

# THE CURRENT STATE AND PROSPECTS OF THE DEVELOPMENT OF INFORMATION TECHNOLOGIES IN A HIGHER EDUCATION INSTITUTION

## O ESTADO ACTUAL E AS PERSPECTIVAS DO DESENVOLVIMENTO DAS TECNOLOGIAS DA INFORMAÇÃO NUMA INSTITUIÇÃO DE ENSINO SUPERIOR

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**Abstract:** The article highlights and summarizes the leading trends in the formation and development and methods and technologies of distance learning for technical specialists, stages, features and dynamics of such development. The theoretical foundations of blended learning in technical specialties using distance technologies (concept and model) have been developed. Structured on the basis of student-centered distance learning technology, the mechanism for implementing the concept and model of blended learning in technical specialties. Criteria for the effectiveness of blended learning in technical specialties have been developed. A block of modular variable technologies for student-centered distance learning has been created with the aim of mastering the methodology of this type of training for teachers, creating their own methodological tools. The module-rating system of intra-university quality management of training in technical specialties has been adapted in relation to the blended learning system.

**Keywords:** Higher education. Education system. Management technologies. Managing educational.

**Resumo:** O artigo destaca e resume as principais tendências na formação e desenvolvimento e métodos e tecnologias de ensino à distância para especialistas técnicos, fases, características e dinâmicas de tal desenvolvimento. Os fundamentos teóricos do ensino misto em especialidades técnicas utilizando tecnologias à distância (conceito e modelo) foram desenvolvidos. Estruturado com base na tecnologia de ensino à distância centrada no estudante, o mecanismo de implementação do conceito e modelo de ensino misto em especialidades técnicas. Foram desenvolvidos critérios para a eficácia do ensino misto em

especialidades técnicas. Foi criado um bloco de tecnologias modulares variáveis para o ensino à distância centrado no estudante, com o objectivo de dominar a metodologia deste tipo de formação para professores, criando as suas próprias ferramentas metodológicas. O sistema de classificação modular de gestão da qualidade intra-universitária da formação em especialidades técnicas foi adaptado em relação ao sistema de aprendizagem mista.

**Palavras-chave:** Educação superior. Sistema educacional. Relações interpessoais. Comunicação. Cultura. Estereótipos étnicos.

## 1. Introduction

At present, it is becoming obvious that the accumulation of knowledge in itself has lost its former value, therefore, the task of developing the needs and abilities of a person is coming to the fore not only to independently obtain and update knowledge that is significant for the profession, personality and society, but also to carry out this process continuously on throughout life. Modern life requires from an employee not only good performance skills, but also key competencies formed at a fairly high level (orientation in the profession, organizational and activity, communicative, intellectual, creative and other competencies), which underlie the qualitative mastery of any profession.

Under the current system of full-time education in technical specialties, students listen to lecture courses during the semester, perform laboratory work, coursework, and then take exams. At the same time, they often feel discomfort and lack of experience in self-study, the need for which is growing, in particular, due to the fact that many students combine work with study. As a result, real learning activities and workload are extremely uneven, and in most cases students work intensively only in the last two or three weeks of the semester. On the other hand, teachers do not fully use their professional resources in the learning process - their significant educational potential is often limited to the threshold of the audience. They do not have reliable everyday feedback; they often find out about the didactic effectiveness of mastering specific sections of the course for this group of students during the exam, when it is no longer possible to correct anything.

The transition from the already archaic principle of "knowledge for life" to the principle of "knowledge through life" involves the development and improvement of the personality of each person throughout life. The existing full-time education is not personalized, so often the student does not have educational motivation and, depending on the degree of his giftedness, the student is able to learn and perform certain types of activities, reaching a creative level, showing a high level of motivation, others - only at the reproductive,

performing level and more under pressure. from the outside.

Technological knowledge "age" every 2-3 years, while there is a steady positive dynamics of this process. With the preservation of the old educational technologies, by the end of the studies at the university, the knowledge of the graduate will be largely outdated. As a result, the competitiveness of a graduate in the labor market will not be at a high level. The new requirements of society, the individual and the state at the present stage give rise to new ideas about educational results that cannot be achieved in the old educational environment (Shehab & Khalifa, 2021). The activation of independent work of students, their preparation for work, which requires almost permanent professional development in the conditions of rapid obsolescence of information, is impossible only within the framework of traditional full-time education. Modern information technologies open up new prospects for improving the efficiency of the educational process. An increasing role is given to active learning methods, self-education, and distance learning programs (Gao, 2021). The effectiveness of distance learning is largely based on the fact that students have the opportunity to work with educational materials in such a mode and volume that suits them directly (Palvia et al., 2018). At the same time, the weaknesses of distance learning are manifested in the absence of: face-to-face communication between the teacher and students, and hence the educational impact; development of motivation and self-discipline in students, necessary for distance learning; formed initial skills of trainees to work in this system (Atieku-Boateng, 2021), (Shoufan, 2019). In addition, it is not effective for all specialties to train specialists in distance courses, etc.

The analysis of the conducted studies shows that the problem of training specialists who own the methodology of applying modern methods of searching, processing and systematizing knowledge to improve their skills throughout their lives is becoming increasingly important. One of the solutions to this problem is the use of blended (combined) learning. The concept of combined learning assumes that in modern conditions the student should optimally and in various combinations use all the opportunities provided by both classical learning and the use of distance technologies (Hillier, 2018). At the same time, conditions are created for solving the main problem of traditional education - limited opportunities for the realization and development of the potential abilities of each student. A mixed learning model is a model for using distributed information and educational resources in face-to-face learning using elements of asynchronous and synchronous distance learning.

In recent years, within the framework of the problem of informatization of education, considerable attention has been paid to the development of such fundamental problems of

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the theory and methodology of vocational education in distance learning as directed didactic communication, forms and methods of interactivity, a structural-dialogue approach in communication, etymological and semantic analysis of the fundamental concepts of distance learning, separation of correspondent and broadcast directions in history and modern practice.

## 2. Literature review

Essential for fruitful pedagogical activity is the implementation of the identified general patterns in the theory of learning, the introduction of which increases the efficiency of the entire education system and creates prerequisites for the development of new directions in solving modern problems of pedagogical practice. (Riera Guasp, Ardid, Vidaurre & Dueñas, 2018), (Rajab, 2018).

A serious contribution to the development of the main conceptual provisions and scientific and theoretical foundations of vocational education was made by the following researchers (Ali, Khalil & El-Sharkawy, 2020).

Require improving the training of a specialist who is capable of technologically designing a student-oriented didactic process, who owns personality-developing learning technologies. (O'Doherty, Dromey, Lougheed, Hannigan, Last & McGrath, 2018), (Nikadambaeva, 2020), (Morin, 2020).

Considering the challenges of online learning organization, scientists pay attention to the issues of qualified support of the student by the educator or other authorized persons during online learning. Such qualified support should begin at the stage of searching for proposals of distance learning programs and accompany the student during the entire learning process (Langegard, Kiani, Nielsen & Svensson, 2021).

Of course, these works have largely created the scientific and methodological foundations for the implementation of distance learning in the country, however, the modernization of all levels of education, which provides for the development of those personal qualities that will become the basis for the social and professional adaptation of people, their skills and culture, is impossible without a harmonious combination of the advantages of traditional full-time training and application of distance technologies.

### 3. **Materials and methods**

The purpose of the article is to identify the conditions for increasing the efficiency of the educational process within the framework of blended learning based on the harmonization of the methodological and theoretical provisions of traditional and distance learning of specialists in technical specialties, which contribute to the effective formation and development of their key competencies.

The object of the research is the process of teaching technical specialties.

The subject of the research is a set of conditions for a pedagogically effective combination of traditional and distance technologies in a modern model of blended learning for technical specialties.

The main hypothesis that determined the content and direction of scientific research work is as follows. The modernization of technical education, in particular, the implementation of blended learning using distance technologies, opens up new opportunities for improving the efficiency of the educational process. A new quality of education in technological specialties can be obtained if:

- the most effective aspects of traditional and distance learning are optimally combined;
- training will be focused not only on the assimilation of knowledge, but also on the development of the student's personal qualities: cognitive, emotional-volitional, professional sphere, etc.;
- the needs and readiness of the participants in the educational process to introduce information educational technologies and the principles of open education into the educational process of the university were studied;
- an appropriate infrastructure has been created: an educational server with a software shell for distance learning, electronic methodological materials suitable for full-fledged independent study;
- the ratio and nature of the presentation of the material submitted for classroom and independent study is correctly chosen in the optimal combination of forms and teaching methods - the essence of blended learning technology;
- teachers will be prepared to model the educational process using modern information technologies, to draw up their own working training program, taking into account specific conditions;
- an automated system for diagnosing the learning process and the degree of students'

education was implemented.

The methodological basis of the study at the philosophical level is the following fundamentally significant philosophical ideas: contradiction as a source of development, technology as a way of interaction between civilization and culture, the cultural vector of history, patterns of probabilistic modeling.

Studies of this problem contributed to the development of mechanisms for transferring management activities to the mode of technologization, which ensures its improvement. The following system of methods served to solve the research problems:

a) scientific methods: informal (writing an experiment scenario), diagnostic (questionnaires, testing, polling, interviewing, mono-conference, collective discussion), graphic (decision tree, dichotomous goal division), modeling (descriptive and normative models, imitation), formally - logical (analysis, synthesis, retrospection, abstraction, forecasting);

b) empirical methods (study of school documentation, observations, conversations, precedents, correlation, interpolation and extrapolation, experiment);

c) statistical methods for processing experimental data.

#### **4. Results**

Combined learning is valuable in itself, because allows you to use the strengths of full-time education and the advantages of distance technologies, primarily collectively distributed forms of organizing activities. There is an opportunity to conduct more interesting and rich face-to-face classes. For example, a teacher organizes the educational process in such a way that the student first masters a certain part of the material on his own using distance technologies. In a face-to-face lesson, the teacher will deal with a more prepared audience, will be able to pay maximum attention to practice, without wasting time reading a lecture, etc (Alqahtani & Rajkhan, 2020). Students get the opportunity to form a full-time lesson, in advance transferring to the teacher their questions that they encounter in the course of independent work. Teachers act as experts and consultants, helping students analyze and solve problems. Thus, in the classroom it is possible to organize practical seminars, exchange of experience and discussions, which is difficult to do with an unprepared audience. Within the framework of a blended learning system, it is desirable to use those forms and techniques that have already proven their effectiveness and expediency (Ratheeswari, 2018). Thus, the module-rating system for assessing the quality of student

learning has already entered the practice of distance learning, but for full-time education this system is used by many universities. Blended learning makes it possible to create a system of continuous postgraduate education, exchange of information, regardless of time and factors.

The study of the problem of teaching technical specialties and modern requirements for the level and nature of specialist training, the development of the potential abilities of the student made it possible to identify a number of contradictions due to the discrepancy between:

- the high potential of blended learning and the lack of research on didactic possibilities and substantiation of directions for its effective use;
- the predominance of highly specialized knowledge and skills in the teaching system and the need to develop the ability of students to independently acquire new knowledge, process and interpret the necessary data to form judgments on relevant social, scientific and ethical issues, using modern educational and information technologies for their future career growth;
- a large amount of required professional knowledge and limited opportunities for their assimilation by students using traditional methods, as well as the rapid "aging" of the information received;
- theoretical views and practical reality in the field of distance learning for students of higher educational institutions of a technical profile;
- the appearance of educational and methodological manuals by domestic and foreign authors intended for students of technical universities and the inability of many teachers to adapt them to the real conditions of blended learning in a higher educational institution;
- the increased need of society for the quality training of the future specialist in the learning process and the need to improve in this regard the intra-university management of the quality of education in general.

## 5. Discussion

1. Considered as priority areas for the modernization of Russian education - the development of the personality of students, the transition to a system of continuous education, a competency-based approach to determining the goals and content of education, the individualization of education, the informatization of education, the creation of a fundamentally new learning environment based on the use of information and

communication technologies - cannot be fully implemented either within the framework of only classical full-time education, or within the framework of distance education. Integration, combination of training using the advantages of various technologies in the educational process is one of the important ways to improve the quality of training of specialists in technical specialties.

2. As part of blended learning, it is possible to create a combined educational environment in which the student feels more comfortable, he becomes an active participant in the educational process, the habit of self-study and information search is stimulated, skills appear that provide the opportunity to independently continue their education after graduation (continuous education), teachers act as experts and consultants, helping students to analyze and solve problems.

3. The modern system of teaching technical specialties based on the use of information and communication technologies consists of two interacting components: a system for the development of distance learning for specialists and an internal system for managing the quality of education. The model of blended learning in technical specialties is focused on the free and responsible choice of the student, regarding the organizational forms and means of education, it implies flexibility and the ability to rebuild your educational route and adapt it to real learning conditions.

4. For the full implementation of blended learning in technical specialties, it is proposed to preserve the general principles of building a traditional educational process using elements of asynchronous and synchronous distance learning: students master a certain proportion of academic disciplines (or disciplines) in traditional forms of education (full-time or part-time, etc.) , and the other part of the disciplines (or disciplines) - on network learning technologies. The ratio of shares is determined by the need to obtain new educational results. In organizational terms, this is implemented when creating an integrated information and educational environment, the basis of which is an “educational” server with educational methodological complexes and automated laboratory complexes located on it for a group of disciplines of technical specialties.

5. The implementation of blended learning in technical specialties, based on the organic combination of traditional and distance learning, involves the use of the following principles: modularity, choice of learning path, updating the content of learning, increasing learning motivation, adaptability and flexibility of learning, synthesis of pedagogical, managerial and technological solutions, dynamic compliance with the teaching the activities of the teacher and the educational and cognitive activities of the student, the orientation of the



content of education to real production tasks, the concentric organization of the content and types of activities, the interactivity of teaching aids, the multiplicity of ways of interaction between the subjects of the educational process, the variety of forms of education (individual and group, real and virtual).

6. One of the important factors in improving the quality of training of specialists in technical specialties should be the improvement of the system for evaluating educational achievements. A change in emphasis in the formulation of educational goals at the present stage leads to a change in both the requirements for learning outcomes and the technologies for creating a means of monitoring and evaluating educational achievements. One of the assessment technologies can be adaptive testing, which, along with the intrauniversity module-rating system for managing the quality of training in technical specialties, serves as the basis for improving an independent system for assessing the quality of training for specialists. The criterion for the effectiveness of blended learning in technical specialties is a single system of relative indicators (numerical indicators) for full-time and distance learning, reflecting in comparable units the achievements in the individual areas of knowledge studied, forms of education, and their dynamics, obtained from the results of attestations and control tests. Determination of learning outcomes is associated with fixing the passage of individual control tests that have a final value and are represented by additive, in accordance with the rating system, values.

## 6. Conclusions

A new quality of education in technological specialties can be obtained if:

- the most effective aspects of traditional and distance learning are optimally combined;
- training will be focused not only on the assimilation of knowledge, but also on the development of the student's personal qualities: cognitive, emotional-volitional, professional sphere, etc.;
- the needs and readiness of the participants in the educational process to introduce information educational technologies and the principles of open education into the educational process of the university were studied;
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- teachers will be prepared to model the educational process using modern information technologies, to draw up their own working training program, taking into account specific conditions;

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