Activation of the Educational Process by Changing the Curriculum in Higher School

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Abstract

Solid scientific research of models and methods of using information technologies aimed at activating the educational process has been conducted in this paper, namely, the structural and logical model of educational plans with the use of information technology in the preparation of Bachelors has been proposed and tested, that has provided an increase in the quality of education, which in turn provides qualified, effective informational and pedagogical technology in future professional activity. Recommendations for modifying them for the effective assimilation of academic disciplines from non-profile areas of training and which can be applied in any Ukrainian higher educational institution have been provided. The application of the method of activating the educational process on the basis of information technology that provides intensive training of the specialist as a result of which the goals are achieved, namely, for the minimum period of processing of the educational material the maximum amount of professional training is obtained, has been substantiated. The analysis of educational and methodical systems and methods of activating the educational process aimed at the effective solving of problems with the increase of competence, quality, training of specialists on the basis of an integrated approach and modern tendencies for improving the content, forms and methods of organization of the educational process has been carried out.

Keywords

structural–logic scheme, higher education, quality of education, information technologies, management of higher education institution

1. Introduction

Rapid development of information and communication technologies in Ukraine provides at the present stage a certain vector of action, provides accelerated, ahead of the innovative development of education. Education to the greatest extent determines the trends in the development of society and is becoming a leading national trend in many countries around the world. A review of foreign information sources shows steady trends in the use of innovative technologies to significantly improve national education systems. The use of the latest information and communication technologies in the educational process determines the effective model of development of the country and acts as an effective factor in the reform of education

Modern reforms that are taking place in the field of Ukrainian education, requiring the solution of urgent problems, namely: ensuring the effective operation of higher education institutions and improving management techniques. Each time higher demands on the quality of educational services, the level of their

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informatization, improving methods and means of learning, training and methodological base, ensuring computerization of higher educational institutions necessitated the use of information technology to ensure quality training and facilitate the perception of educational material [1, 7, 9, 10].

The conducted system analysis of legislative and regulatory documents of education of our state and provisions and declarations of foreign countries makes it possible to make generalizations concerning the world tendency of using innovative processes in the sphere of providing educational services and managing them as one of the main directions of social development [2, 3, 4, 8].

Improving the effectiveness of the educational process through the introduction of the latest information technologies and innovative teaching methods have been studied by many Ukrainian and foreign scholars, in particular B. V. Durniak, JI. C. Sikora, V. M. Glushkov, V. D. Bazilevich, V. S. Zhuravsky, M. Z. Zgurovsky, V. G. Kremen, S. M. Nikolenko, M. F. Stepko, B. D. Shinkaruk, J. A. Arter, D. A. Binet, R. M. Gagne, J. L. Hornke, T. L. Kelley, R. L. Linn, F. M. Lord, J. Millman, J. Spray, H. Swaminathan, M. Waters, D. J. Weiss, R. J. Owen and K. J. Patience. Processing the results of scientific research into the problem–solving management of information–innovation processes in the provision of educational services makes it possible to identify a significant difference between the levels of theoretical and technological advances for the needs of state development [13, 27, 34].

A significant contribution to the concept of data preservation and processing in information systems has been made by W. H. Inman, E. Codd, V. V. Pasechnik, H. B Shakhovskaya, which made it possible to develop multidimensional data storages.

The presence of unresolved problems, which are partially defined above, makes the topic of the dissertation research relevant to models and methods of information technology to enhance learning processes [12, 26]. The proposed research is relevant, given the current trends of individualization of educational competence entry, as well as improving the efficiency of management of the educational process in higher education institutions [36, 44].

The higher demands on the professional level of graduates are caused by the current situation at highly automated industrial enterprises, transport systems, which use integrated, distributed computerized systems of automatic control in the process management. Such systems are characterized by the fact that in the servicing and faults liquidation process not the elements but the functional blocks are changed. It requires the implementation of reconfiguration and software correction procedures, and this is another level of professional training.

The considerable complexity of such systems requires thorough training, which is formed on the knowledge of information and computer technologies, understanding of the structure of the automatic system and the goals of its functioning [5]. This means, on the one hand, the correction of curriculum, and, on the other hand, the selection of students with a certain level of the intelligence and motivation of the neuro–systems cognitive structure and the selection of specialists and mentors for conducting lessons.

In order to master systems with hierarchical structure and automation of processes management at all levels, it is necessary to define the following concepts: the intelligence of the management system and the level of the persons intelligence who is purposefully trained in accordance with the requirements of the standards of management of the automatic system, technological processes, which are the basis for introducing the definition of the systems intelligence and the level of persons intelligence based on the concept of intellectual self–organization of cognitive psychology.

2. The impact of the latest information technology on the acquisition of educational competence

At the present stage of development of information society affects all spheres of preparation of competence of future specialists. One of the main problems facing higher education is the preparation of a qualified graduate for professional activity in the information society. The solution to this problem is associated with the formation of students' competence in the field of “Informatics”, modern information and communication technologies and computer technology [15, 17].

In a unified information space of the use of information and communication technologies in all spheres of professional activity, the formation of new communications and highly automated information space provided the beginning of modernization of the traditional system of education, and also gave the opportunity to form an information society.

The actual level of cognitive development of a specialist involves the use of computer models borrowed from the theory of artificial intelligence and experimental methods. The process of cognitive development makes it possible to create a system of so–called strong artificial intelligence, which will have the capacity for creativity and independent learning. Cognitive science, consisting of several interrelated disciplines, is schematically depicted (Figure 1.) [32, 39, 41].

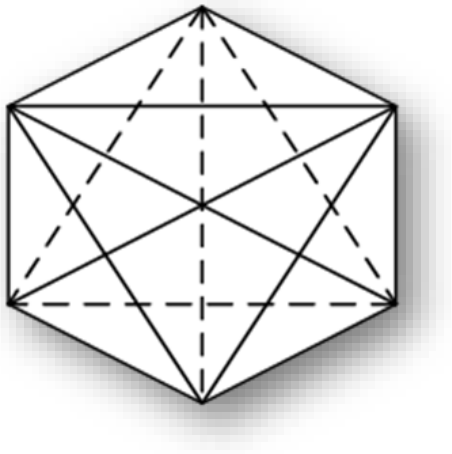

Figure 1: Cognitive hexagram.

However, it is necessary to pay attention to the preservation and development of the concept of "science as an information system", which allows for a connection between the development of science and theoretical knowledge. The cognitive approach creates a new methodological basis for the development of the concept of science as an information system. Today, science as an information system is becoming an important system, performing the function of representing scientific knowledge, protecting and forming the environment for information exchange with society. The main goal of professional education is to train a qualified specialist of the appropriate level and profile, who has perfect professional skills, who is competitive in the labor market and is capable of effective work at the level of world standards, professional mobility and continuous professional growth.

3. Classical model of educational process based on structural and logical schemes

Pedagogical technology is the specification of the methodology (content and instrumental component of the educational and pedagogical process), which involves the algorithmization of the educational process as components of the theory of learning [9, 39, 41].

Techniques and technologies as systems have their own characteristics:

- logical structure of the educational process;
- the relationship between the parts of the subject field of study;
- structural and content integrity of the educational process;
- expediency of knowledge and skills from a certain subject area in the educational process;
- the intensity of submitting the educational material of knowledge and skills in the subject field.

The structure of the technological process of training consists of:

- content part (concept, aims of training, methods and forms of submission of educational material and its contents);
- procedural component (organization of educational and methodical process, methods and forms of educational activity of students and specialists, management and diagnostics of the educational process);
- the target orientation of the educational process for the construction of the technology of educational materials presentation requires its specification (acquisition and awareness of knowledge, the formation of ideas and skills for solving tasks in the subject field);
- identification of methods and means by which one can achieve the result (mathematical logic as well as the usage of the acquired knowledge).

The stages of teaching technology development consist of the following components:

1. The definition of the motives of learning and their formalization and quality criteria.

2. The definition of the main purpose of learning (the construction of a system of goals, the purpose of education, cognitive objectives of the subject).
3. The selection of the content of education according to the subject matter based on the standards, depending on the level of knowledge required in the subject–oriented industry, is carried out in accordance with the goal for each class (mathematics, philosophy, physical, technical, social direction) or according to the idea and concept of the subject and its intended use [33, 35, 37, 43].
4. The formation of knowledge of a social nature.
5. Designing an educational part of learning technology implies the following for a student [18]:

- the diagnostics of the competence level of a specialist in the subject field;
- the assessment of abilities, creativity, intelligence;
- the analysis and evaluation of complex characteristics regarding the mastering of knowledge in the subject field;
- decomposition of the content of the training course (on modules, blocks, elements) in accordance with the purpose of training, selection of criteria for assessing the quality of knowledge;
- determining the level of basic results obtained by a specialist in the learning process (the amount of required knowledge, skills and abilities);
- the substantiation and choice of methods, forms and means of studying specific topics;
- the choice of the mathematical and logical apparatus for the formation of knowledge and understanding of the educational material.

1. The implementation of the planned educational tasks in the subject field is the basis for:

- professional training and motivational orientation towards the future;
- the solution of the problem purpose and content, structure of the educational tasks of the subject area;
- student awareness of the assessing the level of knowledge in the educational process criteria;
- the enhancement of the level of assimilation of educational contents and understanding of interrelations in educational material;
- the awareness and reproduction of the method of both logical and mathematical actions in the processes of cognitive thinking when analyzing and making decisions for finding an optimal solution of problems;
- providing educational dialogue and feedback in systems (student–teacher, teacher–student).

2. Monitoring of assessments in the process of learning and determining the effectiveness of mastering the knowledge by students.

Formation of personal abilities in the learning process

According to Jerome Seymour Bruner statement, professional development of a specialist in the process of learning can happen in the following ways:

- the acquisition of professional skills in the course of the educational game during the development of strategies, mastering the games individual components;
- contextual learning based on the modular and project approach;
- abstract (theoretical learning);
- mastering the subject according to the educational subject field through scenarios and models of problem situations, highlighting the modeling dynamics of the specialist's development and choosing a successful strategy for solving problems taking into account complex professional actions.

The ideas of the Jerome Bruner theory are based on the classification of professional competence of a specialist. From his scientific point of view of similarities and differences of specialists, a coding system is proposed in which specialists form a hierarchical structure of adjacent categories. The next level of competence becomes more unique (specific).

4. Information and logical structure of creative educational process

Informatization and computerization of education should meet the standards and requirements of the Ministry of Education and Science of Ukraine:

- to make an interactive and active process of acquiring and perceiving knowledge in a certain subject–oriented field of knowledge;
- to preserve and expand the possibilities of an interactive "student–teacher" dialogue for effective improvement of communication capabilities of a person;
- to individualize and creative the process of acquiring knowledge using psychological and cognitive technologies of teaching students and their way of thinking;
- to optimize the search and processing of the main educational material, content and concepts and to focus on the use of methods and tools for solving various types of tasks according to a logical structure;
- to deepen and optimize the process of perception of knowledge to accelerate the acquisition of personal competence;
- to provide methods and means of control and self–control of knowledge by a student.

To do this, the following methods should be analyzed and developed:

a) list of educational goals;
b) class working program (level of training);
c) review of educational literature;
d) a work plan of lectures (lessons) in the form of a script (algorithm) of the educational process:

- the material of lectures of the teacher from the subject field;
- practical and laboratory training programs;
- tasks and questions for intermediate knowledge control and examination tickets.

According to the proposed and used methods of teaching courses in the "Informatics" field it is expedient to develop a structural and logical scheme of the subject area, database and knowledge as well as inter subject relations. In accordance with the structural and logical scheme, requirements for theoretical and practical levels of lectures, practical seminars and the process of teaching the material from the subject field can be formed:

- professional–mathematical and system–philosophical levels;
- purposefulness and relevance in solving tasks focused on the subject field;
- structural and logical scheme and topical conceptual apparatus and methods of its use.

In accordance with these professional requirements, the classical structural and logical scheme of acquisition of competences in the educational process is constructed (Figure 2) according to [40,42, 45].

$E1 - E4$ – elementary education, the first – the fourth year;

I_b – basic intelligence;

I_n – acquired intelligence.

The structural and logical scheme has a three–level organization, namely:

- $R1$ – methodical provision and software using information and communication technologies in the educational process and electronic manuals as a database and knowledge base;
- $R2$ – learning process in the form of the verbal dialogue: "teacher (specialist) class (group) students". As a result of such an education activity, theoretical and practical knowledge, ability to set and solve problems as well as to develop creative skills are formed;
- $R3$ – control of knowledge and skills in accordance with the requirements of the Ministry of Education and Science of Ukraine and their impartial (objective) assessment according to the set criteria of the quality of education.

In accordance with the above–mentioned structural and logical scheme, the quality of learning depends on the professional competence of the teacher:

- professional delivering of educational material from the subject field of knowledge to the perception of this material by students;
- the learning material should be systematic, relevant, structured and qualitatively filled with both theoretical and practical educational material;

- skill fully transfer the knowledge of the teacher to the students on the basis of a clear logical thinking and consistent presentation of the educational material;
- a specialist in the subject field must professionally transfer the audience the logic of learning facts, not the amount of data from the subject field; to conduct a structural and logical analysis of educational phenomena as the basis of perception and understanding of their content;
- it is logical to complete the lecture (lesson), to show the dynamism of the development of thought in the presentation of the educational material and to identify problematic and complex tasks from the learning course.

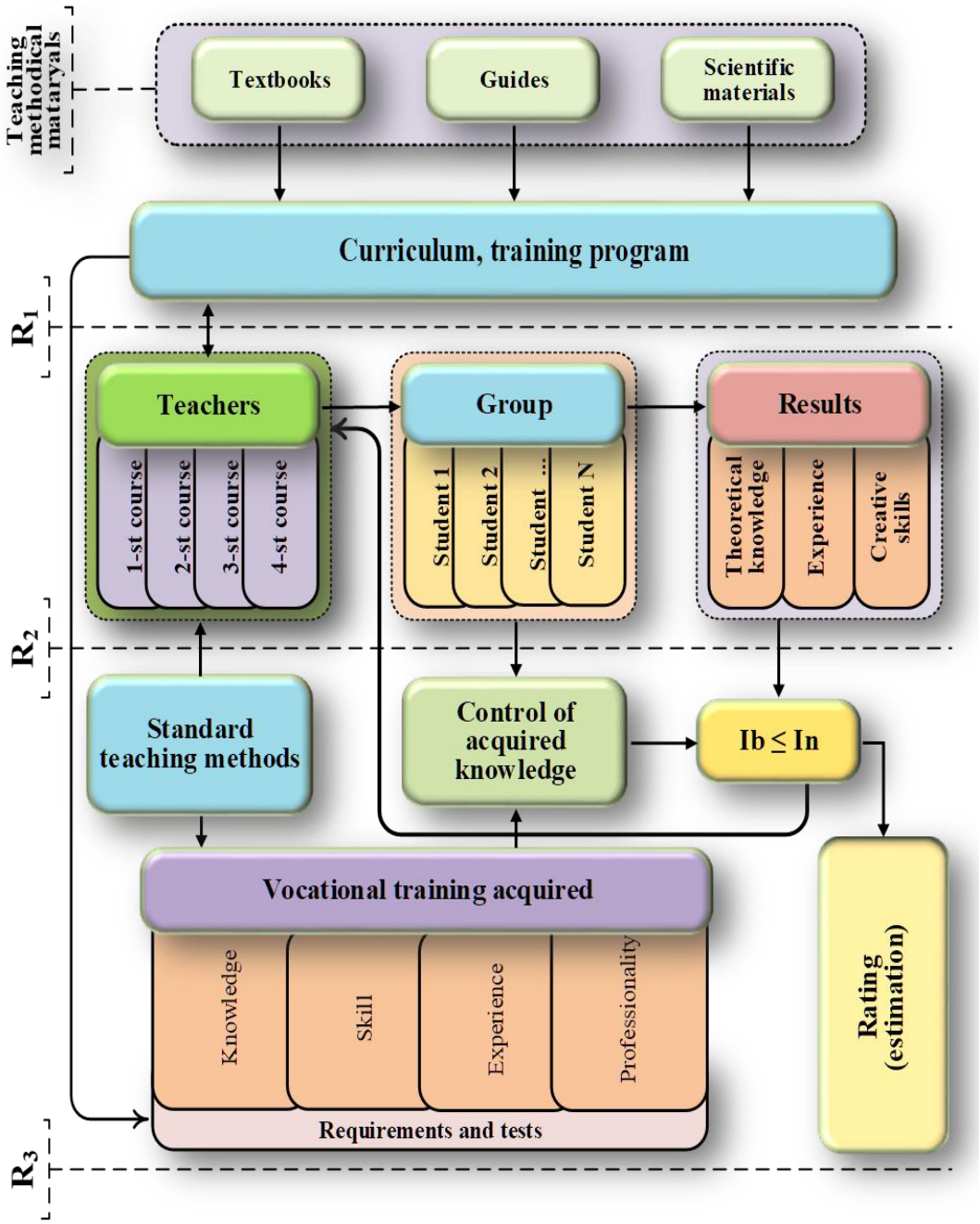

Figure 2: Classical structural and logical scheme of the learning process activation

This approach requires a student to structurally (correctly) recapitulate the lecture, needs considerable intellectual work of both a specialist and student in the process of skilled transfer and assimilation of new knowledge and skills.

5. The analysis of educational and methodical models of training activation

The methodical system of the educational process is an enlarged didactic structure, which is formed on the basis of the choice of methods and means that provide cognitive activity of students, taking into account the cognitive psychology of an individual approach to the training of a specialist.

Depending on the objectives of the study, the development of the subject – oriented field of knowledge and the type of future activities of a specialist appropriate methods of obtaining knowledge are selected. The development of the methodology is based on the choice of an adequate dominant method. Methodological system is integral in accordance with methods, content and form [6].

The choice of the teach in and methodical system is based on the following main components:

- orientation at the personality (intelligence) level;
- leading learning objectives;
- the nature of the material in accordance with the requirements;
- the terms necessary for the professional acquisition of knowledge;
- the degree of a specialist's interest in gaining new knowledge;
- nature of the material (content, form and scope of knowledge, complexity, significance).

Educational material is divided according to the structure of necessary knowledge:

- by the content – the actual material, concepts, skills, abilities;
- by the level of significance – general scientific, ideological, local, interdisciplinary, subject-thematic;
- by the type – theoretical, practical, applied;
- by the form – objective, figurative, didactic, symbolic, linguistic, graphic;
- by the logical structure – discrete on the basis of logical operations, integral;
- by the content elements descriptive and factorial, logical and evidential, figurative and emotional.
- A specialist with a high level of professional (pedagogical) training should be able to and know:
- methodology of the formation of concepts;
- psychological components in pedagogy;
- professionally possess a set of logical and mathematical operational actions, heuristics and various methods of professional activity necessary for the transfer of knowledge of a particular (specific) educational material;
- form an integral orientation of the student in the subject field;
- have systemic approaches to acquiring knowledge and psychological and pedagogical bases of learning.

Characteristics of teaching and teaching systems are given in Table 1.

Modern society demands new approaches in the educational process from specialists. With that in mind, a special role is played by higher education institutions, requirements for specialists in this area of training are increasing. The amount of information that needs to be worked out and mastered by the student with constant curricula is increasing rapidly. Therefore, the important aspects of providing educational services are the improvement of the quality of the teaching process management, the qualitative work of higher education institutions and the development and implementation of new educational programs [9, 10]. Such a scientific approach requires the development of the latest information technologies in higher education institutions management, theoretical foundations and methods of management, computer science, system analysis, decision–making theory [14, 29, 30]. Today, existing developments in this direction are created owing to the fundamental work of many Ukrainian scientists, namely: V. Glushkov, M. Zgurovsky, S. Bushuev, B. Gershunsky, K. Colin, I. Robert, S. Grysh, O. Pavlov, M. Pasyeka, T. Podchasova, Y. Rashkevych, I. Sergienko, V. Skurykhin, D. Khodakov and others.

The organization of the educational process is, first of all, the development of structural and logical models of future specialists in different fields of training, taking into account the current state of informational learning streams, which are based on the implementation of many factors, namely, the planning of the learning process and the monitoring of student learning and specialists work [31].

Table 1

The analysis of the structural and logical schemes of the educational process and their influence on the improvement of the quality of education in the context of information technology

Psychological mechanisms	Type of activity	Methods	Psychology	Features
Reproductive learning	Memorizing the material	– Algorithmicity according to the situation; – titles of instruction	Imitation	– Reduces the activity; – independence; – interest
Dogmatic training (informational and reporting), comprehension is not required.	– Formal memorizing without awareness; – control	– Lecture; – seminar; – practical lessons; – dogmatism.	Imitation of the association	– Standard knowledge; – inductive presentation; – passivity.
Traditional teaching (explanatory and illustrative).	– Perception and comprehension; – remembering; – reproduction.	– Lecture; – narrative; – illustration; – demonstration	Associations	– Focused on knowledge; – dogmatic methods.
Relaxation 1 raining (intellectual concentration) imagination, game scenarios.	– Method of error attempts; – imitation, – modeling of reality.	– Interactive methods; – gaining situations; – simulation games.	– Association; – intellectual relaxation; – interaction.	– Collective activities; – activity, – absence of fear and stress.
Suggestive learning (logical and figurative thinking, problem situations comprehension of the material).	– Acquisition of knowledge and methods of action in the dialogue mode; – systematization of knowledge in sign and symbolic representations.	– Conversion of verbal information into sign and symbolic visual systems; – coding and decoding of information.	– Association; – analogy; – schematization; – attention.	Construction: – tables; – charts; – block diagrams, – schematic compendium.

Information education (informational and illustrative, search of methods, solving of standardized tasks).	– Assimilation; – reproduction; – activity according to the rules of logic and mathematics; **Does not develop;** – creativity.	– Narrative; – explanation; – reading the text; – illustration exercises; – solving problems.	– Association; – methods of cognitive activity; **Does not develop:** – activity; – initiative; – independence; – creativity.	– Limited cognitive abilities; – focused on the average student.
Programmable learning (algorithmically programmed). Low activity and initiative.	– Assimilation; – explanation; – reading the text; – exercises and illustrations; – solving problems by rules.	– Narrative; – explanation; – exercises; – schemes of problem solutions.	– Association; – techniques of cognitive activity.	– Limited development Does not develop: – activity; – creativity; – independence.
Problem–search training (dosing and limitation of the material, algorithmization).	– Assimilation of information in the form of an algorithm; – algorithmization of problems.	– Instructing; – laboratory and practical work; – step–by–step training; – allocation of the basis of the algorithm theory.	– Motive; – mental action; – figurative thinking; – logical thinking.	– Motivation; – low level of creativity.
Associated problem– starch learning (cause–effect scenarios).	– Awareness and perception of the problem situation; – development of knowledge; – search models of knowledge; – reflection; – creativity.	– Transfer of the problem situation into a conscious problem; – methods of creative and scientific research.	– Cause–effect associations; – comparing the analogy, – cognitive need; – updating of knowledge.	– Intelligence of students to master the material; – longtime of knowledge assimilation.

The presence of unsolved problems related to the use of information technologies in the educational process at the state level is a prerequisite for optimizing the structural and logical models of the educational process. The urgent need for their solution causes the relevance of scientific research in this direction.

A system analysis of the structural and logical model has been carried out due to the use of disciplines in the field of computer science that are capable of improving the professional training of students for the modern labor market. The recommendations for optimization of structural and logical educational models of students and teachers of higher educational institutions are given.

System analysis of the work research is based on the use of system theory; methods of system analysis; methods of processing information; structural modeling theory for identification of patterns in constructing structural and logical models of specialists training in different fields of knowledge; the use of the latest information and communication tools for processing of empirical data; methods of reengineering the learning process [20, 23].

Qualified analysis of structural and logical models of organization of the educational process in the training direction provides an opportunity to build an effective information and intellectual system for decision–making support and development of an algorithm for monitoring the quality of educational services [19, 22, 28].

Structural and logical models of specialists training in different training directions in the field of "Informatics" disciplines are an object of research. System analysis of the use of the informational environment in the curricula is the new and most promising direction in the Ukrainian system of higher educational institutions. The main priority of the state policy in the field of higher education is the use of information technologies, the integration of educational structural and logical models of specialists training into a single educational information space. The analysis of structural and logical models of the educational process of the higher educational institution for the improvement of the quality of providing educational services in terms of information technologies is carried out. The condition of providing educational services in higher educational institutions of Ukraine and the influence of information and communication technologies on the quality of the educational process are studied.

The disadvantages of the basic structural and logical model in the training of Bachelors in this training direction are specificities. Since disciplines in the "Informatics" field are foreseen on the I–IV courses, they can only partially provide the study of specialized disciplines for qualitative improvement in their learning and the earlier they are studied, the greater the impact on the learning process is [11].

Thus, the disciplines on information technology in the fourth year indirectly (partly) affect the educational process, as practices and methods of using information and communication technologies are studied by students on senior courses.

The basic structural and logical model of the influence of disciplines in the "Informatics" field in the training direction "Primary Education" on the quality of educational services provision is analyzed, the necessity of its modification is substantiated. It involves the transfer of disciplines from the "Informatics" field to junior courses so that all disciplines of the curriculum are provided with information technology knowledge and skills (Figure 3).

The modified structural and logical model of educational process for the earlier studying of subjects in the informatics field and their direct or indirect influence on deeper assimilation of profile disciplines is offered.

There is a need to substantiate the proposed modified structural and logical model of the curriculum for the preparation of Bachelors. It is suggested to provide studying of disciplines in the "Informatics" field on junior courses, I–II exactly, since in the further educational process they provide more qualified use of information and communication technologies for improving the quality of obtaining educational services in the basic educational direction.

Equally important scientific task is the application of the proposed methodology as well as its adaptation to the requirements of improving the quality of the educational process in Ukraine. The use of the DEA (Data Envelopment Analysis) method for analyzing curricula to evaluate the impact of one discipline on the studying of another in both the current course and subsequent courses is proposed. Around the world, the DEA analysis is used to assess the performance of developed models and systems of homogeneous objects that have a common area of use. In this case, the effectiveness of the analysis is considered as the ratio of the analyzed data of the experimental model to the data of the basic model of the curriculum [21, 24, 25].

The DEA methodology is based on the use of linear programming approaches to construct (visualize) a nonparametric linear surface (curriculum) based on evaluated data. The evaluation of the effectiveness of the proposed methodology is further carried out in relation to the surface. For the first time, this methodology was proposed by Farrell in 1957, but only a few authors referred to it for twenty years, namely: Bowles (1966) and Afriat (1972) proposed to use a number of mathematical programming methods to solve this problem. However, up to 1978, scientists and practitioners did not give any attention

to these developments. Only after the publication of the work by Charnes, Cooper and Rhodes, in which the term DEA was proposed, a number of scientific publications appeared, in which the ideas of Farrell developed scientifically. The DEA analysis methodology has developed and popularized abroad. Today, a variety of models that are used to study management, industry, economics and provide useful data for analytical analysis and management decision making.

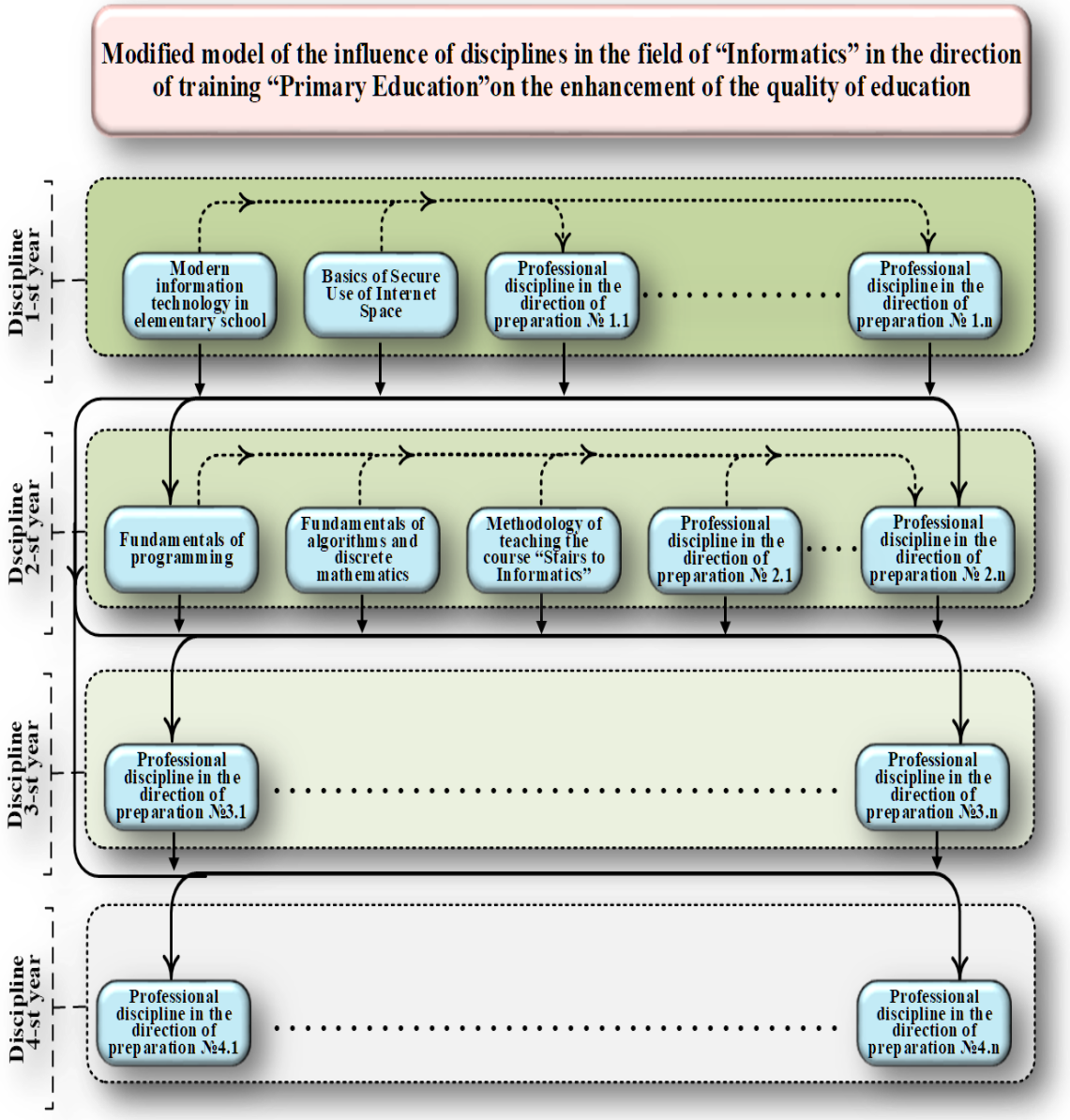

Figure 3: Comparative analysis of structural and logical models of educational process

Recently, the world scientific community has had a significant interest in applying this methodology (technology) to computer analysis of various industrial and non–industrial sectors. Modern features are used in the field of mathematical and logical programming, the theory and methods for solving problems of optimization of significant scope and computer simulation for the effective implementation of this methodology (technology) [26]. models A mathematical apparatus is used for getting an optimal result, namely, the increase of the provision of educational services of higher educational institutions, to implement the task of analysis of the curricula. In the DEA–analysis methodology, each researched object is considered as the information receiving unit.

The DEA methodology is used for our study:

$$E_{max} = \frac{\sqrt{\sum_{i=1}^{n}(P_{ij} + K_{iq})^2}}{\sqrt{\sum_{i=1}^{n}(P_{ij} + K_{ij})^2}}$$

Emax – maximum effectiveness of the developed curriculum relative to the impact of disciplines in the "Informatics" field on the mastering of other disciplines, where: P a subject from the curriculum; n – number of training courses in the curriculum; i a course from the curriculum; j – year of training; q = j − 1 the next academic year; K_{iq} – weight coefficient of influence of disciplines in the Informatics field on the development of other disciplines of the current academic year; K_{ij} = 1 – in case, when the discipline affects disciplines that are studied in the next term or year.

The coefficient of influence on the discipline for the current course is determined:

$$K_{ij} = \frac{d-1}{2 * d}$$

where: d − number of training courses in the current term.

The efficiency of the proposed model.

Conditional units of the increase in the quality of education basic model modified model. If E for a separate curriculum is less than one, then the effectiveness of the proposed curriculum relative to the impact of disciplines in the "Informatics" field on other disciplines is not enough and such a plan needs to be improved. To find the maximum value of E, it is necessary to make calculations using the linear programming method. The comparison of the basic and modified structural and logical model is in the conditional units in Figure 4.

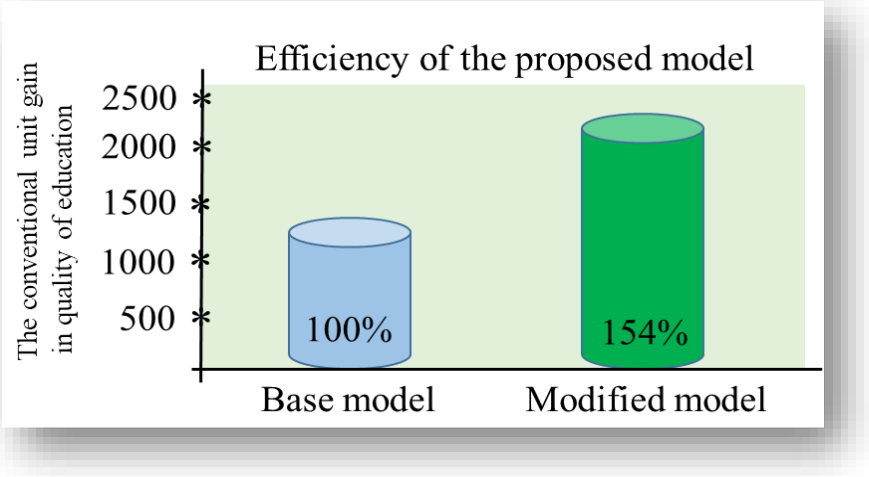

Figure 4: Comparative analysis of structural and logical models of educational process

The professional use of modern information technologies greatly broadens and deepens the general basis for the processing of educational information when learning the educational material, which, in turn, increases the quality of obtaining educational services, which in turn provides a skilled, effective innovation and pedagogical technology in future professional activities.

6. Conclusion

The carried out analysis in terms of the use of information technology substantiated and improved the structural and logical model of the curricula for the preparation of Bachelors, which gave an increase in the quality of education and, in turn, provided a skilled, effective information and pedagogical technology in future professional activities. Also, recommendations for modifying them for the effective assimilation of academic disciplines from non–profile fields of study are provided and can be applied in any Ukrainian

higher educational institution. The application of the method of activating the educational process on the basis of information technology, which provides intensive training of the specialist, as a result of which the set goals are achieved, is substantiated, that is, for the shortest period of processing of the educational material, the maximum amount of professional training is obtained. The analysis of educational and methodical systems and methods of activating the educational process aimed at the effective solving of problems with the increase of competence, quality, training of specialists on the basis of the complex approach and modern tendencies for the improvement of the content, forms and methods of organization of the educational process was conducted.

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