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Models of educational communication in the e-learning system of the university

ABSTRACT

Information technology plays a major role in human life, as it has become an integral part of his life, which is now occupying all civil and military fields. One of the most important areas occupied by this technology is the education sector, as this education is gradually shifting from traditional (face-to-face) education to e learning and distance learning, which has increased in importance during the years of the Corona pandemic. Accordingly, this research came to serve in this field, as it came to explain the most important characteristics of distance learning, by proposing distance-learning models for a university. As for the distance, learning models that were selected in this field, an analysis of the models corresponding to the educational communication process within the university was conducted. Based on this analysis, several factors have been identified to improve the distance learning mechanism within the university, based on the results of educational communication, in addition to setting and formulating some standards necessary for designing educational materials and improving some educational texts included in the distance learning system within the university.

Keywords: E learning, educational system, formulation, Information Technology, communication process, research.

Modelos de comunicación educativa en el sistema de e-learning de la universidad

RESUMEN

La tecnología de la información juega un papel importante en la vida humana, ya que se ha convertido en una parte integral de su vida, que ahora ocupa todos los campos civiles y militares. Uno de los ámbitos más importantes ocupados por esta tecnología es el sector de la educación, ya que esta educación está pasando gradualmente de la educación tradicional (presencial) al aprendizaje electrónico y el aprendizaje a distancia, que ha ganado importancia durante los años de la pandemia del corona virus. En consecuencia, esta investigación vino a servir en este campo, ya que permite explicar las características más importantes de la educación a distancia, proponiendo modelos de educación a distancia para una universidad. En cuanto a los modelos de educación a distancia que se seleccionaron en este campo, se realizó un análisis de los modelos correspondientes al proceso de comunicación educativa dentro de la universidad. Con base en este análisis, se han identificado varios factores para mejorar el mecanismo de educación a distancia dentro de la universidad, con base en los resultados de la comunicación educativa, además de establecer y formular algunos estándares necesarios para diseñar materiales educativos y mejorar algunos textos educativos incluidos en el sistema de educación a distancia dentro de la universidad.

Palabras clave: E-learning, sistema educativo, formulación, tecnologías de la información, proceso de comunicación, investigación.

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Modelos de comunicação educacional no sistema de e-learning universitário

RESUMO

A tecnologia da informação desempenha um papel importante na vida humana, pois tornou-se parte integrante da sua vida, que hoje ocupa todos os campos civis e militares. Uma das áreas mais importantes ocupadas por esta tecnologia é o sector da educação, uma vez que esta educação está gradualmente a passar do ensino tradicional (presencial) para o e-learning e o ensino à distância, que ganhou importância durante os anos da pandemia. do corona vírus. Consequentemente, esta pesquisa veio servir neste campo, pois permite explicar as características mais importantes da educação a distância, propondo modelos de educação a distância para uma universidade. Em relação aos modelos de educação a distância selecionados neste campo, foi realizada uma análise dos modelos correspondentes ao processo de comunicação educacional dentro da universidade. Com base nesta análise, foram identificados vários fatores para melhorar o mecanismo de educação a distância dentro da universidade, com base nos resultados da comunicação educacional, além de estabelecer e formular alguns padrões necessários para projetar materiais educacionais e melhorar alguns programas educacionais incluídos. o sistema de educação a distância dentro da universidade.

Palavras-chave: E-learning, sistema educacional, formulação, tecnologias de informação, processo de comunicação, pesquisa.

INTRODUCTION

In teaching, computer and network technologies are becoming increasingly important, allowing traditional learning to be supplemented with various forms of e learning. In this case, we can talk about the implementation of blended learning, which is currently typical for many higher educational institutions. Blended learning uses traditional learning technologies and distance learning technologies. At the university, such training is carried out based on the Department of Distance Learning and Advanced Training (DDL and AT) using the distance learning support system "CIFS" (Complex, Informational, Forming System), created based on the open tool environment Moodle. The CIFS system includes various functional and information modules to support the educational process: a library of electronic resources, a distance learning module, a module for monitoring the quality of the educational process, and other modules made in the form of sites with a similar unified interface and computer design [1].

With the expansion of the arsenal of technical means (electronic means of processing and transmitting information, computer multimedia systems, interactive computer programs) introduced into education, the role of distance learning (DL) increases. By distance learning, we mean "a learning process independent of the spatial and temporal location of participants in education, in which their activities are carried out to assign education to a student using electronic learning tools based on telecommunications and information technologies in a specific educational environment with the possibility of an individual learning trajectory for the student with coordinating and the guiding role of the educator" [2]. The introduction and application of distance learning in the educational process of universities is carried out in different ways and depends on many factors. Let us analyze the pedagogical communication of different models of distance learning and formulate approaches to optimizing distance learning in the university at this stage.

Objectives:

1- Analysis of the characteristics of distance learning:

2- Suggesting several models for distance learning to be applied within the university

3- Determining the main factors to improve the mechanism of distance learning within the university.

Subject area of research:

This paper poses the problem of the possibility of building a model of distance learning in the process of individual interaction with the educational environment, so that the information received is not only relevant at the time of learning, but also takes into account the development prospects of the area in which the student acquires, that is, so that the acquired knowledge remains relevant In the future.

Research methods:

The following methods were used during the research: theoretical - analysis, comparison, systematization and generalization of scientific, scientific and technical, popular science and applied sources on the research problem.

Classification of distance learning models:

Consider the characteristics of DL. :

1) Synchronicity of interaction;

2) Category of education received;

3) The form of education in accordance with the number of students;

4) Type (kind) of educational materials used in the learning process;

5) use of additional communication channels;

6) Type of communication;

7) The presence of traditional forms of interaction in person;

8) Periodicity (frequency) of interaction between the subjects of the learning process;

9) The level (degree) of adaptation of the system to the individual characteristics of the student [3]. We will take into account such characteristics of DL as:

- Form of education,

- Type of communication (personality and goals of the teacher, personality and goals of the student, features of educational and pedagogical interaction (communication channels, form, synchronism and frequency of interaction)),

- information and educational content (programs, methodological guides, information slides, simulations of working with software, interactive simulators, tests, role-playing exercises, etc.),

- Integration of full-time and distance learning.

Note that the parameter of the ratio between full-time and distance learning is called the degree of remoteness [3].

Consider the classifications of DL models. In the classification of distance learning organization models: asynchronous distance learning model;

Synchronous DL model; mixed model; network mixed model;

Distributed mixed model;

Full-volume DL model [4].

Consider the approaches based on which the use of educational resources "CIFS" in the university is carried out. Students of any form of education (full-time, part-time, additional, advanced training) can individually, using Internet technologies, get acquainted with a variety of educational materials (electronic lectures, presentations, topics and tasks for seminars and laboratory classes, questions for independent work, control and self-control simulators , simulators, electronic testing systems, etc.), posted on the website of university and DDL and AT. In this case, we can talk about a remote form of access to electronic educational resources "CIFS". There is also another form of education - interactive distance learning, carried out using appropriate technical means, CIFS modules and programs in the asynchronous and synchronous interaction mode organized by the University and DDL and AT. Such an opportunity exists for correspondence, additional education and advanced training.

Taking into account practical use, we single out four main DL models for University (see table). Let us take into account in further analysis that DL, on the one hand, requires the subjects of the educational process to have the skills to work with electronic resources, and on the other hand, it allows the formation of information competencies that are important for a modern specialist.

Table 1.

Distance learning models at university.

Type of educational communication	**Characteristics of the information educational environment**	**Form of education**
1. Lack of interactive interaction between the teacher and the student, mediated interaction through the resources of the DL website	Using the DL website learning materials to individual self-counseling	Full-time, Correspondence. Additional professional development and retraining of specialists
2. Asynchronous interaction between a teacher and a student using interactive communication technologies	The content of the course is presented in printed, computer or video materials, which students can study in any place and at any time. There are no classroom lessons. Learning takes place according to the detailed guidelines of the course program and communication with the trainer, who guides, advises and controls the learning process.	Full-time, Correspondence. Additional professional development and retraining of specialists
3. Synchronous interaction between the teacher and the student using interactive communication technologies	Group classroom lessons, carried out using interactive communication technologies. Training is carried out in places that are more convenient in terms of the place of residence or place of work of students	Full-time, Correspondence. Additional professional development and retraining of specialists
4. Mixed interaction between a teacher and a student using interactive communication technologies	The content of the course is presented in printed, computer or video materials, which students can study in any place and at any time. Group classes are also possible, carried out using interactive communication technologies.	

Model analysis of educational interaction in distance learning

Let us analyze the information processes of educational interaction in DL: the production, transmission and receipt of information, which are influenced by technical, social, psychological and pedagogical educational factors. By analogy with the model of educational interaction [2, 6], we will construct and analyze models of educational communication for different models of distance learning (see Table 1).

Model 1. In this case, there is no interactive interaction between the teacher and the student (see Fig. 1).

What are the reasons for accessing the resources of the DL website, for example, for full-time students? In face-to-face training, not all students are suitable for the pace of presentation of the material, which is why there are gaps that can be restored using the materials located on the site. With their help, there is also the possibility of additional individual performance of laboratory work and practical tasks, testing your knowledge.

E-courses attract the attention of students, as they are focused on obtaining modern, specific knowledge necessary for successful professional activity in the chosen subject area. The selection of content for DL courses "is carried out in accordance with its characteristics (usefulness, informativeness and multidimensionality of the reflected social experience), as well as taking into account the requests of the students themselves" [7]. With the help of electronic resources, you can quickly get the necessary information.

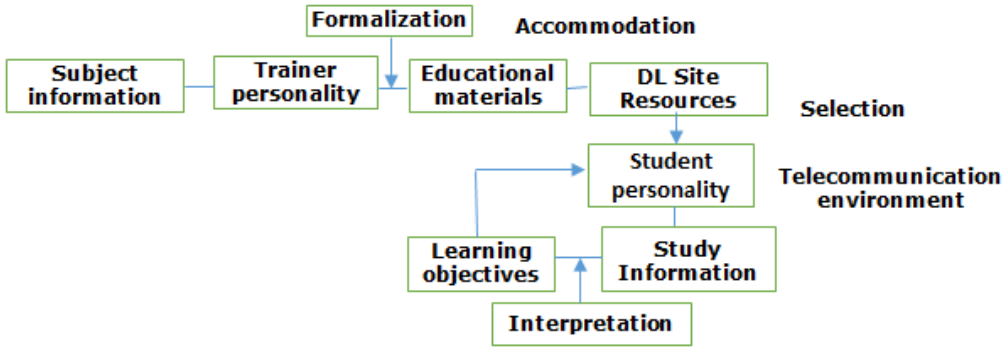

Figure 1. Model of educational communication in the absence of interactive interaction between the teacher and the student.

Teaching materials - a component of the model of educational communication, representing the content of the subject, which must be learned in the learning process, methodological materials for mastering this content. Educational materials contain selected scientific information of the subject area, logically built and clothed in a certain form in order to better understand and assimilate the students. These materials are formed in the process of formalization, which consists in the choice of means, forms of information presentation, and the choice of a strategy for presenting educational information. After being posted on the DL website, the materials become available to students using information and network technologies. The components of the model "Teacher's personality" and "Student's personality" make it possible to take into account personal and psychological aspects in educational interaction.

In this case, there is no interactive interaction between the student and the teacher, but there is an information exchange, i.e. there is an indirect communication between the teacher and the student through the resources of the DL website. The student must select the necessary information, perform decoding and interpret educational information. "Decoding ... is the reverse process of translating an encoded message into a language understandable to the recipient" [8]. The result of the processes of decoding and interpretation is the understanding of the educational content and its integration into the student's individual knowledge system. What determines the success of mediated communication?

The effectiveness of accessing the resources of the University website and advanced training will depend on the motivation of students, the didactic quality of educational materials and the ability of students to work with information (independent search for information to solve

a problem, reasoning about the information found, deepening into the material being studied, a more serious study of the problem) [9]. The didactic quality of learning resources is determined, firstly, by the fact that the content of the resources meets the "requirements of educational standards." Secondly, by the fact that educational materials are presented in the form of "complexes interconnected in terms of didactic goals and objectives of education and upbringing of various types of meaningful educational information on various media, developed taking into account the requirements of psychology, pedagogy, computer science, pedagogical design and other sciences" [10].

Model 2 (see Fig.2).

In the model of asynchronous distance learning, interaction is carried out through distance courses, forums, bulletin boards, e-mail. The distance course includes rules that determine how the student moves from section to section of the distance course when taking distance learning. Very often, the list of such rules is called the trajectory of distance learning. In accordance with the rules, educational materials are selected and studied from the DL website, and practical tasks are performed using special software tools. Educational materials can be presented in both paper and electronic form. Often such courses are provided in the form of a case study. "On the one hand, any case is a complete software and methodological complex, where all the elements are connected to each other into a single whole - materials for getting acquainted with the theory, practical tasks, tests, additional and reference materials, computer models and simulations. The teaching materials of the "cases" are distinguished by interactivity, which implies and stimulates the independent work of students" [5, 11].

Let us note the various interactive possibilities of paper and electronic texts. Electronic resources with the ability to embed images sound and video files in them are very convenient for information perception. Electronic learning tools imply precisely interactive interaction, which consists in "the possibility of direct communication, the promptness of information presentation, and control over the state of the process" [1, 12]. "Conceptually new opportunities are provided by a combination of interactive, multimedia and modeling. The integration of these tools generates a new quality in the representation and knowledge of the world" [3, 12].

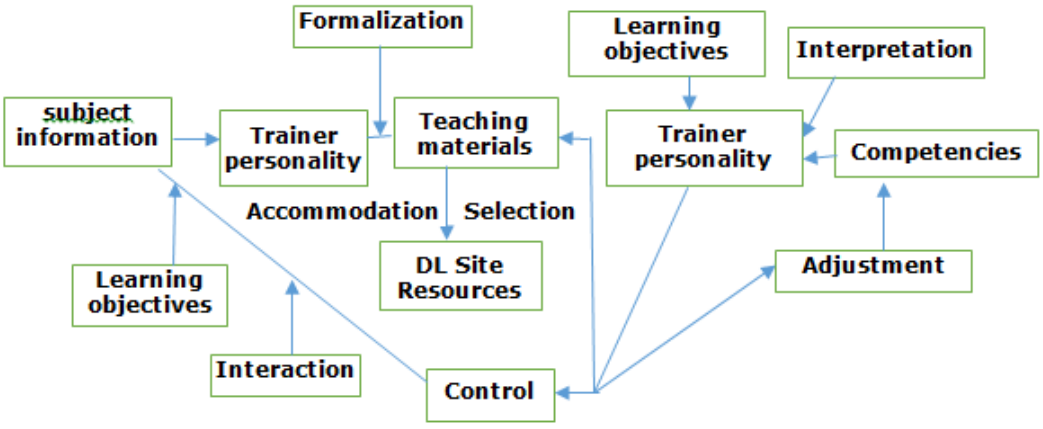

Figure 2. Model of educational and pedagogical interaction with asynchronous distance learning.

The educational process uses modular training: a new discipline is transferred when the previous discipline is mastered. This allows you to fully concentrate on the study of one academic discipline. Despite the lack of synchronous communication, asynchronous communication with an individual tutor is maintained and the student can consult with him and report on the studied sections of the discipline. It is necessary to constantly monitor the learning process and learning outcomes.

Distance learning, involving the study of material in an arbitrary place and at any time, will require students to be conscientious, independent, self-discipline, the ability to allocate their time, maintain contact with an individual tutor and the presence of a number of other individual psychological factors, primarily motivation. It should be noted that high motivation is characteristic of specialists with work experience and those who want to gain additional knowledge necessary for a more prestigious or higher-paid job. For other categories of students, the didactic quality of educational and methodological materials and the active assistance of tutors are of particular importance.

Model 3 (see Fig.3).

Technologies of interactive (two-way or multilateral) tele-video communication (voice and computer chat, video conferences, sharing of software products, virtual audience) allow for real-time interactive interaction of communication subjects in a model with synchronous interaction between a teacher and a student. Such training is close to traditional face-to-face training and requires the teacher to have a certain degree of training not only in the subject area, but also in the field of information technology.

The lecturer is an active subject of pedagogical communication. It uses the oral method of transmitting educational information, carried out with the help of language tools and presentation material. The value of presentations in educational interaction depends on the models of presentation of educational material used in them. On the part of the lecturer, educational and pedagogical interaction is determined by his personal, professional qualities, knowledge of the psychology of communication and non-verbal means used.

The results of the interaction will depend on the information-logical model of the educational material and the availability of skills in working with those means of expressing the content that the lecturer offers. Another important factor in the effectiveness of training is the control over the assimilation of knowledge.

Of particular importance in synchronous educational and pedagogical interaction are the psychological ways of the teacher's influence on the audience in the process of communication, which requires taking into account the perceptual side of communication on learning outcomes. "The perceptual side of communication includes the process of forming the image of another person, his perception, knowledge and understanding, which is achieved by "reading" behind the physical characteristics of a person his psychological characteristics of behavior" [13]. The perceptual side of educational and pedagogical communication affects not only the social aspect of communication, but also the aspect of building images by the trainee, presented in the content of the subject. It is associated with the skills and abilities to build a mental image, correct, clarify, generalize it, that is, and perform a variety of cognitive techniques that make up the chain of modeling actions.

Let us emphasize the specifics of learning according to the synchronous DL model in relation to traditional face-to-face learning, because this interactive interaction is carried out in a virtual information and educational environment. Audio and video conferences are used for seminars. To conduct DL in complex and voluminous disciplines, a virtual classroom is used, with which you can reproduce training similar to training in a regular classroom. In the virtual classroom, students can see each other; write to each other; communicate with each

other, write on a virtual board, exchange materials. An important factor in the implementation of synchronous DL is determined by the reliability of the functioning of the technical infrastructure, namely data transmission channels.

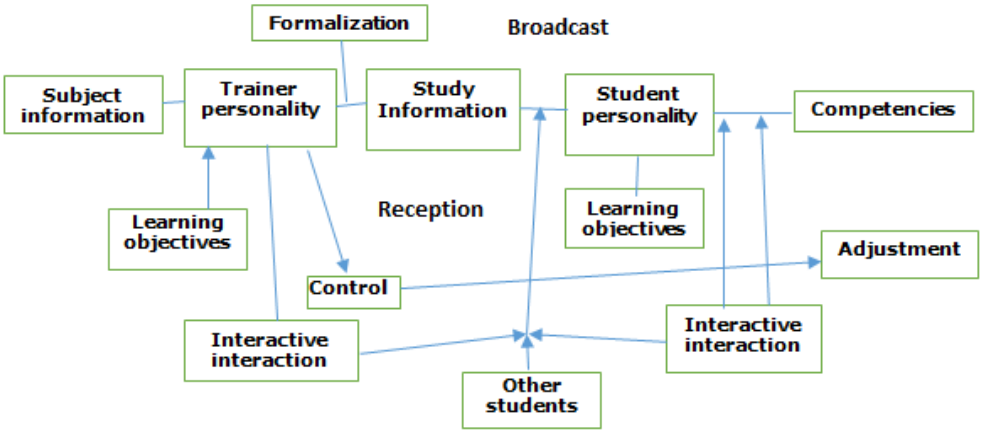

Figure 3. Model of educational and pedagogical interaction in synchronous DL.

Model 4 (see Fig.4).

Asynchronous interaction is complemented by synchronous interaction through instructor-led group classroom sessions.

Classes can be held in a virtual information and educational environment, where each student gets access to a virtual classroom, where he can be acquainted with educational materials, archives of classes, web links and discuss difficult issues with the teacher and fellow students. The features of educational communication observed for synchronous and asynchronous DL models characterize this model.

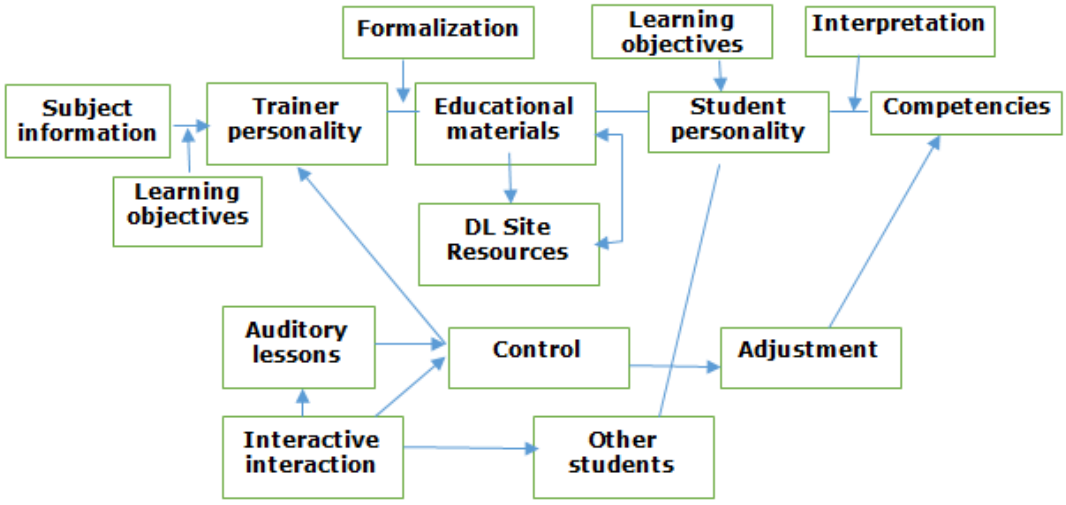

Figure 4. Model of educational and pedagogical interaction with mixed DL.

Important aspects of educational communication in distance learning

According to the considered models of distance learning, the following aspects can be distinguished that affect the results of educational communication: 1) the didactic quality of the information-logical model of educational material; 2) didactic quality of educational texts; 3) work of tutors 3) control of training. Let us consider these aspects.

Learning control. Control over the implementation of the learning process is necessary for all participants in educational interaction. Control allows you to obtain information, analyzing which the subjects of educational communication can evaluate the results of their activities and make appropriate adjustments.

Features of the organization of control depend on the method of learning management.

If a tutor manages the training, then he exercises control according to pre-prepared tests. He also decides on measures to improve the effectiveness of training. If training is carried out using the modules of the distance learning system (DLS), then the teacher can exercise control based on the results, firstly, of the planned testing, and secondly, the testing mechanisms built into the LLS that track certain parameters of learning modules.

The work of tutors. At university, some employees of the university and advanced training and some employees who have completed special UNESCO courses can perform the duties of tutors.

In the dictionary, "Terminology in the system of additional professional education" the meaning of the term "tutor" is defined as follows:

"Tutor (translated from English as a teacher-consultant) is a person who facilitates the learning process, whose role is to be a knowledgeable partner of his students" (quoted from [14]). It is noted that the tutor has no specific duties related to the course, and their main job is to provide mentoring and guidance. "The following functions implemented by the tutor stand out:

discussing course content, providing feedback on student progress, assessing assignments/tests, assisting the student in planning work, motivating the student, resolving administrative issues, supervising projects, conducting face-to-face classes, keeping student records, interacting with the administration on behalf of student" [14]. The specialized training course "Fundamentals of a tutor in the system of distance education" indicates the following characteristics of a tutor: methodically manages the development of the training course; always available to students; organizes the educational activities of the student; works with the course material and the production problems of students; establishes partnership relations with students (developing together) [15].

Excellent knowledge of the subject; good general teaching skills; good communication and social skills; organization, flexibility, patience;

Ability to motivate/inspire; commitment to the program and students" (cited in [14]).

Didactic quality of educational texts. Of particular importance in DL is the interaction of the student with the educational text (paper or electronic).

An important factor in understanding the educational text is the presence of clear definitions of concepts. Concepts are mental models of objects of study. They make it possible to release a person's thinking from direct connection with the object of study and direct it to purposeful mental operation.

To introduce a concept, you can use the method of concept maps, involving students in the activity of building a graphical display of the concept system. "The method of concept maps is based on the idea of the structural organization of knowledge, which is a consequence of the theory of semantic networks that accumulate the entire set of information of an individual about the world around" [17].

In educational texts, you can use concept maps, mind maps and use the laws of their construction. "The construction of mind maps is based on six laws, the observance of which in the process of building a mind map, according to Buzan, allows the most complete and comprehensive representation of the complex of associations associated with the central concept. Buzan divides the laws into two groups: the laws of content and design; structure laws. The laws of content and design are formulated as follows: use emphasis (from the Greek emphasis - expressiveness), associate, strive for clarity in expressing thoughts, and develop your own style. The laws of structure boil down to two imperatives: observe the hierarchy of thoughts, use a numerical sequence in the presentation of thoughts" [17, 7].

What are the benefits of using mind maps and concept maps?

The presentation of the material through mind maps and concept maps contributes to the inclusion of thinking mechanisms in the work and encourages the student not only to memorize knowledge, but also to realize it, by analyzing, comparing, comparing, find connections between new and already known knowledge, and thus meaningfully integrate new knowledge into system already in place. When memorizing meaningful material, its main, most significant parts of information are remembered and the most insignificant, secondary parts of information are forgotten.

From the point of view of active learning activity, the need for interactive interaction between the student and the educational text can be noted.

One of the possibilities of interaction is the hypertext way of presenting educational material, which allows you to work with the material, select the necessary material, sorting through the many links associated with the main text. According to Plotinsk, "the reader of a hypertext gets the opportunity to work not with one, but with several tables of contents that structure this material in different ways. The reader has the opportunity to not only choose the means of "navigation" through the text, but also to supplement the text, create their own table of contents [19, 4].

Electronic design tools allow you to use not only hypertext, but also a multimedia way of presenting educational information. That is, use pictures, diagrams, video, and sound simultaneously with linear text. According to Plotinsk, the use of any drawings can improve communication. Sergom, Kulko. Note that figurative signs (drawings, photographs, etc.) that are not provided with captions evoke associations in the recipient, but at the same time, there is no fixation of a certain association for the sign, which is important for remembering [20, 5, 4]. In works devoted to the problem of processing sign information, it is noted that the images used as representations must be formed correctly from the very beginning, without distorting the reflected reality. Otherwise, breaking the existing image is beyond the power of most students. Therefore, the creation of an image should be the result of thoughtful, purposeful design.

The multimedia method of presenting information makes it possible to implement the principle of effective visualization in training. To do this, it is currently possible to use interactive visualization of the studied objects, processes and phenomena by presenting their computer models. The creation of such models should be carried out based on existing modeling software, taking into account the results of research in the field of cognitive computer graphics.

According to Gestalt psychology, a good form, structure is better remembered.

The tabular form gives conciseness, clarity to the data, structures the data, and allows you to see patterns in the nature of the data. A graph is the most convenient and visual way to represent the structure of a system. It is important to use more pictures, diagrams, graphs, drawings, tables, moving away from the textual representation; present the same educational material in different forms at the same time. The use of figurative and figurative-sign models in itself does not give much efficiency. It is necessary to work on the formation of the essential properties of the object based on a visual image.

The creation of the image should be carried out purposefully. The choice of the form of expression of information should depend on the specialization of students. The use of drawings and diagrams is important for a technical university, where many specialties professionally use drawings and diagrams. Students of these specialties should develop skills for a deeper understanding and memorization of information presented precisely in the form of drawings and diagrams.

According to the cognitive theory of information retention, there are short-term and long-term memory. "Short-term memory is the necessary basis that allows you to select the right information and transfer it to long-term storage. It provides the current activity of a person, and connects memory in general with mental processes and the outside world. "Short-term (working) memory is a type of memory characterized by a relatively short storage time of information (up to 30–40 seconds), which is lost due to the action of the time factor or due to the arrival of new information, and a small number of reproducible elements" [21]. In order for the student to better understand and remember, it is necessary to increase the time of exposure to educational material. This can be done using a multimedia approach to the presentation of educational content. F. Craik, R. Lockhart proposed a model of "leveled processing, according to which the depth of memorization depends on the depth of processing. The authors identified four levels of processing:

1) Structural (Example: "What font is the word written in");

2) Phonemic (Example: "Does this word rhyme?");

3) Semantic - work with meaning;

4) Correlation with oneself (Example: "Is it possible to relate to oneself"), according to which tasks for working out new material should be determined.

The factors influencing the preservation of information in long-term memory include familiarity, the strength of emotional coloring; motivation, interest, context of memorization.

Didactic quality of the information-logical model of educational material. Under the information-logical model of educational material, we mean a system of didactically processed scientific information, which is the subject of study of the academic discipline, for the co-organization and presentation of the elements of which the structure, connections, form, and strategy of presentation are substantiated.

Modeling of educational material includes:

1) Selection of scientific information.

2) Formation on its basis of educational information, which is the subject of study.

The subject of study is formed by research based on knowledge about the object. The object of study is identified with reality.

The selection of the content of an academic discipline involves the implementation of procedures: the actual selection, unification and co-organization. The selection of the content of the academic discipline is carried out based on standards. However, the presence of a standard does not preclude further creative work of the teacher in the selection of content. To select the content, it is necessary to formulate the basic didactic principles for a particular discipline and specialty. Based on these principles, it is necessary to formulate the methodological principles of selection and derive selection criteria from them.

. The next step is to design the learning material. It starts with defining the approach that will be used to analyze and structure learning information. Yakunin cites the classification of principles proposed by Borzenko, based on which educational information can be analyzed and organized: structural-logical, didactic, component. For the structural-logical way of organizing information, it is important to determine the logical connection between concepts and judgments.

With the didactic principle of constructing educational content (text, textbook, course, lectures, etc.), the composition and correlation of old and new, simple and complex, verbal and visual, abstract and concrete, etc. are taken into account. The component principle of structuring educational material involves building it on the basis of the main elements of scientific knowledge, which may include facts, concepts, categories, principles, laws, theories, problems, hypotheses, methods, etc." [4, 16]. Other "possible principles and ways of organizing educational material," notes Yakunin, "may be:

generalization of knowledge (Arkhangels), enlargement of didactic units (Erdnie), generalization of concepts (Skatkin), integration of knowledge (M.N. Skatkin), compression and compaction of information (Lascheno), separation of the main and secondary (Parygin)" [16].

Let us note the principles of designing educational material that are important in our opinion.

1. Carefully choose a strategy for presenting educational information: linear, "web", cyclic, modular, hypertext, etc. The strategy determines the sequence of introducing new information into the study, and "each way of deploying educational information acts as a certain way of thinking, in which a special approach is fixed to the facts and their connections" [16].

2. Build learning based on a logical approach to the presentation of the material, which helps meaningful and therefore better memorization.

3. Select a minimum of facts, use concise and clear definitions to present educational material. To do this, it is possible to compress information by grouping, classifying, systematizing, structuring educational material, highlighting semantic fractals, and constructing metaphors.

4. Use the principle of visualization in teaching, which means: to reduce the unusual to the usual and familiar, to provide a "visual explanation based on examples." Effective visualization is brought into training by models, since they are built as an indicative basis for educational actions.

5. Use information models to present educational content, while solving educational problems; distinguish between data models and action models. It is especially important to use models in the courses of special disciplines of a technical university. The form of the model specifies a set of mental activity operations that are performed when working with this model.

6. Highlight the most significant information. Selection can be done in various ways:

7. Think over a way of presenting educational material in a monologue, characterizing its compositional complexity: inductive, deductive, analogy method, concentric, stepped, historical, etc.

8. Use "simplification of the explanation itself" through the application of methodological rules and procedures that have been successfully tested in practice;

9. Help better memorization by using the principle of chaining

Representations. It consists in using examples that allow you to memorize the main provisions of the educational material by association. There are associations by adjacency (spatio-temporal relationship and cause-and-effect relationship of objects); by similarity (synonyms); by contrast (antonyms).

10. Use mnemonics to store information in memory.

Mnemonics are a set of techniques that facilitate the storage, coding and reproduction of information from memory. The ability of mnemonics to improve memory is explained by the fact that it helps to organize information and creates mediating links between elements to be remembered.

11. at the beginning of the study of the discipline, to acquaint students with the structure of the information-logical model of the educational material. It can be represented using software tools for constructing link diagrams (mind maps).

Probably, it is possible to expand the list of procedures that optimize the presentation of educational material. The holistic application of these, in general, intuitively understandable to subject teachers (we note the fact that most teachers of technical universities do not have special education training) and procedures known to professional teachers, allows us to form an optimal information-logical model of educational material not only from the point of view of its assimilation by students, but also from the point of view of teaching. These procedures will help the teacher to embody in the informational model of educational material such means of presentation and explanation that correspond to his personal psychological qualities and educational readiness.

THE RESULTS

The combination of traditional and distance learning technologies allows you to build a flexible system of vocational training, focused on the formation of students' not only professional, but also informational competencies. The latter allow future specialists to develop the skills and abilities of continuous self-acquisition of knowledge throughout their professional life.

Among the important factors for optimizing DL at the university in terms of the results of educational communication, we include the development of a learning monitoring system; organization of the tutor training system; gradual introduction of a system for checking the didactic quality of teaching materials. These factors will affect, on the one hand, the quality of the formed competencies of students, and secondly, the speed of DL development. The implementation of these factors requires a lot of labor. At present, it is possible to formulate a number of criteria for constructing educational material and optimizing educational texts included in the DL content. Their implementation is also quite complex and time-consuming work. However, this work is of a strategic nature - not only to help students gain solid knowledge in the course of independent work with DL, since "in the center of the learning process is the student's independent cognitive activity (learning, not teaching)" [11]. Also to

help form the skills of self-acquisition of knowledge, to focus on such a way of cognitive activity, the prospects of which are associated with the realities of life and are justified by the informatization of society and education.

It is necessary to carefully choose the strategy for presenting educational information; build training on the basis of a logical approach to the presentation of the material; select a minimum of facts; use concise and clear definitions and information models to present educational material; use the principle of visibility in teaching; highlight the most important information;

Engage students in active discussion, etc.

Use concept maps and mind maps to represent learning content; use hypertext and multimedia methods of presenting educational content; apply procedures for systematization, structuring and generalization of educational information;

Increase the time of exposure to the learning educational material;

Adhere to the level processing of educational material to achieve the required quality of memorization; to form educational texts, taking into account the factors affecting the preservation of information in long-term memory.

CONCLUSION

Information technology plays a major role in human life, as it has become an integral part of his life, which is now occupying all civil and military fields. One of the most important areas occupied by this technology is the education sector, as this education is gradually shifting from traditional (face-to-face) education to e learning and distance learning, which has increased in importance during the years of the Corona pandemic.

Accordingly, this research came to serve in this field, as it came to explain the most important characteristics of distance learning, by proposing distance-learning models for a university. As for the distance learning models that were selected in this field, an analysis of the models corresponding to the educational communication process within the university was conducted. Based on this analysis, several factors have been identified to improve the distance learning mechanism within the university, based on the results of educational communication, in addition to setting and formulating some standards necessary for designing educational materials and improving some educational texts included in the distance learning system within the university.

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