



Didactic frame compression principle in students training content

La aplicación del principio de la compresión del marco didáctico en el contenido de la enseñanza de los estudiantes

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ABSTRACT:

The relevance of the study is determined by the search for effective solutions in the transformation of the university students' education content, which is determined by large information blocks, structures and a set of invariant, author, and multivariate courses that often duplicate each other and, thereby, impede their assimilation. The importance and universality of the didactic frame in the synthesis of knowledge elements integral system, in the educational information transformation in the teaching content, in the transformation of verbal information into non-verbal information, in the creation of innovative, symbolic and symbolic structural diagrams of its presentation to students are determined in the article. The authors reveal the functional essence of the didactic frame as a pedagogical category the structure and content of the didactic frame basic models (frame - concept and frame - scenario), adapted to the university students training content. The practical importance of compression principle implementation in the student training content projecting is proved.

Keywords: didactic frame, teaching content, educational information, principle of educational information compression, reference frame schemes,

RESUMEN:

La relevancia del estudio se debe a la búsqueda de soluciones efectivas para transformar el contenido de la formación de los estudiantes universitarios, que se compone por grandes bloques de información, estructuras y una gran variedad de cursos poliopcionales que suelen superponerse entre sí y consecuentemente dificultar su aprendizaje. El artículo define la importancia y la universalidad del marco didáctico en la síntesis del sistema integrado de los elementos de conocimiento, en la transformación de la información educativa en el contenido de la enseñanza, en la transformación de la información verbal en la no verbal, en la formación de los esquemas estructurales semántico-simbólicos de su presentación a los estudiantes. Los autores revelan la naturaleza funcional del marco didáctico como una categoría pedagógica, además de establecer los modelos básicos del marco didáctico (marco - concepto, marco - escenario), adoptados al contenido de la enseñanza de los estudiantes universitarios. Se demuestra la importancia práctica de la implementación del principio de la compresión en el diseño del contenido de la enseñanza de los estudiantes.

Palabras clave: marco didáctico, contenido de la

1. Introduction

The imperatives of the labor market determined by the orientation towards intellectual production assign the role of the key figure in production to a specialist with a complex of professional and general cultural competencies, a high level of creative thinking, a readiness to use creative samples and norms in their own activity that outstrip the actual level of their development in society, capable of civilized cooperation with other people and other cultures (Blake, Pape & Tchoshanov, 2009; Vakhshayn, 2007; Lozinskaya, 2009; Minsky, 1979; Sukhonosova, 2012; Shteinberg, 2002; Shaidullina et al., 2015; Vlasova, Kirilova & Masalimova, 2015; Khrulyova & Sakhieva, 2017). These processes, as well as the information technologies intensive introduction in the content of university students training, initiated the process of rethinking the goals and tasks of training the future competent specialist with the declared qualities. The established trends determine the search for effective solutions in the transformation of education content within a modern institution of higher education, characterized by a set of basic invariant courses, various and elective disciplines, all sorts of practices on the organizational and on the methodic level and on the content level - by the domination of large information units, structures and complex imagery that makes them difficult mastering by students (Guselnikova, 2009; Gurina & Sokolova, 2005; Kusheva, 2000; Nekrasov & Molchanova, 2009; Ostapenko, 2005 Sokolova, 2008; Erdniev, 1992; Chen et al., 2017; Cherdymova et al., 2017). It is proved that the problem of reducing the redundancy of training courses number in a university is characterized by a permanent nature. In the 80 - 90's of the XX century in order to address this problem in the educational process of universities the concept of "enlarged didactic units" was actively introduced (Erdniev, 1992) The system of principles of P.M. Erdniev (1992) has been successfully used to date in modular teaching and in the design of interdisciplinary courses (Blake, Pape & Tchoshanov, 2009). In modern university practice, the principle of didactic units' enlargement, based on their transformation into the educational information competence, becomes one of the structure elements of compression universal principle of educational information content (Lozinskaya, 2009; Sokolova & Fedorova, 2008; Sukhonosova, 2012; Kong, Kayumova & Zakirova, 2017). Depending on the training content, its intellectual capacity, and interdisciplinary nature, the compression principle is used while systematizing, enlargement, generalizing and algorithmic deployment of educational information using a variety of sign and symbolic means of presentation (Sokolova & Fedorova, 2008; Sukhonosova, 2012). It is established that the logical, production, semantic and frame models of learning content structuring are used in the educational process of a modern university (Gorbushin, 1992; Lozinskaya, 2009; Ostapenko, 2002). Identified models have varying degrees of educational information compression.

The greatest advantages in structuring and presenting the information content to students can be referred to the model of the didactic frame, based on conventional, established in accordance with the established educational traditions, the advantages of compression principle:

- Systematization of educational content, transformation of verbal information into nonverbal (figurative), use of essential links between information elements;
- enlarging the elements of the educational material knowledge with the aim of facilitating the interpretation of information by students;
- The generalization of figurative and logical thinking on the basis of structured schemes use for presenting information available to students;
- Algorithm construction of circuits' universal structure - supports in sign - symbolic form.

The advantages of using the didactic frame in the transformation of training content, oriented to the effective assimilation of educational information and the increase in the effectiveness of new structural schemes for their presentation to students, established during the study, are justified as an important line of modern research (Gofman, 2004; Yanow & van Hulst, 2011; Kaganovich, 2000; Nekrasov & Molchanova, 2009; Sokolova, 2008; Yanitskiy, 2011; Levina et al., 2017). In this regard, the main attention in this article is devoted to the training content transformation on the basis of educational information compression principle and its presentation to students in the basic models of the didactic frame (frame-concept and frame-scenario). The article reveals the functional essence of the didactic frame as a pedagogical category; the structure and content of the didactic frame basic models (frame - concept and frame - scenario), adapted to the training content of the university students, are established. Based on the results of the study, the theoretical and methodical approach to the transformation of the teaching content and its presentation to students in the basic models of the didactic frame are substantiated. The practical significance of projecting and implementing of compression principle in the transformation of students' training content is proved.

2. Literature Review

The theory of frames, originating from the research of American scientists G. Bateson (1972), I. Gofman (1974) and M. Minsky (1979), is a set of concepts developing within the framework of philosophy, sociology, psychology, cognitive linguistics, cybernetics, centering around the problem of information, on the basis of which a person builds forecasts and correlates his behavior with them. The process of thinking in the research of these scientists is based on the presence in the human memory of a large set of diverse frames, from which, if necessary, the right one is selected at the moment, corresponding to the actual needs. However, this approach to presenting information to a person is not without its shortcomings. Science has proven that man's thinking is adapted to the use of new information, except that which is stored in memory. This is the meaning of human thinking development. But frames, in the theory context of M. Minsky, are not adapted to this, because they are designed to create artificial (machine) intelligence. Nevertheless, Marvin Minsky was convinced that the structures linking the frame system into a single whole can be useful in explaining a number of phenomena characteristic of natural intelligence. The term "frame" in this article is used as a "collective context designation" (Vakhshtayn, 2011). In the course of the research, the works of leading philosophers, sociologists, psychologists, linguistic specialists, teachers, methodologists, devoted to various aspects of the frame problem are examined (Blake, Pape & Tchoshanov, 2004; Vakhshtayn, 2011; Gorbushin, 1992; Gofman, 2004; Gurina, Sokolova & Gurova, 1986; Kaganovich, 2000; Kusheva, 2000; Ostapenko, 2005; Sukhonosova, 2012; Shteinberg, 2002; Erdniev, 1992). The scientific and methodical ideas and conclusions of these authors about the features and priorities of designing and implementing frames in the social and humanitarian fields of knowledge form the methodological basis of this study. The use of frame models for the design and presentation of educational information to students, many authors (Gurina & Sokolova, 2005; Gorbushin, 1992; Gofman, 2004; Egorova, 1991; Nekrasov & Molchanova, 2009; Fedorova, 2008) consider as one of the effective approaches to the development of innovative teaching and methodical materials. This approach finds an effective application in the methodic of teaching professional, natural - scientific and social - humanitarian disciplines in the university educational process (Kusheva, 2000; Sokolova & Fedorova, 2008; Lozinskaya, 2009; Sukhonosova, 2012). In pedagogical studies of recent years, classifications of frames have been developed, methods for their organization and application have been proposed, the advantages of use have been singled out, the requirements for the creation have been singled out (Lozinskaya, 2009; Ostapenko, 2005; Sokolova, 2008). The theoretical and practical expediency of didactic frames design and implementation as an innovative element of the university educational process fulfilling the functions of interaction regulator between knowledge and culture is also substantiated (Yanow & van Hulst, 2011; Yadov, 2011; Yanitskiy, 2011). These authors note that recently the frames are mostly spoken of in the language of

philosophy and linguistics, sociology, social psychology and pedagogy. But, despite this, the frame is an element of culture. Culture "tells" us that our world is already "framed", that the primary frame is correlated with the cultural concept "cultural picture of the world", since it organizes the group's experience during long time intervals. In the course of the research it is proved that the frame as an element of culture corresponds to cultural invariants, time-stable archetypes, and basic samples of a social group experience, which presupposes the existence of certain codes that make it possible to achieve universal understanding. These elements in culture study theories play the role of universal foundations, which undergo changes in different cultural spaces and time slices. At the same time, the "constructed" frames, if successful (that is, work for a long time) can be fixed as value preferences and social norms, and then - as cultural code. An example is the digital information technology, transformed in the educational process of the university into a permanent educational code. To date, most of the research has focused on these problems. In the course of this study, despite extensive bibliography in the study of the frame problem, it has been established that the didactic aspects of their design and implementation in the content of university students training remain most in demand. In this connection, up to the present time, it remains urgent to substantiate the theoretical and methodological approach to the transformation of the learning content, mediated by the implementation of educational information compression principle and its presentation to students in the basic models of the didactic frame.

3. Results

3.1. Didactic frame as a pedagogical category

In the course of the research it is established that the theory of the frame in pedagogical science has been used since the 70s of the 20th century, although not as widely as in psychology or linguistics (Sokolova & Fedorova, 2008). The creator of the theory of frames is rightfully considered to be a specialist in the field of artificial intelligence, M. Minsky (1979). He first noticed that frames, as a properly organized data structure for presenting a stereotypical situation, easily provide quick access to the required area of knowledge, and also realize the necessary internal connection between its various parts. The universality of the fundamental part of the frame theory made it possible to transfer it from the sphere of artificial intelligence to the field of linguistics and psychology. With reference to pedagogy in the development of a frame notion's expanded interpretation as a modern categorical structure, a notable contribution was made by S. Blake, S. Pape, M. A. Tchoshanov (2004); V.S. Vakhshayn (2011); Sh.A. Gorbushin (1992); R.V. Gurina & E.Ye. Sokolova (2003); R.T. Egorova (1991); A.A. Ostapenko (2005); V.E. Shteinberg (2002); P.M. Erdniev (1992). These authors investigated the possibilities of the frame in the technologies of problem-based, modular, concentrated learning as a technological mechanism for rethinking the structure and content of educational information. In the most general form, the frame in their works is defined as a way of organizing representations stored in memory. It is identical with such concepts as the scheme, associative connections, and the semantic field in cognitive linguistics, also acts as a generic notation for a set of concepts: a scheme, a scenario, a cognitive model in pedagogy. In the sociological concept of E. Goffman (1974), the frame is associated with the "analytic props» - by which the individual comprehends his own experience. In this concept, which lies far beyond the limits of artificial intelligence, frames are subordinated to multi-level principles that "generate" personal and social events. These same principles govern the subjective participation of the individual in events. In the set of established actions, the frame is a unit of knowledge organized around a certain concept and containing data on the essential, typical and possible for this concept. The frame specifies what is typical in this concept and what does not. This is especially important in relation to certain episodes of cognitive, educational, social and personal interaction (lecture activities, participation in seminars, laboratory work, independent research activities, leisure communication and other routine episodes). Frames organize

students' understanding of the world as a whole, form ordinary behavior through the representation of a stereotypical situation (work in the classroom, theater, algorithm for performing lecture, laboratory, independent or research work). Each frame determines several types of students' behavior in learning activities to learn information: 1) the use of information; 2) waiting for consequences after use; 3) a problem situation, what to do if the expectations are not confirmed. In the learning activity, the most common signs of information often manifest themselves: stereotypes, repeatable nature, frames, visualizing, keywords, mentality, universality, skeleton form (framework with empty windows), associative links and fixing of analogies, generalizations, rules and principles. It is proved that the common features of information make it possible to represent the frame graphically in the form of a network that consists of nodes and connections between them. Each node is nothing but a definite concept, which may or may not be explicitly defined (Minsky, 1979). In the course of the research it was established that the concept (node), given in an explicit form, can be concretized as a result of the process of the given frame concordance with some specific situation taking place in the environment. For example, the topic of the section being studied is integrated into an interdisciplinary module, which qualitatively changes the structure of the given frame. Unspecified nodes (concepts, categories, elementary learning tasks that presuppose self-study, or duplicate material from other related sections) are called terminals. Terminals form the lower levels of the frame structure, whereas at the upper levels there are concepts that represent the basis of the study and are always invariant with respect to the frame represented by the situation.

The set of explicitly specified nodes (concepts) forms the basic core for understanding any particular situation of the given frame. In the process of concretizing terminals and coordinating possible for each of them concepts with a specific situation of the environment, there is an understanding of the student's personality ability adequately to perceive and construct the meanings and models of nature, man, the world, and the semantic and content matrices of cognition. The student achieves understanding by going into a reflexive position, when he asks himself the question: "What did I understand in the text?" And "Why did I understand this?" The key point here is the use of the same terminals by different frames, which allows you to coordinate the information received from various sources. Groups of related frames are combined into systems (frameworks) that can reflect actions, cause-effect relationships, ways of organizing, etc. In the course of the research, it is established that theoretical frame projects find confirmation in the field of humanitarian knowledge in substantiating the cognitive nature of the frame as a pedagogical category: the frame as a knowledge structure (part of the cognitive system of the personality) and the frame as the knowledge representation structure (the cognitive structure representation tool). Due to the frame properties (the categorical principle of knowledge organization, the knowledge representation about the typed situation, the clearly structured hierarchical structure, the availability of the conventional principle and the possibility of dynamics), its application gives many advantages in constructing the content of instruction, oriented to deepening and sustainability of the current, basic, valuable reflexive knowledge by students.

3.2. Structure and content of basic models' didactic fram

In the course of the study, the understanding of the frame as a didactic model of representing knowledge to students is justified: a recurring way of organizing educational material on the basis of compression principle (frame-concept) and learning time (frame- scenario). It is proved that both frame models allow to expand the amount of acquired knowledge and information without increasing the amount of time allocated for their study, and to bring the learning objectives closer to the individual creative abilities of students. An effective way to solve these areas is to increase the density of training content didactic units during their compression in time (for example, lectures and seminars are carried out in the course of the project activity) and in content by compressing the educational information (specific sections

are transformed into discipline, and then as information becomes more complex in interdisciplinary training modules). In this process, the productivity of the frame is made, as the material studied can easily be transferred to tables, diagrams, slides, which saves considerable time and allows the student to form his own solution to problems, ideas that have arisen in the learning process on the basis of the material's independent study. Some authors (Sokolova, 2008; Fedorova, 2008) correlate the frame with the instruction of formation of personality actions' orienting basis, although they recognize the peculiarity and importance of using specific features inherent in the frame: stereotypes, repeatability, the presence of a framework form, etc.

The analysis of the existing experience in the design and implementation of the didactic frame in the university students training content makes it possible to note a certain chaos in the use of the conceptual apparatus, structure and subject content, conditioned by the concept influence of M. Minsky (1979), focused mainly on the formation of artificial intelligence.

In the course of the research, an attempt was made to classify models of the didactic frame structured on the basis of pedagogical goals of transforming the training content:

1. The frame - a concept. It is a "window" (similar to a computer), in which certain educational information is loaded, oriented to specific goals:

- actualization of knowledge - the information in the form of concepts, formulas, short definitions, quantities corresponding to the didactic tasks of the previous material is loaded into the window;

- concretization of cause-effect relations between the previous, already studied material, and new, forthcoming study;

- visual arrangement of drawings, diagrams and other sign - symbolic texts supplementing the content of information;

- construction of the content basic summary:

- 1) goals and tasks are defined;

- 2) the requirements for the contents of the supporting summary are structured;

- 3) the forms of information presentation are defined (it is carried out in the most diverse forms, depending on the creativity of the teacher);

- 4) functions are established (simultaneously performs the functions of the method and the means of instruction);

- 5) A substantive part is presented (basic knowledge, located in a logical sequence and displayed mainly through graphic means, sign - symbolic texts). It is proved that the main advantage of the reference notes is the compression of information, educational content, specifically and visually represented on the basis of the compression principle (the systematization of the educational content, the integration of knowledge elements, the generalization of figurative and logical knowledge, algorithmization of the universal structure of the support schemes in sign- symbolic form).

It is established that the competences formation for translating knowledge into a special language of semantic and symbolic compression of information is a form of intellectual activity that is complex for students. Therefore, at the initial stages of the frame's implementation, the supporting summaries are presented to the students in the finished form. As you progress through the curriculum, the proportion of students' autonomy in their compilation becomes dominant;

- 6) the logical and semantic scheme of the supporting abstract is created and implemented (it serves as a framework for the content of information that establishes the most typical, significant, system-forming links between the semantic cells of the educational information).

The main difference between frame schemes from other logical and structural schemes that represent a certain part of the educational material is the stereotyped nature and universality of the allocated connections for knowledge structuring. Logical and semantic schemes are

aimed at identifying such links and presenting them to students in the form of graphic or symbolic structures. In the course of the research, the main variants of the logical and semantic schema application of the supporting abstract are established for visual presentation of the training content to students:

- units - schemes that represent a coherent structure of educational information. Based on the general structural elements of theoretical knowledge content, it is possible to construct a frame unit diagram consisting of cells: the field of theoretical knowledge (topic, section) and elements of knowledge (scientific facts, concepts, laws, theories). The selected structure can be refined and supplemented by the addition of other cells or frames that establish system connections that reveal the meanings of the scheme elements. For example, when studying historical laws related to the knowledgeable "concept" element, semantic cells can be singled out: reason-cause-goals-tasks-stages-periods-outcomes-significance-evaluation-the consequence of one or another historical process, fact, activity of the historical personality. Such a structure can become the basis of the logical and semantic frame in studying historical regularities. The task of the teacher is to highlight the main, essential in the training material, correctly identify and schematically identify the cause and effect relationships between the structure of the unit - the scheme, provide advice to students in the competent reading of information from the unit - diagram;

- Logical and semantic matrices, with the help of which the systematization of knowledge is carried out, the development of students' analytical and diagnostic skills in the structuring of educational content. Linear and multidimensional matrices are defined: linear matrices - enlarged training knowledge, allocated for a specific reason, are arranged in an orderly manner along one axis.

- support - node circuits. A high level of efficiency in the use of support nodal circuits in the process of presenting the basic structural elements of information to students is proved. To do this, the center of the scheme has a generalized concept corresponding to the topic, the division of the discipline from which the rays of the structural elements of knowledge radially diverge (scientific facts, concepts, laws and theories).

2. The frame - a scenario. It is based on the sequence of training activities' execution or correction and on the way out on the analyzed learning situation.

The hierarchical structure of the frame-scenario consists of information terminals (node-slots) and nonterminal nodes. The terminal represents and describes the studied subject, its specific features, as well as information about the relationship with other objects, the manner in which the frame is used, the next action or the action to be performed if the assumption is not justified. Essentially, the frame scenario is a unit of questions about the topic under study, the problem, the proposed situation, the methods of solution, and the options for answering them. A good example is the structure of teaching aids for passing exams on the USE. In the course of the study, the structure of the frames - scenarios, most adapted to the content of the students' training is justified:

- frames - scenario. They represent the procedure for performing the task (actions): a description of the algorithmic prescriptions using the established language of information transfer (description of the problem solution sequence, instructions for actions in case of negative results, advisory recommendations on the solution of certain emerging problems);

- Frames - algorithms. They form and develop the learning skills of mastering and systematization of knowledge in discipline. Algorithmic frames differ from scenario in that work on a given algorithm requires students to perform a variety of intelligent operations and update information from other frames (including procedural ones). It is established that scenario frames - algorithms are effectively used in the process of designing educational and methodical complexes of different cycles disciplines;

- frames - descriptions. They reveal the patterns of events or processes, the characteristic features of which is a high compression of the text and the developmental sequence of the

situation or the causal relationship of the text basic content. The description frames are represented in sign - symbolic or graphical form by means of digital, algorithmic, symbolic logograms;

- problem solving frames. In the course of the study, stereotyped structural elements of didactic frames were identified: problem actualization - formation of knowledge on how to solve the problem - choosing the solution to the problem - solving the problem - evaluating the optimality of the decision. The main goal of problem solving frames is the development of logical, problem-based, creative thinking of students.

It is established that in the theory and practice of the humanities there are also other classifications of frame models that are determined by various objectives: linguistic, cognitive, semantic, ways of representing knowledge in artificial intelligence, etc. The revealed classification is oriented to the solution of didactic tasks in the content of the university students training and allows effectively to use the discourse of the didactic frame: the periodically repeating way of organizing the educational material (the frame as a concept) and the study time (frame as a scenario), for disciplines, the content of which needs to be systematized, generalized, integrated and deduced to algorithm.

3.3. Implementation of compression principle of didactic frame's educational information

In the course of the research it was proved that the transformation of the teaching content of a modern university students on the basis of the didactic frame compression principle is due to the dominance at the organizational and methodological level of a set of basic invariant courses, varieties and elective disciplines, all sorts of practices, and on the level informative - the availability of large information units, complex figurative material, which hinders their mastering by students. Educational information, transformed on the basis of compression principle, is limited to a small volume and at the same time a complete exposition of the main content is possible, as one of the optimal ways of person understands the studied.

Compression, being one of the most rational means of processing educational and scientific information, can be considered as a special case of a wide and multilateral "curtailment", inherent in the whole process of cognition, human thinking, memory (Vakhshayn, 2011; Guselnikova, 2009; Gurina & Sokolova, 2005; Kusheva, 2000). In general, the task of compressing educational information by many authors (Gorbushin, 1992; Ostapenko, 2005; Sokolova, 2008; Erdniev, 1992) is referred to the task of understanding and highlighting the meaning of the text by the person. In pedagogical science, there are two semantic structures of the text: C 1 is the meaning that is embedded in the text; C 2 is the meaning that the student comprehended in the process of understanding (interpretation) of the text. The complexity of the process of the text understanding (interpretation) lies in the fundamental impossibility of the knowledge coincidence forming C 1 and C 2. Since C 1 is formed at the expense of the whole set of representations, needs, interests, experience of the information compilers, respectively, C 2 is formed in the process of understanding (interpretation) text at the expense of attraction of all set of educational - scientific and personal potential of the student. In the course of the study, two main components of any scientific text are substantiated: 1) the primary material of observations and 2) the system of scientific concepts at the time of writing. The text necessarily contains the subjective views of the compilers, the result of their personal experience, borrowings from other sources or background knowledge, and all these components are immersed in the information environment. Understanding (interpretation) is the formation of the "second text", that is, it is an attempt to recreate the information structure of C 1 in the process of forming the C 2 model. This understanding (interpretation) is the first step in structuring knowledge in the process of implementing the basic models of a didactic frame (frame-concept and frame- scenario).

The central point in the process of understanding (interpreting) the text is the formation of a

semantic structure: the identification of supporting key words or semantic milestones, as well as the integration of semantic milestones into a single knowledge structure. In the text, as a rule, there are two types of links: explicit (clear) and implicit (hidden). Explicit links divide the text into sections, chapters, paragraphs; they highlight keywords, patterns, formulas, principles, categories. Implicit ones cause major difficulties in understanding. They are based on informative links of information of current, retrospective, perspective and reflective nature, on the student's competencies to understand the whole text and be able to distinguish the main values of information.

The student's understanding (interpretation) of the text is influenced by:

- His personal experience;
- General scientific erudition;
- Background knowledge.

The procedure of splitting the text into parts, then condensation, compression into a semantic milestone is the basis for any individual process of understanding (interpretation). A set of keywords is a set of reference points that unfold the text when encoding into memory and is recognized during decoding as the informational core of systemic nature. It is proved that this approach to compression of students' knowledge quite accurately reflects the process of human thinking through the definition of information representation basic unit and the closer connection of knowledge based on facts and procedural mechanisms.

The study found that, depending on the content of the training information presented by the frame, the following elements of the compression principle proved to be successful in use:

- Systematization – is effective in textual, tabular, hierarchical, sign - symbolic forms of educational information. It is oriented on structuring of educational content, transformation of verbal information into nonverbal (figurative), the use of essential and stereotyped links between the elements of knowledge, the synthesis of knowledge elements integral system;
- Enlargement – it dominates in textual, tabular, graphic, sign - symbolic forms of educational information. It is oriented to the creation of a universal system of supporting abstracts and diagrams - supports in sign and symbolic form;
- Generalization – is effective in tabular, graphical, databases, hierarchical, telecommunication forms of educational information. It is oriented to the development of figurative and logical thinking on the basis of information representation structural diagrams use, supporting abstracts, units - information schemes, logical and semantic matrices;
- algorithm construction – is priority in the use of compressed, capacious, universal rules - the prescriptions of training activities and their sequence in the process of solving the learning problems of a particular class: immersion in the problem - formulation of the problem - setting goals and objectives - organizing the work of groups - a phased distribution of frames content (indication of intermediate results) - determination of each participant role in the group - planning of joint and individual activities - discussion of research methods - discussion ways to finalize the final results (presentation, role-playing game, video clip, report, etc.) - summing up, finalizing the results, presentation - conclusions - advancing new problems.

Mastering by students of the identified types of educational and cognitive activity, as well as intellectual operations on compression of information meaningful meanings, the unfolding of reflection logical chain, the description of images and their features with the help of generalized verbal texts, logical schemes, symbolic signs, allows quickly and qualitatively assimilate new systems of concepts, methods actions and develop competence not only to solve learning problems, but also to understand the essence of these tasks information space management.

4. Conclusion

The carried out research confirms the theoretical and practical significance of the didactic frame

design and implementation problem as an actual practice-oriented direction in the training content transformation determined by the existing organizational-methodical and content contradictions. Based on the results of the conducted research, the leading role of the compression principle in the educational information content transformation and its presentation to students in the basic model of the didactic frame is proved. This trend is conditioned by the modified objectives of education content, the core idea of which is the structuring of educational information on the basis of the compression principle through its systematization, consolidation, generalization, algorithm, presented in the models of frames - concepts filled with concrete content, supported by diagrams, tables, various sign symbols graphics and frames - scenarios that increase the density of didactic units of learning content in the process of their compression in time. It is proved that during the implementation of compression principle in the content of learning, the information to be learnt is "curtailed" into concise, capacious, informative texts; verbal information is transformed into figurative (non-verbal) information; an integral system of knowledge and abstract thought of students is formed: their theoretical knowledge is systematized, deepened, their subconscious abilities develop, independent creative thinking develops, practical competences for information management in educational activity are formed. *The article establishes theoretical and methodical approaches to the justification of the didactic frame effectiveness and universality in the synthesis of an integral system of knowledge elements, in the structuring of instruction content, and in new structural diagrams' creation of its presentation to students.* In this connection, the essence of the didactic frame as a pedagogical category is revealed in the article; the structure and content of the didactic frame basic models, adapted to the content of the university students' training, are established. Based on the results of the study, the theoretical and methodical approach to the design and implementation of the compression principle in basic didactic frame models is substantiated. The practical importance of compression principle in the transformation of students' training content is proved.

The process of the frame studying didactic capacity does not end with solving the tasks of the conducted research. The technological aspect of frames implementation in the educational process of the university and the problem of designing interdisciplinary didactic frames are of particular interest to future researchers.

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