

TIRASPOL STATE UNIVERSITY

The manuscript title

C.Z.U.: 378.091:004.056(043.2)=111

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**METHODOLOGY FOR STUDYING INFORMATION
PROTECTION AND SECURITY TECHNOLOGIES IN HIGHER
EDUCATION**

**532.02 – SCHOOL DIDACTICS
(BY STAGES OF TRAINING AND DISCIPLINES)**

Summary of the doctoral thesis in education sciences

CHIȘINĂU, 2022

The thesis was developed at the Doctoral School of the "Education Sciences" of the partnership of higher education institutions Tiraspol State University, "Bogdan Petriceicu Hașdeu" State University of Cahul and the Institute of Education Sciences

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The thesis will take place on **15.07.2022**, at **10:00**, **aud. 304** in the meeting of the Commission for public defense of the doctoral thesis within the Tiraspol State (Gh. Iablocikin 5 str., Chisinau, MD-2069).

The doctoral thesis and the summary can be consulted at the Tiraspol State University and on the ANACEC website (www.cnaa.md).

The summary was sent on 14.06.2022.

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CONCEPTUAL GUIDELINES OF RESEARCH

Relevance and importance of the research. Modern rapidly occurring changes in society and the economy, the rapid development of science and technology, place high demands on the digital competencies of specialists in various fields. The basic skills of digital literacy include information security, which are seriously studied in all countries where documents on cybersecurity are adopted at the national level. The state is interested in developing education in the field of information security, as well as in specialists and qualified personnel from the public and private sectors. The training of economists using new methodological approaches in the system of higher education is an actual task.

Description of the situation in the researched domain and identification of researched problems. In the field of digital pedagogy in the Republic of Moldova, there are leading researches Gremalschi A.[9], Cabac V. [5], Canțer N. [6], Chiriac L., Globa A. [8], Afanas D. [2], Braicov A. and many others. Most research in the field of information security does not address the problems of teaching this discipline Cojocaru I., Zgureanu A. [12] Bădărău E., Guzun, M., Rotari A., Bragaru T., Briceag V., Скринпник Н. etc.

Охрименко С. А. и Склифос К. Ф. [25] speak about teaching future economists of the basics of information security, Velikova T. [17] – future teachers , in school education, topics related to information security in elementary school are recommended for studying and gymnasium classes by Cara A., Gremalschi A., Achiri I. [7].

Despite the versatility of the studies performed and their undoubted theoretical and applied significance, the work does not exhaust the problem of determining the methodology for teaching the basics of information security to future economists.

Different levels of initial knowledge of students, the constant expansion of the range of modern information technologies, the lack of specialized literature and methodological materials that are understandable and necessary in future professional activities, a limited hours within the curriculum - all this complicates teaching the basics of information security and puts forward certain requirements for methodological training system for future economists in this area.

The foregoing allows us to highlight the following **contradictions** between:

- the requirements that arise for future economists in working with valuable information from the point of view of its protection, and the need to improve the process of training future economists to form the necessary competencies in the field of information security;
- the required practical skills that an economist should have when working with valuable information, and pedagogical technologies for the formation of these skills among students in the

process of learning information technology;

- the existing wide variety of methodological and educational materials on technical, software, cryptographic methods of protection and the need to develop an educational and methodological complex for theoretical and practical classes in the process of forming competencies in the field of information security for future economists at the university;

- the established practice of assessing the level of training on the one hand and the use of a point-rating system for evaluating the results and effectiveness of the learning process of the discipline "Information Security".

These contradictions have given rise to a **research problem**, which consists in determining the theoretical and methodological foundations for improving the efficiency and quality of studying information security technologies from the perspective of Internet technologies and the cybernetic approach as part of the formation of professional competencies of future specialists in the economic sphere in demand on the labor.

The object of the research is the introduction of new Internet technologies in the educational process of studying the university course "Information Security".

Aim of the research consists in the theoretical substantiation, elaboration and experimental validation of the pedagogical model for the study of information protection and security technologies by the future specialists in the economic-financial domain, via internet technologies.

The main hypotheses of the research. If:

- the introduction of information technologies, including Internet technologies, into the process of studying information security technologies for future economists is scientifically justified;
- educational and methodological complexes in the university discipline "Information Security" are developed and improved with the introduction of Internet technologies;
- if a pedagogical model for studying information security for future economists using Internet technologies are developed, which takes into account the requirements of the labor market and basic pedagogical and didactic principles
- if a methodology for teaching information security technologies is developed, described and experimentally confirmed through the introduction of information technologies, including Internet technologies, from the point of view of student-centered learning;

then this will make it possible to make effective and high-quality study of information security from the point of view of Internet technologies as part of the professional training of students in the financial and economic direction.

Research objectives:

- 1) the formulation of the principles and methodological approaches necessary for the design of a didactic system for the training of future specialists in the economic-financial domain in the discipline "Information security";
- 2) conceptualization of evaluation indicators, criteria and performance descriptors regarding the study of information security to ensure the efficiency of the instructional process;
- 3) the elaboration of a pedagogical model for the study of the discipline "Information security" by the future specialists in the economic-financial domain that reflects the content of the discipline and the methodological system of skills training in the field of information security;
- 4) development of an educational and methodological complex of the discipline "Information security" using information technologies, including Internet technologies;
- 5) elaboration, implementation and experimental validation of the efficiency of the developed pedagogical model and optimization of the instructional process by recovering on new information technologies

In the process of implementing the goals of didactic and scientific research, the main attention was paid to the following **research methods**:

- theoretical methods: research and documentation; analysis; comparison; synthesis; generalization; systematization; design, description and pedagogical modeling;
- experimental methods: pedagogical experiment; individual projects; observation, questioning, testing, analysis and evaluation;
- methods of analysis: statistic processing of experimental data; quantitative and qualitative analysis of experimental results.

The scientific novelty and originality of the research lies in the conceptual justification of the pedagogical model for the development and implementation of the university course "Information Security" using Internet technologies.

The solved scientific problem consist in determining the theoretical and methodological foundations of the efficiency of the study process of the university discipline "Information Security", which led to the theoretical substantiation and elaboration of the pedagogical model of teaching-learning-evaluation of the university course through internet technologies, the process of training the professional skills of future specialists in the economic-financial domain.

The theoretical significance of the paper consist in the research and evaluation of internet technologies in the process of formation and development of professional skills on

information security for students in the economic-financial domain from the perspective of the pedagogical model developed.

The practical significance of the research is determined by the efficient implementation of the developed pedagogical model and the use of the training methodology developed in the study process of the university course "Information Security", for students in the economic-financial domain, by applying Internet technologies to train and develop professional skills on information protection and security.

In addition, in the course of the study, the following were developed:

1) educational and methodological complex in the discipline "Information security", which includes a short course of lectures, a collection of tasks for performing laboratory work, a system of test tasks to determine the level of knowledge of students of economic specialties in the basics of information security;

2) developed and integrated into the information educational environment of the university electronic textbook "Information security", online electronic edition of guidelines for laboratory work, online electronic edition of test items in the discipline.

Implementation of the research results was carried out in the educational process of the State University of Tiraspol (Chisinau), Bender Polytechnic Branch of the University T. G. Shevchenko, Tiraspol branch of the Moscow Academy of Economics and Law, Tiraspol branch of "ROSNOU".

Approbation of scientific results. The results of the research were presented at the meeting of the Department of Informatics and Information Technologies of the Tiraspol State University, the annual reports of the Școala Doctorală „Științe ale Educației” a Parteneriatului instituțiilor de învățământ superior Universitatea de Stat din Tiraspol, Universitatea de Stat „Bogdan Petriceicu Hașdeu” din Cahulși de Științe ale Educației, as well as in 4 national scientific and methodological conferences (2018-2022), 7 national scientific and methodological conferences with international participation (2018-2021) and 13 international scientific and methodological conferences (2017-2021). Publications of materials on the topic of the dissertation research are presented: in 3 articles in journals of the category “B” *Acta et commentationes. Științe ale Educației* и *Revista Univers Pedagogic*, in 2 articles in “C” category journals *Revista de Științe Socioumane* and *Acta Et Commentationes* (2018), in a peer-reviewed journal from the list of the Higher Attestation Commission of the Russian Federation *Мур университетской науки: культура, образование*.

Guidelines “Information security. Protecting Office Documents” and “Information Security: A Course of Lectures for Economists” were approved by the Council of the Faculty of Physics, Mathematics and Information Technologies of Tiraspol State University in 2019.

THE CONTENT OF THE THESIS

In the **Introduction**, the choice of the research topic is argued; the relevance and significance of the topic are indicated; the purpose and objectives of the research are formulated. Research methods are listed; described, in accordance with the field of study, novelty and originality, theoretical and practical significance.

The first chapter "Psychological and pedagogical foundations for teaching information security technologies in the system of higher professional education of future economists" is devoted to the analysis of information security as a new field of knowledge, its place in the formation of digital literacy.

A thorough analysis of theoretical works showed that the issues of information security began to be dealt with in ancient times, mainly it was cryptography. With the development of computers and the advent of the Internet, new ways of protecting information of an interdisciplinary nature have appeared at the intersection of mathematics, physics, law, economics, psychology, ethics, sociology, history and other fields of knowledge, Рассолов И. М., Ламинина О. Г. [22], Anderson Ross, [3] Atanasiu Adrian [4]. Future specialists in the financial and economic sphere should be introduced to the problems that arise in the process of storing, processing and transmitting information from the standpoint of an interdisciplinary approach.

The study considers the concepts of "*data security*", "*computer security*", "*security of information*", "*information security*", "*protection of information*", "*network security*", "*cybersecurity*".

In the Republic of Moldova, in the “Information Security Strategy of the Republic of Moldova for 2019-2024”, “Decree of the Government of the Republic of Moldova No. 811 of October 29, 2015 on the National Cybersecurity Program of the Republic of Moldova for 2016-2020” [1], the term “cybersecurity” is used, and namely: “*the normal state that has arisen as a result of the application of a set of proactive and reactive measures through which confidentiality, integrity, availability, reliability and non-denial of access to information in electronic format, information systems and resources, public and private services in cyberspace are ensured.*”

Theoretical and practical guidelines for preparing a course on information security by future economists are based on the works Popa S. E. [11], Mihai I.-C. [10], Мельников В.П.,

Клейменов С.А. и Петраков А.М. [24], Курило А. П., Зефирова С. П. [20], Ярочкин В.И. [34], Герасименко В. А., Малюк А. А. [18], Романец Ю. В., Тимофеев П. А., Шаньгин В. Ф. [28], Поляковой Т. А., Стрельцова А. А. [27] etc.

From the position of law, Doctrines of different countries, international standards (ISO/IEC 27002:2013, ISO / IEC 17799, ISF, CobIT, NIST, BS, ГОСТ РФ, BSI) and scientific literature have defined information security as *"the result of countering threats to the security of a person, society and the state in the information sphere, carried out using the forces and means allocated for this"*.

Information security is considered as part of digital competence. This approach can be seen in the documents of the UNESCO Institute for Information Technology and Education, in the European Qualifications Framework, the Russian Digital Literacy Index. Specific competencies are defined in the field of "information security" [35]. In the Republic of Moldova, in 2015, the Digital Competence Standard for teaching staff was developed.

The digital competence of the European Qualifications Framework includes skills: 1) information processing; 2) communication; 3) content creation; 4) security; 5) problem solving. There are three types of users in the digital competency self-assessment grid: basic, independent and advanced. According to the results of a survey conducted among students of economic specialties before studying the discipline "Information Security", more than 90% of respondents can be classified as "Basic User" and less than 10% answer yes to half of the questions from the "Independent User" category.

A review of the standards and curricula for training economists showed that the universities of the Republic of Moldova, in accordance with the NQF, have developed curricula in which information disciplines are presented. Among the competencies related to information technology, only one "The ability to operate with information technology" can be singled out: C11 for profile 364 "Finance", C8 for profile 366 "General economy". There is no separate competence in the field of information security in the NQF of the Republic of Moldova.

The dissertation research analyzes the approach to the study of information security in different countries. An analysis of curricula shows that all over the world there is a tendency to introduce, if not the discipline "Information Security", then at least certain topics in the study of information and communication technologies, or as a variable elective course for any specialty. This is consistent with the Doctrines of these countries, which state that information security is an integral part of national security, and that increasing the information security literacy of citizens is a priority in building the information society.

Teaching the discipline "Information Security" for non-technical specialties such as "Economics", "Management" is complicated by the lack of relevant methodological literature.

Guidelines for the humanities most often contain materials on the protection of information in office programs and documents.

Several dissertations on the methodology of teaching information security technologies have been studied. In the works of Танова Э. В. [32], Синицын Д. С. [31], Малых Т. А. [23], Серебряник Е. Э. [29] propose a methodology for teaching schoolchildren; Алтуфьева А. А. [14], Бояров Е. Н. [16], Ломаско П. С. [22], Димов Е. Д. [19] – for teaching at a university in various non-technical specialties; Поляков В. П. [26], Абиссова М. А. [13] –for teaching students in the humanities and socio-economic specialties.

It is shown that the organization of information security training for future economists requires a systematic approach, because has its own characteristics associated with the complexity and ambiguity of the conceptual apparatus, the insufficient development of methodological approaches to teaching the basics of information security to students of non-technical specialties, the variety of content in various educational materials.

The university discipline "Information Security" helps to make a significant contribution to the professional training of students in the financial and economic sphere, including the development of digital skills and competencies, which requires the development of new approaches to learning through the prism of interactive methods, from the perspective of using Internet technologies.

In the second chapter "Pedagogical model and methodology for teaching information security to students of economic specialties" the process of teaching information security is modeled from the point of view of a systematic approach. Teaching the discipline "Information Security" to students of economic specialties has a number of features associated with the dynamism of the development of this area, the limitation of the classroom format of training, the different levels of knowledge and experience of students in the use of information technologies.

The use of a cybernetic approach in modeling the pedagogical process in such a dynamic area as information security helps to increase the efficiency of the learning process itself. To do this, it is necessary to determine the goal and objectives of training, the level of initial knowledge, skills and abilities, choose the forms and methods of organizing the educational process to obtain maximum results at minimum cost, apply information and Internet technologies to manage the learning process. Its optimization will consist in adjusting the topics of theoretical and practical work, applied didactic methods.

When determining the goals and objectives of teaching the discipline "Information Security", the requirements of the labor market for economic personnel, the standards for the

preparation of bachelors of the direction 38.03.01 "Economics" were taken into account.

The purpose of the discipline is to develop students' stable skills of working in a complex network information environment of a modern enterprise, office, taking into account the basic requirements of information security.

The main objectives of the discipline: obtaining information about the current state of the problems of ensuring information security of computer systems, existing threats, types of information security, methods and means of protecting information, the basics of building complex protection systems, the basics of legal regulation of relations in the information sphere, constitutional guarantees of citizens' rights to receive information and mechanisms for their implementation, concepts and types of protected information.

As a result of studying the discipline "Information Security", the student must: *know*: normative and legislative acts in the field of information protection; information security threats; formal and informal means of information protection; user identification and authentication methods; principles of creating an electronic digital signature, hashing algorithms; methods of symmetric and asymmetric encryption; anti-malware systems; *be able to*: analyze the sources of threats and channels of information leakage; apply the most effective methods and means of information protection; design organizational measures to protect information; monitor the effectiveness of protection measures; *own*: terminology in the field of information security; technology to counter information threats; protection of information from malicious software; skills in selecting and configuring information security software; interpretation of the results and analysis of data from system logs of protection tools.

In the study of complex systems, such as the learning process, the following models are built: 1) the "black box" model; 2) model of the composition of the system; 3) model of the system structure [15]. If we represent the IS learning process as a "black box" model, then it is necessary to determine the inputs (resources or input, operational information), outputs (results produced during the execution of the function). Management - prescriptive or restrictive information (instructions, laws, guidelines, methods, etc.), information about under what conditions, according to what rules (how, where, when) the function is performed. Mechanisms define everything by which a function is performed, i.e., the transformation of an input into an output is carried out. Mechanisms include resources, equipment, personnel (Table 1).

Table 1. Information security (IS) training model for economists at a university in the form of a "black box"

		Control			
		University education standard	Labor market requirements	Society needs	Prevention of harm from dangerous information impacts on the mental, moral or physical state of the individual
		Federal State Educational Standard of the Russian Federation for Higher Education in the field of study 38.03.01 Economics, approved 12.11.2015 General professional competence (GPC-1): the ability to solve standard tasks of professional activity on the basis of information and bibliographic culture using information and communication technologies and taking into account the basic requirements of information security	<ul style="list-style-type: none">- customer orientation;- commitment to work;- teamwork skills;- propensity to learn;- the ability and desire to learn;- the ability to take responsibility;- independence;- ability to solve non-standard tasks;- performance;- the ability to plan their activities;- focus on achieving results;- analytical thinking;- initiative;- entrepreneurial spirit;- self management;- discipline;- communication;- self-presentation;- Ability to multi-task and work with a large amount of information;- adequacy of personal and professional self-assessment.		
↓	↓	↓			
	↑	INFORMATION SECURITY TRAINING FOR FUTURE ECONOMISTS			↑
		Literature for technical specialties Literature for the protection of office documents	Information technology specialist with knowledge in the field of economics, law, mathematics, psychology, etc.		
		Educational literature	The level of teacher training		
		Mechanisms			
	The level of information culture, which includes elements of information security	Knowledge gained at school, at university in computer science classes	Exit (Goal)		
			Competencies in the field of information security		
			Knowledge, skills, abilities in the field of legal, organizational, social, technical, software, mathematical means of information protection		

Using the "black box" model, it is impossible to describe the internal structure of the system, so the system composition model is used. The interior of the "box" is heterogeneous, consists of various components, each of which can also be divided into components, etc. The pedagogical system, being complex, always has the property of hierarchy: the presence of many elements that are in relation to the subordination of lower levels to higher ones. We single out three key subsystems from our point of view: "teaching", "learning", "assessment".

In the "teaching" subsystem, we will display the subsystems: lectures, practical, laboratory classes. Taking into account the goals set in teaching information security to economic profile specialists, theoretical sections (T) are defined to ensure compliance with the content of the discipline: T1. Introduction. Basic concepts and definitions; T2. IS threats and information leakage channels; T3. Legal means of information protection; T4. Organizational means of information protection; T5. Physical and technical means of information protection; T6. Information security software; T7. Identification and authentication; T8. Cryptographic approaches to information security and digital signature; T9. Moral and ethical means of information protection.

Laboratory and practical classes are aimed at developing practical skills and abilities in the field of information security. In accordance with this, assignments for the implementation of laboratory (L) and practical (P) work on the following topics were defined and prepared: P1. Windows security policy; L2. Disk space optimization; L3. Archiving; L4. Password protection; L5. Protection of flash drives; L6. Antivirus protection of information; L7. Protection of text documents; L8. Spreadsheet protection; P1. Symmetric encryption methods; P2. Methods of asymmetric encryption and digital signature.

In the "learning" subsystem, an important part is the organization of students' independent activities: scientific, educational and social. Particular attention in this subsystem is given to information and communication technologies that help support the implementation of this process: the program for creating electronic textbooks SunRav; a program for creating interactive PowerPoint demonstrations; digital publishing platform Joomag; Google tools: Google Sites, Google Forms; Online Test Builder Testmoz.

In the "assessment" subsystem, subsystems are identified that help determine the effectiveness of the learning process: learning control; accumulative point-rating system; final testing.

As a result, a simplified model of the "composition of the system" of the process of teaching the basics of information security for students of economic specialties was obtained (Fig. 1).

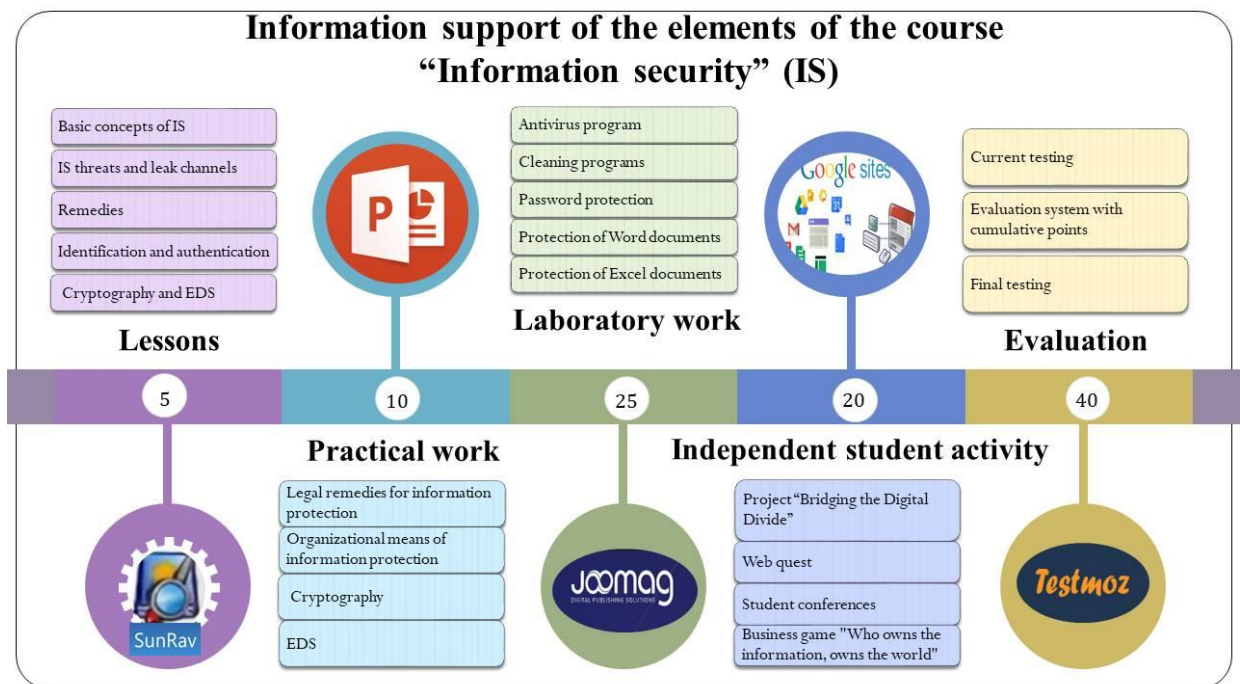


Fig. 1. Model "composition of the system" - components of the course and applied ICT

For a complete and comprehensive description of a complex system, it is not enough to use the "black box" and "composition of the system" models. With the help of the "system structure" model, the links between the components necessary to achieve the goal of the system functioning are described. The synthesis of the selected subsystems and elements, the reflection of their relationship allows us to build an adequate model for teaching information security to future economists.

A distinctive feature of the design of the pedagogical model was the use of a modern and powerful apparatus of systems theory and system analysis. Initially, the process of information security training for future economists was described as a "black box" model, then as a "system composition" model. The reflection of the connections between subsystems and the consideration of the external environment made it possible to build a pedagogical model in the notations of the "system structure" model. Thus, the pedagogical model of teaching the basics of information security to future economists reflects the object of study from the point of view of a systematic approach, helps to understand how the system functions (Fig. 2).

The process of developing a pedagogical model in itself helped to better understand the processes and phenomena that occur when teaching the basics of information security to future economists, and to be able to predict possible directions of development.

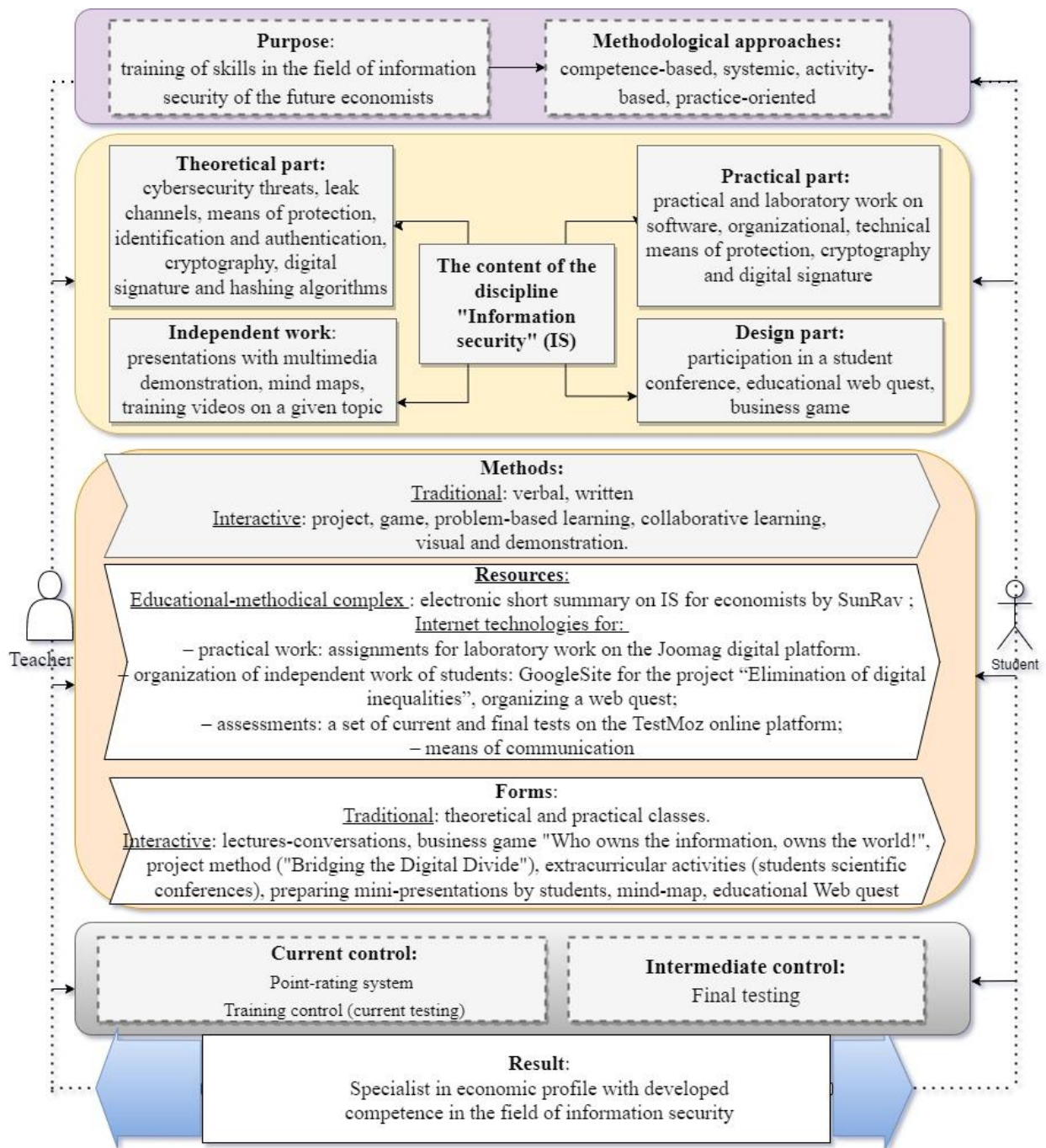


Fig. 2. Pedagogical model

The peculiarity of the developed pedagogical model is that in the formation of the theoretical and practical part of the content of training, the relationship between information security and economic security is taken into account. Correlating discipline topics with economic phenomena and processes helps students answer the questions "What to protect?", "From whom to protect?", "How to protect?".

The pedagogical model is aimed at identifying interdisciplinary links between information security and other branches of knowledge studied at the university by future specialists in the financial and economic domain. Interdisciplinary connections, the impact of information security on economics, make it possible to achieve a better development of

competencies in the field of information security for future specialists in financial and economic profile from the perspective of Internet technologies and student-centered learning. Practical implementation lies in the use of Internet technologies at all stages of teaching-learning-assessment.

An important *methodological aspect of the implementation* of the pedagogical model is information and communication technologies, especially *Internet technologies*, which are convenient to use due to the advantages: 1) the ability to quickly make changes, which is especially important for the discipline "Information Security"; 2) the ability to quickly obtain information from any computer, device with access to the Internet; 3) the possibility of placing additional materials of increased complexity for students with a higher level of informational training. For each subsystem of the process "teaching" - "learning" - "assessment" identified in the course of the system design described above, various information and communication tools and information services of the Internet are used.

The *methodological aspects of the organization of project activities* to enhance the independent work of students are implemented using project technology, namely an educational web quest. As part of the discipline "Information Security" for students of economic specialties, two educational web quests have been developed: "Information Security for Economists" and "Fundamentals of Cryptography". An educational project allows students to face a problem situation, expand the subject of the course, develop the creative abilities of students, activate independent activity, improve communication and group work skills, and arouse interest in the learning process as a whole.

Methodological aspects of assessment include a point-rating system of evaluation. At the beginning of studying the discipline, students get acquainted with the boundaries and criteria that are unchanged throughout the semester. When evaluating practical and laboratory work, a system of criteria is applied, taking into account delays and corrections.

The current testing is used as a training control on the theoretical material passed, and is not evaluated by points. Current computer testing helps to combat the uneven work of students in the semester, so it can be seen as an incentive for independent work. This test plan consists of 3-4 questions and takes 3-5 minutes to complete.

At the end of the course, there is a final test. Questions of different complexity levels are designed to cover all topics of the discipline.

The combination of testing with classical methods of control allows students to receive both an objective assessment and a high level of knowledge and skills in the discipline.

The *methodological aspect of interdisciplinarity* is significant in the implementation of the designed pedagogical model, because the interpenetration of sciences makes it possible to

improve the quality of education, to substantiate the adequacy of the acquired knowledge of real life. Interdisciplinary connections are traced in each lesson in the study of information security (IS). At the level of familiarization, memorization and understanding, topics with the least number of connections are taught. Particular attention should be paid to legal, moral and ethical ways of protecting information (Table 2).

Table 2. Matrix of interdisciplinary connections of the course "Information security"

The topic of the discipline of IS	economy	math	physics	geography	history	literature	law	sociology	psychology
T1	•						•		
T2	•		•				•	•	•
T3	•			•	•		•		•
T4	•						•	•	•
T5	•	•	•				•		
T6	•	•					•		
T7	•	•	•			•	•		•
T8	•	•	•		•	•	•	•	•
T9	•			•	•	•	•	•	•

Especially for students of the economic profile, it is important to emphasize the connection between information security and economic security in order to show the sequence of occurrence of such phenomena in professional activity as information threats, information and economic risks, and economic damage.

The development of information and communication technologies is vital for the competitiveness of the Republic of Moldova in an economy that is rapidly becoming more digital. Innovation using cutting-edge ICTs is becoming a driving force for socio-economic change, including the rethinking of the educational paradigm. Thus, the advantages provided by ICT, Internet technologies are analyzed and the usefulness of their introduction into the educational space of the university is argued. In particular, the process of improving the quality of studying information security technologies from the position of Internet technologies in the professional training of students in the financial and economic domain is considered.

To implement this process, active learning methodologies have been developed and implemented that are student-centered and focused on developing their competencies and skills for lifelong learning through effective and friendly teacher-student cooperation in the process of teaching-learning-assessment.

In the third chapter "Experimental substantiation of the effectiveness of the pedagogical model and the methodology of its application" the types of pedagogical research are analyzed, the organization of the pedagogical experiment is described, and a mathematical and statistical analysis of the results of the study is carried out.

The design of the pedagogical experiment was carried out from the standpoint of the information-cybernetic approach, namely the theory of systems. At each stage of the pedagogical experiment, a certain model was used: on the search engine → "black box"; on ascertaining → composition of the system; on specifying → system structure; on the formative → optimization of the pedagogical model.

The search stage of the pedagogical experiment was implemented in 2014-2015 in order to formulate the results of training in information security technologies for future economists, the study of standards, educational, methodological and scientific literature in the field of information security, as well as labor market requirements. Upon completion of the study of the discipline "Protection of computer information", a survey of 57 students of economic and law profiles of the Tiraspol branch of "Moscow Academy of Economics and Law" was conducted. The survey showed that: 1) students are aware of the importance of mastering theoretical and practical skills in the field of information security, 2) the existing didactic tools are not enough to form the appropriate competencies for professional activities; 3) it is necessary to modify the program taking into account the specifics of the training of future economists, paying special attention to organizational and legal means of protection.

The ascertaining stage of the pedagogical experiment was implemented in 2015-2017 in order to study modern approaches to teaching the basics of information security to future economists, determine the methodological guidelines for teaching information security, and form a didactic system. A new discipline work program was developed, the theoretical and practical part of the course "Protection of computer information" was corrected, and a set of evaluating tools was formed. The updated didactic complex was formed by means of information and communication tools, including Internet technologies: MS PowerPoint, SunRav, Joomag, TestMoz. The experiment involved 74 students of economic and law of the Tiraspol branch of the "Moscow Academy of Economics and Law" and "Tiraspol Technical School of Informatics and Law" (Table 3).

Table 3. The results of the final testing in the discipline "Protection of computer information", 2015-2017

Academic year	Institution	Direction of training	Group	Quantity, pers.	Average score for the group (100 point scale)
2015-2016	МАЭП	Economy	ЭД-14	13	31,9
2016-2017	МАЭП	Law (correspondence	ЮЗ-12	20	24,6
2016-2017	ТТИП	Information systems in economics	312	22	33,7
2016-2017	МАЭП	Law	ЮД-15	19	24,8
Total				74	

All students were provided with the same theoretical material, instructions for performing practical work, business games were held. To evaluate the acquired knowledge on the protection

of computer information, a final test was conducted, created on the basis of questions from the available fund of evaluation tools.

The results of the final testing in the discipline "Protection of computer information" in 2015-2016 and 2016-2017 showed that students on average answered correctly 28.6% of the questions. The low result is explained by a large number of test tasks on cryptographic and technical means of information protection, while special emphasis, in accordance with the previous stage, was made on the study of organizational and legal means of information protection. The ascertaining experiment made it possible to draw the following conclusions: 1) the didactic system for teaching information security to future economists needs to be improved; 2) it is necessary to develop a comprehensive test that allows a comprehensive assessment of the knowledge of future economists on the protection of computer information.

The clarifying stage of the pedagogical experiment was implemented in 2017-2019 in order to test and optimize the constructed pedagogical model for teaching information security to future economists from the point of view of the cybernetic approach and from the perspectives of introducing Internet technologies into the teaching-learning-assessment process. Adjustments were made to the content of the educational and methodological complex, a project technology was used - an educational web quest using the Internet technology GoogleSites and Google Forms, the results were monitored, and their effectiveness in the educational process was checked. For independent study of difficult moments that cause the greatest complexities for students, video materials on the key topics of the course have been prepared. A final test has been developed on the topics of the course, with four levels of complexity.

The conducted clarifying experiment made it possible to draw the following conclusions: 1) it is necessary to build a pedagogical model for teaching information security to future economists in order to increase the effectiveness of teaching and test it in the experimental group at the stage of the formative experiment; 2) it is necessary to evaluate the impact of the use of project-based learning methods on the results of information security training for future economists.

The formative stage of the pedagogical experiment was implemented in the 2019-2020 academic year and fall semester 2020-2021 in order to confirm the likelihood of obtaining the results of the didactic system, obtaining the results of the effectiveness of educational activities. 55 students were involved in the formative experiment, which consisted of three series. It should be noted that the experimental (EG) and control (CG) groups were on equal conditions in terms of mastering practical and theoretical skills. In the EG, special conditions were created that positively affect the effectiveness of educational activities: project method, video lectures, current testing. To check the effectiveness of the formative experiment in the EG and CG, a final

test was conducted, consisting of 36 questions of 4 levels of complexity in 6 main sections of the discipline being studied (Table 4).

Table 4. The average score of the final testing by complexity levels

Year, Semester	Sampling	Level of complexity			
		I	II	III	IV
2019-2020 autumn semester	EG	78,0	56,5	68,9	83,5
	CG	71,0	53,0	48,2	73,9
2019-2020 spring semester	EG	84,3	65,8	77,1	81,6
	CG	64,6	42,8	41,6	63,3
2020-2021 autumn semester	EG	74,4	52,7	65,3	77,4
	CG	72,6	54,4	58,2	72,9

From table 4 and fig. 3, it can be seen that the results of the final testing for each level of complexity in the EG are higher than in the CG in all series of the experimental study.

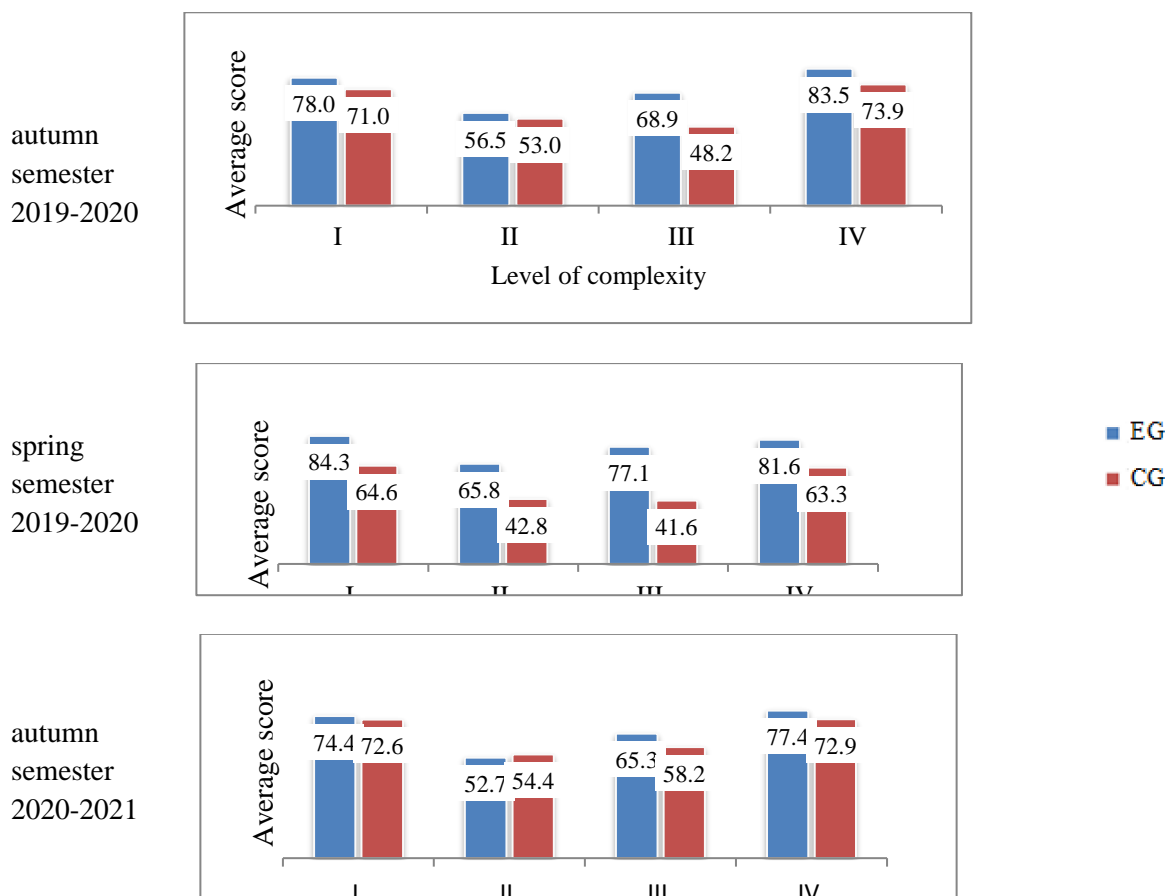


Fig. 3. Final test results with four levels of complexity

The main statistical indicators of the results of testing in the online constructor TestMoz, exported to MS Excel, are determined in the SPSS package and are presented in Table 5.

Table 5. Main statistical indicators of the formative experiment

Year, Semester	Sampling	Quantity, pers. (n)	Average (m)	Median	Standard deviation (σ)	Coefficient of variation (R_σ), %	Asymmetry
2019-2020 autumn semester	EG	5	71,20	72,00	5,263	7,4	-0,959
	CG	6	60,50	60,50	4,680	7,7	-0,176
2019-2020 spring semester	EG	7	77,00	79,00	7,439	9,7	-1,007
	CG	17	53,71	57,00	11,746	21,9	-0,272
2020-2021 autumn semester	EG	10	75,00	75,00	11,353	15,1	0,017
	CG	10	59,90	63,00	13,511	22,6	-0,368
Total		55					

Differences in the average scores in the EG and CG in each series of the formative experiment (Fig. 4) suggests the effectiveness of the designed didactic system in teaching information security for future specialists in the financial and economic sphere.

The results of a formative experiment on teaching "Information Security" to future economists

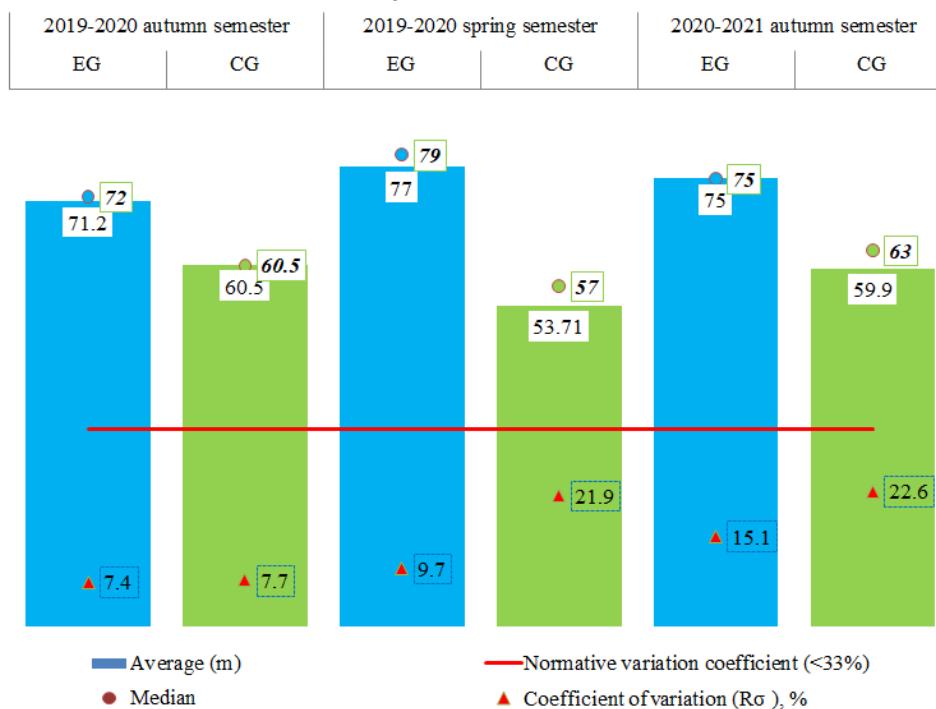


Fig. 4. Statistical indicators of the formative experiment in EG and CG

The significance of the obtained differences was verified using nonparametric criteria. To apply the *nonparametric Mann-Whitney U-test*, the condition is satisfied that each sample has at least 3 observations, and the normal distribution of observations is not required [30, 33].

The null and alternative hypotheses were formulated to test the statistical significance of differences in the means in the studied groups using the Mann-Whitney U-test:

H0: the learning outcomes in the EG and CG do not statistically differ from each other.

H1: the learning outcomes in the EG and CG are statistically different.

Critical values of the Mann-Whitney criterion $U_p(n_1, n_2)$ are determined from the tables

[30] for n_1 and n_2 and significance levels $p=0,01$ and $p=0,05$. The results of the calculation of the Mann-Whitney U-test for three series of the forming experiment performed in the SPSS program are presented in the table 6.

Table 6. Mann-Whitney test for samples of the formative experiment

Year, Semester	Sampling	Mean	Quantity, pers.	U_{emp}	$U_{0.01}$	$U_{0.05}$	Significance p	Hypothesis
2019-2020 autumn semester	EG	71,20	$n_1=5$	2	2	5	0,017	H_1
	CG	60,50	$n_2=6$					
2019-2020 spring semester	EG	77,00	$n_1=7$	4	23	33	0,000	H_1
	CG	53,71	$n_2=17$					
2020-2021 autumn semester	EG	75,00	$n_1=10$	21	19	27	0,029	H_1
	CG	59,90	$n_2=10$					
Итого			55					

Analyzing the data in Table 6 and Figure 5, we see that in each series of the formative experiment, the H_1 is confirmed: the level of learning (average score) in the EG is statistically significantly higher than the level of learning in the CG at a significance level of $p=0.05$ in each series of the formative experiment. This is evidenced by the results obtained in each series $U_{emp} < U_p$.

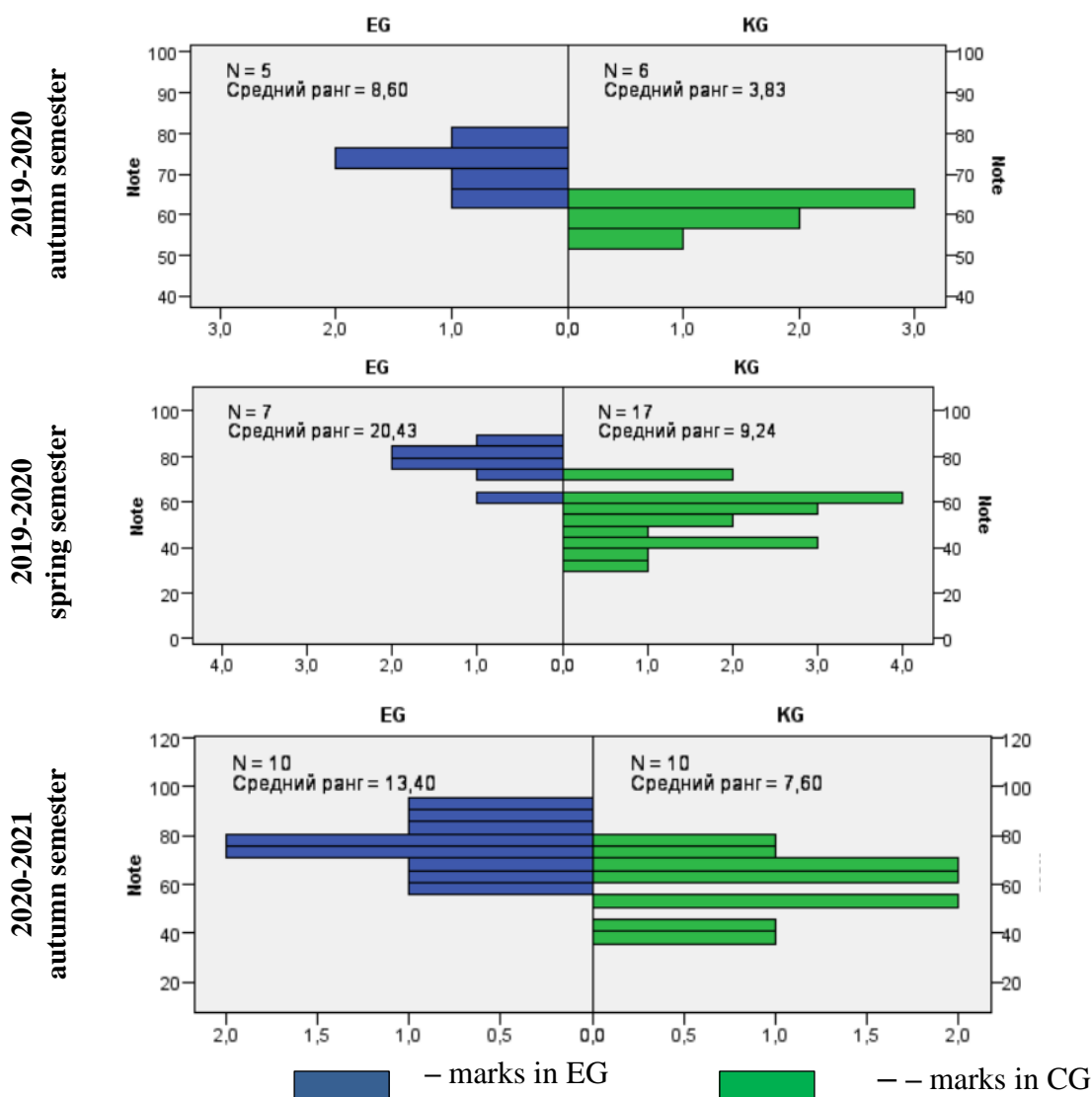


Fig. 5. Values of the U-criterion in three series of the forming experiment

The assessment of the significance of the results of the final testing was also verified using the nonparametric φ^* -Fisher's angular transformation criterion. To use it, you only need to use alternative characteristic values. Each sample must contain at least 5 observations. During the final test, a student can score a maximum of 100 points.

For the sign "there is an effect" we will take the correct answer to 2/3 or more questions (66 points or more), and for the sign "no effect" - less than 2/3 of the questions (less than 66 points). When compiling the final test, the questions are prepared in such way that if a student scores 66 points or more, then we can assume that he owns the material at a higher quality level. Thus, 66 points or more were chosen as the criterion for achieving the effect. The following hypotheses have been formulated: H_0 : the proportion of students who scored 66 points or more in the EG is no more than in the CG. H_1 : the proportion of students who scored 66 or more in the EG is greater than in the CG.

The critical value of φ^* -Fischer's angular transformation criterion is determined from reference tables [30, p. 162; 33, p. 159]: $\varphi_{0,01}^* = 2,31$ for significance level $p=0,01$ and $\varphi_{0,05}^* = 1,64$ for $p = 0,05$. The calculation of the empirical value of the φ^* -criterion for three series of the forming experiment is given in the table 7.

Table 7 Calculation of the empirical φ^* -criterion of Fisher's angular transformation

№	Index	symbol	2019-2020 autumn semester	2019-2020 spring semester	2020-2021 autumn semester
1	Number of students in the EG	n_1	5	7	10
2	Number of students in the CG	n_2	6	17	10
3	The proportion of students who scored 66 points or more	P_1	80%	85,7%	80%
4	The proportion of students who scored less than 66 points	P_2	16,7%	11,8%	20%
5	The angle corresponding to the larger % proportion	$\varphi_1(P_1) = 2 * \arcsin \sqrt{P_1}$	2,214	2,456	2,214
6	the angle corresponding to the smaller % proportion	$\varphi_2(P_2) = 2 * \arcsin \sqrt{P_2}$	0,839	0,701	1,369
7	empirical value	$\varphi^* = (\varphi_1 - \varphi_2) * \sqrt{\frac{n_1 * n_2}{n_1 + n_2}}$	2,27	3,91	1,89

To make a decision on statistical significance, the empirical value is compared with the critical value of a given level of significance. If $\varphi_{emp}^* < \varphi_p^*$, then the hypothesis H_0 about the statistical insignificance of differences in the groups is accepted with probability $1 - p$, and vice versa. Table 8 shows the data for the analysis of the statistical significance of differences in the results in the EG and CG in three series of the formative experiment according to the φ^* -criterion.

Table 8. ϕ^* -criterion of Fisher's angular transformation

Year, Semester	Sampling	Quantity, pers.	ϕ^*_{emp}	ϕ^*_p ($p=0.05$)	ϕ^*_p ($p=0.01$)	p	Accepted hypothesis
2019-2020 autumn semester	EG	5	2,27	1.64	2.31	0,011	H_1
	CG	6					
2019-2020 spring semester	EG	7	3,91	1.64	2.31	0,000	H_1
	CG	17					
2020-2021 autumn semester	EG	10	1,84	1.64	2.31	0,033	H_1
	CG	10					
Итого		55					

Comparing the empirical ϕ^* -criterion of Fisher's angular transformation and the critical values, we conclude that the differences in the EG and CG are statistically significant in each series of the formative experiment, the H_1 hypothesis is confirmed: the level of learning in the EG is higher than in the CG at the level of significance $p < 0,05$ (Fig. 6).

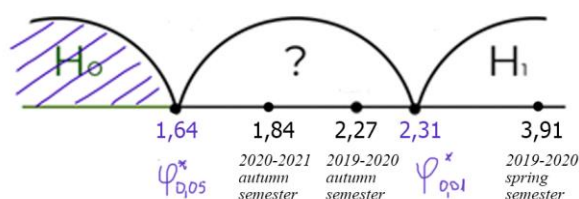


Fig. 6. Boundaries for accepting the hypothesis by the ϕ^* -criterion

Thus, at the formative stage of the pedagogical experiment, the effectiveness of the use of interactive learning strategies and Internet technologies in the study of the discipline "Information Security" by future economists was demonstrated. The application of the developed pedagogical model leads to an increase in the efficiency and quality of training, the formation of competencies in the field of information security. The effectiveness of the developed pedagogical model was confirmed using the statistical criteria U - the Mann-Whitney criterion and ϕ^* -criterion of Fisher's angular transformation.

GENERAL CONCLUSIONS AND RECOMMENDATIONS

The conducted theoretical and experimental research is aimed at creating a theoretical and methodological basis for the process of studying information security by future specialists in the financial and economic sphere using Internet technologies and interactive learning strategies.

Thus, **the scientific problem being solved** was to determine the theoretical and methodological foundations for improving the efficiency and quality of studying of information security from the perspective of Internet technologies and interactive learning strategies, which led to a theoretical justification and development of a pedagogical model for the formation of professional competencies of future qualified specialists in the financial and economic sphere in demand in the labor market.

The tasks of the **research** were completed, which contributed to the clarification of the technological and methodological aspects of the research problem.

From the analysis of the obtained results, the following **conclusions** can be drawn:

1. Research studies and literature on information security education were analyzed. Studied regulatory documents, Doctrines, Strategies of different countries of the world in this area. Information security is considered as part of digital competence. Standards, curricula for teaching information security in universities around the world have been studied. The framework for studying the discipline by future economists is determined.

2. A pedagogical model for teaching future economists the discipline "Information Security" from the standpoint of a cybernetic approach using the apparatus of systems theory and system analysis has been developed. The designed pedagogical model allows the formation of competencies in the field of information security, taking into account the requirements of state educational standards and the labor market, the needs of the individual in the digital economy. The model ensures the successful mastering of the discipline, increasing the level of training, and contributes to the formation of skills for independent assimilation of educational material and its practical application.

3. Theoretically substantiated that in order to improve the quality and effectiveness of training and the formation of practical skills in the discipline "Information Security" by future economists, it is necessary:

- a) to implement the content of training in organizational forms that contribute to the manifestation of cognitive activity and professional orientation of students;
- b) to organize independent extracurricular activities of students;
- c) to apply methods of motivation and stimulation of educational and cognitive activity: point-rating system, preparation of presentations, participation in student conferences;
- d) to use learning technologies that help to increase the level of students' learning and expand the experience of using the acquired skills in their personal lives and future professional activities;
- e) to form practical skills in software methods of information protection, use the built-in utilities of operating systems, modern free software;
- f) to use online tools in the process of teaching-learning-assessment, necessary for the prompt presentation and change of educational and methodological materials for organizing the educational process not only within the walls of an educational institution, but also outside it;
- g) to apply an interdisciplinary approach that contributes to the development of new generalized skills, the formation of a scientific, ideological and moral worldview; influencing the motivational sphere, success in educational and work activities;
- h) to emphasize the relationship of information security with economic security, as well as its impact on economic processes, in order to understand the significance of the acquired skills and abilities in future professional activities.

4. As a result of the pedagogical experiment: (a) the effectiveness of the developed pedagogical model was proved using mathematical and statistical methods: U - Mann-Whitney criterion and φ^* - Fisher's angular transformation criterion; (b) a direct relationship has been established between the methods and means of training used and the increase in the level of students' training in the discipline "Information Security"; (c) it has been established that the use of information and communication, especially Internet technologies, contributes to an increase in the level of formation of practical skills in the field of information security; (d) the problem of research on determining the theoretical and methodological foundations of the effectiveness of teaching the discipline "Information Security" for future economists has been completely solved.

5. The educational and methodological complex in the discipline "Information Security" has been improved, new didactic materials have been developed using ICT, especially online services to implement the pedagogical model, which makes it possible to increase the efficiency of the teaching - learning - assessment process.

6. Based on the above, we offer the following practical recommendations:

For teachers: 1) use improved educational and methodological complexes and new didactic materials posted online in the discipline "Information Security" to improve the efficiency of the teaching-learning-assessment process; 2) use the developed methodology to improve the effectiveness of teaching the discipline "Information Security".

For authors of textbooks and teaching aids: 1) apply the proposed pedagogical model in the development of new textbooks and teaching aids; 2) apply the developed materials in the study of the practical part of the discipline "Information security", as well as for input, current and final controls.

For students and masters: 1) study the developed pedagogical model; 2) to study information security technologies to ensure its security using a project-based approach, in the formation of practical skills to use didactic materials developed by online means.

The conducted research opens up new prospects for the study of information security technologies by future economists through the introduction of Internet technologies and interactive learning strategies. Taking into account the above conclusions, we can conclude that the topics covered are relevant and this led to the choice of a topic for a comprehensive study of the process of forming professional competencies in the field of information security of future qualified specialists for the national economy.

The performed research can be further deepened in the direction of training and developing the skills of critical perception of information and digital ethics among future specialists in the financial and economic sphere from the perspective of Internet technologies and interactive learning strategies.

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27. **ЦЫНЦАРЬ, А. Л., БОГДАНОВА, В. А., ГРАДИНАРЬ, О. А., БИЛИК, Е. В.** Methods of improving information and communicative competence in information disciplines taking into account information security requirements. In: *Матеріали XXIV Міжнародної науково-методическої конференції «Управління якістю підготовки фахівців», 18-19 квітня 2019 р.* Одеса, Україна. с. 10-11.

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АННОТАЦИЯ

БОГДАНОВА Виолетта

«Методика изучения в высшем образовании технологий защиты информации и информационной безопасности»,

диссертация доктора педагогических наук, Кишинэу, 2022.

Структура диссертации: введение, три главы, общие выводы и рекомендации, библиографический список из 189 наименований, 16 приложений, 131 страница базового текста, 24 рисунка, 23 таблицы. По материалам диссертационного исследования опубликовано 33 печатные работы.

Ключевые слова: информационная безопасность, педагогическая модель, балльно-рейтинговая система оценивания, образовательный веб-квест, самостоятельная работа, интернет технологии, педагогический эксперимент, кибернетический подход, системный подход.

Цель исследования – состоит в теоретическом обосновании, разработке и проверке экспериментальным путем педагогической модели обучения будущих специалистов финансово-экономической сферы технологиям защиты информации и информационной безопасности посредством интернет-технологий.

Задачи исследования: (1) сформулировать методические принципы и подходы, необходимые для проектирования дидактической системы обучения будущих специалистов финансово-экономической сферы дисциплине «Информационная безопасность»; (2) концептуализировать показатели оценивания, критерии и дескрипторы достижений для обеспечения эффективности учебного процесса при изучении информационной безопасности; (3) разработать педагогическую модель обучения будущих специалистов финансово-экономической сферы дисциплине «Информационная безопасность», отражающую содержательную часть дисциплины и методическую систему формирования компетенций в области информационной безопасности; (4) разработать учебно-методический комплекс дисциплины «Информационная безопасность» с использованием информационных технологий, в том числе интернет-технологий; (5) разработать, внедрить и экспериментально проверить эффективность спроектированной педагогической модели и оптимизировать учебный процесс посредством использования новых информационных технологий.

Научная новизна и оригинальность исследования состоит в концептуальном обосновании педагогической модели проектирования и реализации вузовской дисциплины «Информационная безопасность» посредством внедрения интернет-технологий.

Решенная научная задача заключается в определении теоретико-методологических основ обеспечения эффективности изучения вузовской дисциплины «Информационная безопасность», что привело к теоретическому обоснованию и разработке педагогической модели преподавания-обучения-оценивания университетского курса посредством интернет-технологий, ориентированных на процесс формирования профессиональных компетенций будущих специалистов финансово-экономической сферы.

Теоретическая значимость исследования заключается в исследовании и оценивании применения интернет-технологий в процессе формирования и развития профессиональных компетенций в области информационной безопасности у будущих специалистов финансово-экономической сферы с точки зрения разработанной педагогической модели.

Практическая значимость исследования определяется эффективной реализацией разработанной педагогической модели и использованием разработанной методологии обучения в процессе обучения вузовской дисциплине «Информационная безопасность» студентами финансово-экономической сферы посредством применения интернет-технологий, с целью формирования и развития профессиональных компетенций в области защиты информации и информационной безопасности.

Внедрение результатов исследования было осуществлено в образовательный процесс Тираспольского Государственного Университета (г. Кишинэу), Бендерского политехнического филиала Университета им. Т. Г. Шевченко, Тираспольского филиала Московской академии экономики и права, Тираспольского филиала «РОСНОУ».

ADNOTARE

Bogdanova Violeta

"Metodologia studierii în învățământul superior a tehnologiilor de protecție și securitate a informației",

Teză de doctor în științe ale Educației, Chișinău, 2022.

Structura tezei: introducere, trei capitole, concluzii generale și recomandări, bibliografie din 189 surse, 16 anexe, 131 pagini text de bază, 24 figuri, 23 tabele. Publicații pe teme tezei 33 de lucrări științifice.

Cuvinte cheie: securitatea informației, model pedagogic, sistem de notare, web quest educațional, lucrul independent, internet tehnologii, experiment pedagogic, abordare cibernetică, abordare sistemică.

Scopul cercetării: constă în fundamentarea teoretică, elaborarea și validarea pe cale experimentală a modelului pedagogic de studiere a tehnologiilor de protecție și securitate informațională de către viitorii specialiști din domeniul economico-financiar, prin intermediul tehnologiilor internet.

Obiectivele cercetării: 1) formularea principiilor și abordărilor metodologice necesare pentru proiectarea unui sistem didactic de formare a viitorilor specialiști din domeniul economico-financiar la disciplina „Securitatea informațională”; 2) conceptualizarea indicatorilor de evaluare, a criteriilor și a descriptorilor de performanță privind studierea securității informaționale pentru asigurarea eficienței procesului instructiv; 3) elaborarea unui model pedagogic de studiere a disciplinei „Securitatea informațională” de către viitorii specialiști din domeniul economico-financiar care reflectă conținutul disciplinei și sistemul metodologic de formare a competențelor în domeniul securității informaționale; 4) dezvoltarea unui complex educațional și metodologic al disciplinei „Securitatea informațională” folosind tehnologii informaționale, inclusiv tehnologiilor internet; 5) elaborarea, implementarea și validarea experimentală a eficienței modelului pedagogic elaborat și optimizarea procesului instructiv prin valorificarea noilor tehnologii informaționale.

Noutatea și originalitatea științifică rezultatelor cercetării constă în fundamentarea conceptuală a modelului pedagogic de proiectare și realizare a cursului universitar ”Securitate Informațională” prin implementarea tehnologiilor internet.

Problema științifică rezolvată rezidă în determinarea fundamentelor teoretice și metodologice ale eficientizării procesului de studiere a disciplinei universitare „Securitatea Informațională”, fapt ce a condus la fundamentarea teoretică și elaborarea modelului pedagogic de predare-învățare-evaluare a cursului universitar prin intermediul tehnologiilor internet, orientat spre procesul de formare a competențelor profesionale ale viitorilor specialiști din domeniul economico-financiar.

Semnificația teoretică a lucrării constă în cercetarea și valorificarea tehnologiilor internet în procesul de formare și dezvoltare a competențelor profesionale privind securitatea informațională la studenții din domeniul economico-financiar din perspectiva modelului pedagogic elaborat.

Valoarea aplicativă a lucrării este determinată de implementarea eficientă a modelului pedagogic elaborat și utilizarea metodologiei de instruire dezvoltate în procesul de studiu al cursului universitar ”Securitatea informațională”, pentru studenții din domeniul economico-financiar, prin aplicarea tehnologiilor internet, în scopul formării și dezvoltării competențelor profesionale privind protecția și securitatea informațională.

Implementarea rezultatelor cercetării a fost realizat în procesul educațional al Universității de Stat din Tiraspol (or. Chișinău), Filiala Politehnică din Bender a ”Universității T. G. Shevchenko” , filiala din Tiraspol a Academiei de Economie și Drept din Moscova, filiala din Tiraspol a "ROSNOU".

ANNOTATION

Bogdanova Violeta

"Methodology for studying information protection and security technologies in higher education",

dissertation of Doctor of Educational Sciences, Chisinau, 2022.

Thesis structure: introduction, three chapters, general conclusions and recommendations, bibliography from 189 sources, 16 annexes, 131 pages of base text, 24 figures, 23 tables. Publications on the topics of the thesis 33 scientific works.

Keywords: information security, pedagogical model, scoring system, educational web quest, independent work, Internet technologies, pedagogical experiment, cybernetic approach, systemic approach.

Aim of the research: consists in the theoretical substantiation, elaboration and experimental validation of the pedagogical model for the study of information protection and security technologies by the future specialists in the economic-financial domain, via internet technologies.

Objectives of the research: 1) the formulation of the principles and methodological approaches necessary for the design of a didactic system for the training of future specialists in the economic-financial domain in the discipline "Information security"; 2) conceptualization of evaluation indicators, criteria and performance descriptors regarding the study of information security to ensure the efficiency of the instructional process; 3) the elaboration of a pedagogical model for the study of the discipline "Information security" by the future specialists in the economic-financial domain that reflects the content of the discipline and the methodological system of skills training in the field of information security; 4) development of an educational and methodological complex of the discipline "Information security" using information technologies, including Internet technologies; 5) elaboration, implementation and experimental validation of the efficiency of the developed pedagogical model and optimization of the instructional process by recovering on new information technologies.

The scientific novelty and originality of the research results consists in the conceptual substantiation of the pedagogical model of design and implementation of the university course "Information Security" by implementing internet technologies.

The solved scientific problem consist in determining the theoretical and methodological foundations of the efficiency of the study process of the university discipline "Information Security", which led to the theoretical substantiation and elaboration of the pedagogical model of teaching-learning-evaluation of the university course through internet technologies, the process of training the professional skills of future specialists in the economic-financial domain.

The theoretical significance of the paper consist in the research and evaluation of internet technologies in the process of formation and development of professional skills on information security for students in the economic-financial domain from the perspective of the pedagogical model developed.

The practical significance of the research: is determined by the efficient implementation of the developed pedagogical model and the use of the training methodology developed in the study process of the university course "Information Security", for students in the economic-financial domain, by applying Internet technologies to train and develop professional skills on information protection and security.

Implementation of the research results was carried out in the educational process of the State University of Tiraspol (Chisinau), Bender Polytechnic Branch of the University T. G. Shevchenko, Tiraspol branch of the Moscow Academy of Economics and Law, Tiraspol branch of "ROSNOU".

BOGDANOVA Violeta

**METHODOLOGY FOR STUDYING INFORMATION
PROTECTION AND SECURITY TECHNOLOGIES IN HIGHER
EDUCATION**

**532.02 – SCHOOL DIDACTICS
(BY STAGES OF TRAINING AND DISCIPLINES)**

Summary of the doctoral thesis in education sciences

Approved for printing: 27.05.2022
Offset paper. Offset printing.
Printing sheets.: 2,1

Paper size 60x84 1/16
Printing 50 ex.
Order no. 1006.

Tiraspol State University
MD-2069, Republic of Moldova, Chisinau, Gh.Iablocikin str., 5.