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## PRINCIPLES OF DISTANCE EDUCATION

The paper is devoted to the outlining of the main pedagogical principles of distance learning in technical universities dependable on a range of pedagogical and psychological conditions. The analysis of scientific literature showed the possibilities for bringing innovations and offering new methods and models in distance learning principles implementation. A brief overview of more specific concepts is given and their implementation in distance education for achievement of students' professional aspirations is underlined. The role of distance learning in the system of higher technical education in science-driven conditions has been outlined, the main advantages and problems of students' psychological characteristics relevant for consideration in distance education environment have been determined. The article outlines the main students' pedagogical and psychological characteristics, which must be taken into consideration in the process of the principles introduction in the distance education at technical universities.

Key words: distance education, distance learning system, lifelong learning, principles, science-driven educational environment, students of technical universities, technical specialists

*Статтю подано мовою оригіналу*

Distant education has developed from correspondence education to the learning with help of the latest computer and media technologies. In the early 1980s, the goal of distance learning was to grant study programs on the chosen speciality; ensuring training opportunities for people who could not study on a regular basis; enriching curricula in traditional educational institutions.

New technologies, globalization and new ideas for teaching students, electronic teaching aids with stored training material, delivered through modern technical means (computer, multimedia projector and multimedia board), have challenged traditional approaches to the practice of distance education. With rapid development of technologies, distance education with various telecommunication facilities is aimed at meeting the educational needs of different categories of population. Such training programs are especially useful for many people who due to financial, physical or geographical circumstances have no opportunity to receive traditional education. Thus, distance learning provides an opportunity to gain equal access to quality education.

The analysis of scientific and educational literature on principles of distance learning technologies has shown that the choice of the main techniques for students' training in a science-driven educational environment depends on a range of pedagogical and psychological conditions. The greatest influence on the principle implementation depends on educational, scientific, innovative, and communicative activities. At the same time, the description of the main principles for future technical specialists training is partially represented in the works of many well-known scientists. Currently, a number of studies have been carried out on the methodological and technological aspects of distance learning implementation by J. Bajtelsmit, A. Bandura, T. Devlin, T. Brennan, R. Dillemans, T. Elias, S. Hargadon, J. Harris, C. Jackson, D. Keegan, S. Nikolaenko. Various aspects of the distance learning principles and technologies in the university education implementation were studied by D. Bodnenko, T. Luschei, S. Dimyati, and D. Padmo, C. Maddux, D. Johnson and J. Willis. Scientific and methodological principles, psychological and pedagogical aspects, diagnostics of the effectiveness of the system of distance learning, are considered in the works of R. Mayer, B. Means, L. O'Dwyer, M. Potashnik, J. Capper, Y. Tatur, A. Yakovlev and others.

**Objectives.** The purpose of the paper is to outline the main principles of the distance learning concept in the framework of higher technical education expediency. Below we provide a description of a list of the most vital educational concepts and their interpretation, made on the basis of various scientific and pedagogical sources.

Traditional concepts of educational process in a higher technical university are based on the ideas of consciousness and active learning, which implies the pedagogical influence and support of effective creative students activities aimed at conscious training of future technical specialists. Consciousness is important for learning goals and objectives comprehension, understanding of the material, and ability to apply it in practice. The principle of the conscious learning is dependent on the students' mental activities as well as on the teacher's support in stimulating the students' attention in the learning process, formulating problem situations without giving readymade answers, which helps to increase the students' cognitive performances.

During the learning process the most important evidence of conscious learning is demonstrated through the correct verbal and practical performance [1, 180]. The consciousness is expressed also in the students' positive attitude and interesting learning as well as in the level of independence.

The next important education principle is consistency. The only way to obtain scientific knowledge is in creation of clear picture of the outside world as a system of interconnected concepts. The universal means and the main way of shaping scientific knowledge is in organized training. The scientific knowledge system is created in the process of sequential training determined by the internal logic of educational material and students' cognitive abilities.

The implementation of the principle of consistency involves continuous learning process, which helps students to comprehend the logical relationship between the courses taught at various levels of vocational education, so that the study of the new material is based on the previous learning, which is particularly true for the distance learning process.

The principle of accessibility is important in distance learning for organization of the didactic process according to the level of the students' cognitive abilities and motivation, their individual characteristics and age. The high level of development is achieved due to the limitation of opportunities for students of technical professions and therefore the learning process should become more difficult but accessible to students. These classical rules of practical implementation of the principle of accessibility were formulated by Y. Comensky: from light to heavy, from known to unknown, from simple to complex [10, p. 24].

The principle of expediency involves the facilitation of independent practical-oriented actions for the implementation of the received theoretical knowledge with a clear understanding of the specific goals and objectives of educational process and corresponding choice of the pedagogic methods of learning activities for developing students' abilities of making independent decisions. The implementation of this principle involves the use of innovative approaches at the learning activities organizational in the distance learning system, including various types of independent activities for obtaining, processing, storing and transferring information.

Besides the main pedagogical principles relevant for distance learning process a number of more specific concepts are employed including a block-modular approach, a blend of education and self-education techniques, learner-centered approach and individual educational methods [5].

The principle of a block-modular approach in the content pre-construction of educational cognitive activities presupposes the implementation of the block-modular structure in training programs planning. The block-modular approach to curriculum development is based on such notions as a separate block for each training direction; each block is presented as a module imbedding specific professional topics to study. The built-in training program from the set of modules takes into account the requirements for the student training at a particular education stage with elements of advanced training depending on the individual students' preferences and number of lessons allocated for teaching. The content of blocks can be adjusted depending on specific conditions. Various combinations of modules can be used in teaching at various stages. Training programs flexibility is provided in new training directions (blocks) introduction and the training content (modules) adjustment. Since modular training as one of the main goals facilitates the development of the students' self-education skills, the whole process is based on a conscious goal-setting with from the primary (general knowledge and basic skills), secondary (professional skills) and perspective (development of personal abilities) goals. Educational activities awareness provides changes from the information teaching into the counseling and management regimes. The modular training method permits students to select their own way of learning within the module frames.

The principle of blending education and self-education technique is being developed with the rapid changes in science and technologies the main goal of university education is to motivate students for lifelong self-education aspirations and equip them with appropriate skills. For the realization of this technique the teacher should provide systematic encouragement of students' independent work for the knowledge acquisition in their favorite field of science and technology.

Self-education is an individual process, which involves a creative approach to the outlining of personal and prospective goals and educational methods. It also involves comprehension of the social demands for certain professionals, their qualification requirements, appropriate training level in correlation with the life plans, the obtained knowledge and skills. The quality and effectiveness of self-education largely depends on the style and methods of independent work. It is important to regard self-education as a specific system of personal learning training suitable for implementation in distance learning system.

The principle of the group learning with consideration of individual characteristics expresses the necessity of education of the students' group as a team, to create conditions for the active mutual work and at the same time take into account learner-centered approach in order to promote successful learning [11].

The principle of collective intelligence was actively used by sociologists in the last century and was defined as the ability of a group of people to find more productive solutions than a particular participant. But in the context of distance learning this concept has received new content. It determines the ability of a group to create better content than an individual. In distance learning this concept has become quite widespread due to the use of computer technologies. One of the objectives of the group training is that the students learn to work together effectively as a team. For that they need clearly understand the tasks, the mutual goals of the team. Teaching to work in a team and coordinating one's intentions with cooperative interests is an important task of the university.

In the process of distance learning organization at a science-driven educational environment, it is necessary to take into account the psychological aspects of student learning and to consider the main types of psychological characteristics and available data on their influence on student learning.

For students some conditions are more favorable for successful learning, while others are unfavorable. Learning process in the university is more favorable for students with a strong and adjustable personality, so among them there are more those who are good at learning than among those with a weak and inert nervous system. Such students with a weak nervous system are characterized by prolonged and harder work, more exposed to psychological or emotional stress. For lessening the negative effects of learning at university the teacher can implement techniques of avoiding tight time limits, giving enough time for preparation; permitting written answers more often than oral; dividing complex and large amounts of material into separate blocks and introducing them gradually, facilitating self-correction techniques; trying not to distract the students' attention from the set task before its completion. And

without doubt the distance education system provides a range of opportunities for applying these techniques in teaching future technical specialists.

Recently, attention has been driven to the development of communicative competences or competence of successful communication, which assist in a successful promotion of establishing and maintaining contacts with other people, providing teambuilding, developing social ties (social status). A high level of communicative competence is important for achieving professional career [2, p. 214]. At the same time, there is evidence that a high level of communicative competences might work as a substitution for the low level of objective intelligence and creativity.

An important factor for successful distance learning is high self-esteem and confidence as students un sure in their abilities often do not participate willingly in difficult assignments recognizing their failure beforehand. For encouraging students' motivation and developing their confidence the teacher should commend them not only for an objectively good result, but for the degree of effort made to overcome obstacles. Commandment for easy assignments facilitates the development of self-confidence but do not help in overcoming the fear of failure and avoiding the difficulties and might lead to the habit of dealing with only easily solved tasks. The emphasis on the effort value rather than on a specific result directs to the development of readiness to muster professional tasks.

The development of critical thinking is a vital quality cultivated in the process of education and upbringing. In the result such personal qualities as curiosity, receptivity, and self-confidence, independence, and sociability, freedom of speech and ideas expressions are developed. The ability of cultivating creative and critical thinking indifferent types of students determines the level of the teacher's professional competence. The way she can teach students to think critically, facilitate perception and comprehension influences the students' productivity, and, consequently, the effectiveness of the distance learning process. Thus, critical thinking is a necessary component of the teacher's professional competence, which provides the development of the students' critical thinking.

Conclusions. The main properties of the students' distance learning in the science-driven educational environment are developed on the basis of three components: didactic principles, psychological factors and methods of training organization in the distance learning system.

Thus, the main methodological principles of distance learning in technical university are the following: of the conscious learning, consistency, accessibility, and expediency. In addition, a number of more specific concepts are implemented including a block-modular approach, a blend of education and self-education techniques, learner-centered approach and individual educational methods.

The technical students like no other require constant self-development and lifelong training. These contribute to the increase of creative and intellectual potential due to the development of self-organization abilities, constant self-education, which necessitates modern computer technologies employment and raise the concept of distance education on a higher level.

Students in the distance learning system constantly interact with international professional and educational communities, which cause technical students to take into account the specificity of vocational training throughout the world and possibilities of international communication, assimilate professional vocabulary and ethics, improve information and communication skills.

The training of future professionals in the distance learning system requires the creation of an information network, maintaining communication between student and teacher as partners that contribute into the development of general intellectual abilities at implementing innovative scientific projects, and maintaining interest in innovative research and implementation of progressive scientific ideas.

The outlined conditions of distance education principles implemented in technical specialists training require further deep and comprehensive research on pedagogical and psychological levels and provide the background for further practical implementation of the main methodological concepts for distance learning process.

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**Гавриленко К. М. Принципи дистанційного навчання**

Стаття присвячена викладенню основних педагогічних принципів дистанційного навчання в технічних університетах, які залежать від низки педагогічних і психологічних умов. Аналіз наукової літератури показав можливості для впровадження інноваційних методів і моделей у реалізації принципів дистанційного навчання. Надано короткий огляд низки конкретних концепцій і підкреслено важливість їх впровадження в дистанційну освіту для досягнення професійних уподобань студентів. Зазначена роль дистанційного навчання в системі вищої технічної освіти в наукомістких умовах, визначені основні переваги та проблеми психологічних характеристик студентів, які необхідно враховувати в умовах дистанційного навчання. У статті окреслені головні педагогічні та психологічні характеристики студентів, на які необхідно зважати в процесі впровадження принципів дистанційного навчання в технічних університетах.

**Ключові слова:** дистанційне навчання, система дистанційної освіти, навчання протягом усього життя, принципи, наукове освітнє середовище, студенти технічних університетів, технічні фахівці.

**Гавриленко Е. Н. Принципы дистанционного обучения**

Статья посвящена изложению основных педагогических принципов дистанционного обучения в технических университетах, которые зависят от ряда педагогических и психологических условий. Анализ научной литературы показал возможности для внедрения инновационных методов и моделей в реализации принципов дистанционного обучения. Дается краткий обзор ряда конкретных концепций и подчеркивается важность их внедрения в дистанционное образование для достижения профессиональных устремлений студентов. Описана роль дистанционного обучения в системе высшего технического образования в наукоёмких условиях, определены основные преимущества и проблемы психологических характеристик студентов, которые необходимо учитывать в условиях дистанционного обучения. В статье очерчены главные педагогические и психологические характеристики студентов, которые необходимо учитывать в процессе внедрения принципов дистанционного обучения в технических университетах.

**Ключевые слова:** дистанционное обучение, система дистанционного образования, обучение на протяжении всей жизни, принципы, научная образовательная среда, студенты технических университетов, технические специалисты.