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QUANTITATIVE ANALYSIS OF RESEARCH ON THE PROBLEM OF THE USE OF INTELLIGENT INFORMATION TECHNOLOGIES IN THE PROFESSIONAL TRAINING OF FINANCE AND ECONOMICS SPECIALISTS

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Quantitative Analysis of Research on the Problem of the Use of Intelligent Information Technologies in the Professional Training of Finance and Economics Specialists

The method of quantitative analysis of dissertation works is worked out, the time period is substantiated, the subject branches and directions of research are specified. It is shown that researchers do not pay enough attention to the use of information technologies in the training of future finance and economics specialists (only 8,89%); and less than one percent of works (0,71%) are devoted to research on the design and application of intelligent information systems. It is revealed that the main researches on the development and use of a new class of intelligent and expert training systems are concentrated in the direction of "Cybernetics. Artificial Intelligence Systems". This indicates a lack of attention of researchers from the pedagogical direction to the problems of creating and using intelligent information systems in the training of future economists and requires further research in this direction.

Key words: analysis, research methods, intelligent teaching systems; information technologies.

Problem statement. Modern information technologies are increasingly based on the development and use of artificial intelligent systems that are widely used in the financial and economic sphere: e-business technologies, intelligent electronic decision-making systems, analytical information systems, etc. [1–5].

This, along with the processes of globalization, the development of

international economic and financial relations of Ukraine, significantly increases the competition between socio-economic systems, which creates fundamentally new requirements for the functioning of pedagogical systems that are associated with the training of future finance and economics specialists [1–8].

Therefore, it can be argued that there is a problem of improving the professional training of future economists, who are able to effectively solve professional problems using information intelligent technologies and systems in the new economic conditions [1; 5; 9–11].

Analysis of recent research and publications. A large number of dissertations, scientific publications and other researches are devoted to the problems of raising the level of professional training of finance and economics specialists based on the use of information technologies and systems [1; 2; 8; 9; 11–14]. There are studies devoted to theoretical and methodological analysis of this (isolated) problem [9; 12–15], but no quantitative analysis of dissertation research in the directions and subject areas of informatization of education, including economic, use of intelligent and expert systems in the process of training in these works was not conducted.

There is a well-known work [16] that deals with the quantitative analysis of dissertation researches on the use of information technologies in the training of future finance and economics specialists, but this work does not take into account the current changes related to the development of artificial intelligence systems (cybernetic direction) and their application in pedagogical systems (pedagogical direction). This makes it relevant to conduct research on the quantitative analysis of the problem of the use of intelligent information technologies in the training of future economists.

Formulating the goals of the article (setting the task) The purpose of the work is quantitative analysis of the dissertation researches of the problem of the use of intelligent information technologies and systems in the training of future finance and economics specialists.

The main research material. For a more complete and detailed analysis of the

study of the problem of increasing the efficiency of future economists' professional training, it is advisable to carry out a quantitative analysis of the dissertations, concerning the directions and subject areas of the use of intelligent systems in pedagogical systems of education.

For the quantitative analysis of dissertation research, a methodology has been developed that includes the following main steps: 1) selection and justification of the time period for dissertation research analysis; 2) allocation of directions and subject areas of dissertation researches on problems of obtaining economic education in educational institutions of Ukraine; 3) search and selection of dissertation works on the mentioned problems, directions and subject branches according to the time period; 4) analysis and classification of dissertation researches according to the selected directions and specific subject areas; 5) processing of analysis results and their graphical representation.

In accordance with the developed methodology, a quantitative analysis of dissertation works on the studied problem was carried out.

1. It is advisable to start the time period of quantitative analysis of dissertation works since 1995. At this time, the first research and development of information systems for training in certain areas appeared, which is connected with the rapid development of new information technologies, understanding of their didactic capabilities in the educational process, including the training of future economists. Thus, the time period for quantitative analysis of studies is: 1995 – present.

2. According to the developed methodology and the selected time period, there are two main areas of study: “Pedagogical Sciences” and “Engineering Sciences: Cybernetics. Artificial Intelligence Systems”. This will allow for the most complete consideration of the study features. According to these directions a number of subject areas of research on problems of obtaining economic education in educational establishments of Ukraine, application of information technologies during training of future economists, creation and use of intelligent and expert systems are given in the Table 1.

Table 1

Directions and subject areas of quantitative analysis of dissertation researches

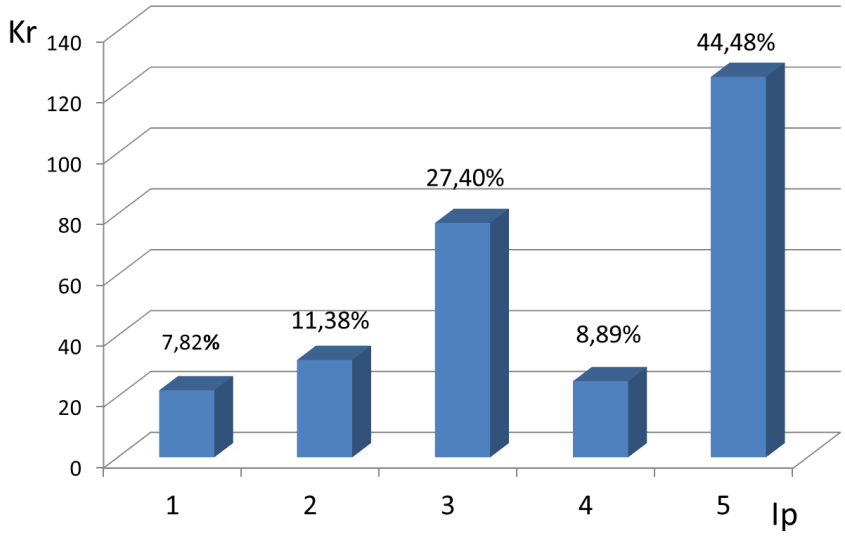
ID subject area, *Ip*	Directions and subject areas of study	Number of studies, *Kr*
Direction “Pedagogical Sciences”		
1	Information technologies and elements of economic education in general educational institutions	22
2	Information technologies and formation of economic knowledge, skills, culture, competences of future non-economic specialists	32
3	Professional training of future finance and economics specialists without the use of information technology tools	77
4	Use of new information technologies in professional training of future finance and economics specialists	25
Direction “Engineering Sciences: Cybernetics. Artificial Intelligence Systems”		
5	Creating and using a new class of information technology and artificial intelligence systems to automate different industries	125

3. Scientific search and selection of dissertation researches were conducted on the basis of selected subject areas and directions of research (see Table 1). In total, 281 papers were selected for analysis.

4. The analysis and classification of dissertation researches according to the directions and selected subject areas is carried out. The main quantitative results are also presented in the Table 1.

5. Quantitative data of the results of the analysis of dissertation researches on the separate subject areas of research in graphical form are shown in the Pict. 1.

According to the results of quantitative analysis, 7.82% of works are devoted to the formation of elements of economic education and the use of information technologies in the process of teaching of secondary school pupils. In addition, scientists pay considerable attention to the use of information technology and the formation of economic knowledge, skills, etc., in the training of future non-economic specialists – 11.38% of studies.



Pict. 1. Distribution of dissertation works by subject areas of study, where Kr is the number of dissertations, Ip is the subject area identifier

According to the analysis of research on the development and use of a new class of intelligent information technologies and artificial intelligence systems for automation of various industries (Ip = 5), including the development of expert systems, this area is mainly engaged in technical specialties (cybernetic) – 44,48 % of works (see Table 1 and Pict.1). However, these developments, as a rule, are not intended for use in the educational process, but are used to automate various industries.

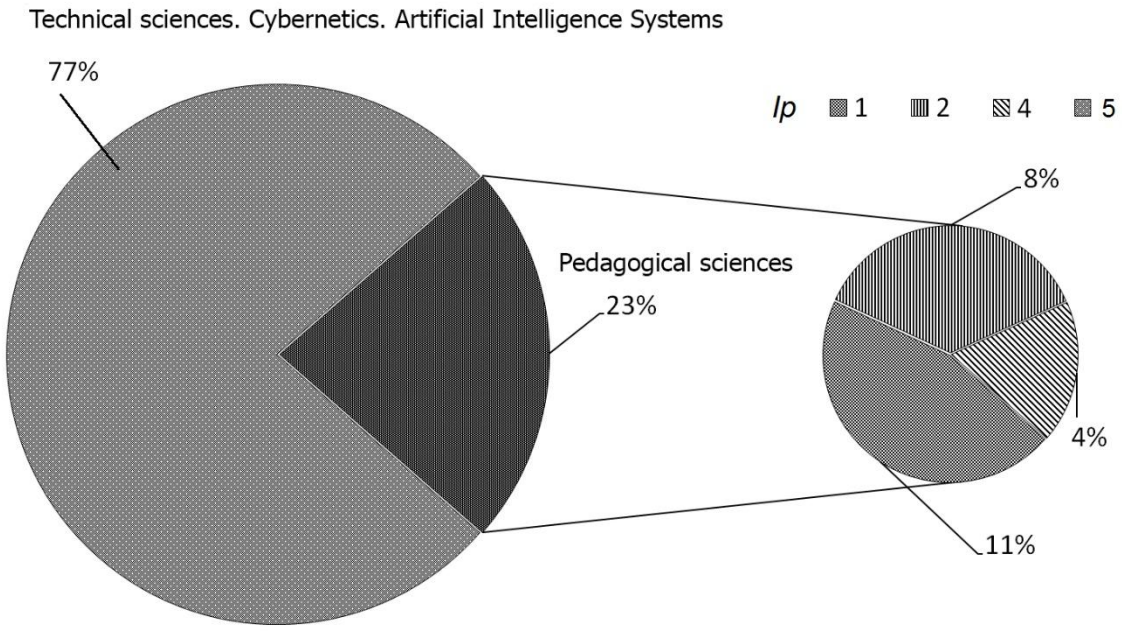
Also, according to the results of the quantitative analysis, it was determined that for a certain time period, the overwhelming number of researchers paid attention to the professional training of future finance and economics specialists without the use of information technology training – 24.4% (Ip = 3, see Table 1 and Pict. 1). These are studies related to: the organization of independent educational and cognitive activity; formation of professional competences; pedagogical conditions of use of credit-modular system, etc.

At the same time, only 8.89% (Ip = 4, see Table 1 and Pict. 1) devoted to organizing the process of professional training of future finance and economics specialists based on the use of information training technologies.

Taking into account the specifics of the identified research problem, a detailed quantitative analysis of dissertation studies based only on a new class of information

technologies – intelligent and expert systems, for each particular direction and subject area was carried out.

A total of 48 dissertations were selected from 281 papers, i.e. a part of dissertation researches in all directions and subject areas based on the development and application of a new class of intelligent and expert training systems is only 17.1%. The main results of the detailed quantitative analysis for directions and subject areas are presented in graphical form in the Pict. 2.



Pict. 2. Results of a detailed quantitative analysis of dissertation researches in the directions and subject areas of research, based on the development and application of a new class of intelligent and expert training systems, where Ip is the subject area identifier

The detailed (detailed) quantitative analysis showed that only two dissertations (Ip = 4), based on the development and use of expert training systems, are devoted to the research on the use of new information technologies in the professional training of future finance and economics specialists. This is the work of N.T. Tverezovska(2003) [15] and K.I. Slovak (2011) [12], which is 0.71% overall.

From this it follows that there is practically no dissertation research on the use of new information technologies in the professional training of future finance and

economics specialists. This subject area in pedagogical direction is the least researched, which makes it relevant to conduct research on the development and use of intellectual and expert training systems in the professional training of future finance and economics specialists.

An extensive quantitative analysis of the research also showed that the main dissertation research on the development and use of a new class of information technology training based on artificial intelligence systems, including intelligent and expert training systems, focused in the direction: "Engineering Sciences: Cybernetics. Artificial Intelligence Systems" – 77% (see Pict. 2). The pedagogical direction is only 23%, which indicates insufficient attention of researchers to the problems of creation and use of intelligent information training technologies.

Thus, the quantitative analysis of research and the existing need of modern society in the preparation of qualified specialists, capable of effectively solving professional problems using information technology in the new economic conditions, allow us to single out the problem that is relevant for higher economic education – the need to develop theoretical and methodological bases for creating and the use of intelligent information systems in the professional training of finance and economics specialists.

Conclusions and prospects for further research in this direction

1. The method of quantitative analysis of dissertation researches is developed, which includes the following main steps: 1) selection and justification of the time period; 2) selection of directions and subject areas of dissertation researches; 3) search and selection of dissertation works; 4) analysis and classification of dissertation researches according to selected directions and subject areas; 5) processing of results and their graphical representation.

2. It is shown that it is expedient to start the time period of quantitative analysis of dissertation works since 1995. At this time, the first pedagogical research and development of expert systems of education appeared, exploration of their didactic capabilities, including the training of future economists.

3. According to the developed methodology and the selected time period, the

following directions and subject areas of study are distinguished: 1) direction "Pedagogical sciences": information technologies and elements of economic education in general educational institutions; information technologies and formation of economic knowledge, skills, culture and competence of future non-economic specialists; professional training of future finance and economics specialists without the use of information technology tools, use of new information technologies in professional training of future finance and economics specialists; 2) the direction "Engineering Sciences: Cybernetics. Artificial Intelligence Systems": the creation and use of a new class of information technology and artificial intelligence systems for the automation of different industries.

4. Scientific search and selection of dissertation researches were conducted on the basis of selected subject areas and directions of research. It is shown that: 1) considerable attention is paid to the issues of professional training of future finance and economics specialists without the use of information technology tools in the initial process, which is 27.4% of the considered number of works; 2) the use of new information technologies in the professional training of future finance and economics specialists is given insufficient attention of researchers – 8.89%.

5. It is found that less than one percent of studies (0.71%) are devoted to the research on the use of new information technologies based on expert training systems in the professional training of future finance and economics specialists.

6. Extensive quantitative analysis has also shown that basic research on the development and use of a new class of information technology training, based on artificial intelligence, intelligent and expert training systems, is concentrated in the direction: "Engineering Sciences: Cybernetics. Artificial Intelligence Systems" – 77%. This points to the lack of attention of pedagogical researchers to the problems of creating and using intelligent information technology in the training of future economists.

7. On the basis of quantitative analysis of dissertation researches it is established that the problem of using intelligent information systems in the process of training of future economists is insufficiently investigated.

8. A promising direction for further research is the development of theoretical and methodological foundations for the creation and use of a new class of information technologies, based on the intelligent and expert training systemsin the training of finance and economics specialists.

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Меняйленко О. С., Шевчук О. Б.

Кількісний аналіз досліджень з проблеми застосування інтелектуальних інформаційних технологій у професійній підготовці фахівців фінансово-економічного напряму

У роботі розроблено методику кількісного аналізу дисертаційних робіт, обґрунтовано часовий період, виокремлено предметні галузі і напрями дослідження. Показано, що використанню інформаційних технологій у професійній підготовці майбутніх фахівців фінансово-економічного профілю приділяється недостатня увага дослідників – 8,89%, а дослідженням з

проектування та застосування інтелектуальних інформаційних систем присвячено менше одного відсотка робіт (0,71%). Виявлено, що основні дослідження з розробки та використання нового класу інтелектуальних та експертних систем навчання сконцентровано у напрямі «Кібернетика. Системи штучного інтелекту». Це вказує на недостатню увагу дослідників з педагогічного напряму проблемам створення і використання інтелектуальних інформаційних систем навчання у професійній підготовці майбутніх економістів і потребує проведення подальших розвідок у цьому напрямі.

Ключові слова: аналіз, методика дослідження, інтелектуальні системи навчання; інформаційні технології

Меняйленко А. С., Шевчук О. Б.

Количественный анализ исследований по проблеме применения интеллектуальных информационных технологий в профессиональной подготовке специалистов финансово-экономического направления

В работе разработана методика количественного анализа диссертационных работ, обоснованно временной период, выделены предметные области и направления исследования. Показано, что использованию информационных технологий в профессиональной подготовке будущих специалистов финансово-экономического профиля уделяется недостаточное внимание исследователей − 8,89%, а исследованиям по проектированию и применения интеллектуальных информационных систем посвящено менее одного процента работ (0,71%). Выявлено, что основные исследования по разработке и использованию нового класса интеллектуальных и экспертных систем обучения сконцентрированы в направлении «Кибернетика. Системы искусственного интеллекта». Это указывает на недостаточное внимание исследователей из педагогического направления проблемам создания и использования интеллектуальных информационных систем обучения в профессиональной подготовке будущих экономистов и требует проведения дальнейших исследований в этом направлении.

Ключевые слова: анализ, методика исследования, интеллектуальные системы обучения; информационные технологии.

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