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OF THE REPUBLIC OF KAZAKHSTAN**

**S. Seifullin Kazakh Agro Technical University**

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**INNOVATIVE TECHNOLOGIES IN TEACHING OF DISCIPLINES  
ON SPECIALTY "PLANT PROTECTION AND QUARANTINE"**

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The textbook deals with the theoretical development and use of modern innovative pedagogical technologies in the professional training of specialists in plant protection in higher education. Currently, in the light of changes in the paradigm of learning as relevant — the search for the most effective methods and means of training to improve the quality of training of specialists, organizations of the educational process, stimulating independent thought activity of students and ensuring the formation of their needs for new knowledge. The authors consider new approaches in education (CLIL, coaching, case studies and various forms of control). These methods represent a set of scientifically and practically justified methods and tools for achieving the desired result in the training of students.

The proposed materials are intended for teachers and students of natural and agricultural sciences, employees of phytosanitary control and other interested organizations.

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## CONTENT

|   |            |
|---|------------|
| <b>Introduction.....</b>  | <b>4</b>   |
| <b>Chapter 1 Innovative technologies and their use in the educational process.....</b>  | <b>5</b>   |
| 1.1 Technologies and their diversity and classifications.....   | 5          |
| 1.2 Variety of methods and techniques in higher schools abroad and in the CIS countries.....  | 22         |
| 1.3 Upgrading of teaching technologies in universities of Kazakhstan.....   | 59         |
| <b>Chapter 2 The diversity of technology and methods for visualizing the disciplines of the natural sciences.....</b>   | <b>88</b>  |
| 2.1 Modern paradigms of learning and transformation of the teacher's role.....  | 88         |
| 2.2 Innovative methods of teaching and ways of mastering new technologies and application at the department "PPQ" (case study, three-dimensional training system, coaching, etc)..... | 93         |
| <b>Chapter 3 Multilingual training as a way of integration into the world educational space.....</b>  | <b>130</b> |
| 3.1 The CLIL method.....  | 131        |
| 3.2 History of the issue - abroad and in Kazakhstan the development of a new form of training (CLIL).....   | 134        |
| 3.3 Aspects of using integrated learning technology (CLIL).....   | 139        |
| 3.4 Importance and variety of forms of control.....   | 143        |
| 3.5 Terms and definitions for the protection and quarantine of plants and work with the conceptual apparatus.....   | 154        |
| <b>Literature.....</b>  | <b>193</b> |
| <b>Application.....</b>   | <b>198</b> |

## INTRODUCTION

The result of modernization of Kazakhstan society is observed in different areas of science and industry. New models in agricultural science and production, a new model of higher education with the use of new technologies, methods and techniques are being formed. The dynamism of the ongoing changes in society is caused by the challenges of time.

In modern conditions, the content of education in specialties and the content of pedagogical work are changing. Today teachers of a high level of professional competence are in demand. Currently, the universities of Kazakhstan are working on the introduction of unique international experience and international practice in education, through scientific and methodological links, training.

Formation of professionals in their own business goes through the introduction of advanced educational practices. These include the structures of a systemic, interactive process realized through knowledge, technology, competencies, skills, attitudes and achievements of quality results in various educational and production fields. When teaching special disciplines, a tandem of practice and science is welcomed, leading to the desired result, this is ensured by the quality of the software, the technologies through which experiments and studies prove the reliability of achieving the desired result.

The ability to use best practices in the field of plant protection is the desire to use all knowledge and technology at its disposal to guarantee success. The textbook reveals a variety of innovative technologies, modern schools, types of methodologies used in the study of disciplines at the Department "Plant protection and quarantine".

It is noteworthy that the strengthening of the formation of social and methodological, independent competences of students in training. This is done in order to create learning environments, identify problems and find effective means to address them:

- setting priorities that are of decisive importance in solving problems;
- collection and classification of information;
- precise and concise description;
- the establishment of unidentified assumptions;
- interpretation of the results for argumentation of evidence and decision-making;
- development of objective conclusions and generalizations;
- argumentation of conclusions and generalizations.

The used technologies belong to a number of educational technologies (technology in education) - a set of scientifically and practically sound methods and tools to achieve the desired result in any field of education.

In this edition, the authors have tried to highlight the types and forms of techniques and technologies used in the study of disciplines on plant protection and quarantine.

## CHAPTER 1

### **Innovative technologies and their use in the educational process**

*Innovation* means new, innovation. The main indicator of innovation is the progressive beginning in the development of the university in comparison with the established traditions and mass practice.

Let's consider the basic approaches and classifications of innovative and modern technologies used in domestic universities, as well as foreign and CIS countries.

#### **1.1 Technologies and their diversity and classifications**

Teachers of secondary special and higher educational institutions now face the most important task - to search for the most effective methods and means of training that would improve the quality of training specialists, organize an educational process that stimulates the independent thinking activity of students and ensures the formation of a need for them to acquire new knowledge.

For a start, let's consider what all the same is commonly understood as educational technologies. In recent years, pedagogical science has gone far ahead, in this regard, new approaches to teaching and education have emerged, and as a result new methods and technologies have emerged in teaching.

So, *Educational technology* (technology in education) is a set of scientifically and practically valid methods and tools for achieving the desired result in any area of education.

The concept of "educational technology" is somewhat broader than "pedagogical technology" (for pedagogical processes), because education includes, in addition to pedagogical processes, a variety of social, socio-political, managerial, cultural, psychological, pedagogical, medical-pedagogical, economic and other related aspects. On the other hand, the concept of "pedagogical technology" refers (as is obvious) to all sections of pedagogy.

The effectiveness of the use of pedagogical technologies in the educational process is confirmed by the research works of a number of authors: GK Selevko, V.I. Andreeva, V.P. Bepalko, V.I. Bogolyubova, Clarina, V. Yu. Pityukova, V.A. Slastenina, Ya. A. Savelieva,

etc. To date, a comprehensive theoretical development of the problem of using modern pedagogical technologies in professional training of a specialist in the conditions of a higher school acquires special sharpness and significance.

In the foreign literature there are the following close terms:

- technology in education,
- technology of education,
- educational technology.

Foreign approaches to the definition of pedagogical technologies :

M. Clark believes that the meaning of pedagogical technology is the application in the education sphere of inventions, industrial products and processes that are part of the technology of our time.

F. Percival and G. Ellington point out that the term "technology in education" includes any possible means of presenting information. This equipment used in education, such as television, various means of projection of images, etc. In other words, technology in education is audiovisual.

The modern dictionary of terms UNESCO offers two semantic levels of this concept. And in the original sense, pedagogical technology means the use in pedagogical purposes of the means generated by the communications revolution, such as audiovisual media, television, computers and others.

Table 1 - Traditional technology

| Positive sides   | Negative sides.   |
|--|---|
| <p>The systematic nature of training.</p> <p>Orderly, logically correct submission of educational material.</p> <p>Organizational clarity.</p> <p>Constant emotional impact of the teacher's personality.</p> <p>Optimal resource costs for mass training.</p> | <p>Pattern building.</p> <p>Irrational timing of the lesson.</p> <p>The lesson provides only the initial orientation in the material, and the achievement of high levels is shifted to homework.</p> <p>Students are isolated from communicating with each other.</p> <p>Lack of independence.</p> <p>Passivity or visibility of students' activity.</p> <p>Weak speech activity (the average time of speaking is 2 minutes a day).</p> <p>Poor feedback.</p> <p>Lack of individual training.</p> |

D. Finn noted that only naive people believe that technology is just a set of equipment and teaching materials. It means much more. This is the way of organization, this is the way of thinking about materials, people, institutions, models and systems such as "man-machine".

P.D. Mitchell, after analyzing more than one hundred sources related to the studied definition, believes that pedagogical technology is a field of research and practice (within the educational system) that has connections (relations) with all aspects of the organization of pedagogical systems and a procedure for allocating resources to achieve specific and potentially reproducible results.

UNESCO offers a broad approach - pedagogical technologies are a systematic method of planning, applying and evaluating the whole process of learning and mastering knowledge by taking human and technical resources into account and interacting with them to achieve a more effective form of education.

The views on educational technologies of Russian scientists are interesting.

S.V. Kulnevich considers that it is necessary to relate the concept of pedagogical technology to such pedagogical categories as the theory of upbringing, the method of educational work and pedagogical skill. The theory, in the opinion of this author, is more general and contains a system of justifications. The technology is more algorithmic and accurate. It contains diagnostic and adjustment apparatus. Mastery is more subjective and intuitive. The technology is more objective and precise. Speaking about education, S.V. Kulnevich characterizes it as an unreliable and inaccurate process. It is possible to change these characteristics in a positive way only in the conditions of its scientific organization, the element of which is technology.

G. Yu. Ksenzova and E. A. Levanova interpreted pedagogical technology in a broad sense as a process aimed at solving both teaching and educational tasks. At the same time, it acquires many aspects.

All pedagogical technologies are classified according to the following parameters:

- ✓ By application level
- ✓ On a philosophical basis
- ✓ By leading factor
- ✓ According to the scientific concept

- ✓ By the nature of the content and structure
- ✓ By the type of organization and management of cognitive activity
- ✓ On the attitude towards the child from adults
- ✓ By the method, method, means
- ✓ By category of students

Let's return to innovative methods. So, proceeding from the definition, it is clear that innovations presuppose qualitatively new approaches in education or the transformation of classical methods, to those that would satisfy the demands of modern society in education.

IN AND.Zagvyazinsky understands pedagogical innovation as "the spread of innovations in pedagogical practice," noting that the innovation is an element of pedagogical reality, which in the presented form has not been found, but analogs of this phenomenon can be found.

In pedagogical vocabulary, pedagogical innovation means: 1) purposeful change, introducing into the educational environment stable elements (innovations), improving the characteristics of individual parts, components and the educational system as a whole; 2) the process of mastering innovation (a new tool, method, methodology, technology, program, etc.); 3) search for ideal methods and programs, their introduction into the educational process and creative rethinking.

N.V. Bordovskaya, A.A. Rean note that innovation (from Latin *in* - in, *novus* - new) means innovation, innovation. The main indicator of innovation is a progressive beginning in the development of a school or university in comparison with established traditions and mass practice.

Realizing the contradiction between the social demand for education and traditional teaching methods, educators-scientists and practitioners-turn to seeking innovative teaching methods based on other principles, and, first of all, to personality-oriented or developing approaches to learning.

The use of new innovative technologies contributes to the solution of pedagogical and methodological problems that are difficult or impossible to solve by traditional methods. It should be borne in mind in the teaching of historical disciplines that it is impossible to prevent the destruction and loss of positive results of the traditional education system. Innovative and traditional teaching methods should harmoniously complement each other as part of the student's unified educational environment.

Innovative pedagogical technology is a project of a certain pedagogical activity, consistently implemented in practice, the main indicator of which is the progressive beginning in comparison with the established traditions and mass practice.

Innovation processes in education should be based on the unity of scientific and educational activities and their orientation to the economic, social and spiritual development of society.

Innovation in education is understood as the process of improving pedagogical technologies, the totality of methods, methods and means of teaching. In some cases, the use of an already known method, with a slight modification or modification , is considered an innovation .

Fig. 1. Modern educational technologies using in teaching process

Innovation is the subject of a person's special activity that is not satisfied with traditional conditions, methods, methods, and wants not only novelty of content, but qualitatively new results. But it should be noted that not always and everywhere the establishment of a new one provides positive results, not every innovation is rational, progressive, often destabilizes the functioning of the pedagogical system, creates difficulties for teachers and their students.

Innovations in the education system are associated with the introduction of changes:

- in the purpose, content, methods and technologies, forms of organization and management system;
- in the styles of pedagogical activity and the organization of the educational and cognitive process;
- in the system of monitoring and evaluation of the level of education;
- in the financing system;

- in educational and methodological support;
- in the system of educational work;
- in the curriculum and curricula;
- in the activities of the student and teacher.

Types of innovations on the correlation of the new to the pedagogical process taking place in the university:

In order and content of education;

in methods, means, methods, technologies of the pedagogical process;

in the forms and methods of organizing training and education;

in the activities of the administration, teachers and students.

Types of innovation based on innovative capacity :

-modifications of the known and accepted, related to improvement, rationalization, modification (educational program, curriculum, structure);

-combinatorial innovations;

-a radical transformation.

Sources of innovative ideas of the university:

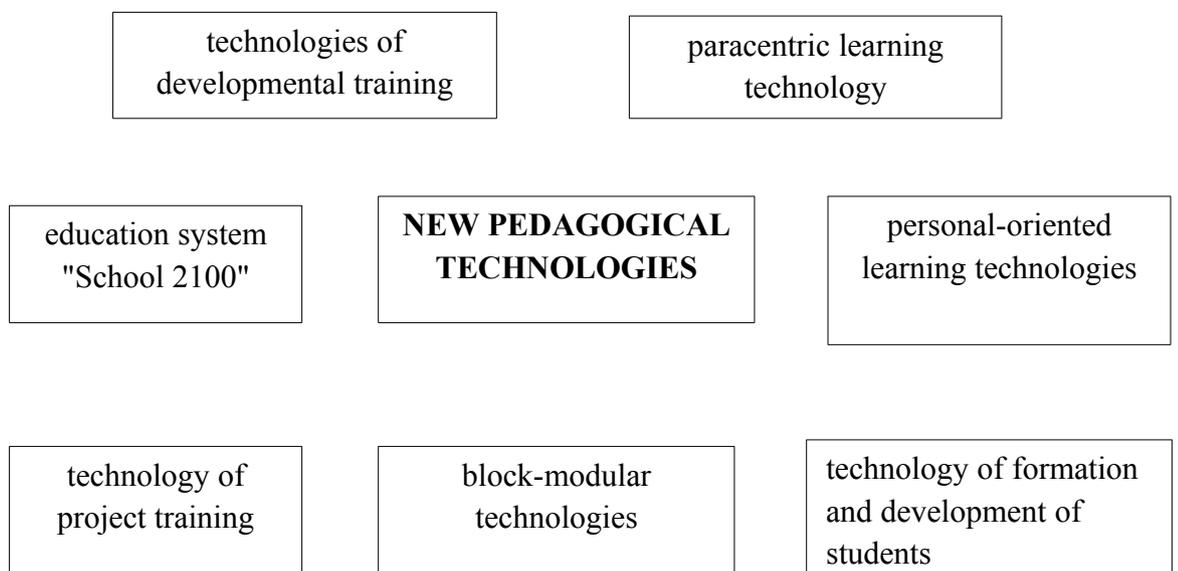
- social order (needs of the country, region, city);

- the embodiment of the social order in laws, directive and normative documents of federal, regional significance;

- intuition and creativity of managers and teachers as a way of trial and error;

- experimental work;

- foreign experience.



## Fig 2. Types of new pedagogical technologies

There is also another approach in the division of innovative technologies.

In the basis of the classification of innovative technologies, it is possible to put certain criteria on the basis of which it will be carried out.

The first criterion can be considered the way of the emergence of the innovative process, the second - the breadth and depth of innovative activities, and the third - the basis on which the emergence, there are innovations.

Depending on the method of implementation of innovations, they can be divided into:

- a) systematic, planned, pre-conceived;
- b) spontaneous, spontaneous, random.

Depending on the breadth and depth of innovative activities, we can talk about:

- a) mass, large, global, strategic, systematic, radical, fundamental, significant, deep, etc.;
- b) partial, small, small, etc.

Innovations can be carried out at various levels. To the highest level are innovations that affect the entire pedagogical system.

Pedagogical innovations are implemented according to a certain algorithm. P.I. Pikasisty distinguishes ten stages of development and implementation of pedagogical innovations:

1. Development of a criteria apparatus and indicators of the state of the pedagogical system subject to reform. At this stage, you need to identify the need for innovation.

2. Comprehensive verification and assessment of the quality of the pedagogical system to determine the need for its reform with the help of special tools.

All the components of the pedagogical system must be subjected to expertise. As a result, it must be precisely established that it is necessary to reform as outdated, inefficient, irrational.

3. Searches for models of pedagogical decisions that are advanced and can be used to model innovations. Based on the analysis of the bank of advanced pedagogical technologies, it is necessary to find the material from which it is possible to create new pedagogical constructions.

4. Comprehensive analysis of scientific developments containing a creative solution of actual pedagogical problems (information from the Internet can be useful).

5. Designing an innovative model of the pedagogical system as a whole or its individual parts. A new project is being developed with specific specified properties that differ from traditional options.

6. Performing the integration of the reform. At this stage, it is necessary to personalize the tasks, identify the responsible, means of solving problems, establish forms of control.

7. Working out the practical implementation of the well-known law of the change of labor. Before the introduction of innovations in practice it is necessary to accurately calculate its practical significance and effectiveness.

8. Building an algorithm for introducing innovations into practice. Similar generalized algorithms have been developed in pedagogy. They include actions such as the analysis of practices to search for sites to be updated or replaced, the modeling of innovation based on the analysis of experience and data of science, the development of an experiment program, monitoring its results, implementing the necessary adjustments, final control.

9. Introduction to vocabulary of new concepts or rethinking of the former vocabulary. When developing the terminology for its implementation in practice, they are guided by the principles of dialectical logic, the theory of reflection, and others.

10. Protection of pedagogical innovation from pseudowires. It is necessary to adhere to the principle of expediency and justification of innovations. History shows that sometimes enormous efforts, material means, social and intellectual forces are expended on unnecessary and even harmful transformations. The damage from this is irreparable, so you should not allow false pedagogical innovation. As false innovations that only imitate innovation, the following examples can be cited: formal change of signage of educational institutions; presentation of the old as a fundamentally new one; turning into an absolute and copying the creative method of any pedagogue-innovator without his creative processing, etc.

However, for innovative processes, there are real barriers. V.I. Andreev singles out the following:

- the conservatism of a certain part of the teachers (the conservatism of the administration of educational institutions and educational authorities is especially dangerous);

- Blindly following the tradition of the type: "We are doing well all the time" ;
- lack of the necessary pedagogical staff and financial resources to support and stimulate pedagogical innovations, especially for experimental teachers;
- unfavorable socio-psychological conditions of a particular educational institution, etc.

When organizing innovation activities, remember that:

- in pedagogy, according to K.D. Ushinsky, not experience (technology) is transmitted, but a thought derived from experience;
- the teacher should "pass" the "foreign" experience "through oneself" (through his psyche, prevailing attitudes, modes of activity, etc.) and develop his own method, most appropriate to the level of his personal and professional development;
- Innovative ideas must be clear, convincing and adequate to the real educational needs of the individual and society, they must be transformed into specific goals, tasks and technologies;
- innovation must master the minds and means of all (or most) members of the teaching staff;
- Innovative activity should be morally and materially stimulated, it is necessary to provide legal support for innovation activity;
- in pedagogical activity, not only the results, but also the ways, means, methods for achieving them are important.

Pedagogical innovations can be pedagogical ideas, processes, means; methods, forms, technologies, content programs, etc. Classification of pedagogical innovations is presented in the following table :

Table 2 - Classification of pedagogical innovations

| Symptoms                  | Types   |
|---------------------------|---|
| Activities                | <i>Pedagogical</i> , providing the pedagogical process. <i>Management</i> , providing innovative driving of educational institutions.   |
| Timing actions            | <i>Short-term</i> .<br><i>Long-term</i> .   |
| The nature of the changes | <i>Radical</i> , based on fundamentally new ideas and approaches.<br><i>Combined</i> , based on a new combination of well-known elements.<br><i>Modified</i> , based on the improvement and addition of |

|                           |   |
|---------------------------|---|
|                           | existing samples and forms.   |
| Scale of changes          | <i>Local</i> - independent of each other changes in individual sections or components.<br><i>Modular</i> - interconnected groups of several local innovations.<br><i>System</i> - a complete reconstruction of the system as a whole. |
| Scale of use              | <i>One-time</i> (only once).<br><i>Diffuse</i> (repetitive).  |
| Sources of occurrence     | <i>External</i> (outside the educational system).<br><i>Internal</i> (within the educational system).   |
| Methods of implementation | <i>Authoritarian</i> .<br><i>Liberal</i> .<br><i>Administrative</i> .<br><i>Initiative</i>  |

The main directions and objects of innovative transformations in pedagogy are:

- development of concepts and strategies for the development of education and educational institutions;
  - updating the content of education:
  - Change and development of new technologies for teaching and upbringing;
  - improving the management of educational institutions and the system of education in general;
  - Improving the training of teachers and improving their skills;
  - designing new models of the educational process;
  - Ensuring the psychological, environmental safety of students, the development of health-saving learning technologies;
  - ensuring the success of education and upbringing, monitoring the educational process and the development of students;
  - development of new generation textbooks and teaching aids, etc.
- Innovations can be carried out at various levels. To the highest level are innovations that affect the entire pedagogical system.

Types of innovations in school and university are grouped for different reasons (N.V. Bordovskaya, A.A. Rean):

The first classification of innovations is based on the correlation of the new to the pedagogical process taking place in the school or university. Based

on the understanding of this process, the following types of innovations are distinguished:

- for the purposes and content of education;
- in methods, means, techniques, technologies of the pedagogical process;
- in the forms and methods of organization of education and upbringing;
- in the activities of the administration, teachers and students.

The second classification of innovations in the education system is based on the application of the sign of scale (volume). Here the following transformations are distinguished:

- local and single, not connected with each other;
- complex, interrelated;
- System, covering the whole school or university.

The third classification is carried out on the basis of innovative potential. In this case, there are:

- modifications of the known and accepted, related to improvement, rationalization, modification (educational program, curriculum, structure);
- combinatorial innovations;
- radical transformation.

The fourth classification of innovations is based on the grouping of characteristics in relation to its predecessor. With this approach, innovations relate to substituting, canceling, opening, or retrograde.

As sources of ideas for updating the school or university, you can:

- the needs of the country, region, city, district as a social order;
- the embodiment of the social order in laws, directive and regulatory documents of federal, regional or municipal significance;
- Achievement of a complex of human sciences;
- advanced pedagogical experience;
- intuition and creativity of managers and teachers as a way of trial and error;
- Experimental work;
- Foreign experience.

Krste Angelowski notes that it is not enough to talk about different types of innovations in education. The allocation of innovations is carried out mainly for methodological reasons.

Some authors in the definitions of the concept of newness also indicate species (Khan, etc.). Others stand for material and spiritual, structural and technological, fundamental, fundamental, strategic innovations, that is, for

innovations that impose goals and objectives of education, etc., then for global, partial, organized and spontaneous, large and small (small), imported and spontaneous, internal and external, innovations in educational technology, in the organization, etc. Classics The fiction of innovations is even more difficult if we take into account the complexity, complexity and dynamism of the process of upbringing and education. Below are some categories that are described in their writings by individual educators and other professionals dealing with the problems of innovations in education. Marklund, for example, mentions three levels of innovation:

1) the external structure of the school and, first of all, the number of classes, the degree of education (age) and division into various disciplines (courses) of instruction;

2) the schedule and plans of the academic disciplines with an indication of the goals and content of the training;

3) methods of teaching the teacher, the way students work, educational materials (means), what material is being studied and the forms of evaluation.

From the point of view of Marklund, the only criterion in his typology of innovations is the level at which they are introduced. In essence, innovations are grouped into one hierarchical series, depending on the level at which the process of innovations in education is realized. Gudlad, like Marklund, gives three levels of innovation, a curriculum, a political level, an institutional and instructive one. Miles describes 11 examples of innovations, depending on three aspects: the goals of education: adaptation and application. Rogers distinguishes between material and non-material innovations, and Barnett - innovations in human thoughts and relationships and material innovations.

Ivan Furlan talks about "global innovations (which relate to the system of education and education in general) and partial (which cover only certain types of schools and individual educational disciplines), systematic or planned innovations (which are introduced into the educational process co. publicly developed system, etc.) and about random or spontaneous innovations (which appear uncontrolled, and their implementation is carried out without any plan). Vladimir Moujic talks about innovations in the macroplane (continuous education, recurrent education and so-called distance education with forms of distance education and education through TV and radio) and the microplane (refer to the organizational forms of teaching within the school itself: group training, desk training or training in special classes, group work, individual form of teaching and individualization within the front and group work). As the most relevant methods of individualization, Moujic

considers work with individual teaching systems and work with programmed materials as the highest forms of individualization in the current phase of teaching development, as well as individually planned training.

Zita Glashki, takes into account the fact that new often differ in the breadth of their application, meaning and consequences in the field of education, which they are primarily concerned with, that they are aimed at changing the goals of education (this is considered most important) and methods and tools of education, adds that it is advisable to distinguish innovations in the major sectors of education, to which they primarily include: 1) innovations in the organization; 2) innovations in technology; 3) program changes.

Milan Bakovlev believes that innovations in educational technology and its "outstanding achievements" (programmed training, training machines, programmed textbooks, the use of TV in training, group (brigade) training and schools without classes). Dragomir Arandzhelovich writes that "innovations can be distinguished by content, significance and consequences in the field of education. Innovations in education can be grouped into three significant categories: 1) innovations in the school system; 2) innovations related to the structure and content of plans and programs for educational and upbringing work; 3) innovations related to the organization, forms and methods of work and most often associated with the means of education.

Innovations can be global or partial, organized or spontaneous. Global innovations are systematic, organized in the aggregate system of education (school system reforms, new curricula and programs, etc.). Partial innovations are manifested in certain types of schools, individual educational subjects, and so on. Organized innovations can be offered by the school or educational institutions. Spontaneous innovations arise in the teachers who seek to develop teaching. "

The UNESCO, OECD/CERI materials "Innovations in educational technology" singled out "two types of innovations: global (in the entire education and upbringing system) and partial (in separate types of schools or study subjects)", and in joint materials - a collection of proceedings The international seminar in Subotica "Innovations in educational technology" says that it is useful to classify in view of the breadth of the field of education, in particular: 1) innovations in the organization (organizational innovations); 2) innovations in technology (technological innovations); 3) innovations in curricula (innovations in teaching programs).

Krste Angelowski believes that it is possible to make a definite classification, but subject to preliminary approval of the criteria on the basis

of which it will be conducted. The most important first criterion depends on the sphere in which innovations are implemented. The second general criterion could be considered the way of the emergence of the innovative process, the third - the breadth and depth of innovative activities, and the fourth - the basis on which appear, there are innovations. According to the first criterion, the following innovations can be singled out: 1) in the content of education, 2) in technology 3) in the organization, 4) in the system and management, 5) in educational ecology. Depending on the method of implementation of innovations, they can be divided into: 1) systematic, planned in advance conceived; 2) spontaneous, spontaneous, accidental. Depending on the breadth and depth of innovative activities: 1) mass, large, global, systematic, radical, fundamental, strategic, significant, deep, etc. ; 2) partial, small, small. Depending on the nature of the origin: 1) external and 2) internal. There are many other criteria, for example, teacher-student relations, but these four, as the most common, according to Krste Angelowski, are most consistent with the methodological principles of the classification of innovations. Most correspond to the methodological principles of the classification of innovations.

I.P. Podlaska highlights the following main directions of innovative transformations in the pedagogical system: the pedagogical system as a whole; educational establishments; pedagogical theory; teacher; trainees; pedagogical technology; content; forms, methods, means; control; goals and results. By the depth of the transformations in these subsystems, one can judge the essence, quality and expediency of innovative innovations. Analysis of the modern innovation process allows you to distinguish the following levels: 1) low, to which innovations belong, presuming changes in the form of unusual names and formulations; 2) medium - change of forms that does not affect entities; 3) high - changing the system or its main components in essence.

At the stage of introduction of pedagogical innovations the teachers of the university use the following forms of work

1. Forms of work not related to the special written formulation of its course and results (A.V. Barabanshchikov, I.F. Krivonos, M.N. Skatkin, etc.):

- attend an open lecture by a teacher using advanced teaching technologies followed by a collective analysis;

- Teacher's report on pedagogical findings, new receptions and ways of working at a meeting of the department, methodical Council, the Council of Psychological and Pedagogical Chairs or the Council of Social and Humanitarian Departments;

- use of recorded lectures, seminars or laboratory practical classes (or their fragments) conducted by teachers initiating the introduction of new specialists in the process of training and education;

- presentation of the teacher about the experience of colleagues on the basis of attending classes, interviews, observations;

- patronage of an experienced teacher-innovator over novice teachers.

2. Forms of work related to the writing of its code and results:

- reflection of pedagogical innovations in the texts of lectures discussed at the departments;

- organization of exhibitions of advanced pedagogical experience of university teachers;

- Preparation of abstracts of speeches and reports at scientific and practical conferences;

- writing scientific and methodological articles reflecting pedagogical innovations introduced both directly by the authors, hack and teacher-colleagues;

- work on teaching aids, dissertations, monographs with the analysis of pedagogical innovations of teachers of higher education.

Innovative activity in the educational process is carried out through long-term purposeful work of teachers to collect, organize, evaluate and implement pedagogical innovations used in the activities of individual teachers of the institution. The result of such a collective work can be a book of pedagogical essays on these teachers. Its value lies in the fact that the essays will present a unique experience of the pedagogical activity of the best teachers of the university; the authors of essays can immerse themselves in the creative pedagogical laboratory of their colleagues, extract and uncover the leading ideas that have made the work of innovators effective, vivid, memorable.

We consider psychological and pedagogical self-education as an important way of supporting the innovation environment in the pedagogical community, one of the indicators of which is the study of relevant literature by university professors. Appeal to the scientific and methodological literature on pedagogy and psychology gives teachers the opportunity not only to be aware of pedagogical searches, but also to find practical ways of introducing innovations into their own activities.

Obviously, in the situation of limited pedagogical information, the role of university libraries, psychology and pedagogical departments, services and laboratories in selecting, recommending, monitoring pedagogical literature increases.

Thus, the success of forming a professional-pedagogical culture of a high school teacher is largely determined by the innovative orientation of his pedagogical activity, i.e. degree of involvement of the teacher in the process of creating, mastering and using pedagogical innovations.

Summarizing the emerging approaches to the essence of innovative processes in pedagogy, it is not difficult to see that they are based on two major problems of pedagogy - the problem of studying, summarizing and disseminating advanced pedagogical experience and the problem of introducing the achievements of psycho-pedagogical science into practice. Some researchers of innovation processes give priority to the study, generalization and dissemination of pedagogical experience, others - the development and implementation of pedagogical innovations. We, however, believe that the subject of innovation, the content and mechanisms of innovation processes lie in the plane of combining these two related problems, which are, until now, unfortunately considered, isolated. Their objective relationship is that the study, generalization and dissemination of the experience of teachers has as its ultimate goal the introduction of a new, advanced in mass practice, in order to make the activity style and thinking of participants in the educational process more progressive. Thus, the result of innovations should be the use of theoretical and practical innovations in a holistic pedagogical process. All this allows us to consider as a most important condition for the formation of a professional and pedagogical culture a specially organized activity of a teacher in the creation, mastering and use of pedagogical innovations. The teacher of the university can act as the author, developer, researcher, user and promoter of new pedagogical technologies, theories, concepts. Yun should be prepared for selection, evaluation and application of the experience of colleagues in their work or new ideas and methods proposed by science, ie, pedagogical monitoring.

1. The innovative orientation of the formation of the professional-pedagogical culture of the university teacher presupposes its inclusion in the activities aimed at creating, mastering and using pedagogical innovations in the practice of teaching and educating students, creating a certain innovation environment in the university. The need for an innovative orientation of the pedagogical activity of the university teacher in the current conditions of the development of culture and education is caused by a number of circumstances. The ongoing social and economic transformations necessitate a radical renewal of the education system, methodology and technology of the organization of the educational process in educational institutions of various

types. The entry of higher education institutions into market relations, the emergence of new types of educational institutions, including non-state ones, create competition not only among universities, but also among teachers. If the student is put in a situation of choosing an alternative training course, the teacher of the university is not at all indifferent to which course, and, consequently, to which of the teachers he will give preference. The innovative orientation of the formation of the professional and pedagogical culture of the university teacher, including the creation, mastering and use of pedagogical innovations, serves as a means of updating the educational policy in the field of training highly qualified personnel. The innovative orientation of the formation of the professional and pedagogical culture of the university teacher, including the creation, mastering and use of pedagogical innovations, serves as a means of updating the educational policy in the field of training highly qualified personnel. The innovative orientation of the formation of the professional and pedagogical culture of the university teacher, including the creation, mastering and use of pedagogical innovations, serves as a means of updating the educational policy in the field of training highly qualified personnel.

2. Strengthening the humanitarization of higher education, the continuous change in the volume and composition of academic disciplines, the introduction of new specialties and specializations require the renewal of organizational forms, technologies of instruction. In this situation, the role and authority of pedagogical knowledge in the teaching environment is also significantly increased.

3. Changing the attitude of teachers to the very fact of mastering and applying pedagogical innovations. With strict regulation of the content of the teaching and upbringing process, the teacher was limited not only in the independent choice of new courses and disciplines, but also in the use of new methods and methods of pedagogical activity. If earlier the innovation activity was reduced mainly to the application of the innovations recommended from above, now it acquires an elective research character. That is why an important direction in the work of heads of departments and faculties is the analysis and evaluation of pedagogical innovations introduced by teachers, creating conditions for their successful development and implementation.

The analysis of structural components of professional and pedagogical culture from the point of view of their innovativeness reveals:

- 1) the presence or absence of novelty;
- 2) repeatability of the known with non-essential changes;
- 3) the specification of what is already known;

- 4) the addition of known significant features, elements;
- 5) the creation of a qualitatively new one.

This algorithm is applicable to the evaluation of the implementation of the results of scientific and pedagogical research, and to the evaluation of advanced pedagogical experience.

The modern higher school has accumulated a rich pedagogical experience, which should be realized in specific teaching and research activities, but often remains unclaimed, since most teachers do not have a need to study and apply it, lack the relevant skills and skills, they do not think about necessity and expediency of the analysis of own pedagogical experience and experience of the colleagues.

Progressive innovations arise on a scientific basis and promote the advancement of practice. In pedagogical science a fundamentally new and important direction arose - the theory of innovations and innovative processes. Reforms in education are a system of innovations aimed at radical transformation and improvement of the functioning, development and self-development of educational institutions and their management system.

## **1.2 Variety of methods and techniques in high schools for abroad and in the CIS countries**

Modern technologies in education are seen as a means by which a new educational paradigm can be implemented. The most general interpretation of the term "technology" is that it represents a scientifically and practically justified system of activity used by a person to transform the environment, the production of material or spiritual values. Any activity, notes VP Bospalko, can be either technology or art. Art is based on intuition, technology on science. From the art everything starts, the technology ends, then everything starts from the beginning. Any planning, and without it, can not do in pedagogical activity, contradicts impromptu, acts by intuition, i.e. is the beginning of technology.

Innovative pedagogical technology in accordance with the recommendations of the European Higher Education Area:

- 1) contributes to the improvement of quality and provides a real approximation of the content of training specialists to the European level;
  - 2) fully meets the ECTS baseline;
- takes into account all the existing requirements of the domestic education system;

3) easily adapts to existing well-developed methods of planning the educational process

Examples of modern pedagogical technologies by G.K. Seleuco:

- Pedagogical technologies on the basis of personal orientation of the pedagogical process
- Pedagogy of cooperation
- Humane-personal technology Sh.A. Amonashvili
- ENIlyin's system: teaching literature as an object forming a person
- Pedagogical technologies on the basis of activation and intensification of students' activities
- Game Technologies
- Problem training
- The technology of communicative learning in a foreign culture (E.I. Passov)
- Technology of intensification of learning on the basis of schematic and symbolic models of educational material (V.F. Shatalov)
- Pedagogical technologies on the basis of management effectiveness and organization of educational process
- S.Nysenko's technology: perspective-advanced training using reference circuits with commented control
- Technologies of level differentiation
- Level differentiation of training based on mandatory results (V.V. Firsov)
- The technology of individualization of instruction (Inge Unt, A.S. Granitskaya, V.D. Shadrikov)
- Programmed Learning Technology
- Collective way of teaching CSR (A.G. Rivin, V.K. Dyachenko)
- Computer (new) learning technologies
- Pedagogical technologies on the basis of didactic improvement and reconstruction of the material
- "Ecology and Dialectics" (L.V. Tarasov)
- "Dialogue of Cultures" (V.S. Bibler, S.Yu. Kurganov)
- Enlargement of didactic units - UDE (P.M. Erdniev)
- Realization of the theory of step-by-step formation of mental actions (M.B. Volovich)
- Private educational technologies
- Technology of early and intensive literacy (N.A. Zaitsev)
- Technology of improving general educational skills in the primary school (V.N. Zaitsev)
- Technology of teaching mathematics on the basis of solving problems (R.G. Khazankin)

- Pedagogical technology based on the system of effective lessons (A.A. Okunev)
- System of phased training in physics (N.N.Paltyshev)
- Alternative technologies
- Walldorf Pedagogy (R. Steiner)
- Free labor technology (S.Frene)
- Technology of probabilistic education (A.M. Lobok)
- Workshop technology
- Urgent Technologies
- In-kind education of literacy (A.Kushnir)
- Technology of self-development (M.Montessori)
- Technologies of developmental training
- General fundamentals of developmental learning technologies
- System of Developmental Training L.V. Zankova
- Technology of developmental learning Elkonin - V.V. Davydov
- Systems of developmental learning with a focus on the development of creative personal qualities (I.P. Volkov, G.S. Altshuller, I.P. Ivanov)
- Personally oriented developmental training (I.S. Yakimanskaya)
- Technology of self-development training (G.K.Selevko)
- Pedagogical technologies of author's schools
- Model "Russian School"
- Technology of the author's School of Self-Determination (A.N. Tubelsky)
- School-park (M.A. Balaban)
- Agroshkola A.A. Catholicos
- The School of Tomorrow's Day (D. Howard)
- Review of modern pedagogical technologies
- Information (computer, multimedia, network, remote) technologies
- Design and activity technologies
- Creative technologies
- Game technologies: imitating; operating; execution of roles; "Business theater"; psychodrama and sociodrama
- Technologies of personality-oriented education
- Ethnopedagogical technologies
- Collective and group ways of teaching
- Trainings
- Coaching

Among the various areas of new pedagogical technologies, personal-oriented learning technologies are gaining popularity. Here, approaches such as cooperative learning have proved effective. The most interesting variants

of this method of teaching are Student Team Learning (STL, instruction in the team), which can be used for any discipline within any competence; method Ligsaw (in literal translation from English - openwork saw, machine hacksaw) and modification of this method "Saw-2" (Ligsaw-2), which provides work in groups of 4-5 people, where, working on the same task, over the same material, team members individually receive a topic that is developed especially carefully and become an expert in it. Meetings of experts from different groups are held. At the end of the cycle, all students undergo an individual control section, which is evaluated. The results are summarized. The team that managed to achieve the highest score is rewarded. Also, such variants of the training method in cooperation as the method of "Learning Together" and the method of research work in groups are also popular.

It is also recommended to use the following methods and techniques:

- conducting interactive lectures, namely the use of the "question-answer" method while working with students during the lecture; holding short presentations prepared by students, which would reveal one of the questions posed in this topic; testing;

- introduction during practical classes of such forms of work as a "round table", "workshop", where students during the discussion solve important problems of the specialty on the basis of their own independent developments; conducting debates, discussions, analysis of pedagogical situations;

- the transformation of the student's independent work, the performance of an individual research assignment, as an obligatory component of the study of a particular academic discipline;

- use of presentations, publications, web-sites prepared by students;

- use in the teaching and educational process of the higher school of role-playing and business games, case studies, brainstorming, which contribute to the development of creativity, creativity, creativity of the teacher;

- about the conduct of workshops, training activities, contributing to the formation of professional competence of future primary school teachers;

- extensive use of multimedia in the process of lecturing and conducting practical exercises, electronic and various types of reference notes of lectures, providing students with educational information on electronic media, Internet search, and the like;

- use of elements of imitation, reflection, relaxation in the course of individual practical exercises;

- the use of new approaches to monitoring and assessing the achievements of students who provide objectivity and reliability.

One of the most effective forms of classes that contribute to the development of students' creative thinking in modern society are imitative games. Important goals of these games are modeling students' behavior in modern society.

The experience of some educational institutions in the CIS countries in using "simulation games" is interesting.

*Simulation games* allow you to build training in such a way that the student feels free, able to show activity and complete independence, learn to correlate their own interests with the interests of nature and the whole society as a whole. The concept of "imitative" games appeared in the pedagogical literature in the 60-80s of the XX century, and meant providing students with the opportunity to "live" real situations close to reality. Simulation games have common requirements that allow them to be organized methodically and conducted methodically. Each game must have a preparatory stage, a plot or a script associated with a certain problem, in each situation the participants of the game get their roles, positions that differ from points of view. And the teacher must necessarily prepare the necessary resources for the game: it is paper, a set of Scotch markers, scissors. The teacher should prepare the instruction. It is important to specify the time for each of the stages of the game. The instruction should be for each group and for the observer. For the game you need to make ballot boxes for voting. Participants must clearly present the outcome of the game. In this case, choose the chairman of the Society for Nature Protection. The necessary stage is reflection. In the game: "I am a teacher" these can be simple questions at the end of the event, in particular: "What did you like about what you did?", "What was useful for you?", "What ideas do you offer when solving problems?", "What does the teacher need to know?". The players get emotional experience, experience of communication, experience in searching and analyzing information, working out a joint solution, finding a compromise based on the knowledge gained. The game allows students to show their views, hear a different opinion, develop their own position. "What ideas do you offer when solving the problems that have arisen?", "What does the teacher need to know?". The players get emotional experience, experience of communication, experience in searching and analyzing information, working out a joint solution, finding a compromise based on the knowledge gained. The game allows students to show their views, hear a different opinion, develop their own position. "What ideas do you offer when solving the

problems that have arisen?", "What does the teacher need to know?". The players get emotional experience, experience of communication, the experience of searching and analyzing information, developing a joint solution, finding a compromise based on the knowledge gained. The game allows students to show their views, hear a different opinion, develop their own position .

Distinctive features of interactive learning technology should be an increase in the emotional involvement of students and the creative nature of classes; "Forced activity", forced activation of thinking and activity of students; the obligatory direct interaction of trainees among themselves, as well as with the teacher; the formation of collective efforts, the intensification of the learning process.

Interactive teaching methods are aimed at stimulating the development of thinking and studying the material by students in unconventional ways and include: discussions, small group work , case studies, method 515, interviews in pairs, structured employment, technique of drawing up structures, business and role games, exercises logical tasks), etc.

#### **Catalog of innovative techniques (interactive teaching methods):**

*Heuristic training* . Learning, which aims are to construct the student's own sense, goals and content of education, as well as the process of its organization, diagnosis and awareness.

Heuristic training for the student - the continuous opening of a new (heuristics - from the Greek *heurisko* - I find, find, open).

Under the heuristic training understand:

- a form of learning, for example, a heuristic conversation;
- method of training, for example, the method of brainstorming;
- Technology of creative development of students.

The prototype of heuristic learning is Socrates' method, which together with the interlocutor came to the birth of knowledge through special questions and arguments.

Extracting the knowledge hidden in a person can be not only a method, but also a methodology for the whole education. In this case, the student is invited to build a trajectory of his education in each of the studied subjects, creating not only knowledge, but also personal goals of classes, programs of his training, ways of mastering the topics studied, the form of presentation and evaluation of educational results. The student's personal experience becomes a component of his education, and the content of education is created in the course of his activity.

In pedagogy P.F. Kapterev, V.I. Andreev, and A.V. Khutorskaya studied the heuristic training, and the oldest example of the application of heuristic methods in Russian pedagogy is the method "Living Word", formed in the second half of the XIX century in the journal A.A. "Khovansky's" Philological Notes. "

In psychology heuristic methods of training were paid attention to by V.N. Pushkin, A.N. Luk, G.Ya. Bush.

Heuristic training is based on certain principles. Among them:

- ✓ personal goal setting of the student;
- ✓ the choice of an individual educational trajectory;
- ✓ meta-subject basis of the content of education;
- ✓ productivity of training;
- ✓ primary education of the student;
- ✓ situational learning;
- ✓ educational reflection.

Control in heuristic training is not the degree of assimilation of finished knowledge, but creative deviation from them. Thus, the personal qualities of the student, his creative achievements in the subjects studied, and the level of mastering and advancing educational standards are subject to verification and evaluation.

*Brainstorming.* Consider the method of "brainstorming", corresponding to the methods of heuristic search, which activates collective creative activity, designed to increase mental activity and solve complex intellectual problems. In interactive methods, interactions are realized, both in the form of cooperation, and in the form of a collision of opposing positions. Cooperation is determined by the acceptance by subjects of interaction of common goals and an agreed program of activities, the rational distribution of functions and roles, taking into account individual characteristics, capabilities and opportunities. Conflict, or clash of opposing positions, cannot be considered uniquely, only as a negative phenomenon - in certain circumstances, a conflict can lead to overcoming the hidden contradiction. Conflicts can be resolved as a compromise, referring to "arbitrators," the separation of the principal and the subjective sides, the switching of attention.

The idea of the "brainstorming" method is based on the fact that criticism and fear inhibit thinking, inhibit creative processes. Therefore, the promotion of hypotheses and their critical evaluation are divided in time. The condition of the problem is formulated by the facilitator before the "storm" clearly, briefly and clearly, while emphasizing the importance of this topic for its participants, so that all participants are interested in solving the

problem. After presenting the problem, the facilitator should present and explain the principles of the brainstorming session and answer all the questions connected with it.

Principles of brainstorming:

We do not comment or criticize the proposed ideas; no idea will be discarded or ridiculed;

every thought is good;

chasing the number: the more ideas, the greater the chance to find a really better solution;

You can rely on the ideas of others;

all ideas, even the most shocking ones, are written down in the form in which the author offers them;

all participate on an equal footing in the proposal of ideas;

the time of ideas is defined.

"Brainstorming" can be divided into three main stages: I stage - collecting ideas;

II stage - evaluation or analysis of ideas;

Stage III - the use of ideas for a selected situation.

At the first stage, the group of "ideas generators" puts forward the maximum number of hypotheses. Any hypotheses are put forward: fantastic, shocking, obviously erroneous, intuitive. Any criticism, including hidden, is forbidden in the form of skeptical smiles, gestures, facial expressions. Ideas are written in the form offered by the author, without specifying his surname. Records should be kept in a prominent place, the rate of writing should not restrain the pace of ideas. Suggested ideas can be recorded on a tape recorder. After getting acquainted with all the ideas, participants can ask questions for clarification and for further explanation. Only the authors of ideas respond. At the second stage, a group of experts evaluates and analyzes proposed ideas. Examination is carried out in a thorough manner, non-serious and unrealistic hypotheses are evaluated.

If the purpose of the lesson was not only the stimulation of creative, creative thinking, but also the solution of the existing problem, it is possible to select the proposed ideas. Hypotheses can be evaluated on a 10-point scale, with an average score of all experts. To activate the process of generating ideas for brainstorming, the following techniques are recommended: inversion (do the opposite), empathy, fantasy.

The method of "brainstorming" can be used in classes for any discipline and specialization, the main thing is that the teacher himself is interested in activating mental activity and developing the creative abilities of students.

The methods of active learning include the so-called "*Hawku*" method. It can be used, for example, for the primary consolidation of didactic categories. Hokku is a Japanese form of versification - a three-poem, in each line of which from one to three words, where rhyme is not necessary. Not everyone can write poetry, but everyone can write hokku, because rhyme is not needed; the main thing is to show understanding of the problem posed, to express the main, to describe one's own state of mind, feelings, to be able to express it in three lines.

The method of "Hokka" allows you to quickly and accurately isolate the main thing, develops creativity and speed of thinking, flexibility of mind.

#### *Discussion.*

Discussion is one of the most complex forms of speech, for the mastering of which requires preliminary preparation with speech cliches that help students express their thoughts. Group discussion can be used both at the stage of challenge and at the stage of reflection. In the first case, its task: the exchange of primary information, the identification of contradictions, and in the second it is the possibility of rethinking the information received, comparing its own view of the problem with other views and positions. The form of group discussion contributes to the development of dialogic communication, the development of independent thinking.

*Problem training.* Problem training is a learning model in which a relatively independent search activity is organized by the teacher. In the course of this activity, pupils learn new knowledge, skills and develop common abilities, as well as research activity, form creative skills. The nature of teaching and learning differs drastically from reporting education: students do mini-research or creative practical work (for example, invent a device), during this "doing" and "research" new knowledge is formed-facts, patterns, concepts, principles, theories, rules, algorithms.

In the problem model, the following structure of the learning process is used: 1) creating a problem situation and posing the problem; 2) the promotion of hypotheses, assumptions about possible ways of solving the problem, justifying them and choosing one or more; 3) experimental verification of accepted hypotheses in natural-mathematical subjects and analysis of materials, sources for the proof of the put forward provisions in the humanities; 4) generalization of results - the inclusion of new knowledge and skills in the system already mastered by the pupils, fixing and applying them in theory and practice.

Thus, the activity of the learner with problem training passes through several stages: the discretion of the problem and its formulation; analysis of

conditions and as a result separation of the known from the unknown; hypothesis and choice of a solution plan; implementation of the solution plan and the search for ways to verify the correctness of the actions and results of the implemented decision. The teacher at each stage performs the functions of the leader, the organizer of the exercise. His activities are as follows: finding (thinking) the way to create a problem situation, enumeration of possible options for solving it student ohm; guide the discretion of the problem to students; clarification of the wording of the problem; helping students analyze conditions; help in choosing a solution plan; counseling in the decision process; help in finding ways of self-control; the analysis of individual errors or a general discussion of the solution of the problem. The degree of participation of the teacher in the search for the student depends on the complexity of the problem and the educational material that the student will have to deal with when solving it; the level of preparedness and development of students; availability of necessary equipment and materials. The degree of activity of the student himself in the independent search for solving the problems arising in the training depends on the same .

Advantages of this model: in the course of problem training students are included in an active intellectual and practical activity, while they experience strong positive emotions (interest, satisfaction). Intellectual skills are: the perception of objects, observation, imagination, analysis, classification, and other evidence, as well as creative skills. The ability to see problems, pose questions, seek solutions. Experiments show that problem learning provides deeper knowledge; students not only reproduce information, but establish connections, interpret, apply, evaluate, but all this is possible only under certain conditions.

Disadvantages: problem training brings unsatisfactory results and negative emotions if students are not prepared for it in terms of their development and level of knowledge. It requires high subject and methodological qualifications of the teacher, his ability to raise and solve problems and teach the students . Problem training requires more time, therefore it is recommended to use it in accordance with didactic tasks and in combination with other types of training (informing, programmed).

*Debate.* Clearly structured and specially organized public exchange of thoughts between the two sides on topical issues. This kind of public discussion is aimed at ensuring that the participants in the debate convince their third party, not each other, that they are right. Verbal and non-verbal means, which are used by the participants in the debate, are aimed at forming

an opinion among the audience on the problem posed. It must be remembered that the debate in the educational process is:

- First, it is a game. The scheme is quite simple: discussion of the bill in Parliament. The game involves two teams defending opposing points of view. In the debate, the one whose position is more reasoned, whose speech is more logical, convincing, correct, wins. You can easily be called a prime minister or an opposition leader.

- Secondly, the debate is an international student movement that uses role plays as an educational technology. The tasks of the movement are the development of the participants' communication skills, the formation of critical thinking and the culture of parliamentarism.

- Third, debates are a form of social activity for young people. For today practically in each school and each HIGH SCHOOL debating clubs function. So, this or that debating club involves students in the discussion of actual problems, teaches us to express our own opinion, communicate it to others and understand the opposite point of view.

*Project method* . The project method is a set of techniques, actions of students in their specific sequence to achieve the goal, which was specific, meaningful for students and designed in the form of some final product.

The main goal of the project method is to provide students with the opportunity to learn independently the acquisition of knowledge in the process of solving practical problems or problems that requires the integration of knowledge from different visual fields.

If we talk about the method of projects as a pedagogical technology, then this technology involves a set of research, search, problem methods, creative behind its essence.

The teacher is assigned the role of developer, coordinator, expert, consultant within the framework of the project . The project method becomes an "integrated" component of an entirely developed and structured education system.

The popularity of the method of projects is provided by the possibility of combining theoretical knowledge and their practical application to solve specific problems. In addition, the method of projects supports the development of new approaches to the organization of pedagogical management, is one of the effective tools for building a personal-oriented pedagogical system.

Developed in the first half of XX century. on the basis of J. Dewey's pragmatic pedagogy, the method of projects becomes especially relevant in the modern information society. It should be noted that the method of projects

is not new in the world pedagogy: he began to be used in teaching practice much earlier. It is mentioned in the world famous article in the American teacher . Kilpatrick's "Method of Projects" (1918), in which he defined this concept as "a design fulfilled from the soul ". In Russia, the method of projects was known as far back as 1905, when, under the guidance of S.T. Shatsky worked a group of Russian teachers on the introduction of this method into educational practice. After the revolution, the method of projects was applied in schools at the personal order of N.K. Krupskaya. But in 1931, the decision of the Central Committee of the CPSU (b), this method was condemned as a stranger to the Soviet school and was not used until the late 1980s and late 1980s. XX century.

Today, the method of projects is one of the main modern active innovative methods of teaching, if the teacher can apply this technology in practice.

Projects can be individual and group, local and telecommunication. In the latter case, a group of students can work on the project on the Internet, while being territorially divided. However, any project can have a website that displays the progress of work on it. The task of the training project, presented in the form of a website, is to provide an answer to the problematic issue of the project and comprehensively highlight the progress of its receipt, i.e. project research.

The work on the project makes it possible to involve in the learning process not only the intellect, experience, the consciousness of a person, but also her feelings, emotions, strong-willed qualities, facilitates the "immersion" in the teaching material, the definition of the person's emotional-value attitude to it, , gives a sense of success.

The design work includes the inclusion of mechanisms for memorizing and reproducing information; transfer of information to others; application of knowledge in variable situations; understanding of cause-effect relationships, the relationship of parts and whole; the articulation of arguments and evidence, the rearrangement of individual parts and the creation of a new whole, and the like.

The project method promotes not only the disclosure of the student's capabilities and abilities, but also the awareness, evaluation of personal resources, the identification of personally significant and socially valuable perspectives. The project activity promotes the development of initiative, independence, organizational abilities, stimulates the process of self-development.

The actualization of internal forces is carried out by the person himself. The student tries to acquire the necessary information, knowledge, actualizes these or other abilities, natural inclinations and discards those that prevent him from achieving the goal.

The general strategy of training is determined by the needs of modern society and the level of development of psycho-pedagogical and contiguous sciences. This strategy is a communicative competence-oriented approach, which predetermines the practical goal of learning.

One of the principles of this approach is the principle of interactivity, to which, among others, belongs and design technology.

The application of the project method creates conditions favorable for positive changes in the knowledge, habits and behaviors of students, their attitude towards obtaining knowledge.

*Decision tree*. The decision tree is a graphic representation of the decision-making process, which reflects alternative solutions, alternative environmental conditions, the corresponding probabilities and winnings for any combination of alternatives and environmental conditions.

The decision tree method is used to select multistage solutions. Each stage consists of two phases: "a set of alternative solutions - a set of outcomes". The outcome is understood as the reaction of the external environment to a specific solution. If the decision-making process is multi-stage, then for each outcome, a set of solutions with a set of outcomes for each of them is again considered. Thus, there is a branched multistage process. Solutions are characterized by costs, and outcomes are probabilities, with the sum of probabilities equal to one. Each final outcome has its own benefit.

The image of the problem, the set of solutions and the set of outcomes can be conveniently represented as a tree when moving from the root - the problem to the tops - to the outcomes. In dictionaries and glossaries, the definitions of the *decision trees* are succinct, for example: 1) the *decision tree* is a graph, a diagram reflecting the structure of the problem of optimizing the multi-step decision-making process; 2) decision tree - a schematic representation of the process of making managerial decisions on a specific problem, represented graphically in the form of a tree structure.

The edges (Figure 2) are of two types - the decisions to be made and the possible outcomes of the decisions. Solutions are indicated by dashed lines, and outcomes by a solid line. Each vertex of a tree (which is often called a node) is the beginning of a branch.

After the tree is built from the root to the vertices, the target is calculated, moving along the tree from the tops to the roots. In this case, the choice of the best sequence of solutions in the form of a path from the root to one of the vertices is made. The criterion of choice is the maximum of the target.

solution (costs)  
 outcomes (probabilities)  
 benefit  
 benefit  
 benefit  
 benefit  
 benefit  
 benefit  
 benefit  
 benefit

Fig. 3. Decision tree with two steps

*Role playing games.* Games and gaming methods are used in their daily practice by almost all teachers, because the game allows students to be interested in the material being studied, to present knowledge in a lighter and "unobtrusive" form. A variety of games are constantly held by educators and organizers. Role-playing game, in addition to the mandatory for any game features, includes two more requirements:

In the role-playing game, the presence of the organizer of the game (the generally accepted term "master ") is necessarily assumed .

In the left game, the main mechanism for "launching" the game is the "role" - a set of rules and restrictions that a person who wants to participate in the game takes over.

Figuratively speaking, a role-playing game can be compared to a theatrical performance based on a play in which only the first act is prescribed, and all the rest is left to the "actors" , as well as what they will play, it will turn out. Game methods are necessary in the framework of teaching subjects that have a "practical component". That is, there are subjects that, in addition to the developed theory, include norms and procedures for practical action. The use of game methods in training provides a unique opportunity to gain experience before colliding with "real" practice (provided, of course, if the training game is built correctly).

As it is not paradoxical, but a serious obstacle to using the game in teaching and educating it is professional pedagogical training and pedagogical experience.

At first. Very many functions in the teacher's work can be called "inspector's": maintain discipline, monitor proper timely performance of tasks, etc. In the game, the inspector functions are practically forbidden: they destroy the game itself. Of course, the game organizer decides teachers' problem, but in contrast to the "classical" teacher, he is deprived of the possibility of a direct impact on the players, it can not directly order the players to punish the violators explain how to act properly. The task of the organizer and the game is to make the players "order, punished and explained" the game.

Secondly. The game organizer can only influence the course of the game, but can not determine it. In this sense, the results of the game, unlike other forms of pedagogical work, are unpredictable (in the sense of a rigidly defined result). The game is a product of collective creativity and the players' contribution to it is comparable to the contribution of the organizer of the game. This is due to the difference in the types of pedagogical goals of the game and the lesson. In the game, it is important not to master certain knowledge, skills and abilities (although this happens), but to build personal relationships and personal understanding of the events that have been played on the game. A personal relationship can not be right or wrong, it either arises or it does not. And the attitude of players to the past game may not be the same as the organizers of the game assumed. In this plan, the actions of the master on the game go against the principles of classical didactics.

On the other hand, on the part of the players, the incorrect or irresponsible work of the organizers of the game generates a very negative phenomenon - "igroholism". That is, this is the state of affairs when a game turns for a person into a single action space. Man uses the game as compensation for his own failure in life. Most often this is due to the construction of games on the template: in several games in a row, the situations are repeated, from which the team of players has already learned to successfully exit. After a series of similar games, the players play the illusion of their own "excellence" - "we all know, we all know how," and as a result, the desire to act only in the already mastered area - in the game.

*Business game.* Business game is a complex methodical method of teaching, in which students first of all consider the decision-making process. This process is reproduced on the model, resulting in episodes (certain results and their consequences), which are often irreversible. The didactic goal is

mainly to improve the methodological components of the competence of the action, in particular when resolving decision-making situations when carrying out activities. The methodological goal of the business game is mainly in training skills and in experimenting with decision-making and, above all, with their consequences, as well as in finding strategies for solving the problem. Business games are recreations of real situations, in which certain fragments of reality are depicted. In this case, a conflict situation is often modeled from social or production reality. Individual actors at the same time perform different roles for the characters whose interests they should represent.

In a business game, action is always characterized by problem analysis, weighting alternatives, developing strategies and making decisions. According to this, in the model in which the solution of the problem is simulated, it is necessary to simplify to some important decision-making processes and thus to important data, structures and actions. Conflicts are best suited for this, which require decisions within one group or between conflicting parties or decisions that go beyond the conflict. To give the group the appropriate dynamics, it is necessary that at least 20 people took part in the business game. Selection of game groups is very important and therefore it needs to be thought over carefully. Groups should be mixed in their academic performance. "Key groups", such as moderators, etc., whose role is not performed by the teacher, must be performed by competent students at the same time. The head of the game gives the participants of the game the freedom of action, it allows you to go "by the circumference" of the educational path and make mistakes. Its main task is to conduct separate phases of the game and provide the necessary materials. It can not influence the decision of the group, but it can add new additional information, materials and suggestions. At the same time, he represents groups that are not engaged in the game, monitors compliance with time and observance of proximity to reality. In addition, he is an intermediary in case of violation of the rules of the game and when appearing seemingly insoluble conflicts. Necessary for the business game knowledge students acquire either during the training lesson before the game, or during the game.

The business game is divided into seven stages: 1. Introduction to the game, 2. Information phase and reading phase, 3. Formation of opinion and strategy planning, 4. Interaction between groups, 5. Preparation of the plenum, 6. Plenum, 7. Evaluation of the game.

The rules of the game can vary in different business games. The following provisions are fundamental for the successful course of the business game: destructive actions (reproducing the "threat of violence", etc.),

dominant behavior, and also the "misunderstood" realization possibility, which as a result can lead to premature interruption of the business game. In general, the rules of the game include information and communication forms, the competence of groups and the management of the game, as well as instructions on the technical course of the game.

Business games model the reality in the society, thus, it is not always possible to find final solutions, but most often agreement is reached. The strengths of the business game are; - a combination of many educational, organizational and working methods; - independent and social action; - a training session with interdisciplinary connections; - high motivational potential; - Simultaneous assistance to gifted and slower students; - promoting awareness of the sense of responsibility; - effective and long-term success in study. As already mentioned in the conditions, there are also some problems / limitations that may arise in the conduct of a business game. These include: - a large organizational complexity (time, space, material costs) - partly excludes work in small training groups, since there is no necessary group dynamics, - there may be insufficient identification with the role, - the difficulty of observing maximum closeness to reality.

*Discussion in a low voice.* This method involves holding a closed discussion in microgroups, after which a general discussion takes place, during which the opinion of the microgroup is reported by the leader and this opinion is discussed by all participants.

*Discussion.* The meaning of the word discussion (Latin *discussio*) - research, analysis, consists in a collective discussion of some issue, a problem or in the comparison of information, ideas, opinions, assumptions.

Purpose and effectiveness. Considering the effectiveness of the discussion, an example is usually the result of the experiment carried out by K. Levin in the United States during the Second World War. The experiment envisaged the realization of an off-site advertising campaign. Since the housewives boycotted their purchase, and wartime resources did not allow them to supply enough meat, it was decided to try various advertising options. K. Levin set the goal to compare the effectiveness of the impact of the traditional form of advertising - a lecture and a new form - developing a collective decision based on group discussion. A week after the experiment, the survey found that in the groups that listened to the lecture, a change in opinion occurred in 3% of housewives. In groups where group discussions have taken place, the opinion has changed in 32% of housewives. Since the experiment of K. Levin in social psychology, many other studies have been carried out. Two important regularities were revealed:

Group discussion allows you to push opposing positions and thereby help participants to see different aspects of the problem, reduce their resistance to new information;

If the solution of the problem is initiated by the group, then it is a logical conclusion from the discussion, supported by all present, its significance increases, as it becomes a group rule.

Now it can be considered to be proven that dialogue is the basis of creative thinking, that the development of dialecticism as a system-forming component of creative thinking is impossible outside of dialogue. Among modern didactic means of discussion belongs one of the notable places. On the basis of the research, new forms of decision-making, new types of group discussions, one of the most widespread forms - brainstorming, were put forward.

Signs of the method. The organization of the learning process based on the discussion is focused on the implementation of active learning aimed at developing reflective thinking, updating and organizing the experience of listeners as a starting point for active communicative dialogue activities aimed at joint development of the problem. The characteristic features of the method are:

- ✓ group work of participants,
- ✓ interaction, active communication of participants in the process of work,
- ✓ verbal communication as the main form of interaction in the process of discussion,
- ✓ orderly and guided exchange of views with the relevant organization of place and time of work, but on the basis of self-organization of participants,
- ✓ focus on achieving learning goals.

The main feature of the training discussion is the search for truth based on the active participation of all listeners. Truth can also consist of the fact that in solving a given problem there is no single right decision. A review of the research on the use of the discussion in various learning environments shows that it is inferior in terms of the volume of information transfer to a direct exposition (lecture), but it is highly effective for consolidating information, creative comprehension of the studied material, and formation of value orientation.

#### Types of discussions

Discussions can be spontaneous, free and organized. This division of the types of discussion is carried out in accordance with the degree of its

organization: the planning of speakers, their order, the topics of reports, the time of the speech. At the same time spontaneous discussion on these parameters is not regulated, and the free one presupposes the determination of the direction and time of the speeches. The organized discussion is conducted according to the rules and in the order established in advance.

In general, the following forms of discussion were disseminated in the world pedagogical experience (M.V. Clarina 1995):

*The round table* is a conversation in which a small group of students (usually about 5 people) participates "on an equal footing", during which an exchange of opinions takes place, both between them and the rest of the audience.

*Panel meeting (panel discussion)*, at which the problem is first discussed by all participants of the group (four or six participants with a pre-appointed chairman), and then they expose their positions to the entire audience.

*The forum* is a discussion similar to the meeting of the expert group, during which this group comes forward in an exchange of views with the audience (class, group).

*The symposium* is a more formal discussion, during which participants present with messages that represent their points of view, and then answer questions from the audience.

*Debate* is a clearly formal discussion, built on the basis of pre-fixed statements by participants - representatives of two opposing, rival teams (groups), and denials. A variant of this discussion is the parliamentary debate ("British debate").

*The trial session* is a discussion simulating a trial.

*The technique of the aquarium* (Clark L.H., Staff I.S., 1991) is a special variant of the discussion organization, in which, after a short group exchange of views, one representative from the team participates in a public discussion. Team members can assist their representative with advice transmitted in scraps or during a time-out.

The main difference characterizing the innovative nature of modern business education from the classical is its :

- practical orientation,
- problematic nature
- use of active teaching methods

According to E.S. Polat, such innovative technologies as training in cooperation, method of projects, multi-level training, portfolio of the student (portfolio) are priority, because in the conditions of the existing class-lesson

system of studies they easily fit into the educational process and may not affect the content of training that is defined by the educational standard for the basic level. At the same time, these technologies are well combined with educational systems that provide for more in-depth, profile-oriented content of education, such as gymnasiums, lyceums and other types of educational institutions.

V.P. Simonenko classifies innovative technologies in vocational education as interactive teaching technologies, technology of project training and computer technologies.

More details of the listed training technologies will be considered below, after studying the design algorithm and the criteria for assessing the effectiveness of technology training.

Before we go directly to the algorithm for designing teaching technology, we turn to the requirements that the developed technology should meet. So, N.O. Yakovleva notes that the result obtained during the design process should be identified as a learning technology, i.e. to have signs of pedagogical technology, such as diagnostic goal-setting, effectiveness, algorithmic, projectability, integrity, manageability, correctability, visualization and flexibility. In addition, the result should have the necessary properties of the pedagogical project, i.e. it should have a documentary expression that provides an unambiguous understanding of any specialist in education, and build on a new idea, be suitable for mass use, to have the principle realizability in the conditions of the modern pedagogical process and bring a positive effect from the introduction, i.e. to solve the actual pedagogical problem.

N.A. Moreva the design by the teacher of his own teaching technology divides the sea into two blocks: the development process and the process of mastering pedagogical technology. She notes that in order for the teaching technology to acquire the author's status, "the instructor should be well versed in the didactic possibilities of new information technologies for teaching and have a certain arsenal of diverse methodological points of view in the form of a generalized experience of the work of innovator educators . "

The development of pedagogical technology includes the following stages:

- 1) theoretical justification of the newly created technology of teaching: the study of the requirements of the socio-cultural environment for education; the analysis of scientific approaches to the organization of the pedagogical situation and the opinion of the public (students, parents,

teachers, specialists in this field); correlation of the developer's own conclusions with the ideas and principles of designing educational processes);

2) development of technological procedures, i.e. direct creation of the project of technology taking into account modern requirements to the content of education. At this stage, the structural components of the learning technology are developed: training objectives, training content, didactic tools, quality control of material assimilation and diagnostics;

3) the development of a methodological tool for the teacher, which is necessary for the implementation of this technology, i.e. a set of specific methods, tools and forms of training;

4) selection and compilation of techniques for measuring the results of the implementation of the technological design. The work of the teacher at this stage is carried out in two directions: the first - the systematization of the requirements for the level of knowledge, skills and skills of students in a particular discipline and the development of criteria for evaluating learning outcomes; the second - the selection of diagnostic techniques (express polls, questionnaires, tests) for assessing learning outcomes.

The process of mastering pedagogical technology includes three stages:

1) the allocation and creation of conditions for the implementation of technology;

2) stage of practical design, on which the developed methodological toolkit is compared with the experience and professional level of a particular teacher, a specific training group;

3) testing technology and recording real learning outcomes.

N.O. Yakovlev in the design of teaching technologies distinguishes the following stages:

1) stage of the pedagogical invention - at this stage the teacher records (receives personally or borrows) a productive idea for solving the existing problem, which in future will form the basis of the draft technology of teaching;

2) stage of creating a single prototype - at this stage a creative model of teaching technology is created. Creation of a creative model of teaching technology includes the following stages: 1) the formulation of the problem, the establishment of a connection between the concept of teaching technology, its specific features, attributes and the image of the pedagogical project that corresponds to the design task; 2) generalization of the teacher's experience in order to identify the most important characteristics of the technology of teaching in terms of the purpose of the study; 3) fixing the criteria for selecting the most optimal set for compiling teaching technology.

As the criteria may be the features of the educational process in the educational institution, the experience of the teacher, his professional preferences, the state of health of the teacher, the individual and age characteristics of the students, the features of the educational material, working conditions, etc. As a result, the designer selects the most preferable opportunities for implementing the content of the technology and gets one of its options;

3) stage of the organization and implementation of a pedagogical experiment to verify the effectiveness of the functioning of the prototype technology of training and the possibility of its further use in mass pedagogical practice - the pedagogical experiment is carried out in the natural conditions of the educational process in order to test the effectiveness of the proposed pedagogical technology;

4) the stage of creation of the final project - at the given stage the created single sample of technology, provided that the results of the pedagogical experiment are confirmed, is processed into a pedagogical project that consists of three main procedures: determining the suitability for mass use, adapting to mass use, and preparing the necessary documentation.

In the practical implementation of the technology of teaching, it is necessary to evaluate its effectiveness, which is determined by the following: "how well each student is guaranteed in any segment of the educational process, taking into account the unconditional achievement of the basic level of general education and vocational training, as well as the safety of teaching, education and development of the trainers".

The objectivity of evaluation (ie, a holistic and comprehensive evaluation of the phenomenon studied in all its diversity and completeness) of the effectiveness of the developed pedagogical technology is largely determined by the development and justification of the criteria and indicators of its effectiveness.

The criterion is defined as the attribute on the basis of which the assessment is made, the judgment; A measure for assessing something.

There are several approaches to isolating and systematizing the effectiveness criteria of pedagogical technology.

The first approach is based on the assertion that the distinctive features of any technology are a clear structure and a sufficiently high level of algorithmization. These features are reflected in the integral criteria of manufacturability, the use of which makes it possible to assess whether a particular pedagogical project is a technology, whether the achievement of the

objectives is guaranteed, and to what extent the requirements ensuring the successful implementation of the entire technological process are met.

The integral criterion of manufacturability includes several of the following particular criteria:

1) criterion for the process to be divided into internal, interrelated stages, phases, operations, procedures. The breakdown of the process into stages with clearly defined goals allows us to determine the boundaries of requirements for the subject and ensure the optimal dynamics of the process. It is expedient to divide the process into stages by designing blocks having a common structure, but filled with different contents;

2) the algorithmic algorithm serves to evaluate the implementation of procedures and operations included in the technology, and to comply with conditions ensuring the reliability of achieving the result;

3) the criterion of management of the learning process allows to evaluate the projected technology of training in terms of the opportunities for monitoring and correcting the training process actually implemented.

It is necessary to develop criteria and indicators for each of the components of the projected technology (the content of training, teaching methods, didactic means, the organization of the learning process), which allows to create a holistic view of the effectiveness of technology.

In accordance with the second approach, the criteria are divided into two groups:

1) criteria that determine the structural affiliation of a pedagogical phenomenon to technology; 2) criteria that characterize the success of technology.

The criteria for the first group include the following criteria:

1) Diagnostic of the description of the goal (criterion for identification of the goal) - the effectiveness of technology is determined by the unambiguous identification of the quality, the formation of which is put forward as a goal (this is important, since in the humanities there is often discrepancy in the interpretation of concepts);

2) rigid determinism of the system means the purpose of technology;

3) systemic pedagogical means - the complex of pedagogical means used in technology must meet the characteristics of the system (its integrity, interconnectedness and mutuality of elements); changing at least one element of the system requires changes to be made to its other components;

4) exhaustive optimality - the requirement "nothing can be withdrawn, nothing can be added" is observed;

5) unambiguous interpretation of the results and their reproducibility - shows that the consistency of the goal and the results should be maximum; that this result is the result of this technology (this can be determined by the reproducibility of the results when using the technology on other teaching material, with other students, at other times).

The group of criteria characterizing the success of technology includes three criteria:

1) the criterion of naturalness - any pedagogical technology influences the development of the trainee and should contribute to this development;

2) mobility and flexibility of training technology - learning technology should be a dynamic system that reacts flexibly to changes in the society;

3) reproducibility of the pedagogical process; the possibility of its recurrence in other conditions.

Speaking from the pedagogical experience of foreign countries, for example we take the formation of the United States.

It is impossible, with the example of one educational institution, to give a complete description of the entire US education system, which is very diverse in content and structure; however, one of the most authoritative higher educational institutions of the United States, the University of Washington in Seattle, can be taken as an example. It should be noted that the university regularly takes a high position in the world ranking and is constantly in the second ten best universities in the world.

In the educational process, a large part of the time is occupied by the independent work of the student, sometimes even ahead of the independent work. The theoretical part is given no more than 20-30% of the time for teaching the discipline, with most of the classroom being paid practical skills. Teachers in the classroom use a variety of active teaching methods, often combining game simulation methods, interactive teaching methods. Widely used computer and multimedia equipment, the Internet. Teachers and students are provided with the most modern teaching aids in all disciplines. On the example of the University of Washington (Seattle, USA), it can be noted that the material and technical base of the university is given great attention in the organization of the educational process. The teaching staff is provided with everything necessary for conducting classroom classes, each classroom is equipped with computer and projection technology.

In addition to state support, the University also receives funding through the endowment system. This system of financial assistance to the university is carried out through contributions generally of large corporations, firms, donations of individuals. For example, such world-famous corporations

as Microsoft, Boeing, Starbucks Coffee Company and others take part in funding the University of Washington. Financing elite universities at the expense of profits from the investment of charitable money in securities of safe assets such as government bonds of developed countries, the shares of the largest companies. The amount of charity and income endowments are exempt from taxes, and the transparent nature of this activity does not allow the system to be used to minimize taxation. The peculiarity of the US higher education system lies in the availability of a system of credit units, the multi-level system of higher education and large branching. Credit system at US universities allows for instructional time in the conditional credit units called Scredit Unit. The use of credits allows you to shorten the duration of studies at the university. All this contributes to the learning mobility vuze. The most important methodology in education is the problem of objectivity in assessing the level of students' knowledge and competencies. In American universities, the final assessment takes into account almost all aspects of the educational process throughout the semester.

Before each lesson, teachers practice small tests for 5-10 minutes. During such a test, students respond in writing to the questions of the topic covered. Such small tests are called quiz, the results of which are also taken into account in the final evaluation.

The student should perform independent work after classes. At each lesson, the independent work performed is checked, a common analysis of typical situations is conducted, during which the student has an opportunity to understand the most difficult questions on this topic. The independent work of students is also estimated in points or percentages at the time of final evaluation at the end of the semester.

In addition, students are regularly tested on the topics covered. During the semester, two large tests are conducted, this is in the middle and the end of the semester, the so-called mid-termexam and finalexam. In this test at the end of the semester has a weight of two times more than the test in the middle of the semester. Thus, the level of knowledge of the student is assessed fairly objectively. Statistics for assessing the level of knowledge of students by the teacher is maintained on the site, and everyone has the opportunity at any time to ask the teacher a question via e-mail.

The most important principle of the American education system is the principle of individualization of education, which is provided by an elective approach, as well as the autonomy of educational institutions in the choice of methodology and organization of the learning process. The elective system of higher education differs flexibility and mobility, the student has the

opportunity to get two or even more specialties in the course of his studies at the university, he also has the opportunity to continue his education in another university or even in another country.

Another important principle of the US education system is the principle of differentiated training, corresponding to the abilities and interests of students. Even in his "Great Didactics", the Czech humanist pedagogue, the founder of scientific pedagogy, Jan Amos Komensky (1592-1670), derived the form of an unshakable pedagogical axiom: education and upbringing will only be in future when their laws begin to be derived from the unchanging nature of man. In his work he wrote: "To cut everyone down with one number, to squeeze a person into a standard pattern, to bring up a narrow series of human types - this seems easier than the differentiation of education".

The most important principles and peculiarities of the modern US education system are: differentiation; individualization; elective system; credit system; multistage, ramification and autonomy of educational institutions; a high degree of commercialization of education.

In universities of developed countries there are various forms of conducting classes and their use in our practice would be of great benefit both for universities in general, and for students and teachers in particular. So, in one of the universities of Scotland, the masters are given lectures throughout the semester, the seminars explain the contents of the lecture by means of detailing, solving problems, analyzing examples, answering questions from students. Control of the level of mastered master's knowledge is carried out through the completion of the course assignments or intermediate examinations on the materials studied and at the end of the semester passing the exams. In the process of training, masters in the first semester study 4 disciplines, each discipline for 20 credits, in the second semester there are also 4 disciplines, of which two for 20 and two for 10 credits. In the third semester masters at their choice write a thesis or three projects for which the appropriate credits are allocated. The experience is peculiar and positive, but for our contingent it is very controversial. In the universities of other developed countries, there are other approaches to training in the magistracy.

In the Higher School of Economics and Business, the working curriculum in the Master's program consists of three sections, namely from basic disciplines, profiling disciplines and practices. The first two sections have four elective modules. The practice section consists of pedagogical practice and 2 research practices, four scientific seminars. Practice has been allocated 6 and scientific seminar 7 credits. By structure, the working

curricula of bachelors and masters differ little from each other. In the content of the plans there are remnants of Soviet thinking, namely languages, psychology, sociology, the history of philosophy and thus for small-sized specialties are given out hours. Elective modules contain two disciplines, one of which the undergraduates choose to study.

Thus, in the basic disciplines there are 8 disciplines (20 credits), in the main disciplines students are required to study 5 disciplines (13) and plus practices with scientific seminars (13 credits). The classes are based on 2 or 1-hour lectures and a one-hour seminar. Other species are not provided. A total of 50 credits with a comprehensive exam and thesis defense. And no credit is allocated for the preparation of the thesis. Here we do not dwell on the names of disciplines and their content. This is another big conversation. The whole problem here is how much such a plan reflects the quality of the specialist's training.

The system of higher education abroad changes priorities. The top three are China. By the number of students (30 million), he began to be considered a student country. Chinese educational institutions actively penetrate into the ratings of the best universities in the world. This is the fruit of the "flagship hundred" program: 100 advanced universities in China have switched to international educational standards.

Under the agreement with 64 countries of the world, the diploma of Chinese universities is quoted on a par with the documents of their own educational institutions.

The classical scheme "4 years of bachelor's degree + 2 years of Master" allows you to produce world-class specialists. A Master can apply for a doctorate after completing postgraduate studies.

Most Chinese universities have bilingual programs - in Chinese and English.

The term of study in higher educational institutions depends on the specialization. The minimum period is 2-3 years for technical and agricultural specialties. An average of 4-5 years in academic universities and technical institutes. The greatest length of training in all countries - 7-8 years - in future doctors.

State support of large educational centers allows to receive free education of a certain part of former schoolchildren. Scholarships can be awarded for outstanding results in school education. This is especially developed in European countries. In Asia, education can be expensive, but the development of long-term credit programs allows future professionals to

subsequently pay off debts. In Europe and the Americas also adopted Progressive Amma student loans higher education

Universities teach students on academic programs, with a choice of commonly used specialties (economics, pedagogy, humanitarian, exact and natural - scientific directions). The universities are preparing scientists - researchers and theorists.

Training institutes and technical colleges are preparing specialists - practitioners for different branches of the economy: agriculture, engineering, light and food industries. In some countries, such higher education institutions are called "higher technical schools". Moreover, colleges have become educational institutions that are defined in different countries as universities (part of universities, as in Great Britain), and, as we would say, "technical schools" (secondary education with a certain specialty).

A special place in other countries is occupied by universities that train future "masters of the arts." Conservatories and art schools, choreographic schools and higher acting and directing courses are always popular. But for the state it becomes a matter of honor to support the national culture, and education for talented young people is more than often done by free or well-paid special funds.

In Europe and the US, the same system of two levels "master-bachelor" operates. But there are features. In France and Germany, after a bachelor degree, you can obtain a degree of a licentiate. If it is available, teaching is permissible.

The study and comprehension of the experience of a foreign higher school are a necessary condition for the further improvement of the training of pedagogical personnel. A comparative analysis of various educational systems, their critical evaluation, allow one to see their common and specific features. The search in the foreign experience for only the negative, unacceptable, allegedly for our society, led to an underestimation of many promising areas in foreign pedagogy and school. Unfortunately, today there is another extreme, when many seemingly attractive approaches, the technologies of education and upbringing are tried in a pure form to be transferred and entered into the Russian system of training specialists. On the other hand, a misunderstanding of the real social and pedagogical situation, the state of the material and technical base, human resources, traditions, experience, psychological environment often prevents the introduction and "registration" of any, even the best, idea, the most effective technique.

The system of higher education in developed countries is quite mobile, mobile, it reacts quickly to changes in the economy, science, culture. Its most

characteristic features are: rather high openness; high level of knowledge and professionalism; interaction of universities with science and industry; orientation to scientific and technological progress.

Higher education has become a necessity, it is increasingly accessible to all segments of the population. Leading industrial countries (USA, Japan, Germany) have for many years increased the admission of young people to universities. If prestigious private universities select applicants on a competitive basis, then almost all local colleges, in particular in the United States, practice forms of open reception, which allows everyone to receive higher education. The introduction of new teaching technologies, the optimal use of modern computing and teaching techniques, the enhancement of the role of independent, individual, student work are aimed at improving the quality of knowledge. The establishment of a synergetic development of higher education and science, that is, of increasingly active cooperative forms of their relationship with industry and production, made fundamental adjustments to the organization of the educational process in universities. According to experts, universities are a decisive factor in Western civilization.

It is obvious that the changes taking place in the aims, tasks, content of the work of the foreign higher school make higher demands on the professional activity of the teacher: the willingness to train not only the most capable, but also all comers; ensuring the individual orientation of training; the combination of scientific and pedagogical activity, the development of democratic relations with students, etc. In this regard, it is advisable to consider the principles of the formation of faculty in foreign universities.

In most foreign countries there is no competitive system and the appointment to a teaching position is carried out on a contract basis. For example, in the United States, appointing a high-level position as a professor or a full professor and assistant professor is approved by the higher body of the university, the board of trustees; on the position of assistant professor, instructor - president of the university. Thus, the office ladder provides an opportunity for a noticeable promotion, creates a positive motivation for improving professional skills.

When assigning a teacher to any teaching position in a university, his pedagogical and scientific qualifications (including the scope and content of scientific publications), the existence of a scientific degree, the recommendations of individual specialists and organizations are taken into account. Advantage at employment of a post use the persons having a scientific degree of the doctor of sciences.

To obtain a doctor's degree, a candidate must submit a thesis containing the results of the original research. The procedure for protection is simplified: there is no need for preliminary scientific publications, abstract. The thesis is submitted for consideration to the doctoral committee of the department or faculty, which decides on conferring the degree of doctor of sciences.

A somewhat different mechanism for defending dissertations has developed in the universities of Germany. After the defense of the first doctoral dissertation, the applicant has the right to defend his second doctoral dissertation in order to become a "full" doctor. Protection takes place in the form of a public speech, the topic of which (one of three proposed by the applicant) is determined by professors of this specialty. After giving a lecture, a discussion is held. Not later than a week the council of professors decides on awarding a scientific degree to the applicant. We note an interesting feature: after defending a doctoral dissertation, the applicant can be elected to the position of a professor only in another institution, or not where there was protection.

The systems of certification of scientific and pedagogical personnel in the United States and Germany indicate different approaches to assessing scientific qualifications, but it is obvious that in comparison with our system they are more democratic and short-term, do not require emotional, psychological and physical stress beyond emotional limits. It is known that in many countries the American system of attestation of scientific personnel is used. The presence in universities of a sufficiently large number of professors of different specialties creates an atmosphere of high intellectual tension, promotes the integration of scientific interests, the deployment of original research papers.

Investigating the problems of the US Higher School, V.A. Parail gives the percentage distribution of faculty in posts, which looks as follows: professors - 27%, assistant professors - 24%, assistant professors - 24%, instructors - 17%, other positions - 8%. The career growth of a university teacher in the United States goes roughly according to this pattern: by the age of 27-30 the teacher usually becomes an instructor, by 34-35 by an assistant professor, to 38 by an assistant professor and, reaching just over 40 years, professor.

The main part of teachers in our universities at the age of 40 - 60 years occupy the position of associate professors and only 4,4% have professors. The situation develops in such a way that after defending the candidate's dissertation and obtaining the academic title of associate professor, most of the teachers are artificially constrained in their scientific growth. Aware of the

coming difficulties in conducting scientific - research work, the preparation of publications and, above all, monographs, university professors go from active purposeful work on his doctoral dissertation. The way out of the situation, probably, should lie on the expansion plane of the hierarchy of the teaching staff, in order to increase the motivation of teachers in the growth of their scientific and pedagogical qualifications.

A doctorate in the United States allows not only to occupy teaching positions in universities, but also opens wide opportunities for the application of their intellectual forces and abilities in business and production. Many prospective young scientists, for material reasons or in search of a better research base and equipment, prefer research work in industry to teaching activities. Unfortunately, a similar situation is observed in our universities: the most talented, promising young scientists leave the higher school in the sphere of business and production, less often in the field of academic science.

Another feature of the teachers of the US higher education, especially universities, is the combination of scientific and pedagogical activity with work as scientific consultants in industrial laboratories, research centers and advisers to government agencies. At first, a number of universities even obliged teachers to such work, but later the scientists' increased interest in profitable contracts between the federal government and private firms led to the fact that part-time work became an obstacle to the performance of their direct duties.

This situation, according to American experts, leads to the fact that universities involved in servicing the economy and production can not perform their functions of teaching students and maintaining scientific knowledge at the required level. In order to provide the teaching process with teaching staff, some universities were forced to limit part-time work one day a week.

So, excessive hobby of teachers with highly paid work outside the university has negatively affected the organization of the educational process and their professional and pedagogical activity. The fact is very instructive for our higher education system. This trend - the outflow of qualified teachers in other areas, an increase in the share of part-time, the involvement of people who do not have sufficient scientific and pedagogical qualifications, are clearly manifested in the life of modern Russian universities. The problems that have arisen in educational institutions at the stage of introduction of market relations can be overcome only through joint efforts of universities, state educational authorities and the government in solving socio-economic, legal, professional and moral problems.

The study of special literature leads us to the conclusion that a flexible, dynamic system of training and attestation of scientific and pedagogical personnel is an important means of encouraging teachers to master the values and technologies of pedagogical culture in foreign universities. Western specialists persistently emphasize the priority of preparing and forming the teaching corps of higher education, as reducing its intellectual and moral potential leads to the degradation of society, and the savings in education, training of scientists and teachers have a negative impact in all spheres of life.

In the course of research on the formation of teacher's pedagogical culture, it is necessary to consider on what theoretical basis (directly or indirectly) the ideas about this phenomenon were formed. Preliminary note that in modern foreign pedagogy there is no single, complete pedagogical theory on the basis of which the problems of pedagogical culture would be studied.

The search for ways to form a professional-pedagogical culture of teachers in modern foreign pedagogy is based on the diversity of schools, concepts, theories. The book of N.D. Nikandrov. The author, comprehending the uniqueness of the Göttingen, West Berlin, cybernetic and psychological schools, singles out the basis and foundation on which the didactic tradition of a foreign higher school is built. The analysis of the indicated directions is carried out only to the extent that they give an answer to the question of the content, structure, and ways of forming a professional-pedagogical culture.

The concept of the Göttingen school, which studies the cultural and historical issues of pedagogical reality on the basis of the interpretation of its living or recorded in written sources of experience, goes back to the ideas of the famous German teacher A. Disterveg, who formulated in the XIX century. principle of culture. Its meaning is that "every state of culture of a given people is the basis, the basis, is something given and real, from which the subsequent state develops. Therefore, the stage of culture that we are in at the present time makes us demand that we act in accordance with it if we want to achieve positive results. In other words, we must act culturally".

The Göttingen school understands didactics as a humanistic science addressed to the individual, to real pedagogical practice and interpreting the learning process as a cultural activity, not reducible only to principles and rules. In particular, the great representative of this scientific direction V. Klafki fills the theory of education with a personal meaning, emphasizing that the right of everyone to education is a condition for the development and self-realization of the individual in the process of cognition of cultural reality.

Thus, the education of individuality is realized through the assimilation of the values of society, familiarization with collective experience.

West-Berlin and cybernetic schools, which gave a scientific description of the education and management of educational activities as a holistic system, paved the way for the introduction of programming and computerization into the teaching process, which required the teachers to master the computer and information culture.

The psychological school considers an important aspect of the pedagogical culture - the problem of the interaction of the teacher and the student, and not at the level of the simplistic behavioral representation of the "stimulus-reaction", but as a consistent and logical transition from the perceptively cognitive elements and actions of the teacher to the perceptually cognitive ideas and elements of the students' actions. This school stimulated the study of the communicative culture of the teacher.

A noticeable revival in the theory and practice of university and school studies abroad has been made by studies in the field of humanistic pedagogy and psychology, which have been particularly developed in recent decades. The main reason for the relevance of such research lies in the dissatisfaction with the growing technocracy of society, in a negative attitude towards school and university education aimed at preparing an "active industrial". The emergence of humanistic pedagogy reflects a tendency toward a more free, democratic system of education.

As well as the psychological school in pedagogy, humanistic pedagogy combines the ideas of various directions, currents, schools (existentialism, pedocentrism, pedagogical futurology, etc.). Common to its representatives is the recognition of the uniqueness, uniqueness of the individual. The goal of humanistic pedagogy is to create conditions for the cultivation of the personality of the pupil and her self-expression (J. Dewey), for self-realization as a manifestation of talent, abilities and talents of personality (A. Maslow), productive personal growth (K. Rogers). Most accurately and figuratively, the goal of humanistic education is set out by A. Maslow, who sees it as helping a person to discover what has already been laid in him, without imposing his own ideas about him.

Recognizing the lack of knowledge about the inner world of man about his nature, the well-known representative of humanistic pedagogy A. Combs believes that the attention of educators and psychologists and some time (until the 40s of the 20th century -I.I.) was focused mainly on methods control and management of human behavior, and they viewed motivation not from the

point of view of people's aspirations, but as a question of how to force people to do what others want from them.

Humanistic orientation of the research of the famous English scientist, teacher and psychologist R. Burns. The main goal of education Berne considers the formation of healthy self-awareness and personal position of the individual, mastering knowledge, experience. He is convinced that the person to whom the society has entrusted the upbringing of the younger generation must have a high pedagogical culture, be a professional, a humanist. Therefore, the most important condition for the successful work of a teacher should be the recognition of the value of each person, the importance of human relationships in the process of education.

To understand the process of formation of pedagogical culture, R. Burns' reflections and conclusions on the teacher's human knowledge are of special importance. The presence of such knowledge allows the teacher to act not intuitively, "by eye", but on the basis of scientific data that determine the optimality of his educational and educational technology. Thanks to this knowledge, the teacher can also analyze his own ideas about himself, create his own self-concept, which includes intellectual, emotional and behavioral components. On the basis of concrete researches, Berne showed, in particular, that teachers and teachers who have positive self-esteem, self-confidence, in their abilities, easily enter into communication with students and students and therefore solve pedagogical tasks more effectively.

I - concept of the teacher determines the style of his teaching. R. Berne notes that a teacher with a negative I-concept is inclined to traditional methods of teaching, his interaction with students is impersonal, he does not take into account their individual characteristics. A teacher with a positive self-concept shows willingness to communicate with students and accepts them as they are.

Subtle psychological observations and conclusions of R. Burns, of course, will give a lot to every teacher. It should be noted that in both foreign and domestic pedagogy and psychology of higher education, the I-concept of a teacher at a higher school has not been practically studied, although the works of R. Burns, domestic teachers, psychologists and philosophers (I.S. Kon, V.V. Stolik, I.I. Chesnokova, N.N. Nechaev, etc.) create a real basis for carrying out special scientific searches.

Analyzing the problems of modern higher education in England, the famous teacher, the head of the department and the director of the Bristol Polytechnic College, W. Birch, notes that now the higher school should form not only theoretical scientists but also people capable of solving practical

problems, a harmonious unity of the theoretical and practical training of the teaching staff. In this regard, Birch addresses the problem of the professional ethics of the scientist-teacher of higher education as a set of ideas about the values of professional activity that determine his scientific research and teaching. As one of the directions in the formation of the pedagogical culture of the teacher, U. Birch considers mastering the methodology of problem-based learning in the university. The problem, in his opinion, is obligatory both in the research and pedagogical activity of the teacher.

Thus, the theory of pedagogy, which develops the problems of the interrelation between culture and pedagogy, the content of education at the school and university levels, the introduction of cybernetic ideas into instruction, the psychological substantiation of the individualization of instruction, etc., served as the basis for an innovative interpretation of the role of the teacher in the pedagogical process, ways of enriching his pedagogical culture.

The variety of theoretical approaches led to a wide range of didactic and methodological searches in applied research that led to the activation of the process of collecting, processing and interpreting empirical (sociological) material; on the basis of the ideas of cybernetics, the dissemination of work on programming, computerization of the educational process; the ideas of humanistic pedagogy had an impact on the organization of the teacher's educational activity, the methodology of individual work, the development of the creative personality of the individual.

Theoretical developments in general and high school pedagogy made significant changes in the system of pedagogical preparation of teaching staff of higher educational institutions, raising their qualifications, contributing to the growth of the authority of pedagogical knowledge. If, until some time, the university diploma granted the right to engage in teaching activities at the university, now in most countries of the West it is necessary to receive special pedagogical training, confirmed by the corresponding document.

Teachers of higher educational institutions, who have received pedagogical training and work with students, have the opportunity to increase their professional and pedagogical culture in full, part-time or semi-short version at their own request. In foreign countries there is no mandatory system of professional development in our understanding, and it is carried out as necessary.

The main factors that stimulate university teachers to improve the pedagogical culture are: first, the realization that lectures should not serve as the main source of information for students, and the search for methods for its

qualified selection and broadcasting in an interesting for the future professionals, original, professionally-adapted form; second, awareness of the need to establish partnerships with students, to develop a culture of communication; thirdly, personal responsibility for the personal professional readiness of students. An important role in improving the pedagogical culture of the teacher is played by the contract system and professional competition existing in universities.

Organizers of improving pedagogical training in developed countries are not only leading universities, but also professional associations, associations, firms, government organizations and institutions. As specialists note, observers and experts, firms and corporations select candidates for teaching and other positions from the student's bench. They take on a portion of the costs of training students, and then include them in their own states, taking into account the specialization received.

In the modern foreign practice of pedagogical education of university professors, along with the traditional, non-traditional forms of adult education are actively introduced. As noted by EF Katunskaya, in Germany and Sweden, workshops were widely distributed in which young teachers are trained along with experienced teachers, which create the conditions for communication and transfer of experience. An interesting form of mastering the pedagogical culture in Germany are courses based on the method of observing and analyzing one's own pedagogical experience, in New Zealand and Switzerland the methods of "content analysis" are popular. In addition to such relatively short courses in the universities of the United States, Great Britain and other countries, additional courses of a pedagogical orientation are being introduced, which give the right to seek a master's degree or a doctorate in the humanities or arts. The program of such courses stipulates the passage of pedagogical practice, the study of the experience of pedagogical activity, the preparation of curricula, the mastery of pedagogical innovation.

The most common form of raising the pedagogical qualification is to work on individual plans, compiled on the basis of the level of the teacher's personal readiness, peculiarities of his individual psychological development, professional interests and abilities.

Effective is the organization of work to enhance the pedagogical culture, as individual counseling specialists in pedagogy and psychology. In the US universities for this purpose, small units are created from two full-time consultants and 15 to 20 specialists from different areas who lead qualified counseling on the problems of teaching methods, relationships with students,

etc. Individual counseling uses modern technical means, studies professional qualities on the basis of personal techniques, etc.

One of the forms of improving the pedagogical qualification is the creation of specialized centers on the basis of large universities (Manchester in England, Massachusetts in the United States, etc.), which provides in-depth psychological and pedagogical training for teachers. As a rule, in such centers the attention of listeners is focused on theoretical problems, while short-term courses give practical training.

In the content plan, the formation of the pedagogical culture of teachers preparing for pedagogical activity in higher educational establishments provides for mastering the educational process by new technologies. At the University of Surrey (Great Britain), pedagogical courses are organized where students learn the method of reading video lectures. In the arsenal of pedagogical facilities of teachers of foreign universities, cable television, the use of video telephones, electronic boards, video discs, etc.

The cybernetic approach to learning served as a powerful impetus to programmed learning, then to the use of EWT, computerization of the educational process in higher education. This required a serious reassessment of the methodology of higher education, equipping it with not only supervisory but also training programs, and most importantly - the special training of teachers for the use of computers and computer equipment. The development of training systems assumes a differentiated approach to the use of computer technology and EWT, based on the nature of the relationship of listeners to this problem. For example, at the University of Moorhead (Nevada), a three-level training system was developed: at the first level, a general understanding of a computer is given and interest in it is stimulated, at the second level, the study of individual sections is planned, depending on the desire of the listeners, and at the third level, work is being done to teach machine languages and master the means of programmed instruction. When organizing courses, schools for teaching computer work, it is necessary to take into account the importance of such a course for the listeners, their knowledge, interests, and the degree of psychological readiness.

The differentiation and integration of scientific knowledge entailed the need to develop interdisciplinary programs and courses in foreign universities that unite several academic disciplines. Such programs, methods, teaching aids should go beyond the existing stereotypes of teaching, provide for new forms of communication with students and colleagues. Interdisciplinary training has received wide development in recent years, but the psychological and pedagogical readiness of teachers of university applicants for its

implementation remains low. Most successfully master and implement his scientists with a healthy professional and personal self-esteem. Thus, the ability to master the methodology of interdisciplinary learning serves as an indicator of the teacher's professional-pedagogical culture.

Based on the foregoing, it can be concluded that the forms and methods of pedagogical training and professional development of higher school teachers combine traditional and non-traditional approaches, which are determined by the corresponding theories, the concepts of general and high school pedagogy.

### **1.3 Updating of Teaching Technologies in Higher Educational Institutions of Kazakhstan**

Kazakhstan was one of the first among the post-Soviet countries to become a party to the Bologna Process and has accumulated some experience in the development of its educational trajectory, the integration of education and science, the application of Western programs, technology and training standards, and the creation of research universities. Since 1998, a bachelor's degree has been established in the republic, since 2002 there has been a master's degree and since 2008 PhD. Teaching staff (PPS) and students gradually mastered the educational programs of Western technologies, switched to the electronic monitoring and evaluation system of students' knowledge, the degree of mobility of students and teaching staff is increasing every year, actively mastering the system of two-diploma education and much more. Of course, all these are tools, indicators and mechanisms for the functioning of the educational process, they deserve every study and that important is the positive dynamics of quantitative indicators of the growth of educational parameters is important, which does not always correspond to the level of development of these parameters.

In the emerging situation, one of the main factors determining the high quality of education is the effective implementation by the universities of both educational and scientific activities on the basis of the principles of the integration of science and education. The most important distinctive features of modern universities are the ability to generate knowledge and provide an effective transfer of technologies, especially innovative ones, to the economy; conducting a wide range of fundamental and applied research; presence of highly effective system of preparation of masters, doctoral candidates and highly qualified personnel, developed system of retraining and advanced

training programs. Such a system of education has already developed in post-industrial countries.

As S.Zh. Praliev, B.Z. Imanberdiev, S.M. Kasymov systemic reasons for Kazakhstan's innovation lag are the lack of innovative traditions:

- There are no scientific systems and world-class laboratories capable of generating new ideas;

- there are no technopolises and technoparks capable of bringing breakthrough ideas to concrete technologies;

- there are no engineering systems capable of ensuring the promotion of national innovative technologies, goods and services to the world market;

- there is no innovative marketing and management capable of organizing on the world level advertising, installation, service and utilization of an innovative product, as required by the rules and customs of the world high-tech business .

The main directions and objects of innovative transformations in pedagogy are:

- development of concepts and strategies for the development of education and educational institutions;

- updating the content of education; change and development of new technologies for teaching and upbringing;

- improving the management of educational institutions and the education system as a whole;

- improving the training of teachers and improving their skills;

- designing new models of the educational process;

- providing psychological, ecological safety of students, development of health saving technologies of education;

- ensuring the success of education and upbringing, monitoring the educational process and the development of students;

- development of new generation textbooks and teaching aids, etc.

Innovation can take place at different levels. The highest level are the innovations which involving the entire educational system.

According to I.P. Podlasoy, an educational institution is innovative if the educational process is based on the principle of environmental protection, the pedagogical system evolves in the humanistic direction, the organization of the educational process does not lead to overloads of students and teachers, the improved results of the educational process are achieved through the use of undisclosed and not previously involved in the capabilities of the system, the productivity of the educational process is not only a direct consequence it means the introduction of costly and media systems.

These criteria allow us to really determine the degree of innovation any educational institution, regardless of its name. Features of an innovative educational institution can be identified in comparison with traditional institutions (Table 1).

This incomplete comparison shows that the fundamental principles of the innovative educational institution are humanization, democratization, individualization and differentiation .

Table 3 - Comparative characteristics of traditional and innovative educational institutions

| Comparable parameters of the pedagogical process | Educational institutions   |  |
|--|--|--|
|  | Traditional  | Innovative   |
| goal   | Transfer of knowledge, skills and associated education, development of social experience | Promotion of self-realization and self-affirmation of personality                |
| Orientation                                      | On the needs of society and production   | On the needs and opportunities of the individual                                 |
| Principles                                       | Ideologically transformed  | Scientific, objective  |
| Educational content                              | Disparate objects with weakly expressed intersubject connections                         | Humanized and personal-oriented cultural values                                  |
| Leading methods and forms                        | Information-reproductive   | Creative, active, individually-differentiated                                    |
| Attitudes of teaching and learning               | Subject-object   | Subject-subjective   |
| The role of the teacher                          | Source and control of knowledge  | Consultant-Assistant   |
| Main results                                     | Level of education and socialization   | The level of personal and professional development, self-actualization and self- |

|  |  |             |
|--|--|-------------|
|  |  | realization |
|--|--|-------------|

A collection of individual innovation in the education system is part of the overall innovative process in the school, which, in turn, is part of an even broader innovation process in the ICU topic of general education area, region, country and so on.

Under the *innovation processes* in the education system are understood managed the creation, perception, assessment, development and application of pedagogical innovations.

Innovation is the process of flowing in time for this learning theoretical principles of innovation procession, you can identify the steps of the "life cycle" of new administration, which differ in the activities related to the creation and implementation of innovations. The innovation process includes the following steps.

*The first stage* (the opening phase). The emergence of a new idea or the emergence of the concept of innovation, which is the result, as a rule, of fundamental and applied scientific research.

*The second stage* (invention). The creation of innovation embodied in any material or spiritual product is a model.

*The third stage* (innovation finds practical application). It is being finalized and the stage ends with a steady effect from innovation. After this, the independent existence of innovation begins, the process of innovation enters the next stage, which comes only if the society, the particular educational institution, is receptive to this innovation.

*The fourth stage* (the beginning of the phase of using innovation). The novelty is spreading, which consists in its wide introduction into new spheres.

*The fifth stage* . The domination of innovation in a particular area, when it ceases to be so, losing its novelty. This stage ends with the demonstration of an effective alternative or replacement of this innovation with more effective.

*The sixth stage* . Reducing the scale of application of innovation, associated with the replacement of its new product.

A specific innovation process does not have to include all the above steps in a strict sequence and their insolubility of continuity. The stages can have different duration.

Innovative processes express not only the internal, objective logic of innovation, but also the logic of its interaction with the environment. From this viewpoint innovations characters form a dynamic parameter ratio expressing how its impact on the environment, and the influence reverse of the medium on the innovation itself. The dynamics of these

characteristics in time and forms the life cycle of innovations . The complete life cycle includes five stages: start, rapid growth, maturity, saturation, finish or crisis.

The results of innovation processes are the realities nye changes that occur under the influence of innova tions in various areas and subsystems school. So, education tion innovation can lead to the change:

- the general orientation of the educational process;
- the quantity and quality of educational trajectories and march Rutaceae;
- nomenclatures of educational services provided by the school;
- the content of education;
- technologies of education;
- the nature of interaction, communication and attitudes of teachers and students;
- organization of individual educational processes and links between them;
- dynamics loads, tempo, rhythm, learning and Sun Power, and so on.

Innovations lead to the following results.

1. Growth of maturity and cohesion of the school community.
2. Growth of professional competence of teachers and educators.
3. Enrichment of the material base of the school.
4. Expansion of financial opportunities of the school.
5. Updating the normative foundations of school life.

According to G.N. Zhukova, P.G. Matrosov, S.L. Kaplan:

1. The need to develop innovative processes in the system of modern education is conditioned by the implementation of the priority tasks of modernizing education and the requirements of modern employers for the training of personnel.

2. Currently innovative activities in secondary specialized educational institutions (colleges) are conducted mainly on certain aspects of the educational process. The vast majority of innovations are devoted to the development of: learning technologies related to the information process of education; new ways of transfer of knowledge and learning technologies-technology of education quality management; problems of organization and development of the educational environment; effective forms of cooperation of colleges with social partners in the training of middle managers.

3. The greatest opportunities for the accelerated development of innovative processes are educational institutions acting as centers of experimental and innovative activity. For provide that, they should have the

necessary conditions for the implementation of the innovation process in all priority areas of educational activities.

4. Innovative processes contribute to reveal and develop the creative potential of teachers who improve their skills by knowledge of the internal laws of the learning process.

5. The most urgent problems of the further development of innovative processes in the secondary schools are:

- creation of a generalized system of pedagogical innovation as a structural component of the educational process of an educational institution, adapted to the social and economic conditions of the development of society and the professional activity of middle-level specialists. At the same time, new trends and prospects for changes in the sphere of labor and production must be taken into account;

- preparation of pedagogical personnel, determination of directions and content of innovations, criteria and indicators of the effectiveness of diagnostic, analysis and correction methods;

- taking into account the peculiarities of secondary vocational education at the present stage in determining the direction, themes and content of innovation activities;

- close interaction with advanced science and practice orientation to changing social needs.

Thus, *innovation* is a dynamic system, characterized as an internal logic (the innovation process), and the logical development in the time of its interaction with the environment (life cycle). The structure of the innovation process varies with the transition of innovation from one stage to another.

It is very rare to meet classes in the form of lectures; Modern teaching methods involve the use of all available communication channels. The person who conducts the occupation is difficult to call a lecturer - his working tool is not only speech and voice. In an effort to achieve the goals of the training, taking care of the participants successfully integrating new knowledge with the existing ones, the coach communicates with the audience, directing the communicative signals through the visual channel of perception (slides, drawings, flipchart recording, video fragments), and auditory, musical background, timer signals), and kinesthetic (simulation situations, activity exercises, task for team consistency). The variety of modalities in the incoming information helps its overall perception of participants and better assimilation.

The purpose of the seminar is to transfer a large amount of specialized information, which further participants work independently. The main

objective of the training, as a rule, is the primary development of special skills, in accordance with the theme of the training. At the same time, the information component of training has a value mainly in the applied aspect: knowledge is important for making more effective actions. It is the action, the improvement of activity, the development of effective techniques, techniques, approaches suitable for use in a real situation, the attention of the trainer and participants is directed.

Innovative teaching methods develop the student's ability to navigate in non-standard conditions, analyze emerging problems independently develop and implement management solutions.

A meaningful aspect of innovative methods: bringing to the students, educational materials, including with the help of electronic manuals, specialized web resources.

Methodical aspect of innovative teaching methods: determining the most effective ways and forms of conducting classes using educational platforms, presentations, as well as working with professional Internet resources and web services.

The organizational aspect of innovative teaching methods: the interaction of the participants in the educational process, both in the classroom and online.

The educational aspect of innovative methods of teaching: the acquisition of skills and knowledge of the trainees in the disciplines of universal values, the expansion of horizons (showing video news, social videos on discipline, attracting well-known practitioners and academics to classes).

Technological aspect of innovative methods of teaching: use of modern technical means and technologies, models and programs for realization of all components of the educational process. It is this aspect that unites others into a single whole and gives a positive effect in gaining knowledge.

At present, the world trend of education, including the system of higher and postgraduate education of the Republic of Kazakhstan, involves the transition of the learning process to a new technological level with the mandatory use of information technology. Of particular relevance are the studies of methodological possibilities, which are opened by the use of information technologies in historical education. The use of information technologies in the educational process allows solving fundamentally new didactic tasks, their application ensures the improvement of the quality and effectiveness of teaching. The use of computer networks, GIS technologies and electronic educational environments requires the development of non-

standard pedagogical practices, both in specific subject disciplines and in the interdisciplinary space of the educational process, including the research work of undergraduates and PhD students.

Summarizing the experience of development of the computer educational technologies, it can be noted that a sufficiently high pedagogical efficiency are provide a dialogue mode in the process of solving various cognitive tasks, are equipped with built-in guides or have access to such resources in the communication environment. Also, it provides data modeling, the issuance of individual tasks, carry out operational and ongoing testing based on a special bank of changing questions and answers. The technologies in training, which has been presented above makes possible to control the interruption and continuation of work, evaluate the student's work, taking into account the number of questions, errors and repeated errors, store for both the teacher and the student the results of educational work.

This provision allows us to formulate an exemplary list of didactic requirements for modern learning technologies. It should provide for each student with the opportunity to study an optimal, individual program that takes into account his cognitive abilities, motives, inclinations and other qualities to the full. Optimize the content of the academic discipline, preserving and enriching the knowledge included in the state program, the ratio of theoretical and practical training of future specialists, to intensify the learning process.

Thus, when developing an innovative modernization program for higher and postgraduate education, three important principles should be considered:

First, the content and ultimate goals of modernization should promote the implementation of state policy in the field of science and technology.

Secondly, the program should use common international approaches to solving the problem of the development of human, social and cultural capital.

Thirdly, any changes in the system of higher and postgraduate education should be linked to the best historical traditions in this field.

We suppose that in the Republic of Kazakhstan it will be most effective, the educational model of higher and postgraduate education in which both separate elements of traditional forms of teaching and modern innovative methods of teaching are concentrated. The combination of innovative teaching methods and a traditional school of learning will allow the system of university and postgraduate education to achieve new results in the education system and integrated by the domestic education system into the world space, and the young specialist m be in demand in the labor market.

At the present stage of development of Kazakhstan, approaches to the theory and practice of education and upbringing of the younger generation are changing significantly under the influence of globalization, integration, computerization, introduction and use of the Internet, media, distance learning, and person-oriented learning. All this leads to the widespread use of innovative information and educational technologies in the system of education in higher and postgraduate education.

The specialist in modern conditions should be ready for work, with competencies not only in his special field, but also having social and personal competencies: the ability to work in a team, adapt to a dynamically changing situation in the labor market, ready for further professional development, structurally related to critic, ready for innovation, thinking and creative. The formation of such competences in students is promoted, in many respects by historical disciplines, which not only expand the outlook of a student of a non-humanitarian profile, but also contribute to the formation of social and personal competences. However, the student will be able to develop such competencies if he applies skills and knowledge in the study of historical disciplines.

Innovative basic methods of teaching and research should include the acquisition of modern knowledge, which are based on the synthesis of the possibilities of various disciplines and interdisciplinary approaches in the study of many aspects of the socio-economic and historical and cultural life of man and the person himself as a social being.

**Information and communication technologies.** To meet the educational needs of modern society and its sustainable social and economic development, it is necessary to use information and communication technologies (ICT). The Information Memorandum of the UNESCO Institute for Information Technologies in Education notes: "For the first time in history, information and scientific knowledge are becoming not just means for improving modern society, but the main products of its economic activities". The use of ICT is one of the most important conditions for the further economic well-being and social development of society. Information literacy and culture became the key to successful professional human activity. The use of ICT in secondary education offers great opportunities for creating qualitatively new forms and methods for preparing students for further education. However, at present these opportunities are limited by the fact that school curricula, methods and criteria for assessing knowledge do not correspond to the level and speed of development of modern society, economy and industry".

The concept of modernization of education for the period up to 2010 also emphasizes the need to develop information competence as one of the main indicators of the quality of education. Competence in the field of information and communication technologies (ICT) is one of the priority objectives of education. The possibility of its formation is directly related to the active activity of the student in the information computer environment. Skills of working with ICT are most effectively formed when solving real problems that are adequate to the interests of students, taking into account their characteristics in their future professional activities. At the same time, ICT should be developed not only in computer science classes, but also in the process of studying some other subjects. Teachers of special disciplines should create a motivation for students to make conscious use of ICT while studying the relevant discipline. This will be possible only when all teachers will own and actively use ICT in their daily activities.

In the methodological arsenal of teachers there should be such forms of organization of educational activities as individual work with the training system, creation and use of presentations in the classroom, modeling, computer testing, project method, information gathering on the Internet, development of Web pages. In the long term, it will continue to work in the areas already outlined, in particular, the improvement of the methods of using ICT in teaching various disciplines and in out-of-class activities.

The main thing is that all this contributes to the achievement of the main goal - to ensure the modern quality of education on the basis of maintaining its fundamental nature and compliance with the current and future needs of the individual, society, state. Information culture is closely connected with the communication culture - the culture of communication, dialogue in the broad sense of the word: dialogue of peoples, man with man, man and computer, internal dialogue, the mind dialogue of the reader and writer, actor and spectator, student and educator. "Dialogue is something that is constantly in danger, but without which it's really impossible to do without" (Sergei Averintsev).

Information culture requires, first of all, from the teacher and the student new knowledge and skills, a special style of thinking that provides them with the necessary social adaptation to change and that guarantees a worthy place in the information society and performs the following functions: - "regulative" because it has a decisive impact for all activities, including information; "Cognitive", because is directly connected with the research activity of the subject and his training; "Communicative", since the information culture is an integral part of the interconnection of people;

"Educational", because the information culture actively participates in the mastering of the whole culture by man, in the mastery of all the wealth accumulated by mankind, in the formation of its behavior.

The use of ICT in the learning process is one of the ways to increase the motivation for learning. ICT contributes to the development of the creative personality not only of the student, but also of the teacher. ICT help realize the main human needs - communication, education, self-realization. The introduction of ICT into the educational process is designed to increase the effectiveness of conducting lessons, to free the teacher from routine work, to increase the attractiveness of the presentation of material, to differentiate the types of assignments, and to diversify the forms of feedback.

The information culture of the teacher includes an ideological and technological component. The ideological component consists of ethical, psychological, social, emotional and aesthetic characteristics and reflects the teacher's value attitude to work with information. Technological - from information skills associated with the development of rational methods of independent search and processing of information using communication technologies.

A special place is occupied by technologies that ensure the activity and independence of trainees. This corresponds to the methodology of cooperation. With such training, students see the importance of helping each other. The work is organized in such a way that the task does not depend on the leader of the group, but on each member of the group. A vivid example of an activating technology based on independent activity of students is project training. Project training contributes to the formation of students' intellectual, creative and communicative skills, namely: - the ability to work with text (highlight the main thing, find the necessary information); analyze information; draw conclusions; compare and create similar; - laconically state their thoughts.

The use of ICT opens didactic opportunities related to the visualization of the material, its "revitalization", the ability to make visual journeys, the ability to present visually those phenomena that can not be demonstrated in other ways, allow combining control and training procedures.

"The Golden Rule of Didactics - Visualization" (Jan Kamensky). Multimedia systems allow you to make the supply of didactic material as convenient and intuitive as possible, which stimulates interest in learning and allows you to eliminate gaps in knowledge. An integral part of the work on the development and introduction of computer-based learning tools into the educational process is the method of preparing and delivering lectures using

ICT. The main part of the lecture is a presentation of the material on the issues accompanied by video demonstration materials: video slides - fragments of the main theoretical provisions of the presented topic, tables, diagrams, graphs, mathematical formulas and models prepared by the lecturer.

The main directions of the teacher-tutor, who uses ICT in the educational process of the correctional school.

1. Review and analysis of educational material presented on electronic media. Selection and structuring of this material into content blocks taking into account individual abilities of students.

2. Thinking about ways to motivate students to learn the material.

3. Assisting learners in mastering the skills of working on a computer, tracking specific difficulties related to the attitude to the computer form of communication, the features of information delivery.

4. Development of control tasks, evaluation criteria, methods of error analysis. Development of tests in the program "Notepad".

5. Organization of consultations during the study of the training course aimed at facilitating the solution of personal, educational, communicative problems of students.

6. Tracking and recording the dynamics of achievements as a group as a whole, and for each student in separation.

The place of information technologies in teaching: during the lesson, during the preparation for the lesson, in the design research activity.

Model of using ICT in class :

"Demonstration of a computer presentation";

"Testing with the choice of answers";

"Training of technical skills using a computer simulator";

"The use of electronic textbooks."

This helps to save time and efficiency of the learning process.

Model using ICT outside the classroom:

"Searching for information on the Internet and other sources";

"Fixing a record about the world around us";

"Preparation of the speech and the presentation itself using presentations."

It is easier for a student to be interested and trained when he perceives a coherent stream of sound and visual images, and not only informational, but also emotional impact is on him. Multimedia creates a multi-sensory learning environment. Attraction of all sensory organs leads to an exceptional increase in the degree of assimilation of the material in comparison with traditional methods. Training with using audiovisual means of complex presentation of

information is the most intensive form of education. Individual interactive communication with video, text and music-speech inserts is so intense that it makes learning as easy as possible. Solving the problem of combining information flows of different model (sound, text, graphics, video) makes the computer a universal learning and information tool for virtually any branch of knowledge and human activity. And this is not accidental, because according to UNESCO, with audio perception only 12% of information is acquired, with visual information about 25%, and for audiovisual information up to 65% of perceived information.

When implementing the pedagogical model, it is necessary to take into account the level of formation of the information culture of the teacher: reproductive, adaptive and creative.

1. The reproductive level is characterized by non-systematized knowledge of the information culture of the teacher and its role in innovation, irrational organization of work in the information and educational environment, the inadequacy in the use of information technology in pedagogical and research activities, the low evaluation of the usefulness of the work with information, the inability to correlate one's own activity and level of information culture with social and professional experience.

2. The adaptive level is characterized by a situational attitude towards the solution of professional tasks, satisfaction with the achieved results without determining the prospects for further development, incomplete possession of modern basic knowledge.

3. The creative level presupposes the teacher's belief in the need to constantly improve the level of information culture, systematized knowledge in the field of information culture, the ability to solve innovative problems, projects on the basis of improving the individual information culture and creating their own author information and educational products.

The main tool for monitoring and evaluating the educational outcomes of students in ICT are tests and test tasks that allow performing various kinds of control: input, intermediate, boundary and final. The purpose of the input control is to assess the initial preparedness of the student for the subject, that is, the degree of knowledge of the student's knowledge required for successful mastering of the course.

Intermediate control is a test consisting of 5-10 compact tasks that are implemented immediately after the material being studied and designed for rapid assessment of its assimilation.

Routine - is held on the basis of the study of the topic, section of the course.

Final control is provided at the end of the course and covers its content in general. Its results are the basis for the student's attestation. Tests can be conducted in on-lain mode (conducted on the computer in interactive mode, the result is evaluated automatically by the system) and in off-lain mode (an electronic or printed version of the test is used, the teacher evaluates the results with comments, work on the errors).

Depending on the pedagogical task, various control options can be implemented: soft self-testing, hard self-testing, control testing. With a soft self-test, the learner has the opportunity to repeatedly try to answer the question (until he chooses the correct answer). With a hard self-test, only one attempt is provided for the answer, but the result is not reported to the instructor. These options, as a rule, provide for the possibility of accessing the material of the textbook and are implemented as an integral part of it. The latter option assumes that the result of testing is taken into account when assessing the level of knowledge.

An important condition for realizing the potential of ICT in a university is: equipment in a university computer class, preferably the presence of a local network and access to the Internet; readiness of the teacher to use ICT in the educational process.

**Credit technology training.** The credit system of training, distributed in the US and most European universities, is the most flexible and effective. It provides academic mobility and the relevance of graduates in the rapidly changing labor market conditions. This is largely due to the flexible planning of academic programs oriented to the needs of the labor market, the elective nature of 50% of the subjects of the curriculum, the improvement of the quality of teaching, as competition arises, the intensification of the educational process, the elimination of information systems, the increased role of the student's independent work .

A modern specialist needs professional competence and ability to make decisions in unusual situations, ability to work in a team, independently to extract, analyze and effectively use information, to work rationally in a rapidly changing world. These qualities will be acquired by students, learning in conditions of using active forms, working in pairs, groups, solving specific life situations, independently, in an interactive mode with a computer, etc. At the same time, priority is given to independent work.

The credit technology of training is aimed at increasing the level of self-education and creative learning of knowledge on the basis of individualizing the preparation of students.

Modern education is based on the individualization and differentiation of education, the alternatives of educational systems and educational institutions, the flexibility and dynamism of the curriculum documentation, adaptability to the changing conditions of the socio-economic environment.

In a rapidly changing world, the content of education is updated as soon as possible, which affects the validity of educational standards.

For example, Western colleagues define our educational standard as a "regulating" educational process, rather than projecting a "threshold result".

The education system in Kazakhstan should become dynamically developing and able to respond adequately to the accelerating global processes of globalization and informatization.

In this regard, the education system should aim at forming a new type of specialist who would be able to independently extract, process, analyze the necessary information and effectively use it at the right time. This can be achieved with the transition to multilevel training of specialists of higher qualification (bachelor - master - doctor).

World educational practice has developed an effective training system, which was called credit training technology.

Credit training technology is a complex system that requires a number of agreed factors for the successful functioning, including certain conditions including training material support (use of a basic textbook meeting the requirements of the European Standard for the organization of CDS - language labs, computer classes, video halls ). With the credit system of education it is very important that the university provide the educational process in full with all the necessary information sources: educational and methodological aids, electronic textbooks, access to network educational resources, active handouts, etc.

In accordance with the State Program for the Development of Education in the Republic of Kazakhstan for 2005-2010 approved by the Decree of the President of the Republic of Kazakhstan on October 11, 2004 No. 1459, conditions for Kazakhstan's accession to the Bologna process will be created in the system of higher and postgraduate education and instead of the traditional system of organization educational process introduced credit system of education, which promotes active and independent work. Student comrade, provides eligibility of an individual educational trajectory, mobility spine, a greater degree of academic freedom of bachelors, masters and doctoral students, contributes to the recognition of documents on education in the world educational space .

One lesson, and this academic hour, equal to 50 minutes, takes place in interactive forms and is followed during a week by the independent work of the student (SRS) and work under the guidance of the teacher (SRSP), during which the given topic is submitted. By the end of the week, each teacher sums up the results of the classes, and the students get acquainted with their weekly ratings. Thus, we can see the dynamics of our successes: we prepared a little time, the other got fewer points, which means that the average weighted score of the achievement level (GPI) will be less than that of the others.

Age psychology found that the student age is different from the school. For the student's age are characterized by: the minimum value of the latent period of reaction to all kinds of signals, including verbal (verbal); the highest activity of the operative memory and the speed of switching attention; the highest speed of solving verbal-logical problems; Optimum sensitivity of analyzers of the external environment. It is in the student's age that professionalization of interests occurs, the previously undoubted truths are critically rethought, the concept of creativity becomes full .

Transition to the credit system of education requires a qualitative restructuring of the teacher's work with students, changes in methods and methods of teaching.

In the context of a credit system, when teaching students, the main tasks are:

- unification of the volume of knowledge;
- creating conditions for maximum individualization of training;
- Strengthening the role and effectiveness of independent work of students.

Characteristic features of credit technology:

1) introduction of a credit system to assess the workload of trainees and teachers in each discipline;

2) the freedom to choose the disciplines from among the disciplines of choice, included in the working curriculum in the formation of an individual curriculum;

3) direct participation in the formation of their individual curriculum;

4) involvement in the educational process of the advisers, assisting the students in choosing an educational trajectory;

5) use of a rating-rating system for assessing academic achievements for each academic discipline;

6) providing the educational process with all the necessary materials and teaching materials ;

7) freedom of choice by the students of the teacher provided that there is a sufficient number of professors and teachers in the university or in the given locality.

Advantages of a credit training system:

- expansion of academic freedom of faculties, departments and teachers;

- Achievement of the intensification of the educational process through the introduction of modern information technologies, raising the qualifications of the teaching and teaching staff and the quality of teaching.

Differences of the credit system of training from the traditional:

- personal participation of each student in the formation of his individual curriculum; the definition of the educational trajectory for the entire period of study;

- freedom to choose the student part of the disciplines listed in the curriculum;

- the introduction of the position of an adviser and a tutor (consultant) for the selection of disciplines;

- the use of a point system for assessing current and external progress.

To positive moments on introduction of credit technology of education in higher educational institutions of Kazakhstan are:

- Unification of knowledge in general and basic disciplines;

- granting the student the opportunity to independently form his educational trajectory;

- elimination of subjectivity in assessing students' knowledge;

- Creation of a competitive environment for teachers, allowing them to strengthen their work in the direction of the constant growth of the scientific and pedagogical level;

- the need for constant improvement of the quality of educational services on the basis of the development and strengthening of the material and technical base of the university, the introduction of innovative teaching technologies ;

- allocation of more time for individual studies, that allows to develop in the students a creative approach to the study of disciplines and skills of research work.

The primary goal of the university is to teach the student to learn and be able to navigate in the variety of scientific material. The orientation of innovative technologies to develop students' skills of independent work will increase their level of creative activity and stimulation in mastering knowledge. The effectiveness of this work will be ensured by regular

communication between the student and the teacher as part of the independent work of students under the guidance of the teacher.

The lack of flexibility in the educational trajectory, the educational workload of students, the briefness of the periods of training, the separation from production - all this negatively affects the quality of higher education in general and the level of training of specialists in particular. The development of distance forms will help make the education in the university as convenient and attractive as possible. According to experts, distance education will enter the XXI century. as one of the most effective (and prospective) systems of training specialists. This entails an increase in the professional motivation of teachers and an increase in the effectiveness of their scientific and pedagogical activities .

If earlier the education system performed primarily the role of a translator of social experience, now it becomes a catalyst for social mobility of a person. Opportunities for understanding intellectual and cultural values that allow individuals to move quickly along the social ladder open up. The change in educational policy presupposes a certain reassessment of already established stereotypes and approaches to scientific and pedagogical activity.

Once a solid and high-quality education system has ceased to meet the usual demands of society. Graduates of the university should be taught skills that combine analytical skills with practical skills in working with the introduction of modern technologies. This will inevitably entail a change in the system of assessing the quality of education, which, unlike the current one, will help determine the level of the creative solvency of the specialist.

Thus, the introduction of credit technology training allows not only entering the global educational space, but also significantly intensifying the process of teaching students in higher education.

The credit technology of training presupposes competition - students themselves choose a teacher to be engaged in. Some have painfully apprehended the fact that they were not chosen. But first-year students do not yet know who is who. There may be such costs: high-class, but a tough teacher also runs the risk of being left without students. But in three or four years everything will fall into place - they will go to the one who demands, but also prepares better.

In the context of the formation of a competitive system of generation, dissemination and use of knowledge in Kazakhstan, the introduction of a credit training system will help to solve the necessary task - to turn higher education into a process not only educational and educational but also scientific and cognitive. Its component is the training of students (the

"thinking labor force" in the future) not only with scientific knowledge as such, but also with the methodology for obtaining and applying them, to instill in them the ability for continuous self-education and professional growth in the conditions of a systemic transformation of society. Only by following this will it be possible to speak of the self-sufficiency of education as a social institution and its quality.

The scientific basis of teaching is the very foundation without which it is impossible to imagine modern education. It is this kind of education that increases the personal, and in the future - professional self-esteem of the graduate, hands over to him a significant part of the cultural and social standards of society. Therefore, in the conditions of rapid development and expansion of the availability of open information networks, the transfer of "ready" knowledge is no longer the main task of the educational process.

The results of high-quality higher education are a combination of education and behavioral culture, the formation of the ability to independently and competently think, and then independently work, learn and retrain. It is from this that modern ideas about the fundamentality of education are based.

At the same time, the educational and cognitive activity of students, in the broadest sense, is regarded as one of the types of cognition that takes place on the basis of the reflective-transforming activity of the subject. And it is in this process that a systematic and consistent formation of those personal qualities that bring students to the position of the formed active personality is accomplished.

By nature of activity, students are a social and professional reserve. Therefore, an important characteristic of student youth is its transition period. The stay of people in the student body is temporary, lasts 5-7 years. The peculiarity of the specific features of the age psychology of student youth is expressed, in particular, in romanticism, the desire to express oneself, categorical and intolerant of the opinion of others, in the need for complete independence and at the same time in the inadequacy of life experience. In the period of training associated with the choice of profession, the formation of the personality and the formation of ideological positions, the maturation, the expansion and deepening of the leading interests, the definition of an informed choice of the life path is taking place. The student's behavior is characterized by an intensive search for more rational ways and forms of special training, students are reassessed by many values of life and culture. So, the leading activity for this group, therefore, is the value-orientation cognitive activity. The problems of forming the value orientation of student

youth depend on education and upbringing, it is in the process of training in the university that the future specialist as a person becomes established. It is in the process of training in the university that the future specialist as a person becomes established. It is in the process of training in the university that the future specialist as a person becomes established.

Thus, the higher school should not only train specialists who meet the requirements of society, but also cultivate, introduce new cultural values, and activate cognitive and cognitive activities of students. To achieve this, in our opinion, it is possible if, along with the educational progress, due attention is paid to the activation of the personal element in the learning process, the spiritual and moral formation of the student.

Understanding the problem of cognition in the traditional form of learning

The cognitive difficulty is an annoying fact, an "obstacle" in the learning process, which must either be bypassed, or overcome with minimal effort and time.

Achieved goal of the training is the mastering by the students of a certain amount of "right" knowledge, which leads to a unique memorization of the educational material.

"Right" knowledge "is introduced" into the student's consciousness by the teacher and various sources of educational information. The primary type of activity is reproductive.

Understanding the problem of cognition in a credit training system

Cognitive difficulties are an indispensable condition and attribute of learning cognition, which will inevitably arise, and there is nothing terrible in this. Competently organized by the teacher educational and cognitive activity of the student corresponds to the idea of personal development.

The goal of the training is the assimilation of knowledge in combination with methods of mastering broad fundamental knowledge and the breadth of application of innovative programs in accordance with the demands of the labor market.

To the true knowledge the student comes through the development of innovative education, integrated with intensive research activities. The primary type of activity is a critical reflexive one, which presupposes the possibility of the student committing a mistake, understanding it and further productive action.

**Modular training technology.** Modular learning, which was formulated in the late of 1960 years of the XX century in the United States,

has been emerged as an alternative to traditional learning, integrating many progressive ideas accumulated in pedagogical theory and practice.

To date, modular training is one of the most holistic and systematic approaches to the learning process, ensuring a highly effective implementation of the didactic process.

Modular training is the organization of the educational process, in which educational information is divided into modules (complete and independent units, parts of information). The module is a block of information that includes a logically completed unit of educational material, a targeted program of actions and a methodological guide that ensures the achievement of the set goals, the content and scope of which can vary depending on the didactic goals, the profile and level differentiation of trainees, the desires of trainees in choosing an individual trajectory movement on the training course. The concept of the module contains "such a volume of educational material, through which the primary acquisition of some theoretical and practical skills for the performance of any particular work."

Modular training is the most coherent, comprehensible and effective learning technology, which guarantees the quality of training of competent specialists. Specialists trained in programs created using modular technology know not only the knowledge, but also the skills of the chosen profession and specialty: decision making, performance of services and production work.

The combination of modules should provide the necessary degree of flexibility and freedom in the selection and completion of the required specific training material for the training (and self-study) of a certain category of students and the implementation of special didactic and professional goals.

In accordance with the State Program for the Development of Education of the Republic of Kazakhstan for 2011-2020, tasks are set to improve the relationship with the labor market; increasing the competence of graduates; updating content, methodologies and relevant learning environments. Modular programs, based on competences, contribute to the solution of these problems.

*Competence approach:* Competence - the total level of knowledge, skills and training (competencies) received by the student in the process of training and for successful activity in a certain field. Modular competence approach: A modular educational program is a set of modules aimed at mastering certain competences necessary for assignment of qualification.

Credit-modular system: A credit-modular system is a model of the educational process organization, based on the unity of modular technologies of training and credits ESTS, as units of the student's learning load, necessary

for assimilation of content modules. The credit-module system of the organization of the educational process provides for: a modular structure of the educational program; the use of credit units (credits) for the assessment of labor intensity; use of rating-rating systems of knowledge assessment; Participation of the student in the formation of an individual curriculum; increase in the share of self-learning in the educational process; increase the flexibility of educational programs.

The main task in the credit-module education system is the selection of new forms and methods of teaching that allow not only to provide the necessary knowledge, but to include the student in the system of continuous vocational education and self-education.

Each module of the educational program is focused on achieving a certain result of training, that is, competence.

All disciplines included in the module are built on the principle of meaningful unity.

There are different schemes for building modules:

- horizontal scheme;
- vertical scheme;
- combined circuit.

In a "horizontal" module, all disciplines make an approximately equal and relatively independent contribution to the educational outcome. Disciplines are studied in parallel.

The "vertical" module includes consistently studied disciplines aimed at achieving a certain educational result, from fundamental and general professional to specialized narrow-application. Development and implementation of modular educational programs assumes constant feedback from employers' demands on the skills and knowledge of employees, which ensures the quality of training of future specialists. A modular educational program based on competencies is in line with the concept of lifelong learning, as it aims to create highly qualified professionals who are able to adapt to the changing situation in the world of work, on the one hand, and continue professional growth and education on the other. This approach to learning makes it possible to create a sense of success for each trainee, which is created by the organization of the learning process, within which the learner can and must manage his own learning, this teaches him to take responsibility for his own training, and in the future - for his own professional growth and career. Thus, the consumer will be satisfied with the education, he can improve it during his life, responding to changes in the labor market.

The educational process, organized by the technology of modular training, ensures the realization of personality-oriented learning. At the same time, each student, taking into account his abilities, inclinations, value orientation, is able to realize himself in educational activity through the use of alternative "trajectories" of training. With modular technology, the content of education and its means allow the student to show selectivity to the subject material, its form and form. Modular technology allows the development and effective implementation of individual training programs. With the modular organization of the educational process, it is expedient to combine individual and group work of students, rationally and economically using study time, each student can move forward in his temporary key. The value of modular training technology as a means of realizing a person-centered education is based on the fact that the education achieved at the same time as a set of knowledge, skills and abilities is the most important condition for the formation of the social and intellectual qualities of a specialist's personality.

The success of the introduction of modular training technology in the pedagogical reality of the university requires the development of appropriate psychological support for this innovation. The lack of elaboration of the theoretical aspect of the socio-psychological problem of the introduction of educational technology leads to rejection of changes by teachers and unpreparedness for students. The creation of a theoretical model for the introduction of modular teaching technology into the practice of education will contribute to the formation of the acmeological professional position of the teacher, which determines the highest productivity of pedagogical activity.

One of the main advantages of the technology of modular training is the activation of educational process. At the heart of the process of activation of educational activities are value orientations, largely formed by the technology of training, in this case, modular technology through rating control of knowledge and skills. Under the value orientations, according to the definition given by N.V. Ivanova, is understood the system of aspirations of the individual, as well as its representation of the meaning of activity, which is the internal source of student self-activity. Value orientations express a concrete understanding of the objectives of the activity. On their basis, prestigious preferences and the corresponding ways of behavior are formed.

**Distance educational technologies.** Continuing the theme of modern information technology, we would like to focus on distance learning. The traditional system of higher education satisfied the social order of an industrial society, and continues to cope with this task at the present time. However, the modernization of the higher education system in the

conditions of the emerging information society must develop in various directions, including the creation and development of specific educational services designed to meet the needs of the population in the formation of starting capital, vertical mobility, and obtaining the required knowledge and skills. Such educational services include distance education (DOs), including distance learning technologies (DOT) .

It is generally recognized that the level of quality of educational services is still significantly different in different universities and regions of Kazakhstan, which affects the social and economic effectiveness of the system of higher education as a whole. The wide use of the latest educational distance technologies will help to equalize the quality of education in higher educational institutions of the Republic of Kazakhstan. Creation of effective distance learning systems creates conditions for social access to quality education for a large part of the population, contributes to the solution of the problem of education for people who, for various reasons, can not use full-time education. The peculiarity of receiving distance education is the possibility of constructing an individual curriculum, the multivariate choice of the trajectory of education and the reduction of tariffs for educational services .

The concepts of "distance learning" and "distance education" were formed over a long period of time and gradually acquired ever more versatile meanings in order to fully correspond to the present.

Distance Learning (DL) - a set of technologies that provide students with the basic delivery volume of the material being studied, interactive communication of students and teachers in the learning process, providing students with the possibility of independent work on the development of the material, as well as in the process of learning I have. Distance learning and the development of modern technology and technology are inseparable: one contributes to the development of the other. Currently, the student, wherever he lives, can study under the program of almost any Western university, without leaving his country. Education is becoming global, outstripping the processes of political and economic unification taking place in the world.

Now practically in all domestic high schools different programs of distance education are being developed. Such programs provide remote access to educational teaching materials, after studying which, the student can check his new knowledge. Based on the answers to the questions, the student is asked to move to the next level or is informed that his preparation leaves much to be desired. In the exact sciences, the questions of assessing knowledge are solved relatively simply - testing is justifiable here, but in the

humanities, of course, you need the text of the answer. The existing experience of introduction of DET in the system of higher education suggests that it is better to conduct control internally, as it is conducted in the form of correspondence education.

One of the most acceptable, in our opinion, options for DO, is that the student receives methodical support of the courses, which he studies, and then passes the exam. Another method - the information was laid out on the server, people studied it and, say, two weeks later had to write a certain control. So, in blocks, they passed the whole program, and in the end the organizers assigned the time in which they pass the exam. In the 21st century, the availability of computers and the Internet makes the spread of distance learning even easier and faster. There was an opportunity to communicate and receive feedback from any student, regardless of location. The spread of "fast Internet" has made it possible to use the "online" seminars (webinars) trained for Nia .

In its historical development, distance education has realized three stages of information exchange with trainees: using regular mail (exchange of parcels), case studies, networking technologies (telecommunications, e-mail, Internet, etc.). The purpose of the development of the DOT in the future is to provide access to information resources located anywhere in the world from anywhere in the world where the process of training in distance education technologies is organized. It can be assumed that the distance form of education in the near future will become the same familiar form of education as full-time or correspondence form. At the same time, the quality of distance learning is growing at a rapid pace and will soon be equalized and may even exceed the quality of the full-time form of education.

In the research of scientists, the question is whether it is possible to consider distance learning (in some sources, distance education) as an alternative to the existing system of full-time and correspondence education and how to implement in modern conditions the transition from established educational traditions to new forms and methods, laid down in distance learning. Distance education (from Latin *distanceia*) is an international term, interpreted as "distance education," which means a purposeful and methodically organized management of the educational and cognitive activities of persons who are distant from the educational institution and therefore do not come into constant contact with its teaching staff . On the basis of this definition, distance education can be treated as an independent entity (self-education), in contrast to self-education as such incorporating in one form or another feedback from the teacher (educational institution).

Polat E. S. believes that with distance learning, systematic and effective interactivity is provided, not only between the teacher and students, but also between learners, regardless of the carrier on which the main content of the training is located (in networks or on CD). The interaction is carried out on the basis of computer telecommunications. Distance learning is built in accordance with the same goals as full-time education (if it is built according to relevant educational programs), with the same content. But the forms of studying the material, the forms of interaction between the teacher and the students, as well as the students who study with each other, will be different. The purpose of distance learning is to provide students in educational institutions with the opportunity to master basic and additional professional educational programs of secondary and higher vocational education directly at the place of residence or temporary residence. Ideally, distance learning: provides the opportunity to undergo training without leaving your place of residence and in the process of production; provides wide access to domestic and world educational resources; provides the possibility of interrupting and continuing education, depending on individual opportunities and needs. In addition, to confirm the possibility of implementing one or more educational programs using the full DOT, it is necessary, among other things, to have teachers, specially prepared for work in new information educational environment .

Gospodarik Yu. P. believes that the model of distance learning that is being formed today, in the creation of which colleges and universities are actively involved, is rather a kind of correspondence education, only with the use of computer telecommunications. In this model, distance learning courses are a set of lectures sent to the user in portions or entirely for self-study. After receiving the study materials, the user (student, entrant) works with them at home, at the workplace or in a special computer class. This takes into account the individual style of activity, ability and needs of the user, who can study the training courses in any sequence.

The quality of education at the present stage in pedagogical encyclopedic literature is understood as the individualization of the educational process due to the diversity of types and forms of educational institutions and educational programs that take into account the interests and abilities of the individual; competitive level of education, both in content of educational programs, and in the quality of educational services. The learning process can be attributed to such educational services. Then, the quality of education should apparently be understood as such an organization of interaction between the teacher and students, that is, the educational process

that would correspond to the basic principles of the teaching concept used reflecting the needs of modern society and the predictable competencies that alumni of an educational institution should have to compete able in society .

The quality of education is determined by the degree of achievement of the indicated goals at each stage of education, in each educational institution. The indicators of the rationality of the use of modern DOTS characterize their impact on the achievement of learning objectives, on the completeness of information support for the educational process.

To meet the demand for higher education in Kazakhstan, mainly on knowledge with traditional technology, it is necessary to increase the number of universities and teachers by almost an order of magnitude. Such loads on the growth of capital investments can not withstand any economy. In countries such as Kazakhstan, which have a huge territory with low population density, it is impossible to continuously divorce a significant part of economically active citizens from the jobs for training.

On the basis of the above, we will highlight the advantages of the practical use of distance educational technologies in higher education institutions with a view to improving the quality of educational services:

1. Flexibility: trainees in the distance education system do not usually attend regular classes, but work at a convenient time, in a convenient place and at a convenient pace. The learner has the opportunity to organize his training in the necessary time-rhythm necessary for him to master the subject and obtaining the necessary credits for the selected courses.

2. Modularity: the modular principle is based on distance education programs. Each separate course creates a holistic view of a particular subject area. This allows a set of independent module courses to form a curriculum that meets individual or group needs.

3. Parallelism: training can be conducted while simultaneously carrying out a professional activity or training in another institution.

4. Asynchrony: the learning process, carried out using remote technologies, proceeds according to the schedule or schedule convenient for the training and learning, regardless of the time.

5. Economic efficiency: an average assessment of the world's educational systems shows that distance education costs 50% cheaper than traditional forms of education. Relatively low cost of training is provided by using a more concentrated representation and unification of content, the orientation of distance learning technologies to a large number of students, and also by more efficient use of existing training areas and facilities, for example, on weekends.

6. The new role of the teacher: it is assigned such functions as coordination of the cognitive process, correction of the taught course, counseling in the preparation of the individual curriculum, management of educational projects, etc. He manages the training groups of mutual support, assists the trainees in their professional self-determination.

7. Specialized control of the quality of education: as remote control forms, remote-organized examinations, interviews, practical, course and project work, external studies, computer-based intellectual testing systems are used as forms of control. It should be emphasized that solving the problem of quality control of distance education, its compliance with educational standards is of fundamental importance for the success of the entire education system.

8. Use of specialized technologies and teaching aids: distance learning technology - this set of methods, forms and means of interaction with the learner in the process of independent, but controlled mastering of a certain array of knowledge.

The listed characteristics of distance learning clearly and clearly signify the advantages of this type of training before the traditional educational practice, create the prerequisites for the wide use of DOT opportunities in the system of higher education in Kazakhstan for a reduced form of education.

The introduction of DOT in the educational process allows to solve a number of problems that arise before higher educational institutions. Among the most important among them are: 1) ensuring equal access for young people to full-fledged high-quality education in accordance with their interests and inclinations, regardless of the material wealth of the family, place of residence, nationality and health status; 2) ensuring the flexibility of the education system, expressed in its organization, taking into account the individual schedule of studies of the trainee; 3) ensuring the possibility of obtaining "education through life"; 4) elimination of problems of regional universities, consisting in supplying regions with qualified engineering personnel in accordance with the changing development strategy of the region itself.

Thus, in the modern education system, the student and the teacher must work in parallel, while the teacher must somewhat outstrip the trainee, constantly replenishing his knowledge for proper direction during the training. A student and a passive listener must pass to active, namely, to present knowledge at seminars, examinations and without hesitation to ask the teacher for incomprehensible questions, to clarify the correctness of the perceived knowledge, to require detailed explanation of questions on this

topic of the lecture, seminar. Due to the above mentioned moments, the students are increasing their independent work, especially in economic and mathematical disciplines and theoretical subjects of various specialties. Often, students are required to read not several dozen pages, but several hundred pages of textbooks, scientific articles, monographs and other literature relating to one or another topic under study.

The teacher's work becomes more complicated due to the activation of the student. The teacher must himself read all the recommended scientific literature and periodicals pertaining to the topic of the lecture or seminar. Select sections and paragraphs, specify pages in books, when issuing assignments to students. All this huge work is called for a clear selection of disciplines for qualitative training of specialists, i.e. there is an objective need to reduce the number of items, and thus the need for specialization of teachers in the conduct of certain disciplines increases.

### ***Control questions***

1. What is educational technology?
2. What are the positive and negative aspects of traditional teaching technology?
3. What does the innovative pedagogical technology include?
4. The variety of methods and techniques in higher schools abroad and in the CIS countries.
5. What is a person-oriented learning technology?
6. What are the disadvantages in the system of higher education in the Republic of Kazakhstan?
7. What is included in the information and communication technologies of the educational process?
8. Basic concepts of credit technology training.
9. What is distance education?
10. Advantages and disadvantages of classical teaching methods?

## Chapter 2 The diversity of technology and methods in the study of disciplines of the natural sciences

*Not teachers define learning  
Learning is determined by students  
And the teachers form the optimal conditions for learning.*

*Professor Dylan William*

### ***2.1. Modern paradigms of learning and the transformation of the role of the teacher.***

A new educational model in Kazakhstan posed completely new challenges for education. The paradigm of teaching from teaching to learning is changing. Paradigm # 1 orientation to the material; paradigm # 2 orientation to study. In the first case, the teacher thinks how I can deliver the material, and in the second case, how do I organize the learning process. Those. the role of the teacher is transformed, the educational-methodical repertoire is expanded. Recent developments in education - VOUD, student surveys, survey of graduates, evaluation of educational achievement, increase in measuring criteria - external evaluation of the educational process (ratings, opportunities and potential). An external evaluation of the educational process and learning outcomes has been strengthened. In the organization of the educational process, a special place was taken by the diversity of the methodological repertoire - combined instruction, consultation, different format of work - guest lectures, virtual laboratory work, virtual conferences and active use of information technology. And all for fulfilling the second paradigm are those creatures provided for training. Currently, the category of specialist and professional are defined as follows.

*A **specialist** is an employee who possesses the necessary **knowledge, skills and skills** for this qualification .*

*A **professional** is a **socially and professionally competent worker** with well-defined, professionally important qualities and competence, which is distinguished by an individual style of activity.*

Modern production and society require professionals. To give a qualitative characteristic of a professional, it is necessary to consider concepts

***Professional qualification is the degree and type of professional preparedness of an employee, the availability of knowledge, skills and skills necessary for him to perform certain work.***

**Key qualifications** are **general professional knowledge, skills and abilities**, as well as the abilities and qualities of a person necessary to perform work in a certain group of professions.

These qualities allow them to successfully adapt in different social and professional communities. (definitions given according to the European Qualification Framework 2008). In the organization of the educational process, the role of the instructor determines the effectiveness of teaching, the use of measuring instruments (forms of control and its diversity) and the formulation and implementation of goals and objectives of the educational paradigm. *The ways of implementing* the education paradigm relies on the use of the Taxonomy of educational goals for Bloom. Bloom tried to construct a hierarchy of educational objectives, describing the levels of the human mind and the ensuing challenges obucheniya. S standpoint Bloom, learning objectives are directly dependent on the hierarchy of mental processes, such as *storing* (remembering), *awareness* (understanding), *use* (applying), *analysis* (analyzing), *synthesis* (evaluating) and *evaluation* (creating). Accordingly, each level can be given a set of tasks using certain verbs. For example, for the **level of memorization, the** tasks starting with verbs *will be remembered, repeat, list, name, write, simulate, define, learn, etc.* The **understanding is** achieved by *explaining, describing, defining, discussing, formulating, illustrating, demonstrating*. Tasks aimed at applying knowledge are formulated with the help of verbs *to solve, plan, explain, represent, experiment, train, show, use, teach, demonstrate, etc.* **Analytical** abilities are formed by assignments with key verbs *to explore, compare, contrast, divide, interpret, analyze, group, select, classify* etc. In turn, the ability to synthesize training tasks focused on *compilation, composition, connection, design, imagination, formulation, construction, invention*. The latter group is aimed at independent intellectual activity and requires the ability *to make conclusions, be able to evaluate, approve, support, recommend, criticize and draw conclusions*. For example, for the levels of memorization and understanding, in the opinion of Alan, Facebook, Google Search, Twitter, Blog Docs, Mental Case, DocsToGo, QuizCast, FeederRSS, etc. are excellent. To develop and improve the level of application - Evernote, AudioBoo, Explain Everything, Keynote. To develop analytical capacities - Mind Mush, Survey Pro, Poplet, Inspiration Maps, Pages, DropVox, Comic Life. The ability to synthesize is best shown in WikiNodes, Web to PDF, Share Board, Prompter Pro. Ability to evaluate and create something is more than anything in applications like Creative Book Builder, Interview Assistant, Aurasma, Fotobabble,

iMovie, WordPress, Skype, Tapose, Google+, Student Pad. Most of these applications are available for download on the official app store sites for iOS and [Android](#). The taxonomy clearly does not lose its relevance to the development of the ways of organizing the educational process. Moreover, it is used in completely new models that involve interactive learning and its openness to new technologies.

Table 4 - Levels of learning objectives

| Levels of learning objectives   | Specific actions of students, indicating the achievement of this level   |
|---|--|
| <p><b>1. Knowledge</b><br/>This category refers to the memorization and reproduction of the studied material - from concrete facts to an integral theory.</p>   | <ul style="list-style-type: none"> <li>- reproduces terms, specific facts, methods and procedures, basic concepts, rules and principles .</li> </ul>   |
| <p><b>2. Understanding</b><br/>The indicator of understanding can be the transformation of material from one form of expression - into another, the interpretation of the material, the assumption of the further course of phenomena and events.</p> | <ul style="list-style-type: none"> <li>- explains the facts, rules, principles;</li> <li>- converts verbal material into mathematical expressions;</li> <li>- Presumably describes the future consequences arising from the available data.</li> </ul>   |
| <p><b>3. Application</b><br/>This category indicates the ability to use the material studied in specific conditions and new situations.</p>   | <ul style="list-style-type: none"> <li>- applies laws, theories in specific practical situations;</li> <li>- uses concepts and principles in new situations.</li> </ul>  |
| <p><b>4. Analysis</b><br/>This category indicates the ability to break the material into components so that the structure clearly appears</p>   | <ul style="list-style-type: none"> <li>- isolates parts of the whole;</li> <li>- reveals the relationship between them;</li> <li>- determines the principles of the organization of the whole;</li> <li>- sees errors and omissions in the logic of reasoning;</li> <li>- distinguishes between facts and consequences;</li> <li>- assesses the significance of the data.</li> </ul> |
| <p><b>5. Synthesis</b><br/>This category denotes the ability to combine elements to get a whole that is novel.</p>  | <ul style="list-style-type: none"> <li>- writes an essay, speech, report, abstract;</li> <li>- proposes a plan for carrying out experiments or other actions;</li> </ul>   |

|  |   |
|--|---|
|  | - Draws up the scheme of the problem.   |
| <b>6. Evaluation</b><br>This category indicates the ability to assess the value of a material. | - evaluates the logic of writing a written text;<br>- assesses the compliance of findings with available data;<br>- assesses the significance of a particular project |

Like any other theoretical model, Bloom's Taxonomy has its own advantages and disadvantages. The main advantage that thinking is presented in it in a *structured and accessible form for practitioners*. But a number of types of learning activities such as solving real problems and project activities can not be correlated with the Taxonomy and attempts to do this reduce the pedagogical potential. In 1999, Lorin Anderson and his colleagues published an updated version of the Bloom Taxonomy, which takes into account a wider set of factors influencing teaching and learning. Unlike the 1956 version, the new Taxonomy distinguishes between knowing "what is the content of thinking" and knowing how, "that is, in the procedures used to solve problems. Measuring Knowledge is knowing that." Unego has four categories: actual, conceptual, procedural and metacognitive. Actual knowledge includes isolated pieces of information, such as vocabulary definitions and knowledge of specific details. Conceptual knowledge consists of information systems, such as classifications and categories. Procedural knowledge includes algorithms, heuristics, empirical methods, techniques and methods, and knowledge of when to use these procedures.

Metacognitive knowledge refers to knowledge about the processes of thinking and information on how to effectively manage these processes. Measurement Cognitive Processes of Refined Taxonomy Bloom, as well as the original version, has six skills. These include in itself - from the simplest to the most complex: (a) remember, (b) understand, (c) apply, (d) analyze, (e) evaluate, and (f) create. Memory consists of recognizing and remembering the corresponding information from long-term memory. Understanding is the ability to form your own values from educational material, such as a read text or an explanation of the teacher.

The skills included in this process include interpretation, explanation by example, classification, generalization, reasoning, comparison and explanation.

#### Fig. 4. Components of education

The third process, application, refers to the use of the procedure mastered in learning in a familiar or new situation. The next process, analysis, consists of decomposing knowledge into components and understanding the relationship of parts to the overall structure. Learners learn to analyze in the course of differentiation, organization and explanation.

The assessment, which is on the top in the original taxonomy, is the fifth of the six processes in the updated version. It includes checking and criticism. Creativity, a process not included in an earlier taxonomy, is the highest component in the new version. This skill implies a connection already known to create something new.

To fulfill creative tasks, students generate, plan and produce. In accordance with this taxonomy, each level of knowledge can correlate with each level of the cognitive process, so that the learner can remember the actual or procedural knowledge.

## **2.2 Innovative methods of teaching and ways of mastering new technologies and application at the department of "Plant protection and**

**quarantine" (case study, three-dimensional training system, coaching, etc)**

*The research method in project-based learning.*

Education is the central element of education, along with science and practice. The planned final results of learning-knowledge, skills, competence, the final results of training. Definition of terminology: knowledge, skills " *Knowledge* is the result of the assimilation of information in the learning process. Knowledge is a set of facts, principles, theories and their applications in this field "(European qualifications framework for lifelong learning 2008)" *Skills* is the ability to apply knowledge to perform tasks and solve problems "(European qualifications framework for education throughout the life of 2008).

Definition of terminology: *The competence of an action consists of professional competence; social competence; methodological competence; personal competence.*

In pedagogical work, the improvement of the professional competence, thinking and style of the teacher's work is a phenomenon of the educational process in accordance with the changing understanding of the teacher's role in the formation of an intellectual product - the constructive and competitive human potential of the country. In the Address of the President of the Republic of Kazakhstan N.Nazarbayev "We will build the future together" it is said that qualitative education should become the main industrialization and innovative development of Kazakhstan. At present, the development of "human capital", through the creation of innovative educational consortiums for the implementation of educational programs on a quality effective level of the main strategy of education. All reforms with new programs, technologies, methods and techniques are closed on a specific performer-teacher. The teacher is the main figure when introducing various innovations into practice, and for the successful implementation of the tasks assigned to him in the new conditions, he must have the necessary level of professional *competence* and *professionalism*. *Currently, the educational process is being modernized, there is an active implementation of new priorities and a competence approach is being taken as the cornerstone.*

**The competence approach** means for teachers and students a gradual reorientation of the *dominant educational paradigm with a preferential* translation and development of knowledge, skills and skills to

create conditions for mastering a complex of competencies aimed at the formation of a personality that can adapt in the conditions of socio-political, market-economic, information and communication rich space. In other words, universities do not have to teach for life, but they must learn to learn all their lives and effectively use the knowledge gained in practice, i.e. develop the key competencies required in the future, the level of formation of which, of course, depends on the competence of the teacher. It is the competent teacher that provides positive and highly effective results in the education, upbringing and development of students. Changes in the current educational system make it **relevant** the professional development and professionalism of the teacher, ie his **professional competence**. Freely thinking, predicting the results of his activities and modeling the educational process, the teacher is the guarantor of achieving the goals of modern education. The term **competence** refers to a set of interrelated qualities of a person (knowledge, skills, skills, methods of activity) assigned to a certain range of subjects and processes necessary to act qualitatively and productively towards them. *Competence* in the main world documents is interpreted as follows. "Competence means the ability to use knowledge, skills, skills, personal, social and methodological qualities in work and study, in professional and personal development" (European qualification framework for lifelong learning 2008). Competence is the ability to act in accordance with specified conditions, responsibly applying all their knowledge, abilities and skills (Van de Bly (van der Blij) 2002), "A person with kompetetnostyu, has a set of very diverse knowledge, interaction COMPONENT which he applies to a certain class of tasks " (Kaiser, 2003). Professionalism is the achievement of high models of the implementation of several aspects of pedagogical work (*activity, communication, the personality of the teacher*).

By *professionalism* is understood a special property of people systematically, efficiently and reliably perform complex activities in a wide variety of conditions. To acquire professionalism, you need appropriate abilities, desire and character, a willingness to constantly learn and improve your skills. The concept of professionalism is not limited to the characteristics of highly skilled labor; this is a special worldview of man. A necessary component of a person's *professionalism* is **professional competence**. **Professional competence** Is a system of knowledge, intellectual and subject-practical skills, habits, habits, providing understanding and fulfillment of professional activities. Competence represents the unity of substantive and procedural, cognitive and operational aspects. Characteristics

of professional competence are: completeness, depth, system. Awareness, strength, efficiency, both knowledge and activity. Requirements for competence, depending on the position of the individual in the system of division of managerial work in the organization, are conventionally divided into two main groups. *First*, it is knowledge and skills inherent in the specifics of activity, information, knowledge of the subject and product of labor - knowledge of students. *Secondly*, ability and enterprise in the assimilation and use and transfer of information received, the ability to systematically perceive and interpret information, structure problems and methodically seek their solution. *Third*, they note the ability to work with learners and manage themselves and time. A competent teacher integrates a high level of professional, pedagogical, psychological, social qualities. *What should a competent teacher be able to do?*

- To successfully solve their life problems by taking initiative, independence and responsibility;
- orient yourself in the labor market and understand what skills students will need to find a job in modern conditions and successfully move up the ladder of professional success;
- to see and understand the real life interests of the students;
- show respect for your students, their judgments and questions;
- to feel the problematic of the situations studied;
- to connect the studied material with everyday life, with the interests of students;
- consolidate knowledge and skills in training and production practice;
- plan a training session using the whole variety of forms and methods of educational work, and, first of all, all types of independent work, dialogical and design-research methods;
- set goals and assess the degree of their achievement together with students;
- to master the method of "creating a success situation";
- to draw on the past experience of students, creating a new experience without extra time;
- To involve experts and experts of experts for discussion of those or other questions;
- assess achievements not only as a mark, but also as a meaningful characteristic;

- to assess not only the achievements of the subject, but also the development of personal qualities;

- To see the gaps not only in knowledge, but also in the willingness to live in a society .

The teacher should understand that:

- *one must be ready for constant change;*
- *build today's and tomorrow's behavior based on yesterday's knowledge and yesterday's experience is impossible;*
- *the main task is to ensure maximum success and a minimum of failures in the future life of their students.*
- *any human activity is beautiful and effective , and this presentation is passed on to the students.*

**The teacher should beware:**

- *from the habit of considering itself the most important and only source of knowledge;*
- *transfer to students their life experience and educate them on the basis of how he was raised himself;*
- *adhere to the notion that there are once and for all given ways of right and wrong solutions to various problems;*
- *follow the petty rules and instructions.*

In this way , professionally competent can be called a teacher who at a sufficiently high level carries out pedagogical activities, pedagogical communication, achieves consistently high results in teaching and educating students. The development of professional competence is a dynamic process of mastering and modernizing professional experience, leading to the development of individual professional qualities, the accumulation of professional experience, involving continuous self-education, self-development and self-improvement of the teacher. The activity of the teacher in this case should be aimed at:

- using interactive technologies in the work;
- Conducting non-standard classes;
- organization of research work;
- stimulation of self-educational activity of students;
- monitoring the dynamics of development of students;
- Promoting the achievements of science and culture;

- selection of tasks that require the use of additional sources of information;
- consulting on finding the necessary information;
- teaching methods of drawing up a plan, writing notes, the ability to highlight the main thing;
- Preparation of creative tasks;
- stimulation of the expression of one's own thoughts;
- use of dialogical methods in work;
- development of tasks of different levels;
- creation of problem situations;
- introduction of self-assessment and mutual verification methods;
- organization of work in pairs and groups of variable composition, etc.

***Information competence lies in the ability to:***

Interpret, systematize, critically evaluate, analyze.

Use the information received.

Present available information in its various forms and on different media .

***Social competence:*** To matches one's aspirations with those of other people. To involve other people in solving tasks. Productively interact with members of the group. Analyze and resolve contradictions. ***Communicative competence:*** Set goals. It is wise to draw up documents. To represent and civilize defend your point of view. Whatever such training programs, they must necessarily be based on professorial research or developed models of an effective specialist. That is, first we must clearly imagine what should be specialist, what he should have knowledge, skills, qualities, professional relations, norms of behavior, and then already make up appropriate training programs for training. Because, it is the models of the professional who should become the benchmarks in mastering the profession and professional skills.

***Systematic organization of activating competence-oriented concepts of teaching and learning.*** Currently, there is an acute problem of creating conditions in the educational system of the University for the Formation of the student's personal qualities, which determine his personal and professional self-development, the ability to individual development. At the same time, there is a contradiction between the student's need for self-improvement, the

development of intrapersonal properties that promote the development of his inner freedom, and the real possibilities of realizing these needs in the educational system of the university. Therefore, the teachers design a didactic-methodological complex of psychological and pedagogical support to form the personal qualities of the future specialist; determine the complex of pedagogical conditions of productive interaction of the teacher and student, *aimed at maximally independent performance of the student's work, in the process of shaping the personal qualities of the future specialist on the basis of the joint activity of the teacher and student.*

I would like to dwell on such a property as cognitive independence, since it is the *cognitive independence of students that is the basis for successful training of specialists* with a credit training system. Well developed cognitive independence of students becomes a way of adaptation in conditions of credit system of training. This is due to the following features: a significant reduction in the volume of classroom work and an increase in the volume and forms of independent work. The total amount of hours of independent work of full-time students in bachelor's degree is about 70% of the total complexity of the discipline, up to half of which is allocated for independent work with the participation of the teacher. But at the same time, the volume of educational material remained the same. Thus, the student must master most of the material himself.

The foregoing suggests that the success of training in high school under a credit system of training depends on the level of formation of informative independence of students; the meaning is not the only way of independence, *but also to create planning skills, self-control, self-esteem and developed volitional qualities. The transition to credit training, as practice shows, highlighted the many problems of readiness of yesterday's graduates of secondary schools and schools to study at a university.*

With the credit system of training, it was assumed that the system of independent work of trainees with the teacher will act as a method of training. It was planned that the SROP would help to fill the gaps in knowledge, play a significant role in shaping the personality of the future specialist. However, experience shows that even the most experienced, qualified teachers, the most advanced learning technology will not lead to the desired result, if a student does not fully will be formed *cognitive independence*, if he will not make the necessary effort to this.

Thus, the **cognitive independence of students at credit system of education** is considered as a fundamental quality of the future specialist, *is characterized by his willingness on their own to carry out informative*

*activities aimed at the development of the theoretical and practical foundations of the specialty*, professional self-development and self-realization in the face of rapid growth in information and technology improvement. When teaching disciplines of the natural direction is observed - the *transformation of the role of the teacher*. The teacher acts as a consultant using a different educational and methodical arsenal.

In this context, it is appropriate to *consider the effectiveness of the types of training*, for the active formation of cognitive independence of students.

#### Fig. 5. Credit system of education

We see that in the percentage of independent work, the implementation of practical exercises and discussion show a high efficiency of 50 to 80%. Based on this, the training methods and technologies used are selected. The teacher forms the conditions for learning, creates learning situations. Conducts presentation of the material and instruction, takes into account the scope, complexity and practical significance of the material being studied. We are seeing a paradigm shift from teaching to learning. From the paradigm-orientation to the material with the idea of how to convey to me, the teacher is currently using the paradigm-orientation to study and thinking about how I organize the learning process, how to combine technologies and methods, and how to strengthen the conditions for independent work.

When teaching the discipline of a special cycle in particular it is herbology, phytopathology, entomology, protection and quarantine of the plant idris at the bachelor's degree. Disciplines have a theoretical and practical block, as well as field training and production practices. The object of studying these disciplines is plants and insects of different groups, studying the patterns and mechanisms of protecting vegetation cover in centuries of cenoses and natural landscapes.



Fig. 6. The Learning Paradigm

When teaching special disciplines, students work in microgroups (collaborative learning) learn to work with a microscope, with dyes, learn micropreparation, identify and identify objects. At the same time they form work skills, learn to pronounce the attributes of objects, identify and correct errors, if they exist and the main thing to work in a group, to discuss and explain to each other the distinctive features of the objects under study. In the case of group, pair work in the classroom, there is an exchange of information, mutual evaluation and dialogue, which makes it easier to immerse students in the professional environment.

One of the actively used types of training is the organization and demonstration of experience and experiment in the study of any topic. Laboratory and practical classes are built on the principle of greater visibility and naturalness. For example, students study the structure of plants of its changes in the process of illness or other reasons on temporary micro-preparations and on living objects, comparing it with reference books, atlases and determinants.

On topics that study plants and their diseases, more than 75% of new knowledge is conveyed through experience and experiment, this makes it possible to treat the plant as a whole organism.

Experimental training is used in the study of topics on entomology and phytopathology, for example, when studying the topic "Cereals and their pests" we lay experiments on the timing of growth and the correspondence of the appearance of various diseases on shoots, ear, exit into the tube. Experimental training allows you to project theoretical knowledge into

practice, and students are easily able to further associate functional features and plant structure with their susceptibility to diseases and pest action.

One of the working methods for orientation to study is the thematic community of students. They are united by a common scientific problem, for example, a group of students engaged in studying the introduction into culture and phytosanitary protection of promising species with decorative features. Students study the following scientific problems, such as determining the timing of forcing in some bulbous species, expanding the methods of planting to shorten the sprouts, and expanding the adaptive features in ornamental crops to protect them from pests and diseases. Unite students in groups to deepen knowledge in one of the areas of phytosanitary. The result of such works is scientific projects on herbology, biological and chemical protection of plants, phytopathology, graduation theses, diploma works are performed by order of the employer, which makes it possible to expand knowledge on applied science.

In the process of writing and defending dissertations, working in circles, students conduct self-evaluation, mutual evaluation, analysis, and practical implementation of theoretical knowledge, taking into account the improvement of the quality of work.

Conducted laboratory and practical classes in special disciplines allow students to use the knowledge gained in further professional activities, for example, when working in phytosanitary organizations, on farms.

### ***Case study as one of the innovative methods of the educational environment.***

Many authors are noted and this is confirmed by the fact that in the age of the Internet and the availability of printed materials, the very fact of memorizing became less important in comparison with the interpretation, analysis and evaluation of information. Traditional technology is aimed at memorizing and reproducing information whereas innovative teaching develops the full potential of the individual's ability. Innovative learning implies the development of the ability to work together in entirely new, unprecedented situations. From the passive recipient of knowledge, where there was no incentive to open discussions with the new technology, training develops the skills of subconscious thinking of a higher order of intercultural skills that are valued in a modern economy. It is now necessary to critically analyze and make informed decisions based on relevant information. What is critical thinking? it means showing curiosity and using research

methods. Critical thinking allows us to develop a point of view on the issue and be able to defend this point with logical arguments.

The method of applying theoretical knowledge in real life is a method of situational learning. Case technology originates in the Harvard Business School and is still the flagship of the case-industry. *Case technology is intensive training with the use of video materials, computer and software.*

Case technology (method) of learning is learning by action. This training is based on the case study of a particular situation - the case-study. Case is a practical situation that contains a number of problems, and case study is a learning case. A case is a simulation of life situations. Case technology allows you to reflect the level of competence and professionalism of the case participant and find a solution to the problem.

The essence of the case-method is that the assimilation of knowledge and the formation of skills is the result of an active independent activity, learning to resolve contradictions, as a result of which creative mastery of professional knowledge, skills, abilities and development of thinking abilities takes place.

Practically any action of a person in life, not only study, is connected with the need to assimilate and process this or that knowledge or information. Learning to learn, namely, to learn and properly process information is the main thesis of an activity-based approach to learning.

Problem-situational learning using cases is referred to as new forms of effective learning technologies. The introduction of study cases into the practice of the Kazakhstani education is currently a very urgent task. The case is a description of a concrete real situation, prepared in a specific format and designed to teach students the analysis of different types of information, its generalization, the skills of formulating the problem and developing possible solutions to it in accordance with established criteria.

The term "case-method", "case-technology" in English translation as the term "case" means:

1 - the description of a concrete practical situation, the methodical reception of instruction on the principle *"from typical situations, examples - to the rule, and not vice versa"*, presupposes an active method of instruction *based on consideration of concrete (real) situations from the practice of the future activity of students; use of the situational learning methodology "case study"*;

2 - a set of specially developed teaching and methodological materials *on various media (printed, audio, video and electronic materials) issued to students for independent work.*

The advantage of cases is the ability to optimally combine theory and practice, which seems to be quite important in training a specialist. The case method promotes the *development of the ability to analyze situations, evaluate alternatives, choose the best option and plan its implementation*. And if during the training cycle such an approach is applied repeatedly, the trainee develops a stable skill in solving practical problems.

What is the difference between a case and a problem situation? *Case does not offer students a problem in an open form, and participants of the educational process have to isolate it from the information contained in the description of the case.*

*The technology of working with a case in the learning process is relatively simple and includes the following stages:*

- individual independent work of trainees with case materials (identification of the problem, formulation of key alternatives, suggestion of a solution or recommended action);

- *work in small groups to reconcile the vision of the key problem and its solutions ;*

- Presentation and examination of the results of small groups on the general discussion (within the framework of the training group).

Case - the stage:

Step 1: Formulate one specific problem and write it down.

Step 2: Identify and record the main causes of its occurrence (the reasons are stated with the words "not" and "no").

Steps 1 and 2 represent the "minus" situation. Then it should be translated into a "plus" situation.

Step 3: The problem is reformulated into a goal.

Step 4: The causes become tasks.

Step 5: For each task, a set of actions is defined - steps to solve it, responsible persons are appointed for each step, who select a team for the implementation of activities.

Step 6: Responsible people determine the necessary material resources and time for the event

Step 7: For each task block, a specific product and criteria for the effectiveness of the task solution are determined.

Table 5 - Distribution of functions between trainees and teachers:

| The phase of work | Teacher actions | Student Activities |
|-------------------|-----------------|--------------------|
|-------------------|-----------------|--------------------|

|                    |  |   |
|--------------------|--|---|
| Before the session | 1. Pick up a briefcase<br>2. Defines the main and auxiliary materials for the preparation of students<br>3. Develops a scenario classes  | 1. Get a case and a list of recommended literature<br>2. Individually preparation for a lesson  |
| During the lesson  | 1. Organizes a preliminary discussion of the case<br>2. Divide the group into subgroups<br>3. Manages the discussion of the case in subgroups, provides students with additional information | 1. Asked questions that deepened the understanding of the case and the problems<br>2. Develops options for decisions, takes into account the views of others<br>3. Accepts or participates in decision-making |
| After class        | 1. Assesses the performance of students<br>2. Assesses the decisions made and questions posed  | Draws up a written report on the occupation according to a given form   |

Usually, the cases are prepared in a package that includes:

1. *introductory case* (information on the presence of a problem, situation, phenomenon, description of the boundaries of the phenomenon under consideration);
2. *Information case* (the amount of knowledge on a topic (problem), set out with some degree of detail);
3. *strategic case* (development of skills ana lyse the environment under conditions of uncertainty and to solve complex problems with hidden determinants);
4. *Research case* (similar to a group or individual projects - results of analysis of a situation presented in the form of presentation);
5. *training case* (aimed at consolidating and more fully mastering the tools and skills already used previously - logical, etc.).

Each teacher should have an interesting knowledge tool that will be interesting for students as well as encourages them to be active participants in the educational process.

**Objectives:** Development of the algorithm for the application of case-technology; Formation of the ability to use the acquired skills to solve actual pedagogical problems.

**Stages of method case**

- Representation of concrete life situations;
- Understanding situations that do not have a unique solution;

- Updating the knowledge complex to solve the problem;
- Developing action models for resolving situations

### **Student's work with case**

Stage 1 - familiarity with the situation, its features;

Stage 2 - identification of the main problem (s);

Stage 3 - analysis of the adoption of a decision;

Stage 4 - Case solution - the proposal of one or more options for a sequence of actions, an indication of important problems, mechanisms for their prevention and solutions.

### **Teacher actions**

- the creation of a case or the use of an already existing one;
- distribution of students in small groups (4-6 people);
- familiarity of students with the situation, the system of assessing the solutions to the problem, the timing of the tasks;
- the organization of work of students in small groups, the definition of speakers;
- work with case;
- organization of presentation of decisions in small groups;
- organization of general discussion;
- a general statement by the teacher, his analysis of the situation;
- evaluation of students by the teacher.

### **Sources of cases**

- Real life;
- Mass media;
- Analysis of scientific articles, monographs;
- Artistic and publicistic literature;
- The Internet.

In our classes, we apply case studies in the study of new topics, in generalizing lessons. For example, classes on the topic "**Weed plants on cereals**".

*The educational objectives of the lesson*: the development of knowledge of students about species of weed plants: species of weed plants, factors determining the active effect of SR on a cultivated plant, developing skills to draw up a plan and algorithm for combating SRs in various ways. *Developing training objectives*: the development of knowledge among students about the measures and types of control of weeds by various methods.

Handout: case with theoretical material - 6 pieces; set of tasks with three levels of difficulty - 6 sets; tokens for distribution by group; Tokens for issuing to groups for the assigned tasks;

The main stages of the lesson:

1. Organizational work. Acquaintance with the course of the lesson.

2. Knowledge updating of students.
3. Work with the case. Analysis.
4. Discussion.
5. The result of the lesson.

Course:

Organizational moments.

At the entrance to the study room, the students take tokens and sit down on groups for tables, on which lies the chosen token. The teacher introduces the algorithm of work in the lesson.

Actualization of students' knowledge.

Formulate the concepts: Weed plants, perennial and annual weeds, herbicides, bioagents.

Work with the case: in the teacher's constructive speech. Acquaintance of children with a case. Work with the case. Analysis of the situation using the method "Brainstorming on the board."

Recommended sequence of work:

1 step - introduction to the task

Step 2 - collection of information on the case-task

Level 3 - Decision Making

4th stage - consideration of alternatives

5 step - comparative analysis

6th step - presentation of decisions

### **Reflection**

Having thoroughly studied this problem, we came to the conclusion that modern agriculture can not develop without the development of protective equipment with pests such as weed plants and molds

### **Conclusion**

#### **Advantages of case studies:**

– use of the principles of problem training - obtaining skills to solve real problems, the ability of the group to work on a single problem field, while the learning process, in fact, imitates the decision making mechanism in life, it is more adequate to the life situation than memorizing terms with subsequent retelling, and the understanding of terms, the ability to operate them, constructing logical schemes for solving the problem, to argue their opinion;

– gaining teamwork skills;

– development of skills of simple generalizations;

– development of skills to conduct presentations, press conferences, the ability to formulate a question, and to argue the answer.

Almost any teacher who wants to introduce case technologies can do it quite professionally, having studied special literature, having passed training and having at hands the learning situations.

Thus, case studies in the educational process allow: to increase the learning motivation of students; develop students' intellectual skills, which they will be in demand with further training and professional activities.

***Pedagogical technology of the three-dimensional methodological training system*** (according to Zh. A. Karaev).

It was created by the Kazakh scientist, doctor of pedagogical sciences, professor Zh. A. Karaev. It is implemented in the scientific and practical pedagogical laboratories. It is a person-oriented technology that places the personality of the training system in the center of the educational system, providing comfortable, conflict-free and safe conditions for the development and realization of natural potentials. By the nature of content and structure, the technology of tier differentiation is teaching. On organizational forms, technology combines both group and individual training, it can be attributed to a differentiated in the form of organization of the educational process of technology. In the technology of Zh.A. Karaev prevailing are the problem-search methods of teaching. In the direction of modernization of the existing traditional system, the technology of J.A. Karaev is a pedagogical technology that functions on the basis of activation and intensification of the activity of students, because it is based on the nature of problem training. Categories of students, that is, a contingent of students, to which this technology of teaching would be applicable, *technology J.A. Karaev is a technology of advanced level*. (Fig. 7) For this educational technology, the teacher determines the goal of the learner's development, trying to take into account the individuality of each, does not present the goal explicitly.

Pedagogical technology offered by Zh. A. Karaev, has one incomparable advantage, characterizing it more as an authoritarian model, because only this model of the educational process allows you to clearly plan, monitor and track the development process of the students present at each lesson. This is evidenced by the existence of numerous appraisal sheets and individual monitoring tables for the development of each individual student.

«Кто хочет достичь цели, тот должен знать ее!»



Fig. 7. Technology of advanced level.

The conceptual approach to the construction of this pedagogical technology has a strong psychological and pedagogical basis, starting, in particular, from the psychological statements of SL Rubinshtein on the inclusion of the object of thought in new connections in the process of thinking and thereby revealing new properties that lead to inventions and discoveries. Another psychological basis of technology is the theory of LS. Vygotsky on the transition in the process of teaching the student's mental development from the zone of "actual development to the zone of" immediate development, "which can be implemented on the basis of activities shifting from the reproductive level to the productive one. These levels of activity provide different levels of mastering the educational material by students. P. Bespalko levels of mastering the educational material are divided into 4 types: for the learner, algorithmic, heuristic and creative.

- The first level provides only such a quality of knowledge as correctness (at the first level, it is the correct execution of similar tasks that do

not require the transformation of the received knowledge, retelling the text, formulating rules, theorems, etc. without own comments).

- Algorithmic level of assimilation provides such a quality of knowledge, as completeness and effectiveness, ie, students can list all the leading elements of knowledge, define each of them, characterize their main features, and perform tasks on the topic with the application of the acquired knowledge and skills. Heuristic and creative levels provide, in addition to the above qualities of knowledge, also their awareness, system and strength. Thus, starting only with a heuristic level of assimilation, we can make sure that the trainees are provided with all the components of the quality of knowledge. Traditional training does not allow us to evaluate the ZUN level according to activity characteristics, that is, how much the learners have learned the material: consciously, firmly, systematically, fully, etc. Also, the fact that methods of thinking activity (analysis, synthesis, comparison, isolation of the main, reflex, etc.) are not taken into account, all this leads to a biased evaluation of the activity of students. At level differentiation of mastering the organization of the learning process, level tasks are developed for independent and control work on each topic according to the requirements of the levels. The learning level is an "obligatory level," and the remaining levels are the ability to select the appropriate knowledge, skills, and skills for individual student demand. Thus, the organization of the educational process on the basis of *tier differentiation allows us to organize an "ever-deepening movement" of thinking around the object of thinking , and thereby ensure a meaningful individualization of instruction ,* to cover not only the level of the learner's actual development, but also the zone of his nearest development. Such training provides each learner with his development dynamics.

Effectiveness is guaranteed by the strict sequence of level tasks (recognition, analogy, partial search, creativity, as well as the optimal combination of internal and external learning motivation. The other main reason for the guarantee of the result is an original approach to the use of a special assessment of activity of pupils in the conditions of the use of educational technology training, *where evaluation is not It is the penalty for a miss, and an incentive of self-development of students.* The objective assessment of the technology of the *espechivaetsya* thematic control different levels of tasks that allow you to continuously monitor the development of the students. Moreover, there is clearly observed pattern of formation of quality of knowledge. In the traditional teaching students often receive good marks

for the retelling of the text or the solution of similar problems, which are the first-level tasks and provide only one from the components of the quality of knowledge - "correctness". This methodical system of learning with the help of technology comes into motion, and as a result The implemented didactic process is transformed into a didactic process that is self-realized by the students. This training technology is one of the most actively used technologies in connection with the transition to a new model of education *focused on the result*.

*Using this technology at the department "Plant protection and quarantine"*. In the study of a number of special disciplines such as \*\*\* a model of cognitive activity is constructed based on the residual knowledge of the students, the material base of the department in this direction. Micro goals are put on the main blocks of disciplines, tasks are defined and actions are planned on the object for obtaining the result. At certain levels, motivations are distinguished - the need for cognitive activity, sustained interest, situational interest, indifference. At the same time, different levels of activity are observed-creative, heuristic, interpretive, reproducing. As a result, various *skills* are formed -creative, partially-search, reproductive in changing situations, reproductive in a standard situation. For example, the following Microcel put Herbology identify weeds for crops sown on campus S Seifullin KazATU.

The tasks for the period of training the course and for the period of practice (studying biology and morphology of weeds, collection and identification, the period of growth and maturation of seeds and fruits of plants) are determined. One of the defining tasks is the development of protective measures and the development of techniques for the destruction of weeds on cultivated crops . For groups of students, various motivations are determined - obtaining a high and high-quality crop and developing private methods for the destruction of weed plants using chemical and biological remedies. At the same time, the learning rule is observed. Level tasks are developed for independent and control work on a given one which makes it possible to deepen and accumulate thinking around the object of thinking. And to develop a method of combating this group of weed vegetation in precisely these climatic conditions and on these soils, which will be the result of active work and unity of goals and motivations.

### ***Coaching as a pedagogical technology.***

In the modern educational space coaching can be attributed to one of the most popular technologies of development and training. Coaching is a

system of principles and techniques that contribute to the development of the potential of the individual and a group of people working together, as well as ensuring maximum disclosure and effective implementation of this potential, a process aimed at achieving goals in various areas of life. This is a system that moves the subject of activity. Coaching is a flexible, adaptive technology of interaction; it allows using it in various spheres of life, including education. Coaching gets special importance in connection with the development and formation of innovative education. In the situation of modernization of the production of educational services, competition between new participants and traditional service providers, between new educational technologies and old methods of education is important to ensure the effective operation of higher education institutions.

Coaching is used not only in the management of educational processes, but also in the organization of pedagogical interaction, as the philosophy of relations and interaction technology, focused on the development of both students and teachers. Coaching technology should be used in higher education as a set of effective techniques to achieve the goals, a means of assisting the future specialist in finding their own solutions and personal and professional development. One of the most important tasks of the educational process is to teach to learn: to receive, to seek the necessary knowledge, to be able to analyze them. Coaching allows activating cognitive motivation of students and encourages them to self-learning and professional self-development. It is also expedient to use coaching in forming the readiness of graduates of higher educational institutions for professional activities.

The main directions in the organization of pedagogical interaction, where the application of coaching technology is the most effective, include motivation for learning and engaging in scientific activity, developing skills in setting and formulating the goals of scientific cognition. The possibilities of this approach allow us to organize the developing environment for both the student and the teacher, create the context of awareness and responsibility and promote the disclosure of the creative potential of subjects of pedagogical interaction. Coaching - how technology is used to achieve meaningful goals, improve planning efficiency, mobilize internal capacity, develop the necessary skills and skills, and develop advanced strategies for obtaining results.

The methodology is aimed at empowering people who set themselves the tasks of professional and personal growth. All methods used in coaching are directed mainly to focus the person's attention on purposeful action and encourage him to perform this action, having received pleasure from it. From

the definition of coaching come a variety of areas of work and a range of methodological activities.

*Coaching definitions:*

*Coaching - to instruct, inspire and train. (Brief Oxford Dictionary).*

*Coaching - to train, practice tutoring, prepare for the exam or competition. (V.K. Muller English-Russian Dictionary)*

*Coaching is a means of facilitating, assisting another person in finding his own decisions or his (her) progress in any difficult situation.*

*Coaching is a tool for optimizing human potential and effective performance.*

*Coaching - a kind of individual support for people who set themselves the task of professional and personal growth, increasing personal effectiveness.*

The main distinguishing feature of coaching is that the coach helps a person to find his / her own solution rather than solving the problem for him / her. Therefore, the coach is not necessarily an expert in the field of the problem. But he must be an expert in helping others discover their own potential.

Pavel Bezruchko. "The essence of coaching is to unlock the potential of the individual to maximize their own productivity and efficiency. It more helps the individual to learn, rather than teach."

Tim Gallwey. Coaching focuses on future opportunities, not past mistakes. John Whitmore. "Coaching frees people to take bolder, more risky and significant decisions, more profitable projects and actions." "Coaching encourages people to take on bolder, riskier projects that can ultimately turn out to be much more profitable than they could have been imagine at first" Coaching is personal. The coach basically works with thoughts, emotions, ideas, choices, reactions of people, without changing their external environment.

***The relevance of the coaching method and the possibility of its use in personal-oriented learning.***

In modern education, the need for new forms of development and training, corresponding to the needs of the time and its tasks, is increasingly felt. It is supposed to give individual and creative character to the education modernization. Currently, a fairly new method is being actively used (in other sources, technology) in education, which is called pedagogical coaching.

Coaching in the West is known for 30 years, since 2001 he became an American profession. In the CIS countries, this method is 10 years old, but he has already started to work with students of the system of General and

vocational education. Coaching became known thanks to Timothy Goldie-coach, who described the "cultivation" of Champions in Golf and tennis. This method has got accustomed and has received active distribution in different spheres of activity. The development of coaching can be traced in the works of financial consulting specialist Thomas J. Leonard, business manager John Whitmore, psychotherapist Milton Erickson, and so on.

So what is "coaching"? We offer several definitions, given by its author Timothy Golvy.

-This is the disclosure of a person's potential for the purpose of maximizing his effectiveness. Coaching does not teach, it helps to learn.

-This is a process that helps a person to look at the development of his personality, to a specific stage of its development, that is, to open a person's eyes to many useful things.

-This is a process that allows the individual to achieve the highest results when using the right methods and techniques.

In the textbooks on management there is a definition of coaching: it is a science of the mind, a collection of philosophical principles designed to accompany people on the path of improving their lives.

This is a fundamentally new direction in pedagogical science and practice, which is based on the formulation and the quickest achievement of goals by mobilizing the internal potential, mastering the advanced strategies for obtaining the result. The philosophical and psychological foundations of coaching are the methods of dialogue, the humanistic concept of emotional intelligence, etc. One of the fundamental components of this technology is the Pareto Law, one of the most common ways of assessing the effectiveness of any activity. In literature, it is also called the principle of least effort. Even at the end of the nineteenth century, the well-known Italian economist Vilfredo Pareto revealed a mathematical pattern: 20% of efforts yield 80% of the result, and the remaining 80% of efforts are realized by only 20%. Therefore, choosing the optimal resources that produce the greatest effect, you can achieve high results with low costs.

The founder of coaching, Milton Erickson, compared a man to a star. He defined five basic principles of coaching, where each principle is a ray. In his opinion, all people:

1. Good such as they are.
2. They already have all the resources for success.
3. Always make the best choice for yourself at the moment.
4. Have positive intentions for every action.
5. With each choice, "grow up" or "die."

Changes are inevitable.

Later these principles were further developed by his followers, and in the modern version they look like this:

- You cannot guarantee results in coaching. What happened with one cannot work out with another!

- Initially, all the people are fine, they do not need to "repair", inside everyone there is a genius. Everyone has all the necessary resources to achieve their goals.

"Everyone can learn what he wants." At a certain point in time, we make the best choice of all possible.

- Each action has a positive intention initially.

- - Work in pairs (student-mentor) and division of responsibility. The priority of the present and the future (rather than obsessing over the past).

- Confidentiality. Lack of advice. Value-free position.

- Assistance in creating new opportunities and abilities, developing their potential. Ecological compatibility.

Coaching is needed as a method in education. First, in modern education, the need for new forms of development and training, corresponding to the needs of the time and its tasks, is increasingly felt.

Secondly, the task of personal-oriented education is officially stated in the standards of education. But the development of practical technologies for implementing a person-centered education in teaching and upbringing work, as well as a system for training teachers for a new approach is still in its infancy, and many technologies are borrowed from business, marketing, etc. This method is very actively used in higher education institutions and brings positive results.

The "coaching" approach corresponds to the concept of personality-oriented training as much as possible and coaching skills are organically integrated into the competence profile of a modern teacher. In short, the meaning of pedagogical coaching can be defined as a movement towards the goal through the full disclosure of the potential of the person and the team. Using coaching, people achieve their goals much more effectively and faster, form clarity in the choice of their development. With the professional support of the coach, i.e. the guide, the student independently formulates goals, develops strategies and implements the most successful ones.

We consider pedagogical coaching as an informal technology and the art of asking questions, the art of motivating. For this, adequate organizational and pedagogical conditions are created, technologies for pedagogical support, diagnostics and monitoring.

The teacher's goal is to help the students, change and achieve the goals, the student's goal is to solve specific tasks and achieve the predicted result. The teacher does not order, does not direct, instructs, does not give advice, in a word, does not exert pressure, influence. He listens to understand, ponder, rehash, summarize, ask questions that awaken awareness; makes suggestions, provides feedback. The main thing is the concern that the students (group, association) solve the problem by themselves.

In education there are different models of learning interaction:

1) The follower guru

"I say - you do";

2) mentor-student

"Do as I do!";

3) "Creative tandem" teacher - students, communication on an equal footing, work together, dividing responsibility for the result in half, become an indivisible whole.

This method is based on getting answers to four main questions:

-WHAT do you want?

-WHY is it important for you?

-HOW can you achieve the goal?

-HOW do you know you've achieved a result?

Solving these issues leads to mastery in any of its manifestations.

Mastery is a state of natural, elegant and satisfying solution of tasks at the level of "unconscious competence", i.e. professional action at the level of instincts, which are therefore strong and do not require volitional efforts. How attractive is the use of coaching in education?

1. Development of communicative and organizational skills, ability to predict and design their educational activities and the activities of others.

2. Getting skills to set goals and achieve success (result), effectively manage time; analyze and structure information, work in a team, quickly make decisions in a problem situation, overcome conflicts, focus on their own successes and the strengths of others.

Thus, pedagogical coaching can be considered as an innovative technology to improve professional skills, and it is necessary to actively introduce pedagogical coaching in the educational process.

Examples of coaching in the teaching of special subjects at the Department "Protection and quarantine of plants". For example, on agricultural entomology. Work with the use of coaching technologies allows to use in plant protection practice orientation on the phase of plant development, and to link them to the observation system and the use of

systems of protection of perennial forage grasses, especially crops intended for seed production. For the diagnosis of students on the basis of the prerequisite knowledge to study and examine the biology of perennial grasses and compare the biology and etiology of phytophages. And deduce terms of activation in these natural and soil conditions. Determine the task that the first rise in the number of pests perennial grasses coincides with the initial phases of development of herbage past years of life. In connection with the increase of temperature of soil and air by this time there are soil-inhabiting insects, weevils, caterpillars of some species of butterflies, bugs, leaf beetles, and their numbers are increasing against the background of the beginning of the growth and development of plants.

During the lesson, students diagnose that the second significant rise is observed in the phase of budding legumes and earing cereals. During this period, the herbage has experienced the largest number of species of pests of vegetative organs and the occurrence of pests of generative parts such as trips, flies, seed pests and other species. Then there is a reduction in the number of pests that are associated with the death of part of the population of entomophages and completion of the development cycle part of phytophages, which has a very short period of active life (blister beetles, flower and leaf pests), or a new insect to passive lifestyle. Students on this problem draw conclusions and propose solutions. The result is an essay.

Using the "creative tandem" such as the teacher - the students, communicating on an equal footing, work together, divide the responsibility for the result in half, become an indivisible whole. For example, developing methods of locust control and studying its etiology and biology. At first the students comprehensively independently then, in the classroom study the biology and physiology of the locust and its varieties and analyze and develop a methodology for the zones of Northern Kazakhstan and see the conduct of the struggle in adjacent territories. During the discussions the teacher focuses attention on the geography of distribution and features of the region and together with the students suggest methods of struggle for the expert group. The expert group, prepared in advance together with the working groups, suggests methods of struggle. The example of the locust control measures in the Pavlodar region.

Sagebrush (*Artemisia* spp.) shrub lands and abandoned croplands (fallows) in Pavlodar (northeast Kazakhstan) region are the primary egg-laying habitats of the Italian locusts (*Calliptamus italicus* L.) (Fig. 4). From these primary habitats locusts can form swarms and fly to croplands and destroy various crops that are vital to the region's economy. Every year plant

protection services personnel are required to monitor locust populations, forecast the infestation risk, and chemically treat areas infested with locust nymphs. Since 1990, more than 750,000 ha of croplands have become fallow, thus increasing the area available for locusts to breed. Given the vast area (several million ha) that needs to be surveyed twice every year, traditional ground field survey methods are inefficient. This study used the IRS-AWiFS data (acquired in 2006) to map the shrub lands and grasslands. Spatial distribution of abandoned croplands (since 1989-90) was mapped using 1989-90 Landsat TM data along with their area estimates, and combined with shrub land and grassland map derived from IRS-AWiFS data to generate the potential locust habitat map. Plant protection specialists can incorporate this information in future surveys. This presentation will outline the processing issues pertaining to IRS-AWiFS data, and the effect of its spatial (56m) and spectral (4 bands) resolutions for mapping a heterogeneous landscape consisting of croplands, shrub lands, grasslands and riparian zones.

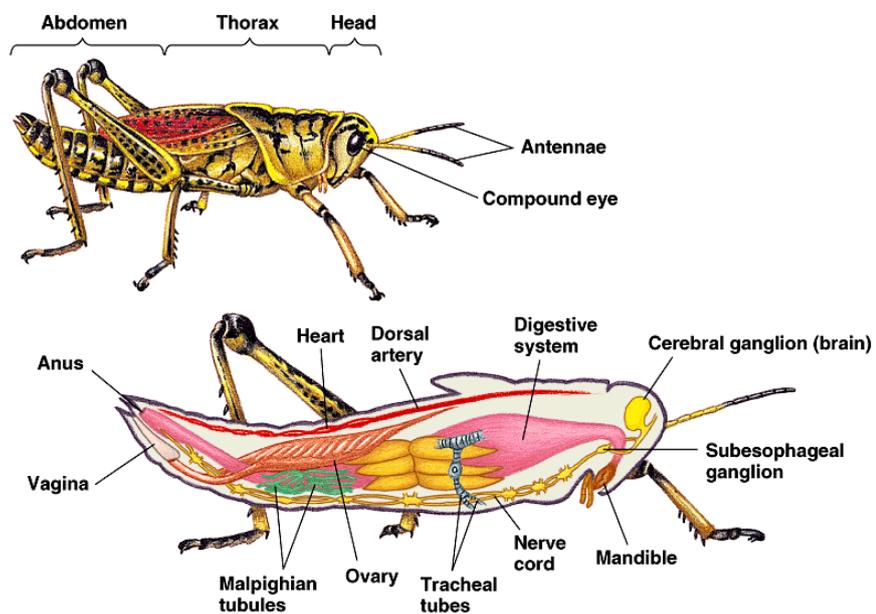


Fig. 8. *Calliptamus italicus* L.

A group of students working on identification represent the morphological structure of locusts of difference and similarity. The solution of the problem is considered from different positions and is fixed by a series of locust issues that are discussed by the expert group and students and is directed by the teacher. The questions may include the following:

[What are locusts? Are they different from grasshoppers?](#)

[What is locusts biological cycle? How long do they live?](#)

Which countries or regions are affected by Italian Locusts, Moroccan Locusts and Asian locusts?

[How long does a Asian locust live?](#)

[How many eggs does a Italian Locust female produce?](#)

[How far and how fast can Moroccan Locusts migrate?](#)

[How much food can Locusts, Moroccan Locusts and Asian locusts eat?](#)

[Which damage can Italian Locusts, Moroccan Locusts and Asian locusts do to crops?](#)

[How can Italian Locusts, Moroccan Locusts and Asian locusts be controlled?](#)

[When is the right period to conduct control operations?](#)

The method of coaching by the principle of answering the question WHY is it important to know? Defines and studies diseases of agricultural crops. For visual and better remembering the symptoms of the disease after discussing the specific methods of determining the disease, a control episode is made based on the presented video material, photographic material of the diseases, which need to be identified (Fig. \*). for example, put the names of the disease beans accordingly to the pattern.

Blight · Rootrot · Whitemold · CommonMosaicvirus · Leafspot · Rust · Anthracnose



Fig. 9. Plant diseases

***Working with the book is one of the most common and relevant techniques. Textbooks and manuals.***

Textbooks are books that specify the content of educational programs. In them the fundamentals of scientific knowledge on a particular subject in accordance with the purposes and objectives of the training, established training programs, techniques and requirements of didactics in them. For each

level of education their textbooks corresponding to the nature of the specialty are drawn up. The textbook is subject to strict requirements: it should be brief, contain material of a high degree of generalization and at the same time concrete, equipped with sufficient factual material. The text of the textbook, the language of the basic provisions, conclusions should differ the utmost clarity and precision. Of particular importance is its scientific, fascinating presentation, able to arouse interest and encourage thinking. Textbooks are the main source of knowledge and the organization of independent work of students, the most important means of training. Therefore, the textbook should be informative, encyclopedic, link the material with specific practical activities, with additional literature related fields of knowledge, encourage students to work and prepare for self-education.

The textbook reveals the content of training, therefore it is a kind of complex information model of the pedagogical process. The textbook reflects the goals and content of teaching, didactic principles, technology of instruction. The textbook reflects such stages of education as the formulation of the problem, the presentation of information, ways to solve problems, generalization and systematization, consolidation and control, and independent research.

For all its multi-functionality, the textbook cannot provide all aspects of education. This explains that since the 1970 began to create educational and methodical complexes - open systems of teaching aids, providing a personal-oriented level of education. At present, teaching and methodological complexes in some academic disciplines contain up to two dozen elements: a textbook, a task book, a reading book, an anthology, a workbook, a teacher's manual, a video cassette, CD Rom, etc. During 1990 years the number of alternative or parallel textbooks on the same subject has significantly increased in the last century. The main components of the textbook content are: informative, reproductive, creative, emotional-value.

**Information component** of the component is presented in the textbook with the help of verbal and symbolic presentation, as well as illustrations (vocabulary, facts and laws, methodological and evaluative knowledge).

**Reproductive tasks** focus on general educational, cognitive and practical activities.

**Creative activity** is set by means of problematic exposition, problems and problems of the collapsed text.

**The emotional and value component** reflects the ideological, moral, practical and labor, ideological, aesthetic and other directions that is provided

by brightness and figurativeness of presentation, the address to vital problems and personal experience of students, paradoxes and other means.

The textbook consists of texts: basic, additional and explanatory.

**The main text is divided into two components:**

1) theoretical and cognitive: basic terms; key concepts and their definitions; basic facts, phenomena, processes, events; experiments; description of the basic laws, theories, leading ideas; conclusions, etc.

2) Instrumental-practical: characteristics of basic methods of cognition, rules of application of knowledge, ways of their assimilation and independent search. In the textbook reflected these stages of learning, as problem statement, presentation of information, solutions of problems, generalization and systematization, consolidation and control, and independent research.

The textbook for all its versatility cannot provide all aspects of education, this explains that since the 1970s began to create educational and methodical complexes-open system of textbooks, providing, as believes A.V. Khutorskoy, personality-oriented level of education. Currently, educational and methodical complexes on some subjects contain up to two dozen elements: textbook, task book, book for reading, textbook, workbook, manual for teachers, videotape, CD-Rom, etc.

The textbook consists of texts: basic, additional and explanatory.

**The basic text** is divided into two components:

1) cognitive: basic terms; key concepts and their definitions; basic facts, phenomena, processes, events; experiments; description of the basic laws, theories, leading ideas; conclusions, etc.

2) instrumental and practical: the characteristics of the basic methods of cognition, the rules of applying knowledge, the methods of their assimilation and independent search for a description of tasks, experiments, exercises, experiments;

- Drawing up a set of tasks, experiments, independent work;
- reviews, sections, systematizing and integrating educational material.

**Additional text:**

documentation;

textbook material;

appeal to readers; biographical and ethnographic information;

statistical information;

reference materials that go beyond the scope of the program.

**Explanatory text:**

substantive introduction to the textbook, sections, chapters;

notes, explanations;

dictionaries;  
alphabets;  
determinants;  
explanations to maps, diagrams, diagrams;  
pointers.

In addition to texts with learning the material in the textbook contains water stove components: the unit of organization of mastering of material, illustrative material, the device orientation:

1) the unit of organization for learning - issues, tasks, memos, instructional materials, tables, captions to illustrative material, exercises;

2) illustrative material-subject and subject materials, documents, technical charts, diagrams, plans, drawings, instructions-techniques, graphics, reference books, illustrations;

3) orientation apparatus: preface, table of contents, rubricates, signal-symbols, bibliography, index, footers.

In addition to textbooks, various textbooks are used in training, which complement textbooks, sometimes partially or completely replace them. The training manual is a printed graphic, visual and other materials designed to provide a visual perception of subjects and phenomena that facilitate the acquisition of motor skills, etc. these include: dictionaries and reference books, tables, maps, and pictures, models, models and models, collection of minerals, microscope and various physical devices, simple measuring and drawing tools, geometric solids and shapes, etc. along with the teaching AIDS specially made in the teaching of applied and natural objects of technical equipment, tool kits, etc.

In modern conditions of modernization of education and its universal informatization, there is no question of rejecting textbooks and teaching aids, the essence and peculiarity of which were disclosed above. Their use is significantly changing. The fundamental novelty consists, firstly, in careful joint work on textbook texts in static and dynamic pairs and, secondly, the purpose of such work on the content of texts is not limited only to its understanding and willingness to respond to the teacher and to cope with control works (texts), but in that the studied program material should be taught to others, their fellow students.

The second task is to teach the whole program or study material of others-the main one.

Since the textbook becomes the main book-the main source of the information that is necessary in order to teach this information to others and in the process of this practice to teach others to assimilate, acquire deeply,

firmly and comprehensively the content of all the topics of the textbook, respectively, amendments, additions and improvements to the current textbook should be made.

### **Dual training.**

"... In the next 2-3 years, it is necessary to form the core of the national system of dual technical and vocational education". (From the message of the President of the Republic of Kazakhstan N. Nazarbayev "Kazakhstan way - 2050: Message Unified goal, common interests, common future").

In Kazakhstan, there is a process of phased introduction of dual training of personnel in the educational process of higher education. For the introduction of dual training at the department and the choice of the format of the work, the experience of Germany's higher school was studied, namely dual training at the universities of North Rhine Westphalia.

Dual education is a type of training in which the theoretical part of the training is conducted on the basis of an educational organization, and practical - in the workplace. A real training system assumes the training of students in institutions that are independent partners to each other - higher school and enterprise.

#### *Application and distribution the dual training.*

This SYSTEM is practiced in Germany, Austria, Switzerland. The founder of dual education is Germany. Origin: Baden-Wuerttemberg (early 70's). Dual training in the Federal Republic of Germany is introduced in a strict legislative framework and is implemented with the help of commercial and industrial and artisan chambers. Analyzing the development of dual education in Woerach North Rhine Westphalia, we concluded that private business invests heavily in the training of specialists in the right profile, and a mechanism for forecasting the need has been worked out in one or another specialist. A graduate of the German school begins his education *not from the choice of the University or Ssuz, but from the search for an enterprise that will take it for training*. If the graduate successfully passes the interview, the enterprise concludes a contract with him for training. The curriculum is formed by order and with the participation of employers who, in addition, have the opportunity to distribute the amount of educational material on the disciplines within the framework of one specialty. In the role of teachers in the production are employees of the company (instructors-mentors).

The Department of Plant Protection and Quarantine works on dual training with employers since its inception (2013). Employers actively participated in determining the trajectory of training, developing modular educational programs and working training programs.

*O organizational aspects of the dual system of training, worked out at the department:*

- Increase in practical occupations in the workplace, now they make up 25% of the entire educational process. *Practical classes in* such disciplines as: quarantine organisms and measures to combat them; methods of detection and recording of quarantine organisms are conducted by groups and subgroups on the basis of the State Institution "Center for Plant Quarantine". The students of the department have the opportunity to participate in conducting laboratory examinations under quarantine products and inspectors for plant quarantine sent to the laboratory, to confirm the presence of quarantine and other especially dangerous objects in them and to determine their species composition. Students carry out together with specialists and teachers entomological, phytopathological, helminthological and herbological examinations.

When carrying out an ethnological examination : students participate in the isolation of insects from a sample of quarantine products and by a visual method; isolation of insects from a sample of quarantine products with latent contamination by the flotation method. Have the ability to use a biological method to consider on phase development of insects. The battery for identification; participate in the identification of insects visually without the preparation of a micro preparation; identification of insects using microscopy with the preparation of a micro preparation. In the laboratories of the State Institution "Plant Quarantine Center" students of the department have the opportunity to conduct a pathological examination: the allocation of fungi from a sample of quarantine products by *cultivation in a moist chamber*, the method of washing off spores and centrifuging, and then identifying fungi. When studying the methods of helminthological examination: students study the isolation of nematodes from a sample of quarantine products by a flotation-flotation method (including using a cyste divider). Effective is the study of the basics and the conduct on the samples of quarantine of products herbological expertise: the allocation of seeds and fruits of plants from the sample by hand or by sieving; isolation of seeds and fruits of plants from soil samples by washing; identification of plants and seeds visually or by microscopy.

- The theoretical part is strengthened by reading in guest lecture format by invited professors and specialists of this profile. For example, for the academic year lectures on special disciplines, on the problematic areas of protection and quarantine of plants are the following specialists: DS in Agriculture, Professor of Belgorod State National Research University

(Russia) V.A. Korobov, FAO international consultants and researchers on locust problem, professors A.V. Lachinskiy (USA), F. Gapparov (Uzbekistan), E.V. Kambulin, Professor of Agricultural University in Krakow (Poland), Maria Pobozhnyak, professors of Kazakh scientific research institute of Plant Protection and Quarantine, DS in biology A.O. Sagitov, DS in Agriculture M.K. Koishibayev, candidate of agricultural science G.A. Zharmukhamedova.

- Recognized organizations for the dual training of the department are selected organizations that reflect a narrow specialization of the specialty, for example, "Republican Center for Plant Quarantine"; "Phytosanitary", "Republican methodological Center for phytosanitary diagnostics and predicting of agricultural pests spreading and development", including regional offices; business farm "Yesil-Agro" (Akmola region), "Astana - Zelenstroy", "Zhasyl Aimak" as well as other scientific institutions of the country. In these organizations, students get acquainted and work with materials representing quarantine facilities, get acquainted with the methods of identification and modern protection measures.

- Availability of certificates and accredited programs, the algorithm of work is worked out jointly by the university and production, each side sates the program and this brings a certain effect in training. It is noteworthy that the training becomes attractive for participants in the training process of students and enterprises. The organization of dual training at the department is aimed at observing the interests of private traders of dual training:

Students: acquire professional skills as following;

- targeted training;
- focused training in small groups;
- continuous study and work;
- direct application of specialized theoretical knowledge in practice;
- supervision of the enterprise and university;
- professional experience already by the time of graduation and compulsory employment;

*Enterprises:* - purposefully instruct young talents, who are trained individually, in accordance with the conditions and demands and of the enterprise are the work at the initial stage;

- continuous theoretical and practical training of future specialists;
- Insignificant risk of losing good graduates, the possibility of bonding;
- optional, company-specific, company-specific training model.

Over the past years, the *implementation of dual training at the department can establish the economic effectiveness of cooperation* :

- effective distribution of the load of teachers and premises;
- establishment of those meat contact and between students and enterprises;
- awakening the interests of enterprises in the preparation of students.

The results of the joint work of the department and enterprises are reflected in: the specification of State document "On approval of the professional standard in the protection and plant quarantine" the order of the Ministry of Agriculture on January 21, 2014 № 20/58. Within the framework of this document, professional types of labor activity are prescribed (specialists in plant protection, entomology, plant pathology, herbology). Taking into account the professional competence of specialists in plant protection, employers offer the following courses in the training programs "Herbology "," Protection of decorative plants" "Harmful quarantine organisms and their control", "Fundamentals of biotechnology in crop production and pest management", "Protection and examination of plant products during storage " etal . In RUEs specialties "Plant Protection and Quarantine" for the expired 2013-2017 . the share of the proposed disciplines by employers was about 4 0%. The list of elective courses is supplemented with disciplines, the necessity of which arose with changing development tasks and modernization of the agro-industrial complex, with changes in approaches to the treatment system against diseases and pests.

In the educational system of the Republic of Kazakhstan, production practice is one of the effective elements of dual training. At the department , third-year students have the opportunity to apply specialized theoretical knowledge in their work , the work of the department and the enterprise is supervised . Enterprises , companies noting the students' professional experience by the time they graduate are accepted and employed (Syngenta , Alem Agro, etc.). The department expands the boundaries of cooperation and activities.

In this direction, at present, employment after practice reaches up to 70%. Students of the department are involved in the implementation of scientific projects for the grant agreements with business entities which are also able to establish close contact with the companies, and n exerting its competence to become attractive to the work of the givers that affects their employment.

At present , the financial aspect is considered as one of the mechanisms for attracting enterprises to train future specialists:

" It is not transferring the systems developed in this or that country to our educational system in the absence of dual training in the universities of the RK . It is necessary to develop their own way and vision, but based on the best practices of the world educational space. The question of the mechanism

for forecasting the need in one or another specialist remains an open and requiring development. Consultations with employers made it possible to develop dual training programs with practical mixed- form phases . When 25-30% practical training carried out in companies and there is a strengthening of the theoretical by bringing in experts specialized organizations and scientific institutions first. Based on the foregoing, dual training at the department is being improved .

One of the main forms of learning is critical thinking, which has a number of meanings and is multifunctional. Briefly discuss the basics of critical thinking

### **Critical thinking**

The constructivist approach to learning is aimed at creating conditions and realizing natural-based learning. In these conditions , the value of the personal position of the trainees increases and the role of the individual style of thinking ; presumed The use of techniques that are close in form to existing models with with a system of rules established in a professional context; requires the integration of monitoring and evaluation procedures in the educational process. Such organizations The forms of work that form the intellectual qualities necessary for modern professionals require from the teacher careful analysis and effectiveness planned planning of the proposed training, effective goal-setting . We need to strengthen target orientation allows the teacher to determine the degree of advancement of the teaching th boiling To the intended result, which presupposes the formation of the experience of the intellect developmental activity, and to ensure timely correction in the structure of a complete model of intellectually developing learning. Successful implementation of training requires an effective tool as critical thinking.

Critical thinking acts as a Meta - subjective approach to op the process of learning in the process of comprehension, evaluation, analysis and synthesis of information obtained as a result of observation, experience, reflection or race judgments for the further development of the educational process. Critical Mind It is an important stage in the structure of education and promotes the development of creative thinking, the introduction of new ways of thinking and acting. Clay The critical skills of critical thinking are observation, interpretation, analysis, conclusions, evaluation, explanation.

Modern research shows that at a basic level, the process of critical thinking involves the following:

- collection of relevant information;
- assessment and critical analysis of evidence;

development of sound conclusions and generalizations;  
correction of assumptions and hypotheses based on practical results -  
experience.

It is recognized that the effective model of the development of critical thinking is Bloom's Taxonomy, discussed earlier. The goal of Bloom's Taxonomy is in the motivation of the teachers and the concentration of effort and attention with the goal of creating a holistic form of learning. Concepts of critical thinking act as a genre-species, critical thinking in teaching activities implemented in reflective practice as a teacher and teaching. The concept of "reflective practitioner" originates in the works of the philosopher, psychologist and reformer in the field of education John Dewey, as well as in the works of the philosopher, industrial and technological explorer Donald Schon. John Dewey's book *How We Think* (1910) had a unique impact on the learning process, defining a reflective thought from the point of view of intellectualizing the problems to be solved: fore the idea or hypothesis, the initiation and implementation of analysis and research practical situations; Approbation of the hypothesis in practice. So in the context of the activities of the teacher, the need comes to the fore, namely: identifying problems and finding effective means for their solution;

- setting priorities that are of decisive importance in solving problems;
- collection and classification of relevant information;
- precise and concise description;
- the establishment of undiscovered assumptions and values;
- interpretation of the results for argumentation of evidence and decision-making;

- development of objective conclusions and generalizations;
- argumentation of conclusions and generalizations;
- Correcting the model of professional convictions based on sex -  
experience.

The teacher conducts a critical reflection on what uchiyutsya students have the skills of critical thinking in the course of performing tasks that require analysis and reasoning of certain tasks and creative thinking purchased. Thus the main characteristics of critical thinking about schihsya th teaching are:

***Rationality.*** The desire to find a better explanation, staging questions instead of finding categorical answers, finding and recording any evidence; open arguments, not emotions (although the emotion takes place and can relate to the self-consciousness mentioned below).

**Open-mindedness.** Evaluation of all conclusions; analysis and recognition possible perspectives or perspectives; the desire to remain open to alternative interpretations.

**Judgment.** Recognition of the importance of evidence, relevance and significance of alternative assumptions and prospects.

**Discipline.** Striving for precision, comprehensive and exhaustive review (taking into account all available evidence and taking into account all check of vision).

**Self-awareness.** Awareness of the subjectivity of one's own assumptions, adherence, points of view and emotions.

It is remarkable that students who are critically thinking are active, capable of analysis of evidence, the conscious use of strategies for division of values; are skeptical about visual, oral and written evidence; are open to new ideas and perspectives, but this is the result of the teacher's constant methodical work

The following is a sequence of actions that can be used as a basis for critical reflection on one's own teaching and training of students:

1. Read the evidence you obtained as a result of the observation of the learning process.
2. Consider the learning objectives that structure the job system.
3. Analyze the relationship between the learning objectives on the one hand, and the methods of work of teaching and their achievements, on the other.
4. Compare the different levels of skills and understanding.
5. Synthesize, compare the information received from the sources and the results of your observations for reflection on the results of the activity as a whole, on a group scale.
6. Evaluate, making intermediate conclusions about relative success or not luck, relating to the results of the students' learning.
7. Use the conclusions and insights gained by you as a result of this critical evaluation, when planning a subsequent task or project.
8. Substantiate the use of critical thinking to replenish the argument - formation of conclusions and conclusions, are necessary for teaching and training in protection disciplines and quarantine of plants.

### **Control questions**

1. Modern paradigms of learning and the transformation of the role of the teacher.

2. What are key qualifications?
3. Research method in project-oriented learning.
4. What is the information competence?
5. Case-study as one of the innovative methods of the educational environment.
6. Pedagogical technology of the three-dimensional methodical training system.
7. Coaching as a pedagogical technology.
8. What is duality education?

### **Chapter 3. Multilingual training as a way of integration into the world educational space**

Multilingual personality of a citizen of the Republic of Kazakhstan becomes a reality today. The formation of a multilingual, multicultural personality is the realization of the cultural project of the President of the Republic of Kazakhstan "The Trinity of Languages". Especially clearly it was made in the media lecture President Nursultan Nazarbayev devoted to the phenomenon of the knowledge society

Multilingual is the basis for the formation of a poly-linguistic personality, the level of its formation largely determines the positive character of the person's self-realization in the modern conditions of social relations, his professional competitiveness.

Multilinguism as an important direction of the development of mankind was realized long ago. For the normal functioning of any multinational state, the formation of bilingualism and multilingualism is very important .

Multilinguism - "the use of several languages within a certain social community (primarily states a); the use of an individual (a group of people) of several languages, each of which is selected in accordance with a specific communicative situation. "

As the fundamental goal of teaching foreign languages is the formation of a multicultural, multilingual personality that has information, communication and intellectual needs, abilities and competencies that will allow it to successfully operate in the context of intercultural communication and vocational and linguistic knowledge of another language, foreign creativity. It is undeniable that teachers use innovative methods, methods of forming interest in learning, revitalization process and promote language learning and in the collection of special disciplines in Kazakh, Russian and foreign languages .

The application of new methods and technologies of instruction in the study of non-linguistic disciplines will contribute to the development of such personality traits that are in demand for a modern multicultural and multisocial society. therefore

The problem of using an effective methodology for teaching non-linguistic disciplines in a university is very important

### **3 .1 The KLIL method**

#### **Techniques used in the teaching of business in English**

In the Message of the President of the Republic of Kazakhstan N.Nazarbayev to the people of Kazakhstan "Strategy of Kazakhstan - 2050" New political course of the held state "noted:" Kazakhstan should be perceived all over the world as a highly educated country whose population uses three languages: Kazakh language - state language, Russian language as

the language of interethnic communication and English - the language of successful integration into the global economy "[1].

The main goal is the development of a multicultural personality. Learning a foreign language is the basis of multicultural education.

The implementation of the multilingual education is supported by the organization of pilot sites of different levels for the education of students and students. Successes in the introduction of multilingual education are demonstrated by schools and gymnasiums, Kazakh-Turkish lyceums, Nazarbayev Intellectual schools, colleges and universities they effectively use a professionally trained teaching staff, modern teaching technologies and the desire to learn in three languages of learners.

The main problem arising in the practice of teaching is, firstly, the absence or a small number of qualified teachers of a non-linguistic specialty with knowledge of the foreign or the second language. Secondly, the lack of educational, methodological, didactic support (special training aids and programs for studying disciplines in Kazakh, Russian and English have not yet been developed).

Third, the lack of knowledge of modern educational technologies in the study of foreign languages.

In order to realize the multilingual education of the NCCU "Arrow", within the framework of the courses for the improvement of the qualification of the teaching staff, training was conducted at seminars, internships on "The methodology of the integrated teaching of the subject and the language: features, advantages, methods of implementation". Participants got acquainted with the methodology of the subject-linguistic integrated learning (CLIL), its forms and ways of applying them, as well as with various forms and methods of assessment in integrated teaching of the subject and language.

CLIL is a teaching method in which some subjects are taught in foreign languages. Thus, the teaching of students in native and foreign languages is one. Teaching takes place in two languages so that in learning situations a language appropriate to the situation and objectives of instruction is used. According to the CLIL method, a foreign language can be used in all lessons in all academic subjects, except for the native language, that is, language becomes not an object of learning, but its means.

International practice shows that students who study subjects through a second or third language:

- more motivated;
- are attentive;
- Creative;

-have higher learning outcomes than students who are trained, only on one (native or second) language;

- successfully master the languages at the academic level, which facilitates the expansion of access to additional information, new perspectives of development, a deeper understanding of other cultures.

The experience of implementing this method shows that when designing a training course based on this technique, it is necessary to take into account the 4 "C" CLIL methods:

Content is the knowledge, skills, and skills of the subject area that are progressing.

Communication - the use of foreign language in training, with emphasis on its use.

Cognition is the development of cognitive and cognitive abilities that form a general representation (concrete or abstract).

Cultural is the provision of oneself as a part of culture, as well as the awareness of the existence of alternative cultures .

In addition, every class should use all kinds of speech skills: listening, reading, speaking and writing.

Auditing is one of the most important types of speech activity when learning the language.

Reading is the main kind of speech activity, reading materials should make sense.

Speaking is a type of activity in which it is necessary to focus on clarity of presentation, simplicity and fluency, while grammar is relegated to the background.

A letter is an activity through which lexical and grammatical skills develop.

In the development of language skills and subject knowledge, a lesson in the CLIL methodology is implemented according to a four-stage scheme:

Word processing. Ideal text should contain illustrations for visualization of the read. When working with foreign textmaking, it is necessary to structure text marking (numbering of lines, paragraphs, headings, subtitles), which makes working with the text much easier.

Awareness and organization of acquired knowledge. Texts are often represented schematically, which helps to determine the idea of the text and the information presented in it.

Linguistic understanding of the text. It is expected that students will be able to convey the idea of the text in their own words. Students can use both simple language tools and more advanced, there should not be a clear

gradation of which vocabulary to use, but the teacher still needs to draw the attention of students to certain lexical units that fit the topic and subject.

Tasks should depend on the level of students' training, on the tasks of instruction, and on the preferences of training [3].

The design of training activities using the CLIL methodology is implemented taking into account the following recommendations:

1) It is necessary to plan and organize each lesson, proceeding from the principles of 4 Connect / Communicate / Cognition / Culture;

2) Each lesson should have clearly stated goals, learning outcomes, methods and criteria of evaluation and reflection;

3) The teacher should regularly conduct self-examination of his / her studies on the basis of a checklist on the methodology of integrated learning;

4) It is necessary to use in practice supportive formative evaluation and alternative forms of evaluation;

5) It is necessary to develop and select high-quality materials, means of clarity and authentic texts for integrated teaching of the subject and language in all subject courses.

As a practical illustration, the following examples of the use of Activities CLIL in the classroom can be cited at the seminar:

Activities "The question loop" There are leaflets of questions and answers in English. On one side of the question, on the other side of the sheet the answer is another question. When one reads, everyone should listen carefully, the one who found the answer, reads the answer to the question and reads his question and so on. Activities develops attentiveness, correct pronunciation.

Active "Guess". Students are divided into groups. For each group a large sheet is printed, sealed by the stickers. Behind the stickers there is a picture of the representative of the entomofauna. Questions and terms are placed in the center of the sheet. Each member of the group answers a question or explains the meaning of words in English and removes one sticker. Answering all questions, students should guess the insect and tell about it.

Thus, the conducted seminar makes its practical contribution to the implementation of the multilingual education. It is noted that teaching by the CLIL methodology provides meta-subject communications and provides an opportunity to achieve practical results, and also develops cultural awareness, internationalization, language competence, readiness not only for learning, but also the ability to apply new knowledge in life and, accordingly, enhance life motivation, focus on success, which ultimately leads to achievement of

the main goal - the formation of professional competence of future graduates, increasing their mobility and the ability to adapt to rapidly changing life situations.

### **3.2 History of the issue - abroad and in Kazakhstan the development of a new form of training (CLIL)**

Content and Language Integrated Learning (CLIL) is an approach to learning that is focused in two directions: the use of the studied language for learning and teaching subject matter, and a foreign language simultaneously [3, 1].

People lived in multilingual societies always and thousands of years ago. Time dictated the conditions and new forms of communication and learning the language.

CLIL is not a new form of learning a foreign language or subject - it is an innovative technology that combines many techniques implemented before the CLIL.

Among such techniques (listed in English) [11]:

- CBI - Content-based instruction;
- CBLI - Content-based language instruction;
- CBLT - Content-based language teaching;
- Dual-focused language education;
- LAC – Language across the curriculum;
- TFL – Teaching through a foreign language;
- TBE – Transitional bilingual education;
- WAC – Writing across curriculum.

Consider the CLIL methodology and the set of historical prerequisites for its development in various countries. According to Dale [4, 19-21], CLIL is the result of the influence of ideas of bilingualism, the ideas of mastering a foreign language as a second language, the theory of cognitive learning and constructivism. Coyle, Hood and Marsh [3] note the influence of bilingual learning and the method of language immersion, as well as language learning through content. Background to CLIL Although the term "CLIL" appeared relatively recently (in 1994), it is not entirely new.

Bilingual, and in some cases, polylingual, of such groups of people was a means of survival. This was especially true for people with a large income. For example, at the end of the nineteenth century, there were two ways of learning foreign languages: rich people sent their children to study abroad or hired foreign tutors and governesses. Children learned not only

grammar rules, but also necessary vocabulary. So many of them studied foreign languages not only through instructions in the studied language, but practiced daily language practice with native speakers.

Bilingual education appeared in countries with several state languages. For example, in Luxembourg, children learned German from elementary school and French from middle school. The principle of studying a foreign language through subject content was covered by two outstanding teachers of Central Europe. The first of these is a well-known teacher of Czech origin, Jan Amos Kamensky, who stressed the importance of effective teaching of foreign languages and the next - Matthias Bel (of Slovak origin). For Bela, the language is a means of mastering the subjects of the curriculum. His motto: "Teach words for the knowledge of reality and the world around." His students studying Latin had to describe various routes through the Latin verb constructions "enter the cave, take it, measure it." He thought to organize age-appropriate lessons using a variety of pictures, maps, visualized stories, and thereby stimulated active imagination of students. Also Matthias Bel worked on the development of communicative competence in all languages used in the region (German, Hungarian and Czech). Bel created a simple grammar manual and several books with texts of different content for studying Latin so that students do not have to deduce them themselves. According to the books, the trainees studied words from everyday life and learned to operate with them. Promotion to CLIL - the second half of the XX century until 1970, the need to create programs with the integration of language and content learning had the prerequisites of geographical, demographic and economic nature.

At most, such programs were used in specific linguistic regions (at the borders of countries or in large cities). One of the first countries where bilingual programs began to apply is Canada.

From the 1960 to the 1998 about 300,000 Canadian children participated in programs of this type. By 2007, there were 317 bilingual language immersion programs in US general education schools, which provided training in 10 languages. In 1966, another way of learning foreign languages arose in England: the so-called LAC (Language Across the curriculum) - the use of intersubject connections in the study of a foreign language. The idea of creating technology was born in teachers of the general education school, who began to think about the importance of the role of discussions in the English language classes. It all began with a discussion of how thought is formulated in language, what functions language performs in society, how people master a foreign language.

The researchers concluded that students need to be more involved in the study of the language they are faced with and that they are studying in school. The first steps to the development of the LAC were based on experiments and the ordering of the theory. The idea of the LAC was very consistent and logical, which led to its rapid spread in England, Australia and Canada.

In the United States, the approach was only partially used: for the development of writing skills (WAC). As a method of integrating simultaneous content and language learning in the United States, the CBI (Content-Based Instruction) and bilingual education programs are used. The success of the above integrated training programs has attracted the attention of Europeans interested in the development of language policy. In 1978, the European Commission proposed that schooling should take place in several languages.

The prerequisites for the emergence of various integrated learning technologies (including CLIL) were various factors: historical, sociological and educational. However, an attempt to copy the model of language immersion in a number was not crowned with success. Presumably, this can be argued by the fact that the European teachers did not take into account the cultural and linguistic differences between the countries.

Language immersion programs did not take hold in a number of European countries due to the place occupied by the mother tongue in the country's education. That is why CLIL is a "simplified" version of bilingual training. In some universities in Europe there was a tendency for the development of courses or programs in English. In part, they were similar to a subject-oriented approach (CBI).

The emergence of CLIL and its development (since the 90s) The acronym CLIL was created by David Marsh, one of the researchers working in the field of poly-linguistics and bilingual studies at the University of Finland of Jyväskylä, in 1994. Marsh has a huge life experience associated with poly-linguism: he was born in Australia. He was educated in Britain and built a career in Finland.

Canadian language immersion programs, as well as British LAC programs, are the basis for the development of CLIL technology. The basic idea of technology was to introduce the study of objects through a foreign language. According to Marsch, the need for the approval of CLIL in Europe during 1994 was due to the development of the political and educational sphere. The political motive power was the view that social mobility in the European Union required a high level of competence in a foreign language. In

the educational sphere, the goal was to create and implement existing teaching methods (in the case of Canada) in order to raise more competent students.

During the 1990 the acronym CLIL has become the most used term in Europe to design programs for integrating foreign language teaching and subject content. In 2005, David Marsh proposed to designate CLIL as a general term for various bilateral methodologies, in which attention was given to the thematic content and the language being studied. In 2006, Eurydice reported that CLIL training is available in most European Union countries. By 2007, CLIL began to be used in 20 European countries.

Over the past decade, CLIL studies, mostly focused on the linguistic side of technology, have quickly accelerated thanks to researchers from different disciplines: linguists, educators, psychologists, neurologists, etc. Also, the study of two-sided learning (language and subject content) has been supplemented by a study of strategies for studying and mental skills of students [9]. At the moment, many universities in Europe have training courses for teachers for teaching on CLIL. A European qualification framework has also been created for teachers who already practice this technology in teaching.

The CLIL methodology in Kazakhstan. One of the objectives of the State Program for the Development of Education and Science of the Republic of Kazakhstan for 2016 - 2019 is to update the content of education aimed at developing and implementing programs for the development of education systems that provide a step-by-step transition to a competence-based model of education. One such program is the "Roadmap for the development of trilingual education for 2015-2020" as part of the implementation and implementation of the program, on-line master classes and conferences are held. On the subject-language technology of integrated learning (CLIL), at the present time the development and translation of the experience of pedagogical ideas with the help of CLIL technology (subject-language integrated learning) is under way in teaching subjects of the natural cycle in conditions of multilingualism.

In the process of learning, personal, subject and meta-subject competencies of students are formed through the active use of the practical orientation of CLIL, through which regulatory actions of self-observation, self-monitoring, self-evaluation are carried out in the process of communicative activity in a foreign language (in our case, in English). Particular attention to the use of this technology is paid attention to the reading and pronunciation of thematic terms in English. To develop listening

skills in English, the classes use video clips accompanied by assignments aimed at revealing an understanding of the material heard through the questions asked by the teacher and the answers that form the communicative abilities of the students.

The fulfillment of the task is accompanied by self-evaluation and mutual evaluation by means of criteria of the level of achievement of the goal. It is noteworthy that this technique develops a creative approach, for example, the use of special disciplines. Students read a book, study the text and find the picture, as well as receiving annotations for Paddleboard Activestudio, which used to create jobs that simultaneously allow you to check the answer and after then tell about the ongoing process in English. Here it's composing by you as well as translating it into English.

What influences cognitive, motivational and creative spheres of the teacher's personality? The basic principles of the CLIL methodology are the following postulates:

- Knowledge of the language becomes a means of studying the content of the subject;
- Classes are held in an exciting form, students put scientific experiments and conduct various experiments;
- The language is integrated into the general education program;
- Increased motivation to learn to use the language to discuss interesting topics;
- Classes are based on immersion in the language environment;
- The necessary skill is reading texts in a foreign language.

Methods CLIL for the development of specialized knowledge among students using different strategies, activates speaking skills. Students perform tasks in English on the analysis of phytosanitary situations, prove the correctness of solving the problem, using SMART technology on individual laptops.

The technology of application of modern herbicides, using audio and video materials, improves the writing skills. The task is an audio text with missing words and phrases of special vocabulary on the ActivStudio interactive whiteboard, and students should fill in empty spaces with the appropriate terminology and explain the proposed material in English through dialogue and conversation (hot chair strategies, interviews, etc.).

Completing such activities are reflexive works of both substantive and emotional order that help each student to comprehend the strategy that is being implemented, provide an opportunity and, furthermore, encourage the statement of his assessment of the performed actions in English, in addition,

serves as an excellent means of feedback for the teacher , allowing more confidently, relying not only on their feelings and opinions of colleagues, but also on the students' reaction to highlight the weak and strong places of the work done.

Thus, the subject-language technology of integrated learning (CLIL) from a modern teacher requires innovative, creative thinking, the ability to solve problems independently, to recognize the personal and social importance of professional activity, to be responsible for its result, and is a vivid experience of using the CLIL method in implementation ideas trilingual.

### **3.3 Aspects of using integrated learning technology (CLIL)**

#### **CLIL in biology: two “organic” activities**

During a CLIL for Starters course in Utrecht in March this year, Justin Peters, a biology teacher from Schoonhovens College, came up with some simple but effective CLIL activities for teaching the topic of “human organs” for his first year TIO class. In this article, we describe the activities and explain why they are effective CLIL.

#### **Language and content aims**

For the activities, Justin formulated both content and language aims. The content aims of these activities are:

- Students activate their prior knowledge about human organs
- Students know what the names of the organs are and their functions
- Students start to learn what the organs do
- Students learn that organs are not only to be found in the abdominal cavity

The language aims of these activities are:

- Students expand their vocabulary related to the topic of organs
- Students deduce words in a reading text using surrounding context

#### **Introduction: a mind map**

The first part of the lesson is a mind map is made by the teacher on the smartboard or whiteboard, with input from the pupils. At the start of his lesson, Justin writes “organs” in a circle in the centre of the board, and pupils are asked what comes to mind. The students are first required to think for

themselves and to write their own individual ideas on to their mini whiteboards, their own associations with the word organs. Justin then asks the students to call out the words they have thought of and written down. At the same time, he secretly (in his ownhead) categorizes them into three categories as he writes them into the mind map (Fig. 10.): 1. Organs (green), 2. Functions of organs (purple),and (for the words which don't really fit anywhere) 3. General or 'other' (red). As he collects the words; Justin ensures that his pupils know the meaning of each one. If there are gaps in the mind map, where the teacher thinks useful words in the unit have been omitted, he adds them to the mind map and explains them.

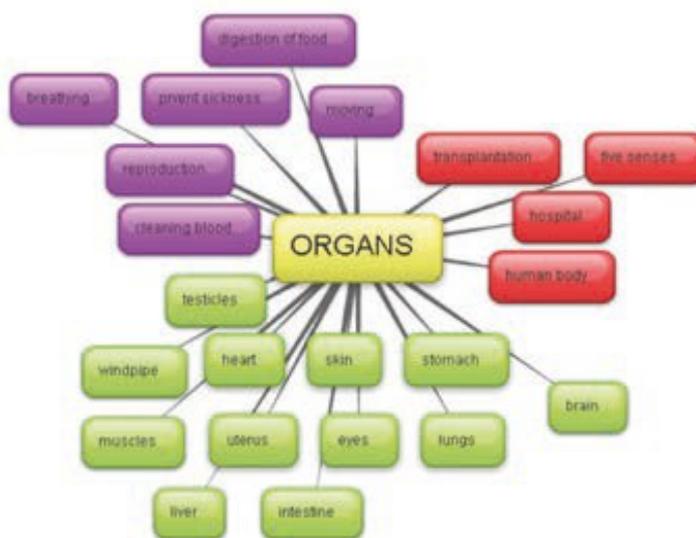


Fig. 10. Organs

Once the mind map is complete, Justin asks, “What are these groups I have made? How have I grouped the words?” He elicits the answers - the names of the categories he had originally thought of mini whiteboard.

### **Why is this effective CLIL?**

“Not mind-boggling,” we hear you all saying. “We all make mind maps these days.” However, there are three important “CLIL” aspects of this activity. Firstly, Justin gives the pupils thinking time - individually to write down the words on their whiteboards, to think of the words (subject) and to think of the names in English (language). Thinking time is really important: it engages more learners than if you ask a question from the front of the class and everyone has to think.

The second effective CLIL aspect of the activity lies in the grouping of the words. Research on learning vocabulary tells us that we store words in

“schemata” or topic groups in our brains. If we teach words in groups of similar kinds, there is more likelihood that our pupils will remember them. A third CLIL aspect of the activity is that – by using the whiteboards and the board at the front of the classroom - Justin is already recycling the words which he and his students will use in the next few lessons. He is focusing them already on the useful vocabulary and getting them to use the words, even at the start of a unit.

### **Gapped text**

The second activity on organs is a gapped text. First, Justin creates a simple text for his pupils at B1 level on the Common European Framework of Reference for languages, since he knows that they are at this level in terms of language. Pupils are given a handout of a gapped text, in which they fill in the gaps from the words below the text, in pairs. In the text, references are made to the words that should be filled in so that if pupils read the words in context, they are easier to guess. Justin also gives them a further clue - a figure with human organ names. This helps the pupils further to find the right word. After having completed the task, the gapped text is projected on to the smartboard and the pupils suggest their answers. Finally, the definition of an organ itself is discussed.

### **Conclusion.**

What is CLIL?

CLIL is an approach or a method which integrates the teaching of content from the curriculum with the teaching of a non-native language.

It is increasingly important in our global, technological society, where knowledge of another language helps learners to develop skills in their first language and also helps them develop skills to communicate ideas about science, arts and technology to people around the world.

CLIL principles in action

Content - Biology, Chemistry, Physics...

Communication – language

Cognition – critical thinking (LOTS and HOTS)

Culture – understanding the world

Vocabulary.

When?

1. At the beginning of a unit
2. Before reading or listening
3. Ad hoc

What?

1. Definition

2. Form
3. Pronunciation/spelling

How?

KWL, Realia, drawing, pictures, demonstration, mime, explanation

Reading a listening the teacher can use 3 stages:

- Pre-teach vocabulary before the text
- Set a task to engage the learners with the reading
- Give a detailed reading with questions answers

Recording vocabulary in CLIL lessons:

- Spelling – spelling gym;
- Single words – frayer model;
- Groups of words – graphic organizers.

Writing:

- Word level;
- Sentence level;
- Text;
- Text (independent).

Lesson plans and resources:

- Select – age, learning outcome, level, motivating;
- Adapt – change some language, add a picture/diagram/glossary;
- Reject;
- Add.

Lesson plan:

- Procedure;
- Communication;
- Cognition;
- Assessment;
- Resources.

### **3.4 Importance and variety of forms of control**

Training is a multifaceted process, and knowledge control is only one of its sides. In correspondence with the model Bloom teachers can permanently be estimated by the process of learning. When the information obtained from such an assessment indicates insufficient cognitive results, the teacher can return to the material and teach it again using other teaching strategies. Almost at the same time, Michael Scriven (Scriven, 1967) proposed two types of evaluation: formative and summative. Formative assessment provides of use analytical

tools and techniques for measuring the progress of the teaching in the process of cognition of the world.

According to P. Black and D. Williams (Black and William, 1998), evaluation means all actions, corollary undertaken by teachers and their students in the evaluation. That provide information used as feedback to adjust teaching and learning. Based on their analysis, Black and William concluded that innovations that reinforce the practice of formative evaluation help to achieve tangible and often significant results in the learning process. Learning results in the application of formative assessment are more significant than those obtained with other teaching strategies (Stefanek, 2002). Evaluation system of teaching is projective tool, which not measure students' achievements only, but also increase the quality of education. Therefore, under the assessment system is understood as not the scale only, which is used for grading, but, above all, the mechanism of the Diag Stick-development activities of teacher and student as full participants in the educational process.

Evaluation is also a reflection of the process of interaction between the state , stvom and university teachers and students. Only if the evaluation system is in line with the goals and objectives of the educational process, it becomes an effective mechanism for improving its quality ( Chepekova , 2009).

As you know, the task of evaluation is quite complex in itself. Its impact on The learning process depends on several reasons:

- The task of evaluation ( formative or summative )
- The type of evaluation objectives (cognitive, affective, behavioral, influences)
- Level of assessment (reaction, assimilation, behavior, impact on the organization)
- Type of training objectives (declarative knowledge, procedural training, vedenoic )
- Type of educational event (in the classroom , technology, mixed)
- Size and type of groups of participants (individually, small group, large Group)

The purpose of the assessment is:

- *Identify learning difficulty* (for example, testing for the purpose of the definition - dividing the gaps in knowledge of students).
- *Feedback* shows the achievements of teaching yuschihsya (may vary vatsya from the informal to the formal in formal pismennyhotchetov)

- *Motivation* . It becomes obuchajushche hsy stimulus for studying Part No..
- *Forecasting and selection* . The system of the VOUD and various tests to continue the training at a higher level-magistracy ).
- *Standardization after appropriate control* (awarding a qualification category). Admission to universities of foreign countries . At the level of teachers it is certification. *Control the content of the educational program and the style of teaching* .

The need to improve the assessment process as an important component of the learning process is conditional on the following circumstances. Baldwin T. and Ford J. cite facts: the American government spends up to \$ 100 billion on education and development , and at the same time "no more than 10 percent of these costs are really transformed into subsequent work" ( Baldwin and Ford, 1988).

Evaluation is *a concept used to denote activities aimed at systematically summarizing the results of training with a view to making decisions about further training* . For teachers and students, it is important to know the goals that they are trying to achieve, which requires an understanding of the criteria for the success of these goals. In this connection, the essence of the criterial evaluation . Criterial assessment - is a process based on a comparison of educational achievements of learning

There are two types of evaluation: formative and summative . Consider what they are.

Formative estimation

Improving training depends on the five key conditions:

- effective feedback from the teacher and student ;
- active inclusion of students in the process of their own teaching;
- Accounting in teaching the results obtained during the evaluation;
- an understanding of how the motivation and self-evaluation of trainees depend on evaluation ;
- the ability of trainees to self-evaluation ( Black and William, 1989).

The Evaluation Approach for Learning is at the center of the solution of the problem of improving the teaching and learning processes. The most relevant requirements of the interim mechanism of society.

Evaluation for learning - is the process of finding and interpreting the data, IP -used by students and their teachers to determine the stage at which the trainees are in the process of their education, the direction in which to develop, and how to achieve the required level better . For Black and William, as well as many other scientists in this area, the shape assessment is not a tool or a case of set of methods with a common feature. In general,

studies show that forms of assessment - this is not instrument, which is formative; at the use of information that is compiled by any means to accommodate education and training, which has a "formative" advantage. Thus, the formative (current) assessment is the definition of the current level of mastery of knowledge and skills in the course of everyday work in the lesson and / or at home, the implementation of the operational relationship between the learner and the teacher in the learning process. It allows students to understand how correctly they perform assignments during the study of new material and achieve the goals and objectives of training. Formative assessment is used in everyday practice (every hour, every day). With this type of evaluation, feedback must necessarily be provided to ensure progress in learning. Formative evaluation helps the teacher to track the progress in the group.

Thus, it carries in itself a formative, stimulating and motivating factor, functions. If we imagine that children are flowers, then the total estimation of plants is simply their measurement. It may be interesting to compare and analyze the results of measurements, but this does not affect the growth of plants in any way.

Formative assessment is equivalent to caring for the plant and its irrigation,

corresponding to the needs of plants, which directly affects their growth .

#### Principles of Formative Assessment

Trainees in their activities should be guided by the following principles of evaluation:

- Relevance. Concentrating on the evaluation of the most significant results
- Adequacy. Monitoring of conformity assessment of knowledge, skills, competencies, goals and learning outcomes.
- Objectivity and fairness. Carrying out of careful development - ki specific evaluation criteria. Criteria warn of the danger of an accident , use of assessment and mark as a pressure tool in the teaching of th schegosya.
- Integration . Implementation of evaluation as planned and carefully thought out component of the learning process.

#### Assessment form.

However, it is in it that various forms of mobile are present, modernized, and make maximum use of the latest achievements in pedagogy and the entire system of education. Noteworthy is the use and expansion of the range of computer technology, they have advanced as far as possible, among them testing takes a leading role. At present, we note that in a number of countries testing has crowded out the traditional forms of control

- verbal and written exams and interviews. Testing in pedagogy performs three basic interrelated functions: diagnostic, teaching and educational:
- The diagnostic function is to identify the level of knowledge, skills, and skills of trainees. This is the main and most obvious test function. By objectivity, breadth and speed of diagnosis, testing is superior to all other forms of pedagogical control.
- The teaching function of testing consists in motivating trainees to activate the work on mastering the teaching material. To enhance the learning function of testing, additional incentive measures can be used, such as the distribution of an approximate list of questions for self-preparation, the availability of guidance questions and tips in the test, and a joint analysis of test results.
- The educational function is *manifested in the periodicity and inevitability of the test* control. This disciplines, organizes and directs the activities of trainees, helps identify and eliminate gaps in knowledge, shapes the desire to develop their abilities.

Systematic testing of the knowledge of a large number of audited leads to the need for automation of knowledge testing, the use of computer technology and appropriate knowledge testing programs. Computer testing and questionnaires have a number of advantages over traditional forms and methods of control. It allows us to use time more rationally, cover more content, quickly establish feedback with trainees and determine the results of mastering the material focus on the gaps in knowledge and skills and make adjustments to them.

The main advantages of this form of knowledge control are:

- The possibility of a detailed verification of the assimilation of each topic of the course;
- Implementation of operational diagnostics of the level of mastering of the educational levels of each trainee;
- provides a simultaneous test of knowledge of trainees and create their motivation to prepare for each session;
- A properly designed test raises interest in the subject;
- Allows individualizing work with the trainee;
- Saving study time in monitoring knowledge and evaluating training results;
- Application of tests allows solving the problem of self-development.

But, along with positive, there are also negative sides in the application tests:

- Test control does not contribute to the development of oral and written speech;
- The choice of the answer can occur at random, it is impossible to trace the logic

reasoning.

The application of testing programs and computer tests is economical, call profitable and enhances the efficiency of the educational process, objective evaluation of the level of knowledge and a rational dopolnieniemk other methods of examination. An important role, when using computer testing, is played by the selection of programs for testing knowledge, developing and creating tests.

Here is an *overview of some online tools for creating and conducting professional research based on surveys and questionnaires.*

The Google Drive application (<http://www.google.com/>) allows you to store all the files on your network, and also create text documents, presentations, tables, pictures. To create questionnaires, you use the form document. The form can include various types of questions: *Text, Text (paragraph), One of the list, Several from the list, Drop-down list, Scale, Grid, Date, Time.* The poll results are automatically saved in a tabular form. This data can be exported to various common formats (Word , Excel , PDF). You can also get a summary of answers in a graphical form .

The site Online Test Pad (<http://onlinetestpad.com>) offers the *opportunity and tools for conducting online studies, exams, quizzes, which are based on tests.* They can be performed both on the basis of their tests created in the test designer, and with the help of an existing test database. The results are available in a tabular form with detailed statistics and in a graphical form. The site has a large collection of online tests on various topics, in various subjects, of varying difficulty. Tests are created in a handy constructor and do not require a single line of code . In the Online Test Designer Test Pad provides flexible editing of the content question. Any question can include text, html-symbols , tables, images, documents, video. To edit the appearance, a powerful and convenient WYSIWYG editor is used. Thus, you can display the question in any form. The answers can be several in number or in types.

The Online Test Pad designer provides the following types of responses:

*One choice, Multi select, Enter number, Enter plain text, Answer in own order,Forms of sequence, Establishment of correspondences ,Filling in blanks (numbers, text, selection from the list), Interactive dictation, Consecutive exception.*

The main features of the online test designer:

- publication / cancellation of publication of the test;
- access to the test by the code word;

- availability of the test in the general list of tests;
  - setting the time for passing the test;
  - enable or disable the display of question numbers;
  - free movement on issues;
  - Showing questions in random order;
  - choice of the test passing mode: all questions at once or one at a time;
- millet;
- flexible calculation of test results;
  - the possibility of plotting graphs and histograms on the results of processing -
- ki test;
- showing the correct answers based on the test results;
  - the ability to add interpretation based on scoring results;
  - the ability to add test registration parameters (date, date, list, etc.) and use them for calculation.

To visualize the results, i.e. for the construction of graphs, histograms, diagrams based on the results of the test processing, a powerful and convenient tool is used. You can customize the appearance, types of graphs, types of histograms, set orientation and much more. Graphs can be downloaded and saved as a picture. After testing, statistics on the answers are presented.

Site **Createsurvey** (<http://www.createsurvey.ru/>) - allows you to quickly create questionnaires. Questionnaires can include the following types of questions : *Single-line, Multi-line text, Single selection, List, Multiple choice, Matrix* . The results of the responses can be sent to e-mail.

Main features:

- convenient editor, many templates;
- sending questionnaires by e-mail ;
- Tracking respondents, reminders;
- a web link to the questionnaire;
- post it on the site, forum, in social networks;
- Real-time reports;
- Online , Excel , SPSS., Filters;

The summary report on the completed questionnaire is available in a graphical format.

Pro-survey (<http://www.pro-opros.ru/>) is a resource created with the aim of making the process of conducting a survey of students more rapid and convenient.

With the help of the resource users can:

- create a questionnaire (questionnaire) from scratch;
- use ready-made questionnaire templates (questionnaires);
- create copies of questionnaires, previously conducted surveys;
- invite respondents to participate in the survey by e-mail through the resource;
- monitor the results online;
- Generate arbitrary reports and much more.

For work "the Personal cabinet" is used.

The following functions are available in the personal account :

*Personal information* . On the personal information page you can specify

personal data, set an avatar , change your password, set nastroykikonstruktoratestov and others.

*Messages*. Your personal messages are displayed here. Here you can write messages to other users and the site administration.

*Designer polls*. Here is the main functional of the online con-  
the polling structure . Here you can add new polls, questions, answer options,  
view general statistics and for each respondent and much more .

*Test constructor*. Here is the main functionality of the online test  
designer. Here you can add new tests, questions, answer options , calculation  
scales, view statistics and much more.

*Bank issues*. A separate categorized 'repository' for your questions.  
Questions from the bank questions can be added to any of your tests, and any  
change in the issue in the bank leads to the same changes in the test.

*My statistics*. Here you can view your statistics on the use of our  
designers, on the tests that you took on the site, on the solvedcrosswords and  
unfinished attempts, as well as the coins you have typed.

*The students*. Here is the functional work with students. Maintain a list  
of students and groups, create assignments and assignments for  
execution, create courses, view detailed statistics on assignments and courses.

*Lists* . Here you add and edit custom  
lists that can be used, for example, as initial test parameters.

*Registration of tests*. Here you can customize and set the appearance  
options for the appearance of tests that you can paste into your site.

*Research*. Here, new studies are added, parameters are set,  
detailed statistics are collected, graphs are built.

*Mini-site.* Here is the functionality of working with your own mini-site . With the help of a mini-site you can organize your own site for testing your respondents.

*My Pages.* Here you can create your own pages and place them on text blocks and test blocks. These pages will help you quickly organize a list of your tests for your respondents.

To create the test, select the "Test Designer".

Enter the name of your test and click the "Add" button. To add a question, you need to specify: question type, orientation, answers, Number of answers and Number of questions . If you have all the same questions, you can specify the right number of questions at once . It is necessary to consider the validity of the test.

*Validity Test - (from the English. Valid - valid suitable, effective) is one of the key criteria for evaluating the test results, along with the reliability, representativeness, objectivity, reliability and efficiency. The validity of the test is a criterion of the adequacy and effectiveness of the test, an indicator of the measure of conformity of the test of the test purpose .* If the correlation coefficient of the question is less than the threshold level set in the program - the question is not test, that is, it does not evaluate the student's knowledge. It is recommended to remove it, and replace it with another question . As a result of practice, a base of test valid questions is formed.

The more often you conduct a test in different groups, the more qualitatively you will have the necessary base of questions. Among the types of questions you can choose: One choice , Multiple choice , Enter number, Enter plain text, Answer in free form, Fill in passes - numbers, Fill in passes - text, Fill in passes - select from the list, Interactive dictation , Matching , Sequential exclusion, Slider (slider ), Official - information message.

### ***One form of control is working with the questionnaire .***

Organization of the questionnaire is that those who wish to answer the board on any question from the list of questions on VF Shatalov call such a work a "lecture". Having prepared all the necessary records and drawings, usually 8-10 people answer each one for their own question and the excellent answer gives the right to examine all the others, but only on this issue.

In the group, everyone becomes an examiner and examiners. The teacher also does not sit idle. Some guys, it provides the right otve tit for two, three or four questions. Who responded well and what is permitted for Nima exam has not

one but a number of them to examination tickets. This eliminates the queue for examiners and possible conflicts: you do not want to answer, one examiner, go to another. When this kind of work all work with everyone: underachiever, honors - does not matter, everything is re meshivaetsya into a single *collective work*. True, their task is facilitated by the fact that they are working on the ready questionnaires and use the textbook. It can be assumed that this is the simplest version of the students' joint work on the questionnaire. But the students are on some more advanced stage coop ARISING rise to the level when they can work very well on 2-3 and even ten questionnaires. Such a situation occurs, as it were, in itself natural, when the transition to a higher level takes place .

### [What are butterflies and moths?](#)

How many moth species are there?

What are the most widespread moth species?

In what stage of development do moths cause the most damage?

Are pheromone traps an effective method to combat moths

Why is the use of trichogramma (ichneumon wasps) the best method to combat moths?

How many types of beetles are there?

Where do Colorado potato beetle live mostly?

What eats Colorado potato beetle?

How are Colorado potato beetles born?

How long do Colorado potato beetle live?

Why it is called the Colorado potato beetle when it comes from Mexico and is found all over the United States?

What do rats eat?

What are rodents?

### [What is souslik biological cycle? How long do they live?](#)

Which countries or regions are affected by sousliks ?

### [How long does a Spider Mite live?](#)

### [How many eggs does a Spider Mite produce?](#)

### [How much food can Spider Mites eat?](#)

### [What are plant parasitic nematodes?](#)

How many plant parasitic nematodes species are there?

What does Septoria tritici blotch look like?

What causes Septoria tritici blotch?

Does Septoria tritici blotch only affect wheat?  
 Are there Septoria tritici blotch resistant wheat varieties?  
 Will fungicides prevent Septoria tritici blotch?  
 Will a seed treatment help?  
 What is integrated disease management?

[What kinds of organisms can cause plant diseases?](#)

[What is the difference between 'symptoms' and 'signs'?](#)

[How can genetic engineering be used to control plant viruses?](#)

Rhizoctonia and Pythium both cause damping-off of seedlings. On the microscopic level, how would you distinguish between these two pathogens?

*The forms and types of exams*, taking into account the formation of competence, are one of the important elements in the educational process. They form a variety of examinations: they form methodological, social, independent competences. The joint definition of quality criteria for certain types of examinations motivates and creates optimal conditions for training. It is of the utmost importance that the training processes are qualified and actively supported by types of control. It is necessary to define the types of control, and n Elzy does not take into account the importance of feedback and reflection on students' perceptions of various materials v This e It is important for the teacher to understand his / her function : to teach , advise on the issues of education and the discipline being studied, to conduct the educational process, and how to check the types of knowledge . Currently, training requires competence-oriented testing of knowledge . (fig. \*)

A variety of examination can check raznobrazie competence of trainee methodical, social and independent. There are forms of control that form all kinds of competences - abstracts and presentations, poster presentations, these forms of control are the dominant ones in checking the knowledge of the students of the department in special disciplines . A special role should be given to scientific and practical activities in formations of competence. For example, written work, Parcours exams form methodological competence

Table 6. Types of examinations in the competence of a condition oriented verification of knowledge

| Types of examinations | Competence | Competences that go beyond the specialty |                     |                        |
|-----------------------|------------|--|---------------------|------------------------|
|                       |            | Methodical competences                   | Social competencies | Independent competence |
| Written exams         | XX         | X  |                     |                        |
| Oral                  | XX         | X  |                     |                        |

|   |    |   |                |   |
|---|----|---|----------------|---|
| examinations  |    |   |                |   |
| Reports / presentations                                   | XX | X | X <sub>1</sub> | X |
| Written works   | XX | X | X <sub>1</sub> | X |
| Poster presentation                                       | XX | X | X <sub>1</sub> | X |
| Scientific and practical activity                         | XX | X | X <sub>1</sub> | X |
| Diary of study  | XX | X |                | X |
| Portfolio   | XX | X |                | X |
| Protocols   | XX | X |                |   |
| Group exams   | XX | X | X              |   |
| Parcours (for example, an objective clinical exam - OSCE) | XX | X |                |   |
| Speeches on the forums                                    | XX | X |                | X |
| Group Puzzle  | XX | X | X              | X |

At the current examination of knowledge practiced for special disciplines cycle, conducting scientific colloquium and consists of the following steps: assessment on expert topic of of inverse relationship, assessment, forming of expert groups on the practical implementation. Practical seminar - which consists of the following steps: to conduct assessment of exercise in small groups. Presentation of answers is demonstration of the decision and the course of work. The main issues and criteria for testing knowledge are includes: measurement and organization. Measurement refers to objectivity, reliability, validity, criterion of organization, economy, transparency, honesty (Fig. 7 ).



Fig.11. Quality criteria for testing knowledge

### **3.5 Terms and definitions for the protection and quarantine of plants and work with the conceptual apparatus**

#### **Terms and determinations of professional words on the protection and quarantine of plants**

Categorical apparatus is a set of terms and concepts that are used (or developed) by science in the process of research. The concepts used by each science reflect accumulated knowledge. All scientific concepts are divided into two main groups: philosophical and private, specific for this science. The following main groups of general scientific concepts are distinguished: · *universally-general scientific concepts ; concepts that reflect the properties and objects of knowledge, and the particular sciences that study these objects* . At the same time, the ontological and logico-gnoseological aspects are united (concepts such as system, element, structure "have not only logical-methodological universality, but also ontological universality); In each concept, *its content and volume* are distinguished . The content of a concept *means that set of attributes or properties of objects that are reflected in this concept* . As for the scope of the concept, *it means a set (class) of objects, each of which contains attributes (properties) related to the content of this concept* . Some of the authors of books on logic believe that there is a law of the inverse relationship between the content and scope of the

concept. Its essence is as follows: any increase in the elements of the content of the concept entails a decrease in volume, and any decrease in content leads to an increase in volume. Sometimes the content of the concept is associated with depth, and the volume - with the breadth of knowledge in any region. All this can be summarized as follows: "... a concept is a mental reflection in the form of a direct unity of general and essential features of objects ." There are concepts that have only a logico-gnoseological status; belong only to the private sciences themselves, but not to the objects of knowledge of these sciences. They have a basis for use in the scientific activity itself and in this respect characterize the development of all sciences and science in general (concepts such as sign, algorithm, formalization, interpretation, etc.); In epistemology (the theory of knowledge) the concept represents a logical form of knowledge of the surrounding world characteristic only for man. In contrast to the sensory image (sensation, perception, representation), the concept as an abstract (ideal) image is devoid of any visibility, all sensuality. Secondly, the concept is a generalized form of reflection of reality . If in the sensory forms of cognition an object is reproduced in its individuality, then the concept fixes only the common features (properties) of many objects that form a special class, group. The abstract, generalized reflection of reality plays a huge role in scientific cognition, as it gives an opportunity to penetrate into the essence of things (objects, phenomena, etc.), which is impossible with a sensual reflection of reality. Third, the concept reflects the essence of things. It is with the help of the concept that the goal of revealing the essence of things is achieved. Operating concepts is a necessary condition for the existence of science. The state of the conceptual - terminological apparatus of science makes it possible to judge the degree of development of the corresponding theory, to highlight various aspects, the relations of real objects, and the variety of cognitive tasks arising in the process of teaching and educating a person. Operating concepts is a prerequisite for studying and constructing theoretical models, understanding the learning processes in dynamics and perspective, allows you to more clearly identify the subject of research and build a consistent concept of it. The system of requirements reinforces this conceptual awareness and difference. The development of terminological questions in the teaching of the science of plant protection and in pedagogy in general is particularly relevant during the reform of the education system, in the conditions of free access of users to domestic and foreign sources of information, the possibility of cooperation and cooperation of scientists from different countries . The restructuring of the general and vocational schools, the introduction of new standards, greatly enriched

science with new concepts, increased the need for systematization and streamlining its technology of use. An important stage in the development and use of the conceptual and terminological apparatus is the organization, organization and grouping of concepts and their definitions. When developing and using the conceptual and terminological apparatus of science, it is necessary to take into account the whole modern context, i.e. usage in scientific works, encyclopedias and dictionaries. With specific concepts are included in the terminology in the first place. To this end, it is necessary first to identify the composition of this system of concepts. When using terms like technology should rely on reliable facts, correct ideas about them, appropriate words for their transfer. To have a single language of science, an unambiguous system of concepts and adequate terms is important for phytosanitary science in connection with the fact that many terms and concepts have come to science in connection with integrations into the world educational space and links with the development of phytosanitary science and the expansion of its boundaries. In any science, among the set of concepts, it is possible to identify the most significant ones, those that are identically defined in any of its branches, without which it is impossible to do without describing its subject, and which correspond to its basic processes and phenomena. They are called categories and constitute the categorical-conceptual apparatus of this science. These are the concepts that determine the main phenomena and processes studied by science. These categories are very complex, and therefore their very interpretation in science is ambiguous, many basic concepts are actively used by other sciences. In the study of special disciplines on plant protection, there are different forms of using concepts and terms that are original techniques and techniques. Let's give an example, find the value and choose the appropriate value for the proposed concepts. The significance of this work is much functionally - to fix the pronunciation of terms, to understand the essence and significance of concepts, to form an idea of the application of concepts.

|                                  |  |
|----------------------------------|--|
| <b><u>Algicides</u></b>          | Biopesticides are certain types of pesticides derived from such natural materials as animals, plants, bacteria, and certain minerals |
| <b><u>Antifouling agents</u></b> | Kill or repel organisms that attach to underwater surfaces, such as boat bottoms   |
| <b><u>Antimicrobials</u></b>     | Control algae in lakes, canals, swimming pools, water tanks, and other sites   |
| <b><u>Attractants</u></b>        | Kill insects and other arthropods  |

|                                     |   |
|-------------------------------------|---|
| <u>Biopesticides</u>                | Kill mites that feed on plants and animals  |
| <u>Biocides</u>                     | Kill fungi (including blights, mildews, molds, and rusts)   |
| <u>Disinfectants and sanitizers</u> | Kill microorganisms (such as bacteria and viruses)  |
| <u>Fungicides</u>                   | Attract pests (for example, to lure an insect or rodent to a trap). (However, food is not considered a pesticide when used as an attractant.) |
| <u>Fumigants</u>                    | Kill nematodes (microscopic, worm-like organisms that feed on plant roots)  |
| <u>Herbicides</u>                   | Microorganisms that kill, inhibit, or out compete pests, including insects or other microorganisms  |
| <u>Insecticides</u>                 | Kill microorganisms   |
| <u>Miticides</u>                    | Produce gas or vapor  |
| <u>Microbial pesticides</u>         | Biochemicals used to disrupt the mating behavior of insects   |
| <u>Molluscicides</u>                | Kill weeds and other plants that they wanted  |
| <u>Nematicides</u>                  | Kill or inactivate disease-producing microorganisms on inanimate objects  |
| Ovicides                            | Kill eggs of insects and mites  |
| Pheromones                          | Control mice and other rodents  |
| Repellents                          | Kill snails and slugs   |
| Rodenticides                        | Repel pests, including insects (such as mosquitoes) and birds   |

Or the assignment from the proposed text to highlight professional terms and explain the meaning.

*Task* - answer questions and highlight terms and explain their meaning.

What is the definition of integrated disease management?  
 Why use integrated disease management?  
 How do you know if a respirator is necessary?  
 When must you always wear a respirator?  
 Why not use cotton or leather gloves when handling highly toxic pesticides?  
 In what kind of containers should pesticides be stored?  
 What can you do for an accidental spill of a pesticide?

Assignment. Describe the process shown in the figure and describe it with several special terms.



Fig. 8. Chemical treatments

*The task.* Read, choose professional words from the text and translate into English.

High numbers and harmfulness of insects and mites are observed in those farms that cultivate grass for a long time on seeds. Therefore, first of all, it is necessary to alternate the use of crops for seed and forage purposes, as far as possible to maintain spatial isolation between new seed plots and areas from the last year's testes. Waste after cleaning the seeds should be destroyed or used in the farm before the onset of spring. The use of chemical and biological tools in the field helps to quickly suppress harmful insects. Pesticides should be used only on seed crops and in the protection of seedlings. Fields intended for green fodder and hay, processed with chemicals are undesirable because of the danger of preserving residual amounts of pesticides. Guaranteed suppression of pests to economically insignificant sizes is achieved only with the integrated use of all available preventive and extermination measures.

*The task-. From the text choose terms, give a definition. Using professional terms to them to pick up by appropriate videos and posters and to check the effectiveness of the action*

In order to detect and eliminate foci, to prevent the spread of the Californian scabbard, as well as to prevent crop losses and the loss of fruit crops, a system of measures is established to identify and control the pest, which is mandatory for all enterprises and organizations, regardless of their departmental subordination, as well as individuals.

To identify the Californian scabbard, it is necessary to carefully inspect all parts of plants: trunks, branches, shoots, leaves, fruits (pay attention to the stems and calyx - the places most populated by the pest). Colonies of the

California shield are characterized by a dense arrangement and layering of scutes, which distinguishes them from colonies of species similar to it. Fruit and ornamental trees infected with Californian scabbard have a specific longitudinal and transverse cracking of the cortex of the trunk and branches. When examining fruits and leaves, you need to pay attention to the red spots that are formed as a result of feeding the scales.

First of all, all state nurseries, irrespective of their location, growing planting material of fruit, forest and ornamental crops are subject to annual inspection. Nurseries and forest belts are more convenient to inspect during the period when the trees are in the impersonal state. The rest of the examinations should be carried out from the beginning of the maturation of apples of early varieties when collecting the carrion and before the harvesting of late varieties, paying special attention to the characteristic cherry-red spots of the pumps during the inspection. Samples with the scars detected during the survey are collected, analyzed and sent to the Republican Quarantine Laboratory to establish species identity.

At present, a very reliable and promising method for examining the Californian scabbard with the use of glue traps with a sex pheromone is widely used, which makes it possible to detect even a very weak infection.

### **Terms for work on disciplines**

Abdomen - the posterior of the three body divisions of an insect. The other two body divisions are head and thorax.

Abiotic-pertaining to the absence of life,

Abscise-to separate from a plant, as leaves, flowers, and fruits

Acari-an order in the class arachnida, including the mites and ticks. They are characterized by an oval, one-part body and a min

Acervulus (pl. Acervuli) -erumpent, cushionlike fruiting body bearing conidiophores, conidia, and sometimes setae

Acropetal-upward from the base to the apex of a shoot of a plant; in fungi, the production of spores in succession in the direction of the apex so that the apical spore is the youngest (see basipetal)

Actinomycete-a group of microorganisms similar to bacteria that produce long filaments

Acute toxicity-ability of a single dose of a compound to poison (see chronic toxicity)

Acute-pertaining to symptoms that develop suddenly (see chronic)

Additional- declarational statement that is required by an importing country to be entered on a phytosanitary certificate and to specific additional information pertinent to the phytosanitary condition of a consignment

adult-the-last, or mature, stage in the life cycle of an insect. It is the reproductive stage. Ute to small body size

Adventitious-arising from other than the usual place, as roots from a stem rather than as branches of a root

Aeciospore-dikaryotic spore of a rust fungus produced in an aecium; in heteroecious rusts, a spore stage that infects the alternate host

Aecium (pl. Aecia; adj. Aecial) - the fruiting body of a rust fungus in which the first dikaryotic spores (aeciospores) are produced

Aerial-occurring in the air

Aerobic-living only in the presence of oxygen

Aestivation-dormancy during a warm or dry season that allows insects to survive.

Aflatoxin-chemical byproduct from *aspergillus flavus* and *a. Parasiticus* harmful to humans and other animals

Aggressiveness-relative ability of plant pathogen to colonize and cause damage to plants (see virulence)

Air pollution-any air contaminant that causes undesirable effects on living organisms or materials

Alate-winged (see apterous)

Allele-any of one or more alternative forms of a gene

Allelopathy (adj. Allelopathic) -ability of one species to inhibit or prevent the growth of another species through the production of a toxic substance (s)

Alternate host -one of two kinds of plant on which a parasitic fungus (eg rust) must develop to complete its life cycle

Alternative host-a plant other than the main host that a parasite can colonize; alternative hosts are not required for completion of the developmental cycle of the parasite

Amphid-a chemosensory organ located in the anterior region of a nematode

Amphigynous-having an antheridium through which the oogonium grows, as in many phytophthora species (see paragynous)

Amphimobile-able to move both upward and downward in phloem, as do some pesticides

Anaerobic-living in the absence of oxygen

Anamorph (adj. Anamorphic; syn. Imperfect state) - the asexual form in the life cycle of a fungus, when asexual spores (such as conidia) or no spores are produced (see holomorph and teleomorph)

Annulations-grooved bands in the cuticle of some nematodes

Ant- any of the various social insects of the family formicidae (order hymenoptera). Only the males and fertile females have wings. They are living in colonies.

Antagonism-a general term for interference between organisms that may include antibiosis or competition for nutrients or space; action of two or more pesticides that reduce the effectiveness of one or all (see synergism)

Antagonist-an organism or substance that limits or counteracts the action of another

Antenna- a pair of jointed appendages located on the head of an insect above the mouthparts, which are usually used for smelling and feeling (touching), and in some cases for hearing.

Antheridium (pl. Antheridia) -male sexual organ (male gametangium) found in some fungi

Anthraxnose-caused by acervuli-forming fungi (order melanconiales) and characterized by sunken lesions and necrosis

Antibiotic-a chemical compound produced by one microorganism that inhibits the growth or kills of other living organisms

Antibody-a specific protein is formed in the blood of warm-blooded animals in response to the presence of an antigen

Antigen-any foreign chemical (normally a protein) that induces the formation of antibodies in warm-blooded animals

Aphid-insect to the family of aphididae in the order hemiptera, suborder homoptera.

Apothecium (pl. Apothecia) -open, cuplike or saucerlike, ascus-bearing fungal fruiting body (ascocarp), often supported on a stalk

Application - of these terms to plant products and regulated articles depends on their nature

Appressorium (pl. Appressoria) -swollen, flattened portion of a fungal filament that adheres to the surface of a higher plant, providing anchorage for invasion by a fungus

Apterous- without wings. Wingless.

Araneae-an order order, to the class arachnida, comprised of the spiders. They are characterized by two body parts (cephalothorax and abdomen), eight legs, and a pair of fangs (chelicerae).

Arbuscular mycorrhiza (abbr. Am; syn. Endomycorrhiza) -symbiotic association between a nonpathogenic or weakly pathogenic fungus and the roots of plants in which fungal hyphae invade cortical cells of the root and produce vesicles and arbuscles (see ectomycorrhiza)

Arbuscule (adj. Arbuscular) -branched haustorial structure of certain endomycorrhizal fungi that forms within the living cell of the root

Area - an officially defined country, part of a country or all of parts of several countries

Arthropod-member of the phylum arthropoda, which consists of animals with articulated bodies and limbs and which includes insects, arachnids, and crustaceans

Ascocarp (syn. Ascoma) -sexual fruiting body of an ascomycetous fungus that produces asci and ascospores; eg apothecium, ascostroma, cleistothecium, perithecium, pseudothecium

Ascogonium (pl., Ascogonia) -a specialized cell that gives rise to the hyphae that produce asci

Ascoma (pl., Ascomata; syn. Ascocarp) -sexual fruiting body of an ascomycetous fungus that produces asci and ascospores; eg apothecium, ascostroma, cleistothecium, perithecium, pseudothecium

Ascomycetes (adj. Ascomycetous) -a group of fungi, also called the ascomycota, that produces sexual spores (ascospores) within a saclike structure called an ascus

Ascospore-sexual spore borne in an ascus

Ascus (pl., Asci) -saclike structure containing ascospores (typically eight) and usually borne in a fungal fruiting body

Asexual reproduction-any type of reproduction not involving the union of gametes and meiosis

Asexual-vegetative; without sex organs, gametes, or sexual spores; the imperfect or anamorphic stage of a fungus

Audpc (abbr. For area under the disease progress curve) -a measure of the total amount of disease over a period of time, determined from graphs of disease vs. Time, which can be used to measure epidemics quantitatively

Autoecious-in reference to rust fungi, producing all spore forms on one species of host plant (see heteroecious)

Autotroph-an organism that synthesizes its nutritive substances from inorganic molecules; eg plants capable of photosynthesis (see heterotroph)

Auxin-plant hormone (growth regulator) influencing growth through cell elongation

Avirulence (avr) gene-gene in a pathogen that usually causes a hypersensitive reaction, is associated with active plant defense reactions in a susceptible plant

Avirulent (syn. Nonpathogenic) -unable to cause disease (see virulent)

Avoidance-the principle of plant disease control in which plants are grown at times or locations where the pathogen is inactive or not present

Axenic culture in the absence of living bacteria or other organisms; pure culture

Bacterial streaming -large populations of bacteria that exude from the cut surface of a diseased plant tissue when observed with a microscope

Bactericide-a chemical or physical agent that kills bacteria

Bacteriocin-a protein antibiotic, one or more types of which can be produced and excreted by certain strains of bacteria

Bacteriophage-a virus that infects a bacterium

Bacterium (pl. Bacteria) -a prokaryotic, microscopic, single-celled organism with a cell wall that increases by binary fission

Basal knob (syn. Stylet knob) -structure at the base of a nematode stylet

Basidiocarp (syn. Basidioma) -sexual fruiting body of a basidiomycetous fungus

Basidioma (pl. Basidiomata; syn. Basidiocarp) -sexual fruiting body of a basidiomycetous fungus

Basidiomycetes (adj. Basidiomycetous) -a fungus group, also called the basidiomycota, characterized by the formation of external basidiospores on basidia

Basidiospore-haploid (1n) sexual spore produced on a basidium

Basidium (Basidia, adj. Basidial) -specialized cell or organ, often club-shaped, in which karyogamy and meiosis occur, followed by production of externally-borne basidiospores (generally four) that are haploid. There are several types of basidia.

Bee-any of several insects of the superfamily apoidea (order hymenoptera). Bees are winged, hairy-bodied, usually stinging insects, including both solitary and social species. They are characterized by sucking and chewing mouthparts for gathering nectar and pollen

Beetle-any insect of the order of coleoptera characterized by elytra (thickened outer wings), chewing mouth parts, and complete metamorphosis

Beetle-any of the numerous insects of the order coleoptera. Beetles have biting mouthparts. Their forewings are modified to form a strong covering that protects the underlying membranous hind wings when at rest.

Bicellular-two-celled

Biennial-a plant that produces seeds and dies at the end of its second year of growth (see annual, perennial)

Binary fission-a type of asexual reproduction in which two cells, usually of the same size and shape, are formed by the growth and division of one cell

Binomial, latin-the scientific name of an organism, composed of two names, the first designating the genus and the second, the specific epithet, together making the species name

Binucleate-having two nuclei

Bioassay-any test (assay) using a living organism

Biocide-a compound toxic to all forms of life

Biocontrol (syn. Biological control) -exploitation by humans of the natural competition, parasitism and / or antagonism of organisms for management of pests and pathogens

Biocontrol (syn. Biological control) -use by humans of one species of organism to eliminate or control another species of organism

Biological control (syn. Biocontrol) -exploitation by humans of the natural competition, parasitism and / or antagonism of organisms for management of pests and pathogens

Biotechnology-the development of genetically modified organisms through the use of modern technology and processes, including genetic engineering

Biotic-relating to life, as caused by living organisms

Biotroph (syn. Obligate parasite) -an organism that can live and multiply only on another living organism (see necrotroph)

Blotch-necrotic area of tissue irregular in form

Borer-insect or insect larva that forms tunnels or cavities in the bark or within the tree of trees

Boundary layer-the calm layer of the air on surfaces below the layer of more turbulent air

Breaking-disease symptom, usually caused by a virus, in addition to loss of flower color to create a variegated pattern. (see flower break)

Brood-all of the individual insects that hatch from the eggs laid by one mother.

Budding-a special type of plant grafting using a single bud on the rootstock of another plant; method of asexual reproduction in fungi, such as yeasts

Bug-any insect of the order hemiptera characterized in part by piercing-sucking mouth parts, a triangular scutellum, two pairs of wings, and gradual metamorphosis

Bug-true bugs are insects of the suborder heteroptera (order hemiptera). They are wingless or four-winged, with mouthparts adapted for piercing and sucking. The term bug is sometimes used to refer to any insect or similar organisms such as centipedes and mites.

Bulbs and tubers - dormant

Bursa-extension or flap of cuticle at the side of the male nematode sex organ, used for orienting during mating

Butterfly-any of the various insects of the order lepidoptera. Butterflies have slender bodies, knobbed antennae, and four broad, usually colorful wings. Most butterflies are day-flying insects. (see also: moth)

No information is available. Callose-amorphous, hardened carbohydrate.

Capsid (syn. Coat protein) -the protective layer of protein surrounding the nucleic acid core of a virus; the proteins that make up this layer

Capsule-gel-like material surrounding a bacterial cell

Casting-premature loss of abscised leaves or twigs

Caterpillar-larva of an insect to the order lepidoptera (butterflies and moths). Caterpillars usually have a cylindrical body, a distinct head capsule, chewing mouthparts, thoracic legs, and abdominal prolegs. The name of the caterpillar is also used for larvae of scorpionflies and sawflies.

Caudal-referring to the tail or rear of the body.

Causal agent-organism or agent that incites and governs

Cellwall-protective, resistant, but permeable structure secreted externally to the cell membrane in plants, bacteria, fungi, and certain other organisms

Center of origin-geographical area where a plant originated

Centipede-animal to the class chilopoda. Some characteristics of centipedes are an elongate, flattened, wormlike shape, a hard external skeleton, two body sections (head and many-segmented trunk), 15 to 30 pairs of legs (one pair per trunk segment), a pair of antennae with 14 or more segments, and simple eyes.

Certificate - an official document which attests to the phytosanitary status of any consignment affected by phytosanitary regulations

Chemical control of insects-control of insects with insecticides.

Chemotaxis (syn. Chemotropism) -movement or growth of an organism in response to changing concentration of a chemical stimulus, often in relation to food or for mating

Chitin-complex polysaccharide carbohydrate in fungal cell walls, animal exoskeletons, and nematode egg shells

Chlamydo-spore-thick-walled or double-walled asexual resting spore formed from hyphal cells (terminal or intercalary) or by transformation of a conidial cell that can function as an overwintering stage

Chlorophyll (adj. Chlorophyllous) -one of a group of green pigments found in chloroplasts and important in photosynthesis

Chloroplast-disklike structure containing chlorophyll in which photosynthesis occurs in green plants

Chlorosis (adj. Chlorotic) -failure of chlorophyll development, caused by disease or a nutritional disturbance; fading of green plant color to light green, yellow, or white

Chromosome-the structure that contains the genes of an organism; in eukaryotes, chromosomes are in the nucleus and can be visualized with an optical microscope as threads or rods during meiosis and mitosis; in bacteria, the chromosome is usually an optical microscope

Chronic toxicity-poisoning due to low levels of exposure to a compound of a period of time

Chronic-pertaining to slow-developing, persistent, or recurring symptoms (see acute)

Chytridiomycetes-a fungus group, also called the chytridiomycota, characterized by the production of motile zoospores and resting sporangia; the plant-pathogenic species are all biotrophs that are restricted to the cells of their host.

Circulatory transmission (syn. Persistent transmission) -virus transmission characterized by a long period of acquisition of the virus by a vector (typical an insect), a latent period of several hours before the vector is able to transmit the virus, and retention of the virus by the vector for a long period, usually several days; the virus circulates in the body of the vector

Circulatory-propagative transmission (syn. Propagative transmission) - pathogen transmission characterized by a long period of acquisition of the pathogen (usually a mollicute, eg phytoplasma or spiroplasma, and sometimes a virus) by a vector (typically an insect), a latent period before the vector is able to transmit the pathogen, and retention of the pathogen by the vector for a long period because the pathogen reproduces or replicates in the vector

Class-an animal classification category.A subdivision of a phylum, consisting of a group of related orders. (see: classification)

Clearance (of a consignment) - verification of compliance with phytosanitary regulations

Cocoon-a silken case in which a pupa is formed.

Coleoptera-insect order containing the beetles. Beetles are characterized by hard front wings that meet in a straight line in the m

Colony-a group of individuals of the same species of insects, living together, often in a type of a nest. Idle of the back, chewing mouthparts, and a complete metamorphosis.

Commodity - a type of plant, plant product, or other

Commodity class - a category of similar commodities that can be considered together in phytosanitary regulations

Complete metamorphosis- a type of development of four distinct stages; egg, larval stages, pupa and adult. A complete metamorphosis is characteristic for insect missions.

Consignment - a quantity of plants, plant products and / or other regulated articles (a consignment may be composed of one or more lots)

Containment - the application of phytosanitary measures in and out an infested area to prevent spread of a pest

Control (of a pest) - suppression, containment or eradication of a pest population

Cornicle-one of a pair of tubular structures extending from the posterior part of the abdomen of aphids (family aphididae).

Country of origin - country where a consignment of plants is grown

Country of re-export - country through which a consignment of plants passed

Country of transit - country of which a consignment of plants passed without being split up, stored or having its packaging changed, without being exposed to contamination by pests in that country

Coxa-the basal segment of the insect leg.

Cuticle- the noncellular outer layer of the body of an anthropod (see: chitin)

Damselfly- any of the various insects of the suborder zygoptera (order odonata). Damselflies are often brightly colored, predatory insects. They have a long slender body and elongated membranous wings that are folded together when the insect is at rest.

Debarking - removal of bark from round wood (debarking does not necessarily make the wood bark-free)

Delimiting survey - survey conducted to establish the boundaries of an area considered to be infested by or free from a pest

Detection survey - survey conducted in an area to determine if pests are present

Detention - keeping a consignment in official custody or confinement for phytosanitary reasons

Diapause- a period of dormancy during which the development of the insect is arrested. In the life cycle of many insects, this period of suspended growth and reduced metabolism will make them more resistant to unfavorable environmental conditions such as low temperatures.

Diptera- insect order containing flies (gnats, mosquitoes, true flies). They are characterized by a single pair of membranous wings, a pair of halteres (instead of the hind wings), sucking mouthparts, and a complete metamorphosis.

Dragonfly- any of various insects of the suborder anisoptera (order odonata). Dragonflies are large insects with a long slender body and two pairs of narrow, net-veined wings. Usually the wings are held outstretched while resting. They feed as predators on small flying insects. Sometimes they are referred to as "mosquito hawk" or "snake doctor".

Ectoparasite- a parasite that lives on the outside of its host

Endangered area - an area where ecological factors favor the establishment of a pest The presence in the area will result in economically important loss

Endoparasite- a parasite that lives inside his host.

Entomologist-a person who studies the biology of insects.

Entomology - the study of insects.

Entry (of a pest) -movement of a pest into an area where it is not yet present, or present but not distributed and once officially controlled

Equivalence - the situation of phytosanitary measures which are not identical but have the same effect

Eradication - application of phytosanitary measures to eliminate a pest from an area

Establishment - perpetuation, for the foreseeable future, of a pest within an area after entry

Exopterygota- subclass of the insects, including the orders with a simple or incomplete metamorphosis. In molting from egg, through the nymphal stages to an adult, there is a gradual change in the external appearance. The late nymphal stages already show the development of wing pads. But only in the last molt functional wings are developed. The nymphs usually have the same feeding habits as the adults.

Family- a subdivision of an order, containing a group of related genera. Family names always end in "idae", for example meloidae.

Fauna- all of the animals found in a given area.

Field inspection - inspection of plants in a field during the growing season

Fieldplot- of land with defined boundaries within a place of production on which a commodity is grown

Find free - to inspect a consignment, field or place of production and consider it to be free from a specific pest

Flagellum (pl. Flagella) -hairlike, whiplike, or tinsel-like appendage of a motile cell, bacterium or zoospore that provides locomotion

Flea- any of the various insects of the order of siphonaptera. Fleas are small, wingless, bloodsucking insects that have legs adapted for jumping. They are parasitic on warm-blooded animals.

Fleck-minute, discolored spot in green tissue

Focus (pl. Foci) - small area of diseased plants within a population

Form genus - a genus based on morphology and not on evolutionary relationships, such as used for imperfect fungi

Fumigant (v. Fumigate) - a gas or volatile substance used to kill or inhibit the growth of microorganisms or other pests

Fumigation - treatment with a chemical agent that reaches the commodity wholly or primarily in a gaseous state

Fungicide (adj. Fungicidal) - chemical or physical agent that kills or inhibits the growth of fungi

Fungistat (adj. Fungistatic) - a chemical or physical agent that inhibits fungal growth, sporulation, or spore gemination, but does not cause death

Fungus (pl. Fungi) - a eukaryotic organism that is usually filamentous (forming a mycelium) and heterotrophic, has cell walls composed of chitin, and reproduces by sexual and / or asexual spores

Gall (syn. Tumor) - abnormal swelling or localized outgrowth, often roughly spherical, produced by a plant as a result of an attack by a fungus, bacterium, nematode, insect, or other organism

Germplasm - plants intended for use in breeding or conservation programs

Giantcelln-enlarged, multinucleate cell formed in roots by repeated nuclear division without cell division induced by secretions of certain sedentary plant-parasitic nematodes

Gibberellins - plant hormones (growth regulators) that affect stem elongation

Gill - thin, radial membrane production basidiospores in the cap of certain basidiomycetous fungi (eg mushrooms)

Girdle - to circle and cut through the stem of the bark and the outer few rings of wood, disrupting the phloem and xylem

Glabrous - smooth; without hairs

Gram stain - used for identification of bacteria in which crystal violet stain, gram's iodine, ethyl alcohol and safranin stain are applied in succession to cells of the bacteria

Grasshopper- any of numerous insects of the families acrididae and tettigoniidae (order orthoptera). Grasshoppers usually have long, powerful hind legs adapted for jumping.

Green manure - a crop plowed under while still green and growing to improve the soil; sometimes used to enhance populations of antagonistic microorganisms for biological control

Greenbug - the common name for certain species of aphids.

Growing medium - any material in which plant roots are growing or intended for that purpose

Growing season- inspection see field inspection

Growth regulator - a chemical substance produced in one part of an organism and transported in the minute quantities to induce a growth response in another part, eg in plants, auxins, cytokinins, and gibberellins

Grub- a thick-bodied larva of a beetle with thoracic legs and a well developed head. The body is curved, c-shaped.

Guttation - exudation of watery, sticky liquid from hydathodes, especially along the leaf margins

Habitat - a place with a particular kind of environment suitable for the growth of an organism

Haploid - having a single complete set of chromosomes (see diploid, polyploid)

Hardness - ability to withstand stress

Haustorium (pl., Haustoria) - specialized branch of a parasite formed inside a host to absorbing nutrients

Head - in plants, a type of inflorescence in which numerous small flowers are densely crowded on a disk or around a central stalk

Hemiparasite - parasitic flowering plant that contains chlorophyll when mature and obtainable by water with dissolved nutrients by connecting to the host xylem via the haustorium.

Hemiptera- in some classifications this is an insect order containing two suborders; heteroptera and homoptera. Other classifications consider the heteroptera and the homoptera as separate orders.

Herbicide - a chemical used for killing plants or inhibiting plant growth, eg a weed or grass killer

Heritability - a measure of the ability to move from one generation to the next

Hermaphrodite - having both male and female reproductive organs

Heteroptera-order of insects containing the bugs.

Heterosis (syn. Hybrid vigor) - increased vigor of hybrid offspring when compared to any parent

Heterotrophy - an organism that obtains nourishment from outside sources and must obtain its carbon from organic carbon compounds (see autotroph)

Homoptera- order of insects containing cicadas, hoppers, psyllids, whiteflies, aphids and scale insects. They are characterized by uniformly leathery or uniformly membranous forewings, sucking mouthparts, and an incomplete metamorphosis.

Honeydew - sugary ooze or exudate, often from aphids, and a characteristic symptom of ergot

Hormone (syn. Growth regulator) - a chemical substance produced in one part of the organism and transported in the minute quantities to induce a growth response in another part, eg in plants, auxins, cytokinins, and gibberellins

Host plant - living plant attacked by or harboring a parasite or pathogen and from which the invader obtains part of all of its nourishment

Host range - species of plants capable, under natural conditions, of sustaining a specific pest

Host range - the range of plants on which an organism, particularly a parasite, feeds

Hyaline - transparent or nearly so so; translucent; often used in the sense of colorless

Hybrid (v. Hybridize) - offspring of two individuals of different genotypes

Hymenoptera- insect containing containing bees, wasps, ants, and sawflies. They are characterized by membranous wings, chewing or chewing-lapping mouthparts, and a complete metamorphosis.

Hyperparasite - the organism that is parasitic upon another parasite

Hyperplasia (adj. Hyperplastic) - abnormal increase in the number of cells, often resulting in the formation of galls or tumors

Hypertrophy (adj. Hypertrophic) - abnormal increase in the size of cells in a tissue or organ, often resulting in the formation of galls or tumors

Hypha-single, tubular filament of a fungal thallus or mycelium; the basic structural unit of a fungus

Hyphal sheath (syn Mantle.) - dense hyphal mass of ectomycorrhizal fungus enclosing the short feeder roots of plants

Hyphomycetes - imperfect fungi that produce conidia free or on a sporodochium or synnema (see coelomycetes)

Hypocotyls - part of the stem below the cotyledons and above the root (see epicotyl)

Hypovirulence - reduced ability to cause disease

Imago- the adult stage of an insect. The reproductive stage.

Immediate vicinity - fields adjacent to a field, or places of production

Immune - can not be infected by a given pathogen

Import permit - official document authorizing the importation of a commodity in accordance with the specified phytosanitary requirements [revised, 1995]

Inclusion body - structure developed within a plant cell as a result of infection

Incomplete dominance - the interaction of alleles of a gene that produces an phenotype, as in the production of pink flowers when red and white alleles are present in a heterozygous individual

Incomplete metamorphosis- a moderately complex type of insect development with three distinct stages; egg, nymphal stages, and adult. An incomplete metamorphosis is characteristic for insect missions.

Incubation period - the time between penetration of a host by a pathogen and the first appearance of disease symptoms; the time during which microorganisms inoculated on a medium are allowed to grow

Infection period-the time required for infection to occur under conducive environmental conditions, usually hours of leaf wetness and temperature

Infectious - pertaining to disease, capable of spreading from plant to plant

Insecticide- chemical substance used for killing insects.

Insect- insects are animals, to the class hexapoda. They have a segmented body with three distinct regions; the head, the thorax, and the abdomen. The head bears one pair of antennae, compound eyes, and the mouthparts. The thorax bears three pairs of legs (one on each of the three thoracic segments). The thorax bears one or two pairs of wings (on the second and / or third thoracic segments). A gonopore is present at the posterior end of the abdomen.

Insectivorous- feeding on insects.

Inspection - official visual examination of plants, plant products or other regulated articles to determine if pests are present and / or to determine compliance with phytosanitary regulations [revised, 1995; formerly inspect]

Inspector - person authorized by a national plant protection organization to discharge its functions

Interception (of a pest) - the detection of a pest during inspection of an imported consignment

Introduction - entry of a pest in formation

Invertebrate- animals, not having a backbone or spinal column (molluscs, arthropods, worms, etc.)

Joint- the articulation between two segments, body parts, or appendages.

Larva- the immature stage between egg and pupa of insects with a complete metamorphosis. (see also: nymph)

Lepidoptera- insect order containing butterflies and moths. They are characterized by scale-covered wings, coiled siphoning mouthparts, and a complete metamorphosis.

Life cycle - the sequence of events in the development of an insect that comes from birth.

Louse- any of the numerous insects of the orders mallophaga or anoplura. Lice are small, flat-bodied, wingless biting or sucking insects. Many species are external parasites on various animals, including human beings.

Monitoringsurvey - ongoing survey to verify the characteristics of a pest population

Moth- any of the numerous insects of the order lepidoptera. Moths are generally distinguished from butterflies by their nocturnal activity, hairlike or feathery antennae, stout bodies, and the frenulum that holds the front and back wings together. (see also: butterfly)

National plant protection organization - official service established by a government to discharge the functions specified by the ippc [formerly plant protection organization (national)]

Neuroptera- insect order, containing the dobsonflies, fishflies, alderflies, owlflies, snakeflies, antlions, and lacewings. They are characterized by membranous wings, chewing mouthparts, and a complete metamorphosis.

Nit- the egg of a louse, which is glued to the hair of its host.

Non-quarantine pest- pest is not a quarantine pest for an area

Nppo - abbreviation for national plant protection organization

Occurrence - the presence in the area of a pest was officially reported to be indigenous or introduced and / or not officially reported to have been eradicated

Ocellus is a simple eye of an insect or other arthropod.

Official - established, authorized or carried out by a national plant protection organization

Orthoptera- insect order containing grasshoppers and crickets. They are characterized by skinny forewings, chewing mouthparts, and a gradual metamorphosis. Usually the hindlegs are enlarged and adapted for jumping.

Outbreak - an isolated pest, recently detected and expected to survive for the immediate future

Oviposit- to lay or deposit eggs.

Parapatric - referring to organisms, but not immediately adjacent to each other

Parasite - an organism that lives at the expense of another usually without killigist host

Parasitoid - an organism that lives at the expense of another

Paratype - any additional specimen listed in the type series, where the original description designated a holotype

Parthenogenesis - a form of reproduction in which the eggs develop normally without being fertilized

Pathway - any means that allows the entry or spread of a pest

Pelophilous - thriving of creatures in habitats rich in clay

Pest - any species, strain or biotype of plant, animal, pathogenic agent, injurious to plants or plant products

Pest free area - an area in which a specific pest does not occur as demonstrated by scientific evidence and in which, appropriate,

Pest risk analysis - pest risk assessment and pest risk management

Pest risk assessment - determination of whether a pest is a quarantine pest and evaluation of its Introduction potential

Pest risk management - the decision-making process of reducing the risk of introduction of a quarantine pest

Petricolous- inhabiting rocks

Pheromone - a chemical used in the communication between individuals of the same species (used for eg aggregation, alarm, courtship, sex attraction, trailmarking)

Pholeophilous - preferring darkness or shade

Phoresis (also phoresy) - a form of symbiosis when the symbiont, the phoront, is mechanically carried by about its host. Neither is physiologically dependent on the other.

Phoront is an animal living in the form of symbiosis where it is mechanically carried by about its host

Photochemical - chemical reactions that require sunlight

Photophobic - intolerant of, or avoiding, conditions of full light

Photosynthate-product of photosynthesis

Photosynthesis- manufacture of carbohydrates from carbon dioxide and water in the presence of chlorophyll (s), using light energy and releasing oxygen

Phycomycete-archaic term for a member of a group of fungi without cross walls (septa) in their mycelium

Phyllody-change of floral organs to leaflike structures

Phyllophagous - feeding upon leaf tissue

Phyllotaxy-arrangement of leaves on one's stem in relation to one another

Phylogeny is the evolutionary relationship between organisms. The phylogeny of the organism reflects the evolutionary branch that led to the organism.

Phytoalexin-substance produced in higher plants in response to a number of chemical, physical, and biological stimuli that inhibits the growth of certain micro-organisms

Phytopathogenic- able to cause disease in plants

Phytopathology (syn. Plant pathology) - the study of plant diseases

Phytophagous - eating plants

Phytophilous - fond of plants

Phytoplasma (syn.mycoplasmalike organism, mlo) -plant-parasitic pleomorphic mollicute (prokaryote with no cell wall) found in phloem tissue; can not yet be grown on artificial nutrient media

Phytosanitary - pertaining to plant quarantine

Phytosanitary certificate - certificate patterned after the model certificates of the IPPC

Phytosanitary certification - use of phytosanitary procedures leading to the issue of a phytosanitary certificate

Phytosanitary legislation - basic laws granting legal authority to a national plant protection organization from which phytosanitary regulations may be drafted

Phytosanitary measure - any legislation, regulation or official procedure, with the intention to prevent the introduction and / or spread of quarantine pests

Phytosanitary procedure - any officially prescribed method for performing inspections, tests, surveys or treatments in connection with plant quarantine

Phytosanitary regulation - an official rule for the prevention of the introduction and / or spread of quarantine pests, by regulating the production, the movement or the existence of commodities or other articles,

Phytotoxic-harmful to plants (usually used to describe chemicals)

Pigment-a colored compound, such as chlorophyll, in the number of plants or fungi

Pistil-the ovule-bearing organ of the plant and its appendages (eg style, stigma)

Pith-parenchymatous tissue occupying the center of the stem

Place of production - any premises or fanning unit

Planar - climate zone under 150 m

Plant pathology (syn. Phytopathology) -the study of plant diseases

Plant product -unmanufactured material of plant origin (including grain) and those manufactured products that, by their nature or that of their processing, may create a risk for the spread of pests

Plant protection organization - see national plant protection organization and regional plant protection organization

Plant quarantine - all activities designed to prevent the introduction and / or spread of quarantine pests or to ensure their official control

Planting (including replanting) - any operations for the placing of plants in a growing medium to ensure their subsequent growth, reproduction or propagation

Plasmodiophoromycetes-a fungus-like group of organisms, sometimes called the plasmodiophoromycota or the endoparasitic slime molds, is characterized by the production of zoospores and plasmodia that are restricted to the cells of their host.

Plasmodium (plasmodium plasmodium) -naked multinucleate mass of protoplasm moving and feeding in amoeboid fashion

Plasmogamy-the fusion of two sex cells

Polyclonal antibody-based antibodies against more than one epitope of an antigen (see monoclonal antibody)

Polycyclic-having several to many diseases in a growing season (see monocyclic)

Polyembryonie-the production of two or more embryos in one seed

Polyetic-requiring more than one year to complete one life or rights cycle

Polygenic resistance (syn. Multigenic resistance) -resistance conferred by several genes (see monogenic resistance, oligogenic resistance, single gene resistance)

Polygenic-pertaining to, or governed by, many genes (see monogenic)

Polymerase chain reaction (pcr) - a technique used to amplify the number of copies of a specific region of dna in order to produce enough of the dna for use in various applications uch as identification and cloning

Polyphagous - eating many kinds of food

Polyploid-having three or more complete sets of chromosomes (see haploid, diploid)

Polyporicolous- living on polypore fungi

Polyprotein-a Protein is a protein that has been removed from the entire viral genome which is then cleaved by proteases (protein-degrading enzymes) into the active protein products

Pome (syn. Pome fruit) -simple, fleshy, indehiscent fruit derived from several carpels, eg apple, pear, quince

Ponto-mediterranean - south-east europe around the mediterranean

Population - all the organisms that constitute a specific group or occur in a specified habitat

Positive sense rna-rna that can serve directly as messenger rna (see negative sense rna)

Post-entry quarantine-quarantine applied to a consignment after entry

Posterior - relatively or facing the rear

Powdery mildew -a white, powdery, superficial ascomycetous fungus that is an obligate parasite and generally is found only on one or a few closely related species of plants

Pra area - area in relation to which a pest risk analysis is conducted

Practically free of consignment, field or place of production, without pests (or a specific pest) in numbers or quantities in excess of those that can be expected to result from, and consistent with, good culturing and transport practices. production and marketing of the commodity

Praticolous - living on meadows

Preclearance - phytosanitary certification and / or clearance in the country of origin, performed by or under the regular supervision of the national plantation organization

Predator - an organism for hunting and eating other animals

Primary inoculum (syn. Initial inoculum) -inoculum, usually from an overwintering source, that initiates disease in the field, as well as to inoculum that spreads disease during the season

Primary leaf-first true leaf that emerges on the plant following the cotyledons

Primary pest - an injurious organism that attacks an immaculate substrate and is the leading cause of a damage

Primary root-root that develops directly from the radicle of an embryo rather than from a crown or node

Primer-small fraction of nucleic acid with a free 3'-hydroxyl group necessary for initiation of dna, and, sometimes, rna synthesis; often specific fragments selected for use in polymerase chain reaction (pcr) for rapid identification of pathogens

Prognathous - mouthparts are directed forwards from the head from the insect's normal position

Prohibition - a phytosanitary regulation forbidding the importation or movement of specified pests or commodities

Proinhibitin-a plant defense compound that is already present before invasion by a pathogen

Prokaryote-an organism without internal membrane-bound organelles, lacking a distinct nucleus, such as bacteria and mollicutes (see eukaryote)

Promycelium (pl. Promycelia) -in rust and smut fungi, a germ tube issuing from the teliospore and bearing the basidiospores

Pronotum - the upper (dorsal) plate of the prothorax

Propagative transmission (syn. Circular propagative transmission) is a pathogen for the transmission of a pathogen, a latent period, before a vector (usually an insect), a latent period the vector is able to transmit the pathogen, and retention of the pathogen by the vector for a long period because the pathogen reproduces or replicates in the vector

Propagule- any part of an organism capable of independent growth

Prosternum - the first segment of the thorax

Protectant fungicide (syn contact fungicide) - a fungicide that remains on the surface where it is applied; no after-infection activity (see systemic fungicide)

Prothorax - the first segment of the thorax

Pseudochrysalis - a false pupa: applied to the fifth stage, or coarctate pupa, of those insects which undergo hypermetamorphosis. Also called semipupa.

Pseudothecium (pl. Pseudothecia) - perithecium-like fruiting, containing asci and ascospores dispersed rather than in an organized hymenium; an ascostroma with a single locule or cavity containing a bitunicate asci

Pubescence - a covering of soft short hairs, or down, as one some plants and insects; also, the state of being so covered

Pubescent - covered with short, soft hair

Puccinia pathway- the region through which rust urediniospores move from the southern areas through all the grain-producing areas of the united states to canada each season

Pupa (pl. Pupae; v. Pupate) - quiescent stage between the larva and the adult of certain insects

Pustule-small blisterlike elevation of epidermis formed as spores emerge

Pv. (abbr. For pathovar) - a subdivision of a plant pathogenic bacterial species defined by host range; pathovar for bacteria is equivalent to forma specialis for fungi

Pycnidiospore-spore (conidium) produced in a pycnidium

Pycnidium (pl. Pycnidia) -asexual, globose or flask-shaped fruiting body of certain imperfect fungi producing conidia

Pycniospore (syn. Spermatium) -haploid, sexually derived spore formed in a pycnium of rust fungi

Pycnium (pl. Pycnia; syn. Spermagonium) -globose or flask-shaped haploid fruiting body of rust fungi bearing receptive hyphae and pycniospores

Pygidium - the posterior part of the body in certain invertebrates

Qualitative resistance- resistance, that can be placed in distinct categories, usually conferred by one or a few genes. (see quantitative resistance)

Quarantine - official confinement of plants or plant products subject to phytosanitary regulations for observation and / or treatment

Quarantine area - an area within which a quarantine pest is present and is in the form of controlled

Quarantine pest - a pest of potential economic importance to the area, endangered and distributed

Quarantine procedure - see phytosanitary procedure

Quarantine station - official station for holding plants or plant products in quarantine

Quarantine-legislative control of the transport of plants or plant parts to prevent the spread of pests or pathogens

Quiescent-dormant or inactive

Radicle-part of the plant embryo that develops into the primary root

Receptor-a site that recognizes and binds an elicitor; any organ or molecular site that is sensitive to a distinct (specific) signal molecule

Recessive-describes a phenotypic trait that is expressed in diploid organisms only if both parents contribute the trait to the progeny (see dominant)

Refusal - forbidding entry of a consignment or phytosanitary regulations

Region - the combined territories of the member countries of a regional plant protection organization

Regional plant protection organization - intergovernmental organization with the functions laid down by article viii of the ippc [formerly plant protection organization (regional)]

Resistant (n. Resistance) -possessing properties that prevent or impede disease development (see susceptible)

Respiration-series of chemical reactions that make energy available through oxidation of carbohydrates and fat

Restriction endonuclease-enzyme that cleaves dna at a particular base sequence; sometimes informally referred to as a restriction enzyme

Rheophilous - thriving in or having an affinity for running water

Rhizobium-genus of bacteria that lives symbiotically with roots of leguminous plants; during the symbiosis, atmospheric nitrogen gas is converted into a form of useable by the plant

Rhizobium nodules-galls on the roots caused by rhizobium spp.

Rhizome-a mostly horizontal, jointed, fleshy, often elongated, usually

Rhizomorph-macroscopic rope-like strand of compacted tissue formed by certain fungi

Rhizophagous - feeding on roots

Rhizosphere - competent-used to describe microorganisms adapted to living in the rhizosphere of a plant

Rhizosphere-microenvironment in the soil, immediately around the plant roots

Ribonucleic acid (abbr. Rna) -several nucleic acids composed of repeating units of ribose (a sugar), a phosphate group, and a purine (adenine or guanine) or a pyrimidine (uracil or cytosine) base; transcribed from dna

Root cap -a group of cells on a root that protects the growing tip

Root exudates - the various compounds that leak from growing and expanding sections of the roots

Root graft -the fusion of roots of the two adjacent plants so that their water and food conducting (vascular)

Root hair -threadlike, single-celled outgrowths from a root epidermal cell

Rootstock-portion of the stem (trunk) and associated root system into which a bud or scion is inserted in grafting; fleshy overwintering part of a herbaceous perennial plant with buds and eyes (see scion)

Rot-softening, discoloration, and often disintegration of plant tissue as a result of fungal or bacterial infection

Round wood - wood not sawn longitudinally, carrying its natural rounded surface, with or without bark

Roundworm-nematode

Rust-a disease caused by a special group of basidiomycetes that often produces spores of a rusty color

Sanitation - destruction or removal of infected and infested plants or plant parts; decontamination of tools, equipment, containers, work space, hands, etc.

Saprophagous - eating decaying organisms

Saprophyte (adj. Saprophytic; syn. Saprobe) -organism that obtains nourishment from non-living organic matter

Sapwood-physiologically active zone of wood contiguous to cambium (see heartwood)

Sawn wood - wood sawn longitudinally, with or without its natural rounded surface, with or without bark

Scab-roughened, crustlike diseased area on the surface of a plant organ

Scald-a necrotic condition in which tissue is usually bleached and has the appearance of high temperatures

Scape - the first segment of the antenna

Sclerenchyma (adj. Sclerenchymatous) - tissue made up of thick-walled cells

Sclerite - hardened body part in the exoskeleton of insects

Sclerotium (pl. Sclerotia) -a vegetative resting body of a fungus, composed of a compact mass of hyphae with or without host tissue, usually with a darkened rind

Sclerotization - hardening of the cuticle by the cross-linking of the protein chains in the exocuticle

Sculpture - texture of the cuticula, eg puncture, granules, wrinkles, etc .; see also microsculpture

Scutellum - the posterior third of the mesonotum

Secondary infection-infection resulting from the spread of infectious material produced after a primary infection or from secondary infections without an intervening inactive period

Secondary inoculum-inoculum produced by infections that took place during the same growing season

Secondary metabolite-a compound produced in microbes (eg, mycotoxins, syringomycins) or plants (eg, caffeine or nicotine) that is not necessary for normal growth and development

Secondary organism-organism that multiplies in an already diseased tissue but is not the primary pathogen

Secondary root -branch from a primary root

Self-fertilization-a process in which sexual reproduction occurs as a result of the fusion of sex cells produced by the same individual (see cross-fertilization)

Senesce (adj. Senescent, n. Senescence) -to decline, as with maturation, age, or disease stress

Septate-with cross walls; having septa

Serrate - toothed like a saw

Sessile-used in reference to a leaf, leaflet, flower, floret, fruit, ascocarp, basidiocarp, etc., without a stalk, petiole, pedicel, stipe or stem; (of nematodes) permanently attached; not capable of moving about

Seta (pl. Setae) -bristle or hair-like structure, usually deep yellow or brown and thick-walled

Sexual dimorphism - a systematic difference in form between individuals of different sex in the same species

Sexual reproduction-reproduction involving fusion of the two haploid nuclei (karyogoidy), nuclei (karyogamy) to form a diploid nucleus, followed by meiosis (reduction), back to haploid nuclei at some point in the life cycle, resulting in genetic recombination

Sexualdichromatism - a systematic difference in color between individuals of different sex in the same species

Sign-indication of disease from direct observation of a pathogen or its parts (see symptom)

Silvicolous - growing in or inhabiting woodlands

Slime molds (syn. Myxomycetes) -saprophytic organisms that form vegetative amoeboid plasmodia and spores

Smut-a disease caused by a smut fungus (ustilaginales) in the basidiomycota or the fungus itself; it is characterized by masses of dark brown or black, dusty to greasy masses of teliospores that generally accumulate in black, powdery sori

Soft rot -softening, discoloration, and often disintegration of plant tissue as a result of fungal or bacterial infection

Soil drench-application of a solution or suspension of a chemical to the soil, especially pesticides to control, soilborne pathogens

Soil inhabitant-an organism that maintains its population in the soil over a period of time

Soil invader-an in the human population in the soil diminishes in several months to years

Soil sterilization-process used to free soil of all microorganisms

Soilborne-carried on or beneath the soil surface

Species-any one kind of life subordinate to a genus but above a race; a group of closely related individuals of the same ancestry, resembling one another in certain inherited characteristics of the structure and behavior and relative stability in nature; the individuals of a species ordinarily interbreed freely and maintain themselves and their characteristics in nature

Specific resistance (syn. Vertical resistance) -resistance which is effective against some biotypes or races of the pathogen, but not others, usually inherited monogenically and expressed qualitatively. (see general resistance, horizontal resistance, race-nonspecific resistance)

Spermogonium (pl. Spermogonia; syn. Pycnium for rust fungi) -structure in which male reproductive cells are produced; in rust fungi, globose or flask-shaped haploid fruiting body composed of receptive hyphae and spermatia (pycniospores)

Spermathecal - a small sac-like branch of the female reproductive tract of arthropods in which sperm may be stored

Spermatium (pl., Spermatia; syn. Pycniospore for rust fungi) -a male sex cell; a nonmotile male gamete; a haploid male gamete

Sphagnetum - plant society characterized by sphagnum

Sphagnicolous - living in sphagnum

Spicule-copulatory organ of male nematode

Spikelet-spike-like appendage comprised of one or more reduced flowers and associated bracts; unit of inflorescence in grasses; a small spike

Spiroplasma-spiral-shaped plant pathogenic mollicute (prokaryote without cell wall)

Sporangiospore-non-motile, asexual spore that is borne in a sporangium

Sporangium (pl. Sporangia) -sac-like fungal structure in which the entire contents are converted into an indefinite number of asexual spores

Spore -reproductive structure of fungi and some other organisms, containing one or more cells; a bacterial cell modified to survive an environment

Sporidium (pl.sporidia) -basidiospore of rust fungi, smut fungi, and other basidiomycota

Sporocarp -spore-bearing fruiting body

Sporophyte-the diploid stage of a plant (see gametophyte)

Sporulate -to produce spores

Spot symptom of disease characterized by a limited necrotic area, as on leaves, flowers, and stems

Spread - expansion of the geographical distribution of a pest within an area

Springwood - early part of the yearly xylem growth ring in woody

Staghead-defoliated, dead or dying major branches in the crown of a tree, usually resulting from inadequate water uptake or translocation

Stamen (adj. Staminal) - male structure of a flower, composed of a pollen-bearing anther and a filament, or stalk

Stele -central cylinder of vascular tissue (especially in roots)

Stem pitting -a viral disease symptom characterized by depressions on the stem

Stenophagous - utilizing only a limited variety of foods or food species, eating only a narrow range of food

Stenotopic - able to adapt only to a narrow range of environmental conditions

Steppicolous - living in steppe environments

Sterigma (pl., Sterigmata) -small, usually pointed projection that supports a spore

Sterile fungus -a fungus that is not known to produce any kind of spores

Sterilization (adj., Sterilized) -the total destruction of living organisms by various means, including heat, chemicals or irradiation

Sternite - the ventral piece in a ring or segment

Stigma - a spiracle or breathing pore

Stipes - the second joint of a maxilla of an insect or a crustacean

Stippling-series of small dots or speckles in which chlorophyll is absent

Stipule-small leaflike appendage at the base of a leaf petiole, usually in pairs

Stolon (syn. Runner) -a slender, horizontal stem that grows close to the soil surface; in fungi, a hypha that grows horizontally along the surface

Stoma (pl., Stomata, adj. Stomatal; alsostomate) -structure composed of the two cells in the gas exchange

Stored product - unmanufactured plant product is intended for consumption or processing, stored in a dried form (this includes in particular grain and dried fruits and vegetables)

Strain-a distinct form of an organism, or physically, physically, or chemically

Striate (n. Striations) -marked with delicate lines, grooves, or ridges

Stridulation - the production of sound by rubbing two ridged surfaces

Stroma (pl. Stromata) -compact mass of mycelium (with or without host tissue) that supports fruiting bodies are embedded

Stunting-reduction in the height of a vertical axis resulting from a progressive decrease in their number

Stylet-borne transmission (syn. Nonpersistent transmission) -a type of virus transmission in which the virus is acquired and transmitted by the vector after short feeding times, and is retained by the vector for only a short period of time

Stylet-stiff, slender, hollow, feeding organ of plant-parasitic nematodes or sap-sucking insects, such as aphids or leafhoppers

Stylopized - insect hosts that have been attacked by endoparasiticstylopids (strepsiptera), eg hymenoptera like bees and wasps, but from other orders as well

Subgenus - a taxonomic group between a genus and a species

Submontane - climate zone 450 - 800 m, european beech (*fagus sylvatica*), silver fir or european silver fir (*abies alba*) and norway spruce (*piceaabies*).

Subpopulation - a population that is part of a larger population

Subspecies - a well-marked form of a species differing from the type in some character of color or maculation which is recognizable but does not prevent a fertile union

Subspecies-a subpopulation of a species, defined on the basis of more than one character (morphologic for many organisms) that distinguishes the members of the subpopulation from other members of that species

Substrate-the substance on which an organism lives or from which it obtains nutrients; chemical substance acted upon, often by an enzyme

Subterranean - living under the surface of the earth

Subtribe - a taxonomic rank between tribe and genus

Succession - the gradual and orderly process of change in an ecosystem brought about by the progressive replacement of one community by another until a stable climax is established

Sudden, severe, and extensive spotting, discoloration, wilting, or destruction of leaves, flowers, stems, or whole plants

Summerwood-part of the yearly xylem growth ring in woody plants formed late in the growing season and consisting of smaller than those of springwood

Sunscald or sunburn-injury of plant tissues burned or scorched by direct sun or sunburn

Suppression - the application of phytosanitary measures in an infested area to reduce pest populations

Suppressive soil-soil in which various diseases are at lower levels than expected due to biological factors in the soil; an example of natural biological control

Survey - methodical procedure to determine the characteristics of a pest population or to determine which species occur in an area

Symbiosis - a long-lasting, close and dependent relationship between two organisms of different species

Symbiosis (adj. Symbiotic; n. Symbiont) -mutually beneficial association of two different kinds of organisms

Sympatric - organisms With ranges overlap or are even identical, so that they occur at least in places

Symptom-indication of disease by reaction of the host, eg canker, leaf spot, wilt (see sign)

Synanthropic - associated with humans or their dwellings

Synapomorphy - a derived trait that is shared by two or more taxa of shared ancestry

Synonym - different scientific names that pertain to the same taxon

Syntype - any of two or more specimens listed in a species description where a holotype was not designated

Systemic fungicide-a fungicide that is absorbed into a plant tissue and may offer some curative or after-infection activity; includes fungicides that are locally systemic, xylem-mobile (upward moving), and amphimobile (move in phloem upward as well as downward in the plant) (see contact or protectant fungicide)

Tarsus - the leg segment distal to the tibia, comprising 1-5 tarsomeres

Taxon - a category in the classification of living organisms. The taxa (the plural of taxon) in the linnean system are kingdom, phylum, class, order, family, genus, and species.

Taxonomy - the theory and practice of naming and classifying organisms

Teliospore (sometimes called teleutospore, teleutosporodesm) -thick-walled resting or overwintering spore produced by the rust fungi (uredinales) and smut fungi (ustilaginales) in which karyogamy occurs; it germinates to form a promycelium (basidium) in which meiosis occurs

Telium (pl. Telia) -fruiting body (sorus) of a rust fungus that produces teliospores

Teratogen-a chemical that causes malformations in the fetus

Tergite - the primary plate or sclerite forming the dorsal surface of any body segment

Terricolous - living on or in the ground

Test - official examination, other than visual, to determine if pests are present or to identify pests

Tetrameric - having four parts, or parts arranged in groups of four, referring to the tarsi of insects

Thanatosis - feigning death

Thermophilic - applied to species living in hot places

Thermotherapy-use of heat to reduce or eliminate pathogens in plant tissue; often used on plants prior to meristem culture to produce pathogen-free plants

Thorax-insect body part between the head and abdomen

Tibia - the fourth leg segment, following the femur

Tillage-the process of turning or stirring the soil

Tiller-a lateral shoot, culm, or stalk arising from a crown bud; common in grasses

Tissue culture - see plants in tissue culture

Tissue culture-in vitro method of propagating healthy cells from plant tissues

Tissue-group of cells, usually of the same structure, that perform the same or related functions

Tolerance (adj. Tolerant) -ability of a plant to endure an infectious or noninfectious disease, adverse conditions, or chemical injury without serious damage or yield loss; (of pesticides) the amount of chemical residue legally permitted on

Tomentum - a covering of dense, matted, woolly hairs

Toxicity-capacity of a substance to interfere with the vital processes of an organism

Toxin-poisonous substance of the origin

Trachea - one of the tubules forming the respiratory system of most insects and many arachnids

Tracheid-elongated conducting cell of the xylem, with tapering or oblique end walls and pitted walls

Transduction-the transfer of genes from one to the organism to another by viruses, especially in bacteria

Transit - see country of transit

Transmit (n. Transmission) -to spread or transfer, as in spreading an infectious pathogen from plant to plant or from one plant generation to another

Transparency - the principle of making available, at the international level, phytosanitary measures and their rationale

Trap crop-crop planted around a field to protect the inner crop from diseases transmitted by aerial vectors; host crop of a parasitic plant, such as witchweed (*striga* spp.), that is planted to stimulate seed germination, and later sacrificed by plowing

Treatment authorized procedure for the killing, removal or rendering infertile of pests

Trenching-physical of soil from a vertical plane to sever grafted roots between trees

Tribe - a taxonomic rank between family and genus. It is sometimes subdivided into subtribes

Trichome - a filamentous or hairlike structure of gland, eg in myrmecophilous beetles

Triungulin - the active first instar larva of some parasitic, hypermetamorphic neuroptera and coleoptera

Trochanter - the second leg, the following coxa

Troglobious - organisms, Which life cycle takes

Troglophilous - frequent inhabitant of the caves, adapted ecologically but not morphologically

Trogloxenous - casual inhabitants of caves, Who long permanence in the caves could cause them to die

Type - the type provides the objective standard of reference whereby the application of the nominal taxon can be determined; see also holotype, paratype, syntype, neotype and lectotype

Ubiquist - species that is not bound to any particular habitat

Unicellular-one-celled (see multicellular)

Univoltine - having but a single generation a year

Urediniospore (also urediospore, uredospore) - the asexual, dikaryotic, often rusty-colored spore of a rust fungus, produced in a structure called a

uredinium; the "repeating stage" of a heteroecious rust fungus, ie capable of infecting the host plant on which it is produced

Uredinium (also uredium; pl. Uredinia) -fruiting body (sorus) of rust fungi that produces urediniospores

Vagile - having freedom to move about

Variety (syn. Cultivar; adj. Varietal) -a plant type within a species, resulting from deliberate manipulation, which has recognizable characteristics (color, shape of flowers, fruits, seeds, height and form)

Vascular bundle-strand of conductive tissue, usually composed of xylem and phloem (in leaves, small bundles are called veins)

Vascular cylinder (syn. Stele) -the cylinder of vascular tissue in stems or roots

Vascular wilt disease-a xylem disease that disrupts normal uptake of water and minerals, resulting in wilting and yellowing of foliage

Vascular-pertaining to fluid-conducting (xylem and phloem) tissues in plants

Vegetative propagation-asexual reproduction; in plants, the use of cuttings, bulbs, tubers, and other vegetative plant parts to grow new plants

Vein banding -symptom of virus disease in which regions along veins are either darker green or distinctly more yellow than tissue between veins

Vein clearing-disappearance of green color in or around leaf veins

Vein-small vascular bundle in a leaf

Ventral - to or at the lower surface

Vermiform-worm-shaped

Vicariance - the division or group of organisms by a geographic barrier, such as a mountain or a body of water, resulting in differentiation of the original group into new varieties or species

Virescence-state or condition in which normally white or colored tissues (eg flower petals) become green

Virion-complete virus particle

Viroid-an infectious, nonencapsidated (naked) circular, single-stranded rna

Vulva-exterior opening of a mature female nematode's reproductive system

Walling-off -separation of diseased from healthy tissues by barrier tissues produced by a diseased plant

Water-soaked-describing disease symptom of plants or lesions that appear wet, dark, and usually sunken and translucent

White rot (of wood) -type of wood decay resulting from enzymatic action of fungi; it degrades all components of wood, including lignin, leaving the wood light-colored and spongy

White rust-common name usually used for diseases caused by oomycetes in the genus *albugo*

Wilt-drooping of leaves and stems from lack of water (inadequate water supply or excessive transpiration); Vascular disease that interrupts normal water uptake

Wind break -a row or other grouping of trees or shrubs used to provide protection against the effects of high velocity winds

Winterburn-foliar necrosis, often marginal, of plants that retain their leaves in winter due to water deficiency because they can not take up water from frozen soils

Witches' broom-disease symptom characterized by an abnormal, massed, brushlike development of many weak shoots at close to the same point

Wound -injuries to plant tissues that often breach barriers (cuticle, bark, cell walls) that might otherwise exclude pathogens; some pathogens (eg viruses) can enter plants only through a wound; wounds may occur from natural growth processes, physical and chemical agents, animals (especially insects), and many human agricultural activities, such as pruning

Xerophilous - applied to species living in dry places

Xerothermic - both dry and hot climate or area

Xerothermophilous - applied to species living in hot and dry places

Xylem-water and mineral conducting, food-storing, supporting tissue of plant

Xylodetriticolous - living in decayed wood

Xylophagous - eating wood

Yeast-unicellular ascomycetous fungus that reproduces asexually by budding

Zonate-targetlike development of tree canker, characterized by successive, perennial rings of callus; any symptom appearing in concentric rings

Zoophagous - feeding on animals

Zoosporangium-sporangium, or spore case, that bears zoospores

Zoospore-fungal spore with flagella, capable of locomotion in water

Zygomycetes-a fungus group, also called the zygomycota, characterized by nonseptate hyphae, sexual zygospores, and sporangiospores produced in a sporangium; common post-harvest pathogens

Zygosporangium-sexual resting spore formed from the union of gametangia in the zygomycetes

### **What should the teacher follow?**

True credibility and trust is won by the teacher who:

- knows what he is talking about;
- Deeply understands the topic;
- knows himself and is therefore confident in the result;
- has such universal talents as nobility,

trending strength, alertness of the mind, sociability, soul harmony or koystvie, wisdom, sense of humor, kindness, insight, intuition, empathy or empathy.

Each teacher should be simple and pleasant, even if he tells the complex trivial things. Because people perceive new information is not so easy as it seems. The brain catches from the external stream of familiar terms, links them to existing logical schemes and creates a new picture of the surrounding world. The effectiveness of this process, even in very gifted people, is never equal to one hundred percent, something remains behind the scenes. *That's why they say: "Repetition is the mother of the teaching," because from the second to third time we get missing facts and nuances, so if the speaker speaks intricately, unclearly, admits double-valued statements, often corrects himself - he runs the risk of remaining misunderstood and irritating audience.*

Do not need to complicate the perception of the material. On the contrary, one must thoroughly prepare

To simplify his perception. It is necessary to use special methods of information simplification, sorting and ordering it according to several criteria. The teacher should accurately predict the result of his actions and understand which processes he launches in the group while he is showing something, says, answers questions.

What do you mean? First, a well-designed training plan, taking into account the various nuances of the behavior of the group or individual participants. Secondly, understanding of human psychology (for example, such subtleties as: psychological protective functions, the basis of motivation, template thinking, laws of compensation).

Psychological flexibility is a variety of successful strategies, when one and the same situation can be solved by different methods from a reasonable dispute with the participant before a competent self-reflection about the question that has arisen.

Emotional competence is a range of openness, calmness, sensitivity to other people's reactions and a willingness to better understand the atmosphere of the activity.

Personal thoroughness is a mixture of experience, work with bugs and self-analysis, which allows each time to react more calmly to taunts, mistrust, accusations and covert aggression.

Personal study allows the teacher to lead the group to a better understanding of the problems.

**The Preacher must also have such qualities as:**

- **Responsibility** - one must be able to answer for what happens in life nor, as well as teach students .
- **Intelligence** - you need to know a lot, constantly evolve, It takes a lot of knowledge to make the classes interesting, tory .
- **Knowledge in the field of psychology** - it is necessary to work with people, knowing psychologists- human characteristics, groups, methods and methods of teaching.
- **Creativity** - the creative approach of the teacher will create the opportunity for non- ordinary classes.
- **Empathy** - the teacher needs to feel participants in the learning process. .
- **Self-monitoring** - is necessary for a realistic assessment of the situation occurrence of supernumerary cases.
- **Rapidity of reaction** - manifests itself in the ability to develop and operatively apply different methods and techniques depending on the learning process , and the composition of the group.
- **Goodwill** is a necessary condition for building a professional relations with students . Being good-natured, the teacher creates a trusting relationship with the group, gives an opportunity to open the students and, as a result, to get maximum effect from work.

### ***Control questions***

1. Multi-linguistic training as a way of integration into the world educational space.
2. The KLIL method, its advantages and disadvantages.
3. What are the forms of control of students' knowledge?
4. What are the types of examinations?
5. What criteria and qualities should a full-fledged teacher have?

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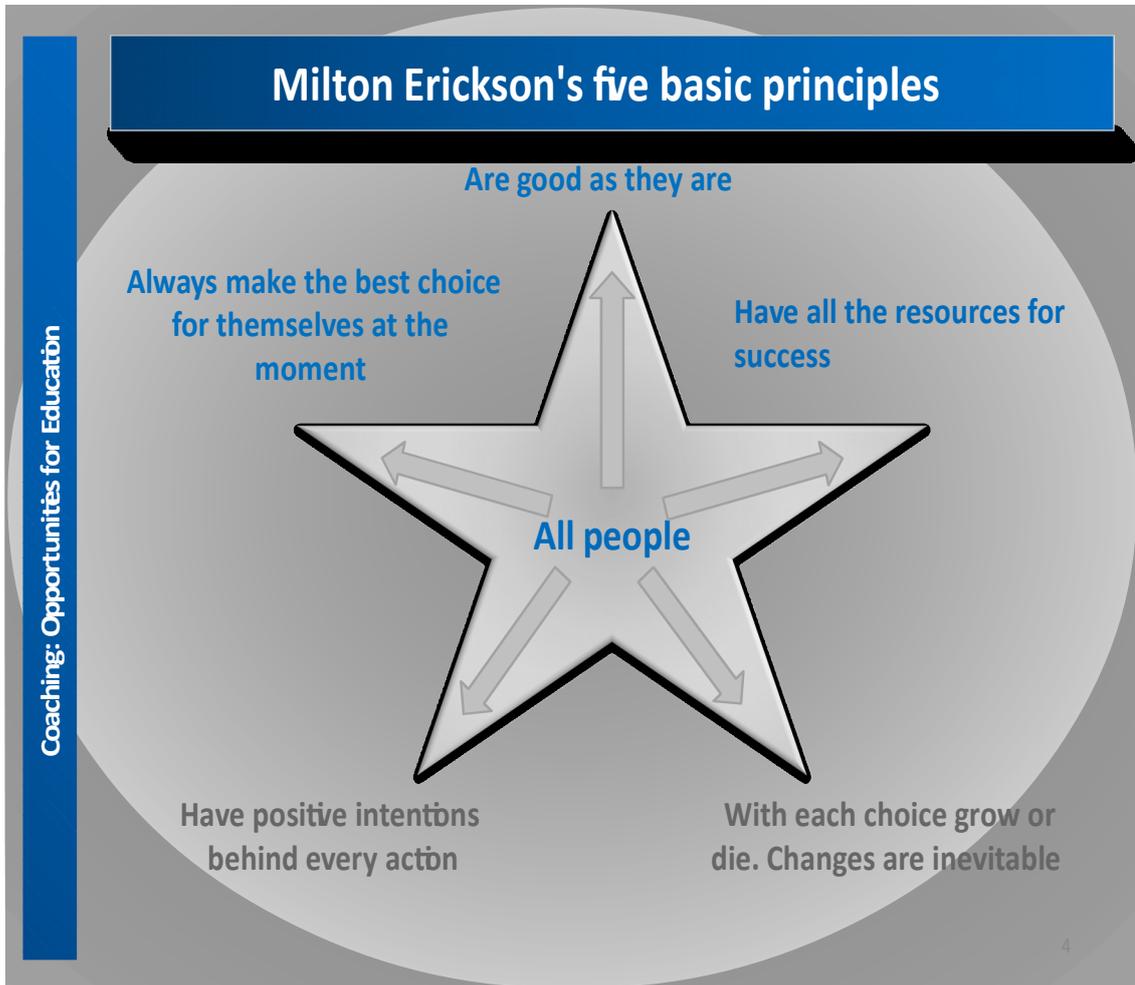
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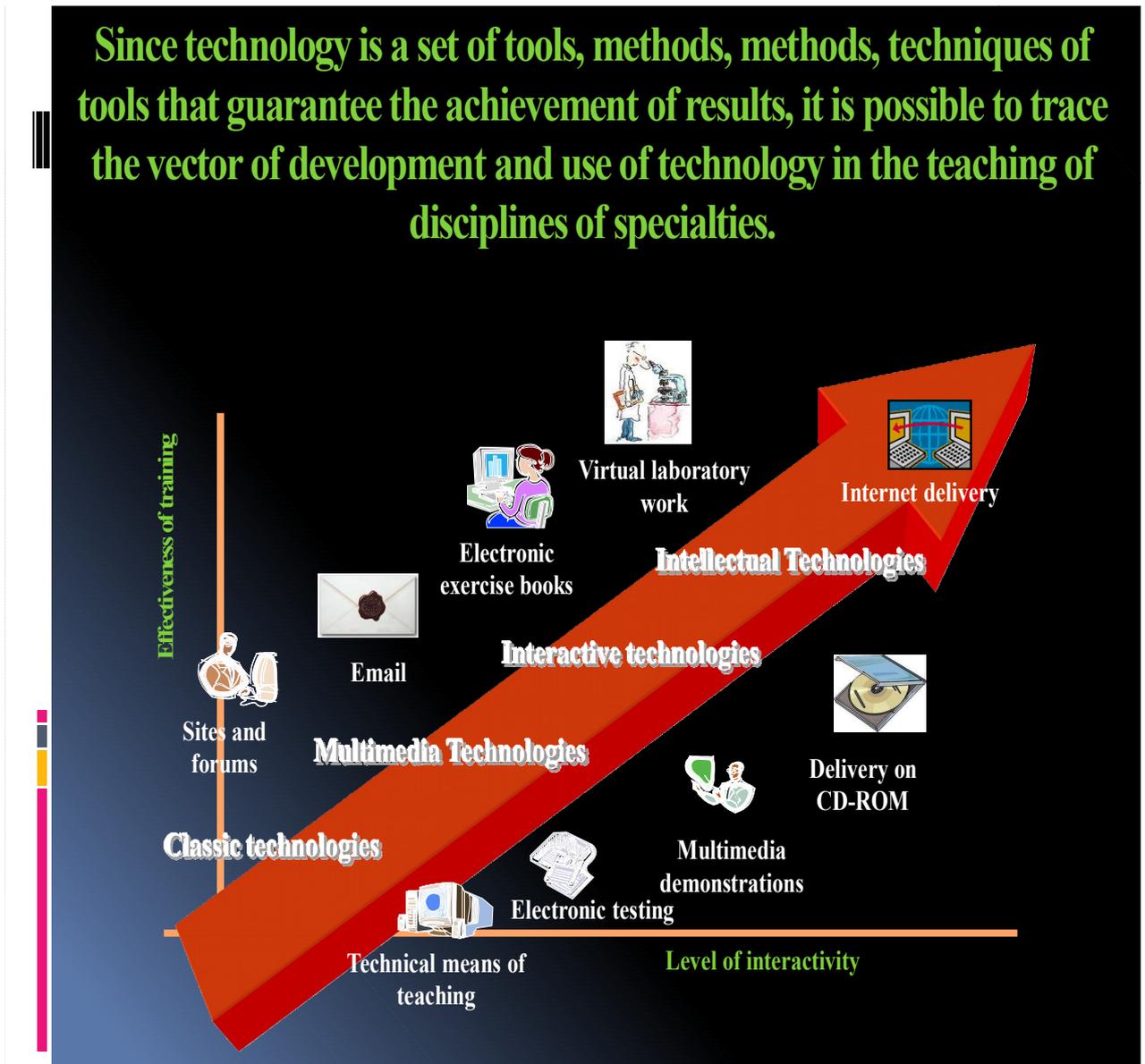


Coaching: Opportunities for Education



Educational Innovation

Since technology is a set of tools, methods, methods, techniques of tools that guarantee the achievement of results, it is possible to trace the vector of development and use of technology in the teaching of disciplines of specialties.



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