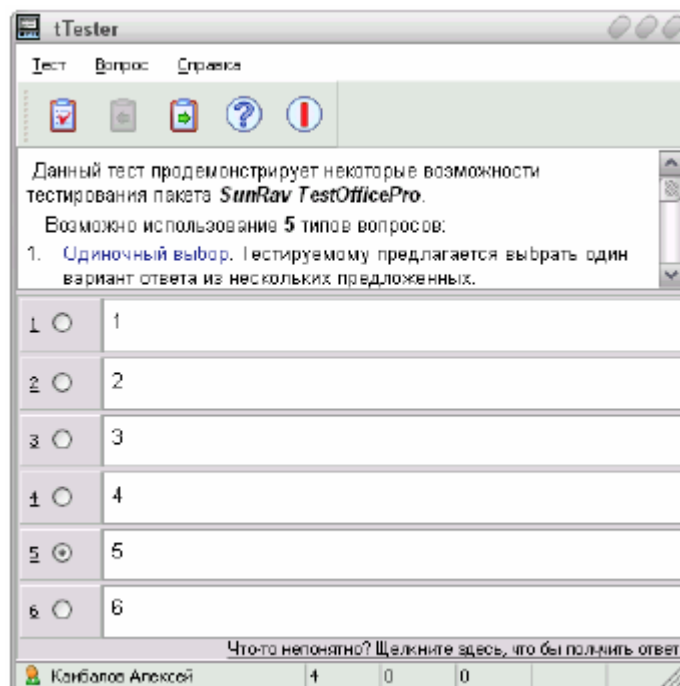
The test is offered to choose one answer from several. For this you need to choose one of the numbered circles. This can be done in two ways: - click on the bottom of the mouse; - click on keypad the number of the circle, holding the this button **Alt**. Once selected the desired answer, then to move to the next question, press **Enter** or click button ![button] In this figure, selected the fifth option.

Multiple choice
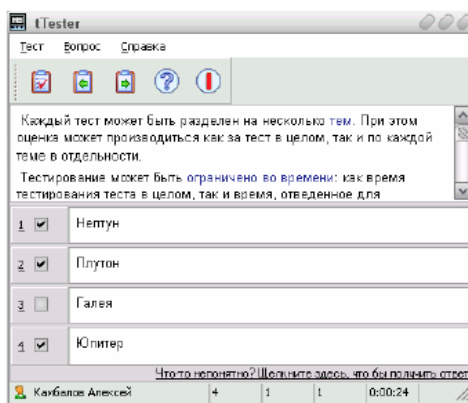
Test is proposed to select one or several alternatives from several proposed. For this you need to select one or more numbered squares. This can be done in two ways: - click on the box with the mouse; - click on the keypad number box while holding down the Alt key. Once selected the desired answer options, then to move to the next question, press Enter or click button ![button]. In this illustration, the selected first, second, and fourth response.

Open question
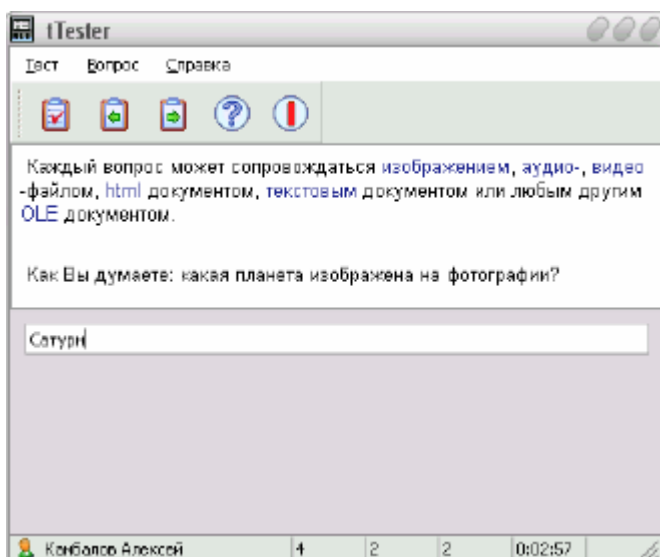
Tested prompted for a response from the keyboard specially in the input field. After you enter the answer, then to move to the next question, simply hit **Enter** or click .

Compliance Test is proposed to establish correspondence between the two columns - left and right. To do this, for each element (possible answers) from the left column choose from the drop down list the appropriate item number (answer choice) from the right column. Once the correspondence is established, then to move to the next question, simply hit **Enter** or click .

Ordered list Test is proposed to organize the list. To do this, for each item (answer choices) to select from the dropdown list by its serial number. Once the list is ordered, to proceed to the next question, simply hit Enter or click

Multimedia file

Any question may be accompanied by:

• Image

• Video fragment

• Audio snippet

• A piece of music

• Document in HTML format

• Any OLE document

The file is displayed in a special window that appears when necessary. In this window, you can show, for example, illustrations, video fragments or any other information. The test can be one of two types: control and psychological.

Adjust paths for tests and groups tTester.

Tests. The **Add** button increases the number of lines (sections). The **Remove** button reduces the number of lines (sections). Button **Mouth. by default**, the current section does section by default. This section will be initially selected when you select the test. In the **Name** column of the partition you can edit the title of the section tests. In the **Path** column section you can specify the path to the tests from this section. Double-clicking on a line allows you to choose the path

in a special window.   Possible automatic determination of the sections of the tests. In this case the user during the selection test will be offered a choice from all sections of the tests, stored in a specific folder. To do this:

- Mark the check box to **Use the start folder**.

- Enter the path to this folder in the edit bar.

Check lists of groups and students. Registration for testing.

To begin testing you need to register. To do this: • Press **F4** or click on the line to **Start testing**. • A dialog will appear user registration. • Select the desired group
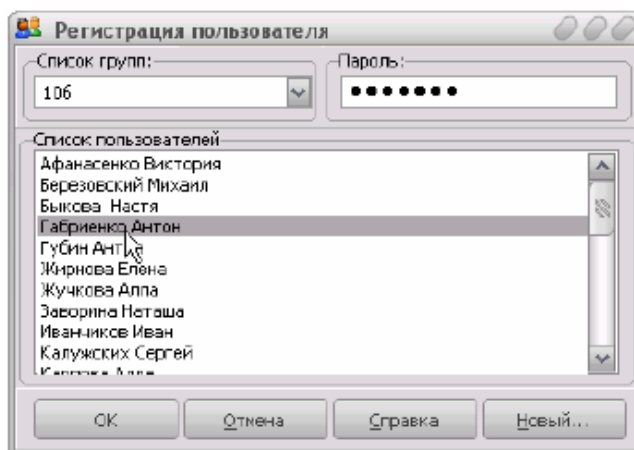
After registration the user can choose the test. To do this, in the window that appears, select the tests you need:
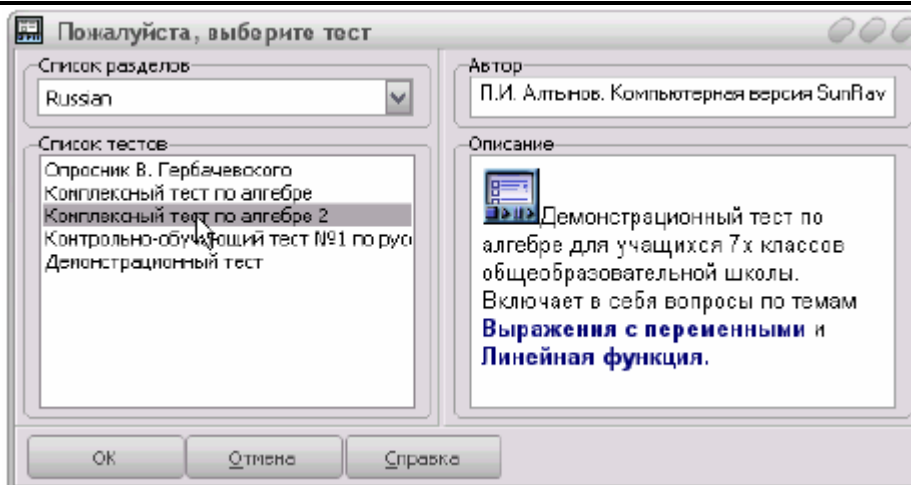
1. Select the partition that contains the test from the drop-down list **A list of topics** (check in what section is the test of the head or a teacher).

2. In the list of the **List of tests** click the mouse pointer on the desired test. To the right of the list shows the description of the selected test and perhaps a brief statement on the test (depends on test) [15]

3. Click **OK** or press **Enter**. The user may be asked one of five types:

1. Single choice

2. Multiple choice

3. Open question.

4. Compliance.

5. An ordered list.

Depending on the type of question a user can answer it. Click the question type to find out more about each type. If you want to return to the previous questions, this can be done using the **Esc** or **F6** keys or click the mouse pointer on the button. In some tests this option can be disabled.

Stages of test creation.

The process of creating. The test creation process is not difficult and available to all those who at least sometimes sits at the computer.

There are two different ways to create tests:

1. Enter questions and answer options directly in **tMaker**.

2. Enter questions and answers in a text editor and then import from the program tMaker.

The advantages of the first method consist in the fact that to introduce the issues in this case much easier than in a text editor. In addition, if you are going to use the questions advanced text formatting and (or) different objects, this method becomes the only possible one.

The advantages of the second method is that many people have the skills to work in a text editor (such as, for example, MS Word) are developed very much and it is inconvenient to switch to another program to do the job.

The following describes how to create a test using the above methods.

Method 1. Enter questions and answer options directly in the program.

1. Test conguration.

2. The setup used in the test topics.

3. The input and configuration issues.

4. Setting insights.

Method 2. Enter questions and answers in a text editor and their subsequent import from tMaker.

1. Enter questions in the text editor

2. Import the created text file.

3. Setup issues.

4. Test conguration.

5. The setup used in the test topics.

6. Setting insights.

Test properties:

Name - in this field you should enter the name of the test. This line appears in the test list of the program **tTester** when you click test. This string will appear in the list passed user tests. This field must be filled in.

The test type determines how it will be carried out counting the keystrokes typed points.

Author: use this field to enter the author of the test. Group **Messages** are the checkboxes that are responsible for the way in which the program **tTester** will respond to the user's answers.

That's right - if this check box is marked, the program will display to the user the message, the text of which is set in the line below.

Wrong - if this check box is marked, the program will give the user a message about the wrong answer. View this message depends on other flags: If you marked the checkbox to **Show the file to information**, you will be **shown a window with additional information** about the issue, which was responded to by the user. With this box checked **Incorrectly** will be marked and greyed out, which suggests that this additional file can only be shown if an incorrect answer. If you marked the check box to **Show the hints**, the user, along with a message about the correctness of his answer, will receive a small comment on the

question that he answered. If both check boxes are marked to **Show the file to. information** and **Show explanation**, then the user will receive a message about your answer and it the **Advanced** button, clicking which the user will get a window with additional file.

Show results - defines whether to show the user the results window after the tests. **Show number of points** - defines whether to show the user in the results, the number of earned points [16]

May ago - defines the possible return of the user to previous question. In the control tests it is recommended to disable the possibility of a return to a previous question.

Further, only if the answer is correct - if the check box is marked, then the user will be able to move on to the next question only if you correctly answer the question. This feature can be very useful in tests aimed at (self -) training.

The limitation of testing time - specifies the amount of time allotted for the test. If you mark this check box, it will be available time editor, located below. It is necessary to input the desired time (hours, minutes).

Password - allows you to restrict the view/edit test program tMaker.

The password for testing - allows you to restrict the testing in this test. Convenient to prevent training test (testing to learn correct answers).

Group **Show in the statistics** determines what to show in the status panel of the program **tTester** during testing:

- Number of questions in the test

- The current question number

- Number of correct answers

- The time remaining on the test overall and on each question separately.

Test description - a brief description of what need to test, what goals pursues, testing rules, etc. Click the **Description**... for that would be to edit the description of the test. You can use all formatting capabilities available in the

editor (fonts, lists, paragraphs, etc.). You can insert a description of the test different images and OLE objects.

In order to view the list of tests passed by user, navigate to the **Results** page. Select the desired user in the **user List**. The names of the past tests will appear in the **List of tests**.

__**Printing of test results.**__ In order to print the results of user testing go to the **Results** page. Select the desired user in the **user List**. In **the List of tests** and select the test. Select the menu item User/print the results or click on the toolbar button. In the dialog that appears, enter the number of copies and confirm with print.

__**Viewing test results.**__ In order to view the results of user testing go to the **Results** page. Select the desired user in the **user List**. In **the List** of tests, select the test and click on it. You can view the test results report and test statistics.

__**Deleting tests (testing results).**__   You can delete the test results . To do this, select the tests that you want to delete in the **List of tests** and select the User/Delete test or click the toolbar button. After that, the results of the current user will not remain the test results on these tests - they will all be permanently deleted.

2.3. Technology development adaptive test items

Advantages and disadvantages of the tasks with multiple choice answer

Advantages of tasks with multiple choice answer:

1. Versatility in measuring all levels of cognitive processes (intellectual skills).

2. Allow a selection of the content and goals of the measure (high validity of measurement).

3. Provide highly reliable test results.

4. The possibility of partial automation of counting of test results in the blank format and full automation with computer format of presentation.

The disadvantages of the jobs with a choice of response:

1. Technology development requires highly skilled author and it takes different time.

2. The likelihood of accidental guessing the correct answer.

The basic rules of spelling and design a test by selecting answers

1. The basis of the task should be allocated the same way for all jobs in this test (e.g., bold font). Subjects are required to remember standard registration tasks and easily considered the mother in the testing process.

2. If the basis of the job – a complete sentence, then at the end put a dot, and if the substrate has a question form, the corresponding and the end put a question mark [17]

3. Every answer encoded the same for the entire test. For blank testing format encoding is applied either digital- 1), 2), 3), ..., either an alpha - A), B), C), ... and is accompanied by a parenthesis (undesirable point). A good way of encoding Latin letters, e.g. A), B), C), (D). The computer format is visible coding may not be used.

4. When you use complete sentences or question-based assignments, all response options must start with a capital letter.

5. If the basis of the job offer unfinished or requiring internal completion (with blanks), all answers begin with lowercase letters.

6. Answers should not end with a period or other punctuation mark.

7. Negative wording in a job should be a special way to distinguish, for example, underline, italics, etc. ("...", "**not** responding...").

Rules additional instructions to the job

• Additional instructions for the task required only when the job is accompanied by additional text or graphic material;

• Additional instructions for the task should be written clearly and as briefly as possible;

• Additional instructions for the task are placed above the text or graphics and should attract the attention of the examinee to term job. To facilitate the flow of information for the examinee, the procedure should be the following: additional manual first, then text or graphic material, and, finally, the basis of the task and alternatives;

• Additional instructions for the task should differ in spelling from other parts of the task (for example, italics, bold, etc.)

Please note that additional instructions are written only to the jobs that have accompanying text or graphics. For all other assignments such instructions are unnecessary. Although unnecessary the user can not harm the examinee, but they add nothing, and only clutter the text.

Rules answers

1. *Use parallel grammatical construction.*

If possible, you should begin each answer with the same words, or to use the same part of speech. Formulating all the answers on the basis of one and the same part of speech, the author of the job will be sure that all options are grammatically combined with the basis.

2. *To avoid too or unnecessarily long answers* Too long answers tend to confuse, to confuse the subjects.

3. *Response to the task needs to be fully, "absolutely correct" or "best".* The developers of pedagogical tests are forced to make many of the jobs on judgments that are not absolutely true, however, it is highly likely. In this test subjects are instructed to look for absolute correctness in the answers, and make the best choices.

The rules for creating believable and effective distracters

• All distracters (wrong answers) should be such that each of them could attract the attention of those subjects who are insufficiently prepared for testing.

• Distracters should be "similar" to the correct answer. Ideally, when analyzing the effectiveness of each distractor tasks need to be equally used by all examinees who do not fulfill this task properly, Obviously, if the distracters are ineffective (that is, they choose a small number of subjects from the sample), the task itself will be too easy.

• Correct answer and distracters one task in the test should not give the test answers to others. So you should not be tapped distracters from one job to the list of response options to other tasks in the test.

Time estimation to complete the task

Knowledge of approximate time required to perform the job - useful information for authors. This knowledge can help the authors to determine the number of jobs all over the pastry. Generally accepted principle among the developers of pedagogical tests like this: students need more than one minute to perform a typical job closed form. Thus, developers can approximately plan that, on average, the test with 60 - TEW jobs will take at least one hour. Moreover, these 60 minutes do not include the time required to embed students in the audience, the distribution of test materials, instructions, collecting materials after testing etc.

Obviously, the rule "one minute job" does not apply to many difficult tasks, especially if they have large chunks of explanatory text or require complex calculations or detailed graphics. On the contrary, very simple tasks that requires only recognition of facts or simple computation, less than one minute to run. There are two methods for measuring the real time for the assignment or test.

The first method is that the job set or the whole test is offered to fulfill the professional – the teacher of the discipline. In this case, you should record the time spent by him in the execution of a set of tasks, and multiply it by two. In practice, the average time to complete set task for the test two times more than that of a professional [18]

The second method is associated with the group of subjects, performing the test or set of tasks. You must determine the time when 20% of test-themah finishing the fulfillment of the set tasks. This intermediate-current time and is optimal for the given set of tasks.
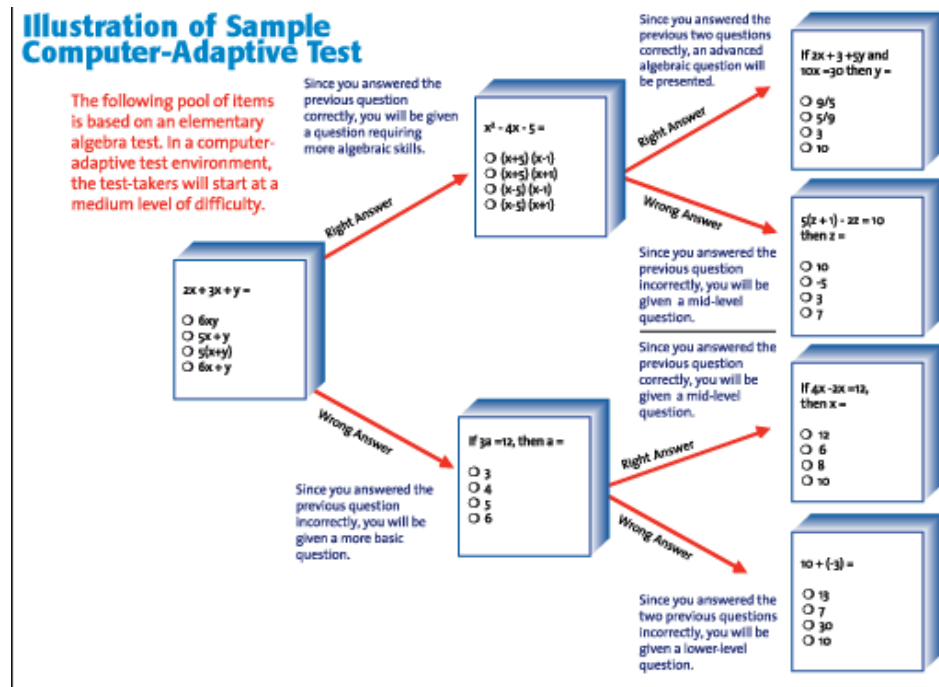
Pic. 11. Illustration of Sample Computer-Adaptive Test

Guidelines for creating tasks with multiple choice answer. General recommendations.

1. Objectives must be focused on measuring important learning objectives and (or) certification.

2. Should concentrate on drawing up such jobs that measure the ability of subjects to comprehend, apply, analyze and evaluate, not only to remember the actual training material.

3. The job should be designed so that the subject, which chose the correct answer and eliminate incorrect answers, demonstrated would be useful, a significant achievement.

4. The subject should not be able to answer the assignment correctly, using only simple logic and common sense, and not possessing knowledge or ability.

5. In the text of the job is undesirable the use of words that could be the key to the correct answer such as: "always", "can", "none", "never", "all", "sometimes", "usually", "typical" etc.

6. The text items should be avoided ambiguous or meaningless expressions.

7. Follow standard rules of punctuation and grammar.

8. If a job used figures, tables, drawings, it should be correctly formatted and easy to read (understood) subjects.

9. From the outset decide for yourself what type of job you are - job "with an absolutely right answer" or the task "with p-rum best answer".

10. Make sure that either in the main or in the additional instructions to the subjects have information about the type of the task i.e. either the job is "absolutely correct answer" or the task "pick the best answer". The subjects should understand clearly what type of job they will be doing.

11. Repeated words and phrases should be included in the basis of the task and not in the answer choices. This will allow to form more concise, and therefore more effective job.

12. Stick in a job of this style, and a level of difficulty of the text, which corresponds to the level of the tested group of subjects. Don't use words and expressions that the subjects will not understand [19]

13. Avoid the quest text to use verbatim quotes from textbooks or other teaching materials. The wording of the task should not follow the familiar phraseology of the textbook so closely that verbal memory of a subject without an understanding of the nature of the problem could provide an adequate basis for the correct answer.

14. If the text of the job based on someone's opinion or authoritative source, be sure to tell whose opinion or some authoritative source were used.

15. In all the test tasks must be independent from each other. The response to one task should not depend on answer to another task. Avoid using in one the test jobs that help the examinee to respond to other tasks in the test.

16. Check out all of the assignments with your colleagues, to resolve the ambiguity, technical and other errors in the text of the task.

17. If possible, avoid creating jobs that test more than one idea, issue, and concept.

18. If possible, avoid creating jobs, the answers to which may change within a short period of time.

19. Formulate the task so that was unambiguous, only one interpretation of them.

20. To function properly, the job with the choice of response must be expressed in the carefully edited words and sentences.

21. The authors of the task can make some tasks easier, in formulating the basis of the more General definitions and response options making more different, varied and diverse. Conversely, it is possible to make the job more difficult, if the basis of the job will be more specific (concrete, detailed), and the responses more similar, similar, similar.

22. The difficulty of the task should not be based on the inclusion unclear, confusing content.

23. Make sure all answer choices grammatically compatible with the base.

24. You should avoid revealing the subjects of their personal opinions, you should ask questions based on solid facts, concepts, etc.

25. You should avoid "elementary" questions.

26. You should not formulate "questions-tricks", the answers to which depend on some obscure or little known fact.

27. If possible, do not make basis or the answers are unnecessarily long.

28. You should avoid verbal associations between the base and the correct answer. The same word (or phrase, or root word) should not be located in the basis and the correct answer. However, verbal Association framework and a wrong answer is possible.

Recommendations to form the basis of the task

1. Job choice should be based on true, significant ideas that can be expressed as a judgment with a clear goal.

2. The basis of the job should deliver (articulate) or clearly imply a specific question (issue, problem).

3. The basis of the job should be fully formed, pose a problem (task), as well as all related estimates and characteristics. To make sure that the Foundation is a concrete problem, it is recommended to include a verb in the approval of the framework.

4. The basis of the job "with an absolutely right answer" should be clear and unambiguous. It is necessary to avoid the use of imprecise expressions such as "accompanied by", "for useful", "important to" and the words are tip – "maybe" or "perhaps". The indefinite participles of the type "usually" or "often" should not be used.

5. The basis of the task should outline the nature of the issue or issues so succinctly and concisely as possible. However, this is not to sacrifice clarity or omitted important details.

6. Use negative wording in the basis of the job economically (no more than 5-10% of the total number of tasks in the test). Be sure to attract the attention of the subjects to negative way, highlighting it or underlining etc. way.

7. You cannot use a double negative, i.e. simultaneously to use negative wording in the basis, and the options for response.

8. The basis of the task to include as much information as possible pertaining to the problem. Repeated words, groups of words or phrases should be included in the main text (the basis) of the task and not in the answers. From the answers it is necessary to remove repeated words or expression-tion in the text of the assignment.

9. You should avoid jobs that contain not related to the measured property difficulties; such as is little used vocabulary or complex sentence structure [20]

Recommendations for the compilation of answers

1.   All answers should be similar (similar, similar, parallel). This applies to their appearance, grammatical structures, and a General disposition on the classification of belonging, i.e. all responses should be selected on the same basis, the type of the concept.

2. True statements that do not provide the correct answer to the question is the basis of the job often form a good, effective distractor.

3. Answer options in jobs "with a completely correct answer" must be either absolutely true or absolutely incorrect. Exclude use of undefined phrases and words like "usually", "often", "probably".

4. Options in response to tasks desirable brevity, but this should not be achieved at the expense of losing significance and / or meaning.

5. Answers like "all of the above" and "none of visitare-numerical" are acceptable only when used "absolutely correct answer".

6. The answers on the basis of the task should be worded simply enough that there are clear significant differences between them.

7. Distracters in the task should be definitely less correct than the answer, but most likely not attractive for a well-informed, unprepared examinee.

8. Make each distracter like the truth, plausible, credible, convincing and quite attractive to examinees that are not sufficiently prepared for the test.

9. The correct answer should be clear, concise, correct and free from tips (inside the text of the task and outside it).

10. If there is some logical sequence in which answers can be built (e.g. in the order of magnitude, in chronological order, then, if possible, use this sequence when putting the options in the task.

11. If answers can be placed in some natural or logical order, avoid making the first and last options are always wrong.

12. Randomly distribute the correct answer among the positions (positions) of the distracters in each item on the test.

13. The answers should be the same length (at least approximately).

14. You should not formulate the correct answer markedly longer or shorter than the distracters.

15. You should not make the correct answer more details-Pirovano than the distracters. The correct answer must match the same level of detail as distracters.

16. You should not generalize correct answer so that it had more wide application than the incorrect options.

17. If possible, do not use in the correct answers a familiar or stereotyped phraseology, and the distracters, malongo-the MUI language.

18. Make all answer choices grammatically compatible with the base.

19. The distracters should not use words or technical terms that examinees can not or should not know.

20. The distracters should not use emotional words and expressions.

21. If possible, make all answer choices are parallel in form and grammatical structure.

22. In tasks of type "multiple-choice" do not use answers like "all of the above" and "none of the above".

23. In one job, do all the answer choices are independent of each other. In some embodiments, the response to make any links to other response options.

24. Should not exist any material in other test the buildings, which may be the key to the correct answer to this task. It is impossible in some jobs, to make any links to other tasks.

25. In one test (or one version of the test) you cannot apply the tasks, the answers to which are key to responses to subsequent tasks.

26. Use the same significant, correct, sensible, logical words and phrases in the distracters as the correct answer.

27. You should not repeat key (s) word(-a) fundamentals of the task in the correct answer.

28. If possible, list the response options on separate lines, one below the other

2.4. Methods of teaching the course "Introduction to the professional and educational activity" applying adaptive test items

Currently, there are two paradigms of educational quality assessment – objective and dynamic. When the target paradigm, the results of education graduates are treated as a certain level of knowledge and skills, mental, physical and moral development achieved by the graduates of educational institutions in accordance with the planned objectives of training and education. Under the learning outcomes understand the competencies, which are a combination of knowledge, understanding, and skills, but also include installation, motivation, values [21].

Within a dynamic paradigm of quality assessment of educational achievements is based on identifying those changes in the training of trainees who as the improvement of knowledge and skills, which is necessary to accumulate data on cognitive and creative activity and other academic achievements of each student or groups of students throughout the training period and to record these data for analysis in the form of descriptive statistics and various documents on quantitative and qualitative levels of evaluation.

Dynamic models, fairly widespread abroad, is not yet fully implemented in Russia, therefore, at this stage of development of pedagogy is dominated by the target paradigm, according to which is determined when evaluating the educational results of regulatory requirements (state standard, educational program), expectations of students, parents and society. Consequently, learning outcomes is the definition of what is expected to know, understand and be able to demonstrate to the student after completion of the training process.

Assessment of learning outcomes (evaluation) involves a "range of theoretical and methodological and practical work on a systematic study of the values and positive qualities of the students are analyzed on the basis of a common methodology, combining quantitative and qualitative methods to track the nature and dynamics of changes in the quality of the process and outcomes of education".

The application of quantitative methods in evaluation requires the use of primarily standardized tests, whose data are processed and analyzed using the apparatus of mathematics, statistics, meta-analysis, ANOVA, factor analysis, etc. Quantitative indicators are captured in points or percent. Qualitative methods of data collection based on the involvement of experts, observation, questioning and interviews. Qualitative assessments are expressed in judgments such as "good", "satisfactory", etc. Often every evaluative judgment is attributed to a certain, pre-agreed (set) score, an indicator (e.g., evaluative judgment of "excellent" – score 5).

It is important to understand that valuation is not a number, derived from measurements and calculations and assigned evaluative judgment value, therefore, the quantitative manipulation of value judgments (points) is unacceptable. To avoid the temptation to use the rating as a number, in many countries they have a letter designation, e.g. A, b, C, etc. Methodological foundations of the modern theory of evaluation is based on the idea of combining quantitative and qualitative data presented in one of three scales of the theory of measurement (nominal scale, ordinal scale, interval scale).

Competence approach to the interpretation of the quality of learning outcomes that reflect the desire of participants of educational process to increase its effectiveness in terms of pragmatism, without compromising the fundamental nature of education, provides for the evaluation key, instrumental and substantive competencies . The key competencies are seen as the ability of the individual, characterizing its interaction with society, other people and himself.

Competencies include the ability for solving problems on the basis of the generalized interdisciplinary knowledge and skills, based on the transfer of knowledge from one subject area to another and generating on that basis a new ability in the application of knowledge in practical situations on the basis of generalized scientific and humanitarian picture of the world.

Instrumental competences can be interpreted as the ability to apply the skills of working with information with a view to its integration and processing, the skills of organization and planning of work, skills for effective presentation of the

results of their work. Subject competence is considered as ability to attract students to solve practical life problems and the knowledge and skills obtained in the framework of a particular item.

Core competencies are interdisciplinary in nature and required graduate of an educational institution in any area of life; however, due to the latent nature of mediated communication with the curriculum, they are difficult to measure. Substantive and instrumental competences, it is possible to use complexes of different gauges. Such measures primarily include tests for the assessment of practical activities (Performance assessment), and portfolio.

Case gauges, consisting of a set of tasks (usually no more than 10 in case of using mini-cases), mainly developed in higher education, because they include special challenges, which offer the student to comprehend the real professional situation.

The most promising from the standpoint of the competence approach are presented competency tests that are interdisciplinary (integrated) in nature and require in assessing the readiness of students to use methods of multidimensional scaling and special methods of integration estimates for the individual scales.

At the moment, on the background of traditional assessment tools and tests on a quantitative basis in educational measurement there is a need to transition to the most effective, and in fact efficiently, methods of control.

Traditional test with fixed number of tasks and time to accomplish them does not always lead to accurate, highly objective (reliable), justified (valid) and comparable results. In this case it makes sense to apply in monitoring and evaluation activities adaptive testing, which is closely connected with computer and information technologies and adaptive learning.

Adaptive testing is based on the modern theory of design and application of tests (Items Response Theory – IRT) and concept of L. S. Vygotsky, according to which the development in the learning process is achieved through the constant overcoming of the boundaries between the sphere of actual development and zone

of proximal development of the students upon presentation difficult enough job to encourage each student to work to their limits.

The presentation of tasks in an adaptive test is an iterative process, whose convergence to the optimal estimates of the latent parameters of the subjects is ensured by minimizing the measurement errors, changing after each execution of the next job, which allows a smaller number of tasks faster and more accurately assess the level of preparedness of students.

With the development of information technologies it became possible to speak and about computer adaptive testing, although in the modern sense, both phrases involve the use of computers and appropriate software.

Adaptive testing should be considered as efficiently method by presenting each subject such tasks, which it feasible to perform, which in turn leads to increased measurement accuracy, minimize the number of assignments and time control and also allows you to reach of individualization and differentiation.

The adaptively should not be mistakenly understood as step-by-step selection of tasks based on a dichotomous assessment of their outcome (correct or incorrect). In fact, this understanding has nothing to do with the scientific approaches to the definition of adaptive testing. To reach efficiently control method of adaptive testing is possible those jobs that are not evaluated dichotomously and have stable characteristics (difficulty and differentiating ability) [22].

Implementation of adaptive testing in practice involves the use of probabilistic IRT models. Note that IRT with classical test theory (Classical Test Theory) and the theory of generalization of the data of educational measurement Generalizability Theory) are considered as the General methodology of pedagogical measurement, which is interdisciplinary and is at the core of the scientific organization of control and evaluation processes in education.

In addition to selecting a model, IRT must have a large Bank of tasks with different characteristics, which ensure high precision and validity of measurements. In this regard, it is important how the quality of primary test material, which is provided by proper selection of test content and the ability of the

developer to correctly display it in the test tasks and the stage of processing of empirical test results, obtained at the stage of validation.

For the implementation of adaptive testing necessary software and tools that implement the algorithms and strategies of adaptive testing. The best strategy for the selection and presentation of the job to be considered a multistage strategy in which each step is a reassessment of the level of preparedness of the test and the selection of each subsequent task in accordance with the computed level. Thus, there is a "situation of success" and achieved maximum individualizing effect, in which each monitored student is not presented too difficult and daunting to do tasks, as well as very light.

Obviously, **monitoring and evaluation activities** should not and cannot be limited only to the tests. However, whatever form of assessment of learning outcomes was used as for the quantitative assessments and qualitative judgments must be used a Toolkit, developed in accordance with modern approaches in the theory of educational measurement. Because the competencies describe the abilities that manifest themselves after graduation, when their estimation is necessary to obtain highly predictive assessments that likely will predict success in his future activities. Ideally it should be such learning tasks, the process of obtaining the answer to that and the actual content of the response to the assignment will be related to future professional activities of graduates of higher educational institutions, which not all teachers are often very well imagine.

In practice, this involves the preparation of a large number of tasks of increased difficulty, requiring detailed answers, which leads to a decrease in student motivation to perform tasks and increased fatigue, and ultimately leads to increased measurement errors. That's why it's so important to choose and individual pace, and a differentiated approach in the pedagogical control.

The information obtained at the evaluation of results learning based on measurements (quantitative and qualitative), allows you to take various managerial decisions – from the creation of individual trajectories of training and adjusting training programs to assess the effectiveness of innovation and policy in education.

Technological map of the lesson using Adaptive Testing

The subject	Professional education			
Class	College			
The theme of the lesson	Introduction to the subject			
No. lesson on the topic	Lesson 1			
Type of lesson	combo			
The purpose of this lesson	The formation of students ' knowledge about the basics of the subject			
Objectives of the lesson	To identify the basic concepts of the subject			
№	Structural element of the lesson	The use of ICT		The product	Note
1	The organization started classes.	View used ICT tools	Videomaterialy Testing	www.youtube.com	.
		The purpose of using ICT	Create an emotional attitude of students to class, the intensification of attention to the subject, the actualization of students ' knowledge on the topic.		
		Methodical assignment ICT	Demonstration		
		Activity students with ICT	Front work (see video)		
		The duration of the work with ICT	3 min		
		Software ICT	Windows Media Player		
		Hardware ICT	Computer, projector	,	
		Internet resources	The unified collection of digital educational resources		
2	The study of new material. 1.The educational process	View used ICT tools	DH		
		The purpose of	Monitoring of		

		using ICT	experiments to highlight the properties of water.		
		Methodical assignment ICT	Demonstration		
		Activity students with ICT	The front (viewing experience).		
		The duration of the work with ICT	4 min		
		Software ICT	Windows Media Player		
		Hardware ICT	Computer, projector		
		Internet resources	DH		
	Consolidate study	View used ICT tools	Adaptive Computer test	Adaptive Computer test	
		The purpose of using ICT	Intensification of work on the subject		
		Methodical assignment ICT	Generalization and consolidation of knowledge		
		Activity students with ICT	Individual work on the computer.		
		The duration of the work with ICT	3 min		
		Software ICT	Computer adaptive test		
		Hardware ICT	Individual computer		
	2. Функции проф.образования	View used ICT tools	Slide show		
		The purpose of using ICT	The development of interest, observation		
		Methodical assignment ICT	Demonstration		
		Activity students with ICT	Front work (view illustrations)		
		The duration of the work with ICT	2 min		
		Software ICT	Slide show		
		Hardware ICT	Computer, projector		

		Internet resources	HD		
	Обобщение и закрепление изученного материала	View used ICT tools	Computer adaptive test		
		The purpose of using ICT	Intensification of work on the subject.		
		Methodical assignment ICT	Generalization and consolidation of knowledge.		
		Activity students with ICT	Individual work on the computer.		
		The duration of the work with ICT	3 min		
		Software ICT	Test prepared by teacher		
		Hardware ICT	Individual computer		
	3. Виды проф.образования	View used ICT tools	Presentation		
		The purpose of using ICT	Actualization of students ' knowledge on the topic.		
		Methodical assignment ICT	Demonstration		
		Activity students with ICT	Front job (view schema)		
		The duration of the work with ICT	2 min		
		Software ICT			
		Hardware ICT	Computer, projector		
		Internet resources	DH		
	Обобщение и закрепление изученного материала	View used ICT tools	Computer adaptive test		
		The purpose of using ICT	Intensification of work on the subject		
		Methodical assignment ICT	Generalization and consolidation of knowledge		
		Activity students	Individual work		

		with ICT	on the computer.		
		The duration of the work with ICT	3 min		
		Software ICT	<mark>Test prepared by teacher</mark>		
		Hardware ICT	Individual computer		
		Internet resources			
3.	The control of knowledge.	View used ICT tools	Computer adaptive test		
		The purpose of using ICT	Intensification of work on the subject		
		Methodical assignment ICT	Monitoring and evaluation of students ' knowledge		
		Activity students with ICT	Individual work on the computer.		
		The duration of the work with ICT	3 min		
		Software ICT			
		Hardware ICT	Individual computer		
		Internet resources	DH		
5	Homework	View used ICT tools	Video clip flash video		
		The purpose of using ICT	The development of interest in the topic		
		Methodical assignment ICT	Demonstration		
		Activity students with ICT	Front work (see video)		
		The duration of the work with ICT	3 min		
		Software ICT	Windows Media Player		
		Hardware ICT	Computer, projector		
		Internet resources	The unified collection of digital educational resources		

Chapter 3. SAFETY OF VITAL ACTIVITY AND ECOLOGY

3.1. Impact of technosphere on environment

Technosphere. The human has been living for a long time not in "nature", and has been living in the environment antropo-genno-changed, transformed, under the influence of the activity. In life cycle the human and environment always form an operating system of «the person – the environment».

Surrounding environment of the person, caused at present by a set of factors, capable to render direct or indirect, remote affect on human, its health and life.

With the advent of people on the Earth influence of their activity on a cycle of substances and power exchange in biosphere has begun, the tragedy of biosphere has begun. Ancestors of human have stepped into a way which strengthened confrontation with biosphere, about 1,5-3 million years ago when subordinated to commands of the intellectual device - brain which required an increasing quantity of energy for satisfaction of the requirements, have lighted for the first time a fire in bowels of Africa and Northern Yakutia (in settlement Dirin-Jurjah). From that moment on, the ways of human and biosphere have gone apart completely, their opposition has begun because of what the collapse of biosphere or disappearance of the humanity may happen.

The mankind, extending numerically and expanding on the planet, automatically has inevitably pushed aside other inhabitants of the nature. And the nature itself has rejected on biosphere boondocks, replacing the latter not any more by Vernadsky's noosphere, but by a technosphere, or a biotechnosphere.

The technosphere is a region of biosphere in the past, transformed by people by means of direct or indirect influence for the purpose of the best conformity materially, socially and economically to their requirements.

By creating a technosphere, the person aspired to increase comfortability of environment, to the increase in communication growth, to maintenance from natural negative influences. All this has positively affected conditions of life and in aggregate with other factors (improvement of medical service, etc.) on life

expectancy of people.

But creation by hands and mind of human of the technosphere intended as much as possible to satisfy their requirements for comfort and safety, by far did not justify the hope of people. Irrational economic activities, strengthened by achievements of scientific and technical progress for several times, led to damage and exhaustion of natural resources, changes of reclaiming th mechanisms of biosphere, deformation generated during many millions years of natural circulation of substances and power currents on the planet, infringement of dynamic balance of the global terrestrial social ecosystem [23].

In global ecosystem, biosphere which is a single whole, nothing can be won or lost, cannot be object of the general improvement. Everything, that is extracted from it by human work, should be returned.

Payments of this "bill" cannot be avoided, it can only be delayed. The technosphere includes regions of a city, an industrial zone, manufacture of anything and household environments.

To live, a person should provide his/her life, first of all, materially. Production of goods, firstly, is the activity directed on the development of environment. It includes the industry and agricultural activity. Production of goods is a social development basis as it satisfies the most human requirements. The leading part in system of production of goods have played:

1) agrarian manufacture which dominated in Europe almost till XVIII century;

2) industrial production which began at that moment when steam and car made revolution in the industry;

3) information manufacture – manufacture of knowledge, turns to defining form of work more and more. At the third stage of production ideas, knowledge, the information leaves on the foreground.

The mankind enters a new era – the era of information. Manufacture, storage and information distribution becomes the principal type of economic activities.

Dangers of technogenic character. Five millenia ago, when there were first

city settlements, began to form the technosphere – the sphere which contains artificial technical spores on the Earth. Certainly, then they were only technosphere elements. The present technosphere appeared during the epoch of industrial revolution when steam and electricity allowed to repeatedly expand technical opportunities of the person, having given the chance to:

a) to quickly move on terrestrial surface and create the world economy;

b) go deep into earth crust and oceans;

c) rise into atmosphere;

d) create many new substances.

There occured the processes not peculiar to biosphere: observance of metals and other elements, energy manufacture on atomic power stations, synthesis of organic substances unknown till now. Powerful technogenic process is burning of fossil fuel.

In connection with the use of the increasing power capacities people are compelled to concentrate energy on small sites, and more often within cities and other settlements. There is going on a spatial concentration of synthetic political chemical compounds (their quantity has reached 400 thousand), the most part of which is poisonous. Thereof, pollution of surrounding has sharply increased, destruction of woods, desertification, more and more people perish as a result of failures on manufacture and transport.

The failures caused by breakdown of service of technical objects, on the scales have started to get catastrophic character in 20-30th years of XX century. Influence of these failures by time oversteps the limits of the states and covers the whole regions. The adverse ecological conditions caused by these failures, can remain from several days to about many years. Liquidation of consequences of such failures demands the big expenses and attraction of many experts.

Failure is a dangerous event of technogenic character, creates a threat on objects, on territory or water area for a life and healths of people and leads to destruction of buildings, constructions, equipments and vehicles, infringement of production or harms environment.

According to the sizes and the cause harm they distinguish easy, heavy and especially heavy failures. Especially heavy failures lead to the big destructions and are accompanied by big victims.

The analysis of consequences of failures, character of their influence on environment causes their distribution by kinds:

· failures with leak of strong poisonous substances (ammonia, chlorine, sulfuric and nitric acids, carbonic oxide, sulphurous gas and other substances);

· failures with emission of radioactive substances in environment;

· fires and explosions;

· failures on transport and etc.

Especially heavy failures can lead to accidents. Accident is a large-scale failure which leads to heavy consequences for the person, an animal and flora, changing inhabitancy conditions.

Global accidents cover the whole continents, and their development threatens existence of all biosphere.

Anthropogenous influence on environment. Greatest "contribution" to environmental contamination is brought by thermal power stations, metallurgical and chemical plants. On a share of thermal power stations 35 % of total pollution is of water and 46 % is of air. They throw out connections of sulphur, carbon and nitrogen, consume water in a considerable quantity: for making one kilowatt-hour of electro-energy thermal power stations spend nearby 3 litres of water (nuclear power stations - even more: 6-8). Sewage of thermal power stations are polluted and have a heat that becomes the reason not only chemical, but also thermal pollution.

The metallurgical enterprises differ by high consumption of resources and a considerable quantity of a waste, among which dust, carbon oxide, sulphurous gas, gas coke, phenol, hydrogen sulphide, hydrocarbons (including quinazine). The Iron and steel industry consumes a lot of water in the course of manufacturing.

By various kinds of manufacture is characterised chemical manufacturing. The most dangerous are manufacturing of ammonia, the acids, Anil-new paints,

phosphoric fertilizers, chlorine, pesticides, synthetic rubber, caustic soda, mercury, carbide of calcium, fluorine.

Cars strongly pollute atmosphere. The motor transport (in the world there is more than 600 million cars) gives 70-90 % of pollution in cities. If in cities lives more half of population of the Earth there is clear a crucial importance of motor transport concerning direct influence on people.

In exhaust gases of cars lead, toxic hydrocarbons (benzene, toluene, xylol, etc.) prevail carbon oxide, nitrogen dioxide. Interaction of hydrocarbons and nitrogen dioxides at heat leads to ozone formation (O_3). If in the atmosphere layer at height of 25 km there is high enough volume of ozone, not th for protection of all live from rigid ultra-violet radiation the raised and maintenance of ozone causes vegetation oppression in a terrestrial surface, irritation of respiratory ways and defeat of lungs.

Considerable pollution is given by a pulp and paper industry. By the volume of polluted drains it wins first place (more than 15 %). In sewage of the enterprises of this industry more than 500 is component, and maximum concentration limits are defined only for 55. The greatest danger show the connections of sulphur and chlorine, the dissolved organic chemistry.

Pollution of atmosphere of cities. The basic sources of pollution of atmosphere of a city is transport, power systems of a city and the industry.

In cities the great bulk of vehicles is concentrated. They are cargos, own and public transport. Motor transport gives 70 % of all toxic emissions in atmosphere. In Ukraine are registered more than 1 million lorries and about 3 million automobile. Cities are not adapted for such quantity of transport. The length of run without stops between traffic lights makes only 400-600 m, that average speed of movement in the afternoon in city centre and on the big roads decreases to 12-20 kms/hour, and it increases the fuel expense for 3-4 times. Accordingly emissions increase too. Motor transport also leads to specific forms air pollution. At movement tyres are erased, and thousand tons of rubber in the form of a dust get into air. The city motor transport not only pollutes air products of combustion of

fuel, but leads to growth of receipt of lead in environment. In Ukraine for the present use gasoline with the maintenance of lead 0,36 g/l, whereas in England, Germany and the USA - 0,013-0,15.

Cities are the basic consumers of energy. City consumes energy in various forms. Fossil fuel - coal, mineral oil and natural gas are used enough widely. This already in itself defines pollution of cities by combustion products. To apartment houses and industrial premises energy gets in the form of electricity, gas, steam heating.

Decrease in quality of atmospheric air is hazardous to health of city dwellers. The person uses on average 25 kg of air a day. Even if the relative maintenance polluting in air is slightly, their total quantity which gets to a human body at breath, can appear toxic. The most widespread harmful impurity is carbonic oxide. The superfluous quantity of this gas in air leads to fast fatigue of the person, headaches, dizziness, memory easing, infringement of activity of cardiovascular and other systems of an organism.

Pollution of drinking water in cities. Drinking water is the major factor of health of a person. In cranes of city apartments potable water arrives from rivers, water basins, lakes, from underground depths. The cleanest is underground (especially deep, artesian) water. But for the big cities this water does not suffice.

According to the W.H.O., water can contain 13 thousand toxic substances, by water is transferred up to 80 % of all diseases of which in the world 25 million persons annually die.

In real conditions, water contains organic and mineral connections, microcells and a macro-elements, gases, colloid particles and live microorganisms. The cores a component of potable water are invariable - hydrocarbon, sulphatic and salts of calcium, magnesium and sodium. From minerals in water silicon, fluorine, strontium, zinc, from macrocells are iron and calcium. The maintenance of these substances should not exceed maximum concentration limit.

Shares of soil and everything, that can decay, brings in water organic connections. Their variety is huge.

That natural water was suitable for the use, it passes some stages of clearing and disinfecting on waterworks. Ways of clearing of the polluted waters can be united in following groups:

- Mechanical;

- Physical;

- Physicomechanical;

- Chemical;

- Physical and chemical;

- Biological;

- The complex.

After mechanical, chemical and physical and chemical methods of sewage treatment (microorganisms) for definitive clearing of drains of organic substance are subject to biological clearing. Biological clearing is carried out in biofilters.

After certain methods of clearing in water there can be various viruses and bacteria (dysenteric bacteria, cholera vibrios, activators of belly typhus, poliomyelitis virus, virus of hepatitis, etc.). Liquidation of microorganisms which remained can be done in four ways:

• Thermally to (boil);

• By means of strong oxidizers (for example, chlorine, ozone);

• Influence of ions of precious metals (silver is usually used);

• Physical methods (by means of ultra-violet beams or ultra-sound).

3.2. Interaction of human and technosphere

Concept of technosphere. Today the large quantity of anthropogenous sources are caused not by streams of substance peculiar to the nature and energy of various capacity. The human is more actively transforming the planet into a geotechnical system, changing natural ecological system that conduct to loss of ability of self-restoration of the vital functions of objects of biosphere. Negative influence on environment is caused not only irrational structure of manufacture, but also imperfection of technological processes. From a large quantity of

substances are withdrawn by people from an environment for manufacture, the great bulk passes in an industrial and household waste.

The sharp increase in anthropogenous pressure at the nature has led to an ecological balance disruption and has caused degradation not only inhabitancies, but also health of people. The biosphere has gradually lost the dominating value and in the occupied regions began to turn into a technosphere.

Biosphere is an area of distribution of life on the Earth, including the bottom layer of atmosphere at a height of 12-15 kms, all water environment planets (hydrosphere) and the top part of earth crust (lithosphere at the depth of 2-3 kms). The top border of biosphere is at height of 15-20 kms from the surface of the Earth in stratosphere. Active technogenic activity of the human has led to biosphere destruction in many regions of the planet and to the creation of new type of an inhabitancy – technospheres [24]

Technosphere is the object of planetary ecology consisting of elements of biosphere, hydrosphere and etc. (ecosphere) which have undergone anthropogenous changes or are created as a result of conscious activity of the human.

The technosphere is a region of biosphere in the past, transformed by people in technical and technogenic objects, i.e. the environment of the occupied places.
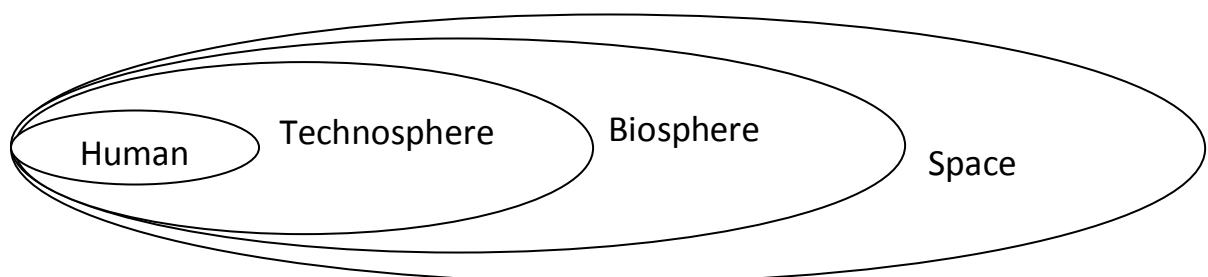
Fig. 3.1. The interaction of human, technosphere and biosphere

In the course of the vital activity the human have created the conditions, its further existence, at present methods of operation of natural resources, endanger influences of polluting substances. Earlier existing condition characterising biosphere, has turned to a special, artificial inhabitancy - a technosphere: being protected from bad weather, built houses, sewed clothes and footwear; being

protected for hunger, developed agriculture and its basis - agricultural machinery; being protected from illnesses - searched for new, more effective medicines and treatment methods; being protected from electric current action - have thought up an electrosecurity; being protected from devastating fires - have developed system of fire safety.

The person from the most occurrence on the Earth has been compelled to struggle with external natural dangers, creating for this purpose the technosphere: the industry, transport, power, communications etc. But the technosphere has its own laws of the development which action in increasing frequency leads to undesirable results - to the defeat of people and material losses. The technosphere originally created for protection of the human from external dangers, itself is more and more becoming the source of danger. For successful struggle against various dangers of the technosphere the modern theory presented in scientific discipline «Safety of vital activity» (SVA) is created.

Classification of dangerous factors. Danger is the central concept of science of SVA. This phenomenon, processes, the objects are capable in certain conditions to cause a damage to health of the human directly or indirectly. Danger is stored by all systems having energy, chemically or biologically active components, etc.

The definition of danger in SVA is most the general and includes such concepts as the dangerous, harmful factors of manufacture, striking factors and so forth.

There are some ways of classification of dangers:

- according to the origin of occurence:

a) natural;

b) technical;

c) anthropogenous;

d) ecological;

e) mixed.

- according to localisation:

a) connected with lithosphere;

b) connected with hydrosphere;

c) connected with atmosphere;

d) connected with space.

- according to caused consequences:

a) exhaustion;

b) disease;

c) trauma;

d) lethal outcome, and etc.

According to the official standard of danger, it is divided into physical, chemical, biological and psychophysical types.

3.3. Ecological monitoring

Ecological monitoring (environment monitoring) is a complex supervision over an environment condition, including components of the environment, natural ecological systems, processes occurring in them, the phenomena, an estimation and the forecast of changes of the condition of environment.

Usually, in a territory, there is already a number of networks of the supervision belonging to various services and which are departmentally separated, are not co-ordinated in chronological, parametrical and other aspects. Therefore, the problem of preparation of estimations, forecasts, criteria of alternatives of a choice of administrative decisions on the basis of departmental data available in region becomes, generally, uncertain. Because of this, the central problems of the organisation of ecological monitoring are ecological and economic division into districts and the choice of "informative indicators" of ecological condition of territories with a check of their system sufficiency.

Types and subsystems of ecological monitoring. At the monitoring organisation there is a necessity for the decision of several problems of different level, therefore I. P.Gerasimov (in 1975) has suggested to distinguish three steps (a type, a direction) monitoring: bioecological (sanitary and hygienic), geosystem (natural and economic) and biospheric (global). However, the given approach in

the aspect of ecological monitoring does not give clear split of functions of its subsystems, neither division into districts, nor the parametrical organisation and represents, basically, historical interest.

Such subsystems of ecological monitoring, are distinguished as: geophysical monitoring (the analysis of data on pollution, blur of atmospheres, investigates the meteorological and hydrological given environments, and also studies the elements of lifeless parts of biosphere including the objects created by the human); climatic monitoring (control service and the forecast of fluctuations of climatic system. Covers that part of biosphere which influences climate formation: atmosphere, ocean, ice cover, and etc. Climatic monitoring is closely closed with hydrometeorological supervision.); biological monitoring (based on supervision over reaction of live organisms on environmental contamination); monitoring of health of the population (system of actions for supervision, the analysis, an estimation and the forecast of a condition of physical health of the population) and others.

In a general view, it is possible to present ecological monitoring process by the scheme: environment (or concrete object of environment)-> measurement of parametres by various subsystems of monitoring-> gathering and an information transfer-> processing and data presentation (formation of the generalised estimations), forecasting. The ecological monitoring system is intended for service of control systems by quality of environment (further "control system"). The information on the environment condition, received in ecological monitoring system, is used by a control system for prevention or elimination of a negative ecological situation, for an estimation of adverse consequences of change of a condition of environment, and also for working out of forecasts of social and economic development, working out of programs in the field of ecological development and preservation of the environment.

In a control system, it is also possible to allocate three subsystems: decision-making (the special representative the state body), management of decision

performance (for example, administration of the enterprises), performance of the decision by means of various technical or other means.

Ecological monitoring subsystems differ on objects of supervision. As environment components are air, water, mineral-raw and power resources, bioresources, soils, etc. they allocate subsystems of monitoring corresponding to them. However, subsystems of monitoring have no uniform system of indicators, uniform division into districts of territories, unity in periodicity tracing, etc., that does impossible the acceptance of adequate measures at management of development and ecological conditions of territories. Therefore at decision making, it is important to be guided not only by given «private systems» monitoring (a hydrometeorological service, monitoring of resources, socially-hygienic, etc.), and to create on their basis complex systems of ecological monitoring.

The levels of monitoring. Monitoring is a multilevel system. In chronological aspect they usually allocate systems (or subsystems) into detailed, local, regional, national and global levels.

The lowest hierarchical level is level of detailed monitoring realised within small territories (sites) etc.

At association of systems of detailed monitoring in larger network (for example, within area, etc.) the system of monitoring of local level is formed. Local monitoring is intended to provide an estimation of changes of system on larger areas: territories of a city, area.

Local systems can unite in larger systems of regional monitoring covering territories of regions within edge or area, or within several of them. Similar systems of regional monitoring, integrating data of networks of the supervision differing under approaches, to parametres, tracing and periodicity territories, allow to form adequately complex estimations of the conditions of territories and give forecasts of their development.

Systems of regional monitoring can unite within one state in uniform of national (or state) monitoring network, forming, thus, national levels of monitoring systems. An example of such system was "the Uniform state system of ecological

monitoring of the Russian Federation" (ЕГСЭМ) and its territorial subsystems were successfully created in 90th years of the 20th century for the adequate decision of problems of management of territories. However, after the ecology Ministry in 2002, also has been abolished and now in Russia there are only departmentally-separated networks of supervision that does not allow to solve adequately strategic problems of management of territories taking into account an ecological imperative.

Within the limits of the ecological program of the United Nations a task in view of association of national systems of monitoring in a uniform interstate network is the «Global system of monitoring of environment». It is the higher global level of the organisation of system of ecological monitoring. Its appointment is monitoring realisation behind changes in environment on the Earth and its resources as a whole, on the global scale. Global monitoring is a system of tracking the condition and forecasting of possible changes of universal processes and the phenomena, including anthropogenous influences on biosphere of the Earth as a whole. While creation of such system in the full volume, operating under the aegis of the United Nations, is a future problem as many states have still no own national systems.

The global system of monitoring of environment and resources urged to solve universal environmental problems within the limits of the Earth in a whole, such as global warming of the climate, the problem of preservation of the ozone layer, the forecast of earthquakes, preservation of woods, global desertification and erosion of soils, flooding, stocks food and power resources, etc. The example of such subsystem of ecological monitoring are the global observant network of seismomonitoring of the Earth, operating within the limits of the International program of the control over the centres of earthquakes (http://www.usgu.gov/) and others.

The program of monitoring the environment. Scientifically proved monitoring of environment is carried out according to the Program. The program

should include organisation of overall aims, concrete strategy of its carrying out and realisation mechanisms.

Key elements of Programs of monitoring of environment are:

•the list of the objects which are under the control with their strict territorial binding (the chorological organisation of monitoring);

•the list of indicators of the control and admissible areas of their change (the parametrical organisation of monitoring);

•time scales - periodicity of sampling, frequency and data presentation time (the chorological organisation of monitoring).

Besides, in the appendix of the monitoring Program there should be schemes, cards, tables with instructions of the place, date and sampling and data presentation method.

Systems of land remote supervision. Now in programs of monitoring besides traditional "manual" the emphasis is laid on data gathering with use of electronic measuring devices of remote supervision in real time mode.

Use of electronic measuring devices of remote supervision spend using connections to base station or through a telemetering network, or through land lines, cellular telephone systems or other telemetering systems.

Advantage of remote supervision is that in one base station for storage and analysis many channels of data can be used. It sharply raises efficiency of monitoring the achievement of threshold levels of controllable indicators, for example, on separate sites of the control. Such approach allows to undertake immediate actions if threshold level is exceeded according to monitoring.

Use of systems of remote supervision demands installation of the special equipment (monitoring gauges) which usually mask for vandalism and larceny decrease when monitoring is spent in easily accessible places.

Systems of remote sounding. Remote sounding of environment is widely involved in monitoring programs with use planes or the companions supplied with multichannel gauges.

They distinguish two kinds of remote sounding.

•Passive detection of the terrestrial radiation let out or reflected from object or in vicinities of supervision. The most widespread source of radiation is the reflected sunlight whose intensity is measured by passive gauges. Gauges of remote sounding of environment are adjusted for concrete lengths of waves - from far infra-red, to a far ultraviolet, including the frequencies of visible light. Enormous volumes of data which gather at remote sounding of environment demand powerful computing support. It allows to carry out the analysis weakly distinguished distinctions in radiating characteristics of environment in data of remote sounding, successfully to exclude noise and «false colour images». At several spectral channels, it is possible to strengthen contrasts which are imperceptible for a human eye. In particular, at problems of monitoring of bioresources it is possible to distinguish thin differences of change of concentration in chlorophyll plants, having found out areas with distinction of nutritious modes.

•At active remote sounding from the companion or the plane the stream of energy is radiated and the passive gauge for detection and measurement of the radiation reflected or disseminated by object of studying is used. For reception of the information on topographical characteristics of investigated area is often used LIDAR, that is especially effective, when the territory is great, and also manual shooting will be expensive.

Remote sounding allows to collect data about dangerous or remote areas. Application of remote sounding consequences of action of change of a climate on glaciers of Arctic regions and Antarctic, researches of coastal and ocean depths include monitoring of woods.

Data from the orbital platforms, received from various parts of an electromagnetic spectrum in a combination to land data, represents the information for the control of tendencies of display of the long-term and short-term phenomena, natural and anthropogenous. Other scopes include management of natural resources, planning of use of the earth, and also various areas of sciences about the Earth.

Interpretation and data presentation. Interpretations of data of the ecological monitoring even received from well thought program, is often ambiguous. Often there are results of the analysis or «prejudiced results» of monitoring, or disputable enough to use statistics to show correctness of this or that point of view. It is well visible, for example, in treatment of global warming where supporters assert, that levels of CO_2 have increased by 25 % for the last hundred years while opponents assert, that level CO_2 only has risen for one percent.

In the new scientifically-proved programs of monitoring of environment a number of indicators of quality is developed to integrate considerable volumes of processed data, to classify them and to interpret sense of integrated estimations. So, for example, in the Great Britain system GQA is used. These general estimations of quality classify the rivers on six groups by chemical criteria and biological criteria.

For decision-making, the use of an estimation in the system GQA is more convenient, than a set of private indicators.

CONCLUSION

Thus, today on the market software product has a wide range of software for realization of a computer adaptive test items. The choice of a particular environment or program depends on the goals of the testing, the training developer in the areas of computer skills, type selection of test items.

The use of tasks in the test form, combined with new educational technologies can provide a dramatic improvement in the educational process through increased training, organizing, diagnosing, educational and motivational functions of those jobs. Repeatedly it has been shown that the tasks in the test form, combined with the modular principle of organization of educational process, provide a high level of learning, the consistency and strength of his study.

Known in the pedagogical literature task approach to organization of educational process can be greatly modified through the reconstruction of the tasks themselves, and the application of the tasks in the test form, which helps to increase the level of technologization of educational process, to make the tasks clearer, to create a parallel and simplified versions of the same task.

Monitoring the training process a lot better than a single test. The monitoring results can be used for organization of independent work based on modular technology and to introduce in schools the level of education. The idea of the level of education seems to be more constructive and helpful to improve the quality of education in the country than now introduced the idea of specialized education.

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