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THE AUTOMATED SYSTEM “SEL” AS A TOOL FOR HIGHER EDUCATION INSTITUTION MANAGEMENT

Purpose. The goal of the article is to highlight the aspects of implementing the educational-process automated management system “SEL”, which has been adapted to the existing stable processes in higher education institutions and realities of higher education in Ukraine. In particular, the study focuses on the implementation of the module “Teacher’s Individual Work Plan”, which significantly simplifies and optimizes the work of teachers.

Methodology. To characterize the automated system “SEL”, research methods such as comparison and synthesis are used. To justify the effectiveness of the proposed system, a critical analysis method is used, while recommendations for further improvement of the system’s operation are developed using the generalization method.

Findings. The article describes the aspects of implementing the “SEL” system at Vinnytsia Institute of Trade and Economics of State University of Trade and Economics. The system meets modern quality standards, considers the specifics of higher education in Ukraine, integrates with other information systems, and supports scalability for various user needs. Functional modules, including the “Teacher’s Individual Work Plan” and the elective subject selection system, are presented as tools that enhance the efficiency, transparency, and quality of educational services. The integration process of the module “Teacher’s Individual Work Plan” with other system modules is also detailed.

Originality. The “SEL” automated system is developed, which, through automation and digitalization of educational services, improves the management of higher education institution. In particular, the use of unique modules such as “Teacher’s Individual Work Plan” and “Elective Subjects” enables the automation of processes and facilitates the work of the teacher and the process of elective subject selection by higher education students.

Practical value. The developed system “SEL” makes it possible to implement the main functions for planning, organizing, motivating and controlling the educational process, scientific, methodological and organizational activities in a higher education institution.

Keywords: *automated management system, elective subjects, individual plan, higher education institution*

Introduction. Currently, in the context of constant informatization in the educational sector, and, in particular, in the higher education system of Ukraine, the problem of automating the management of the educational process in education institutions is gaining specific relevance among scientists. Thus, one of the directions of implementation of the National Program “Education. Ukraine of the 21st Century” involves the introduction of information systems at education institutions that combine educational, methodological, organizational, and other components [1]. The use of automated management systems significantly reduces costs for organizing and managing the educational process, provides an opportunity to meet the information needs of a higher education institution, and promotes scientific research on the activities of all components of educational management [2].

At the beginning of the 21st century, most higher education institutions mainly solved management tasks by using MS Word tools, MS Excel spreadsheets, as well as accounting and office management systems. Over time, various computer programs for compiling schedules in higher education institutions, distributing teach-

er workloads, etc., became quite popular. Each of the programs had its advantages and disadvantages, but the need to exchange data between them caused the requirement to create a comprehensive information system that would automate all components of higher education institution management. Thus, in response to the demands of the time, automated education institution management systems began to appear in the market of informatization of educational services, which are integrated information complexes that allow automating the work of all departments of a higher education institution. Currently, in some higher education institutions, management processes are partially automated, but the trend towards their full automation prevails. The autonomy of a higher education institution involves the introduction of its own developed organizational structures, automated systems, educational programs, and training formats [3].

Literature review. The issue of increasing the efficiency of management of a higher education institution by automating various areas of its activity has been studied by many domestic and foreign scientists. In particular, Kosiyuk, M., Bilovskyi, K., & Lysak, V. considered the issue of developing and implementing information systems for managing activities of higher education institutions in the context of digital transformation and

shortcomings of automated management systems presented on the Ukrainian IT market, which encourage higher education institutions to develop their own systems [4].

Palamarchuk, Y., Zamkova, N., Novytsky, R., & Kovalenko, O. developed a concept for building an IT strategy for the development of a higher education institution, its information electronic systems and the corresponding electronic information educational environment [5]. According to the authors, the IT strategy can be presented as a separate document for the development of a higher education institution or/and as part of its general strategy in terms of digitalization [2].

Baybuz, O., & Kuzma, K., [6], Hanzha, A., Antonenko, S., & Izmailova, M. [7] analyzed existing automated management systems for higher education institutions, and from a technical point of view described the components of the information support system for decision-making in the process of managing an education institution. According to the authors, a decision-making support complex for managing the educational process should consist of two basic modules and several auxiliary ones: 1) a decision-making support module during knowledge testing, which is designed to manage the knowledge assessment process based on the sequential analysis method; 2) a learning process modeling module, which is designed for information analysis.

Polyvyana, O. characterized modern automated systems for managing the educational process in higher education institutions [8]. Dobryshyn, Y., & Chernozubkin, I. studied the effectiveness of using management automation in higher education, where private higher education institutions were particularly considered [9].

Zamfiroiu, A., & Vasile, D. [10], Drobakhin, O., Guk, N., & Tkachenko, M. [11], Sherman, M., Samchynska, Y., & Korniienko, Y. [12], Haitan, O. [13] investigated the features of automating various components of the educational process: automation of student evaluation process through online educational platforms, forming volumes of educational work of departments, rating assessment of activities of scientific-pedagogical workers, generating schedules.

Khalid, J., Ram, B., Soliman, M., Ali, A., Khaleel, M., & Islam, M. summarized the research on the recent technologies and their impact on the formation of a digital campus, and also analyzed potential obstacles and proposed ways to effectively implement digitalization [14].

Buinytska, O., Varchenko-Trotsenko, L., & Hrytse-liak, B. described the main components of the “digital campus” that should meet the needs of higher education institutions: digital education, digital infrastructure, digital science, digital management and marketing [15]. Kadykova, I., Dotsenko, N., Skachkov, O., Husieva, Y., Tymofeiev, V., & Chumachenko, I. considered modern information technologies for managing education institutions and argued for developing an in-house strategic management information system [16].

Foreign researchers also pay considerable attention to the issue of automating management processes of higher education institutions (including entrance exams, administrative services, financial components, etc.). The most famous is the developed SAP R/3 sys-

tem, which is used by universities in the USA (University of Massachusetts, Arizona State University), Canada (University of Toronto), Germany (University of Munich), etc. This system is used for accounting, financial planning, personnel management, student record management, course registration, scheduling, and reporting on the effectiveness of the educational process and university expenses.

The best international solutions that allow the transition to electronic management in higher education institutions under conditions of society digitalization are described by Vakaliuk, T., Antoniuk, D., Novitska, I., & Medvedieva, M. in [17]. The authors analyze the impact of the COVID-19 pandemic and the military aggression against Ukraine on the need for digital transformation of higher education and emphasize that, despite different approaches to digital transformation, all researchers agree on its importance for ensuring a high-quality educational process under current conditions.

Thus, the analysis of recent research and publications confirms that implementing an educational-process automated management system is relevant for further improving automation of management processes of higher education institutions in order to meet current standards of digitalization.

Unsolved aspects of the problem. Today, higher education institutions of Ukraine use both automated management systems available on the IT market and their own developments in their work. Most higher education institutions consider it necessary to purchase an automated management system that will allow digitalization of all areas of activity [6].

The most popular system today is the automated management system “VNZ”, designed for higher education institutions of all accreditation levels, developed by the Research Institute of Applied Information Technologies of the Cybernetic Center of the National Academy of Sciences of Ukraine. This system consists of several components: automated document flow, the automated management system “Admissions Committee”, the automated management system “Studmistechno”, the automated management system “Secure Higher Education Institution”, etc. [18]. The advantages of the automated management system “VNZ” are: unique opportunities for direct data exchange with the information and production systems “Osvita” and “Education”; high level of reliability and security of the database, regular updates and constant service support; management and distribution of access rights to the system using hardware and software; individual training on working with the system; use of a powerful and highly reliable Oracle database.

Also, many companies developing corporate information systems that create high-tech software, including those in the educational sector, operate in the IT services market today. Thus, LLC “Unitech” created an automated management system for a higher education institution of III and IV accreditation levels. The system consists of autonomous modules: academic schedule, structure of the higher education institution, WEB – website of the higher education institution, educational department, dean’s office, department, applicant, document flow of the higher education institution, academic councils of the higher education institution. Naviga-

tors of thematic sections, in turn, have a tree-like structure [19].

In addition, higher education institutions can purchase computer system packages from Polytech-Soft [20] to optimize certain areas of their activities. The developers offer the following software modules: “Dean’s Office”, “PS-Eurodiploma”, “Colloquium”, “Bibliograph”, “PS-Personnel”, “PS-Journal of Achievements-Web” and “PS-Applicant”.

Kosiyuk, M., Mazarchuk, A., & Bilovskyi, K. proposed a modular information system based on free software, which provides solutions to the tasks of collecting, processing, storing, and effectively using information in the process of university activities. The implementation and development of this system improved the entire document flow in a higher education institution and increased its efficiency and effectiveness, allowed ensuring proper control and identifying errors and inconsistencies in paper documents [21].

Therefore, most of the currently existing automated management systems for managing higher education institutions consist of package program modules, the main ones of which are document management, applicant, schedule, dean’s office, admissions committee, but they do not allow automating such important components of the educational process as the choice of elective subjects by higher education applicants and the control and organization of the teacher’s professional activities, which is reflected in one’s individual plan.

However, despite the fact that the problem of automating higher education management has been highlighted in the works of many modern scientists, to this day there are no unified approaches to the components of the implemented automated systems.

Purpose. The purpose of the article is to highlight the features of the automated educational process management system “SEL” (Smart Electronic Learning), developed by taking into account the existing sustainable processes in Vinnytsia Institute of Trade and Economics of State University of Trade and Economics and realities of higher education in Ukraine.

To achieve the goal, the following tasks are set to accomplish:

1. To characterize and justify the feasibility of the modules of the automated system.
2. To describe the automated system for forming an individual curriculum for a teacher.
3. To develop recommendations for further improvement of the automated system.

Methods. To characterize the automated system “SEL”, research methods such as comparison and synthesis are used. To justify the effectiveness of the proposed system, a critical analysis method is used, while recommendations for further improvement of the system’s operation are developed using the generalization method.

Results. Currently, taking into account the specifics of its activities, the tasks that need to be solved, the features of the educational process, forms of training, and the organizational structure of the institution, each higher education institution makes its own decision on the feasibility of purchasing an already developed automated management system or developing its own system. A comprehensive automated management system

for higher education institutions should ensure the functioning and management of the educational process, scientific and methodological activities, financial-economic, and bibliographic systems.

At the beginning of 2020, Vinnytsia Institute of Trade and Economics of State University of Trade and Economics started implementing its own automated educational process management system “SEL” (Smart Electronic Learning), which is adapted both to existing stable processes at the Institute and to realities of higher education in Ukraine. The purpose of implementing this system is:

1. To increase the efficiency of the educational process through automation and digitalization of educational services.
2. To optimize management processes and reduce administrative costs, along with reducing the time for processing documents, reports, and organizational procedures.
3. To improve communication: ensuring convenient access to information for students and teachers.

The “SEL” implements the main functions for planning, organizing, motivating and controlling the educational process, as well as scientific, methodological and organizational activities at Vinnytsia Institute of Trade and Economics of State University of Trade and Economics. When developing the system, standards GOST 24.601-86 and GOST 24.602-86, which regulate the creation of automated systems [22], are taken into account.

The following stages are carried out when designing the system: formation of requirements, concept development, technical support, draft design, technical design, working documentation, system implementation and maintenance. The requirements that the system must meet are also taken into account – for functionality, interface, system requirements, feedback, scalability [23].

The main components of the “SEL” are the following modules:

1. Teaching (includes an electronic journal, an individual plan and own repository).
2. Student (electronic gradebook, grade journal, elective subjects).
3. Services (services of Vinnytsia Institute of Trade and Economics of State University of Trade and Economics, dean’s office, personnel department, workload distribution, schedule).
4. Repository (repository, electronic publications of department teachers).
5. Internal resources (office management, Moodle).

A unique module that distinguishes this automated management system from other existing systems is the designed automated system for selecting elective subjects, which is an effective means of building individual educational trajectories for higher education applicants and an effective tool for increasing transparency and quality of specialist training. The implementation of the automated system for building an individual educational trajectory for higher education applicants made it possible to: 1) provide the possibility of remote familiarization with the list of elective subjects and their content to improve the selection process; 2) select elective subjects and form an application for their study in an automated mode; 3) generally increase interest in learning and mo-

tivation through the introduction of the latest technologies and the possibility of individualizing learning. At the same time, all processes of registration, processing and analysis of data on the selection of subjects are performed by the automated system, and administrators only perform the correct settings for its operation. In the conditions of automation, it became possible to reduce the time and labor costs of the dean's office and academic department staff for conducting and processing documents regarding the procedure on elective disciplines for applicants of the higher education institution. The algorithm of this module is described in detail by the authors in [23].

The novelty of the system is also the presence of the module "Teacher's Individual Work Plan". The importance of its creation is due to the fact that it is a key document that determines the types of scientific-pedagogical activity and its scope. The individual plan of the teacher serves as a tool for planning, evaluating, and controlling the quality of the teacher's performance of one's professional duties. The content and structure of the individual plan are regulated by the internal regulations of the University and the Regulations on the organization of the educational process in a higher education institution, which are based on: the Labor Code of Ukraine, the Law of Ukraine "On Higher Education", Order of the Ministry of Education and Science of Ukraine dated February 16, 2022 No. 186 "On approval of the recommended list of types of educational, methodological, scientific, and organizational work for scientific-pedagogical, scientific, and pedagogical workers", the ISO 9001:2015 standard "Quality management systems – Requirements", the collective agreement.

The main goal of automating the individual plan document is to create a tool that helps optimizing the process of planning, monitoring, evaluating, and preserving the results of teachers' professional activities. For its implementation, the module "Teacher's Individual Work Plan" is developed to meet the following five fundamental requirements that ensure its effectiveness, functionality, and ease of use.

1. Functional requirements.

1.1. Flexibility in setting up templates: allows creating individual plans based on standard templates that meet the requirements of the education institution and state regulations.

1.2. Integration with other system modules: it interacts with other modules, such as class schedule, academic workload, scientific publications and reporting, to automatically upload the necessary data.

1.3. Monitoring task performance: provides the ability to track the progress of the plan in real time.

1.4. Report generation: automatically creates summary reports for a specified period (semester, academic year) in accordance with the approved format.

1.5. Support for various types of activities: includes all types of teacher work – educational, methodological, research, professional development, organizational.

2. Technical requirements.

2.1. Multiplatform: works on different devices and operating systems (computers, tablets, smartphones).

2.2. Data protection: complies with cybersecurity standards, ensures the protection of teachers' personal data and provides access to them only to authorized users.

2.3. Speed: the module is optimized for fast loading and processing of large amounts of data.

2.4. Scalability: the module is able to process information from a large number of users without loss of performance.

3. Ergonomic requirements.

3.1. Interface convenience: the module has an intuitive, logical interface.

3.2. Search and filtering support: the module has tools for quickly finding the necessary information and filtering data according to various criteria.

4. Organizational requirements.

4.1. Adaptability to regulatory changes: the module has the ability to quickly update in accordance with changes in regulatory documents or internal regulations of the institution.

4.2. Technical support: the module has an available operational service to quickly resolve user problems.

5. Analytical requirements.

5.1. Data collection and analysis: the module provides the University administration, the educational department, the head of the department with the opportunity to receive analytics on the fulfilling of individual plans, the workload of teachers, and the effectiveness of their work.

5.2. Formation of statistical reports: the module generates statistical reports for further management decision-making.

The module "Teacher's Individual Work Plan" consists of sections that contain all types and scope of the teacher's work, a report on the completeness and timeliness of its fulfilling for the academic year (Fig. 1). Access to the module, in addition to the teacher oneself, is provided by the head of the department to control and record the fulfilling of the plan. Access in viewing mode is provided by the relevant structural units (educational and methodological department, science department).

All fields in the sections "Methodological work", "Research work", "Organizational work", "Professional level improvement" are filled in by the teacher, except for the mark on fulfilling (filled in by the head of the department). An example of filling in the "Methodological work" section is presented in Fig. 2.

In the section "Academic work", the teacher fills in only the cells containing data on the hours of actual academic workload. Information on types of academic work, academic subjects, groups, and planned hours is filled in automatically according to the distribution of academic workload at the department. An example of filling in the section "Academic work" is shown in Fig. 1 as well.

In case of non-fulfillment of the load plan, the possibility of entering a comment on the justification for non-fulfillment is implemented. An example of the comment on the plan change is presented in Fig. 3.

At the end of each academic semester, a report of the academic work fulfillment by the scientific-pedagogical staff is automatically generated. In case of overfulfillment of the workload plan, the possibility of making changes to the actual hours is implemented. Since overfulfillment happens due to inter-substitutions within the department, the system allows selecting the teacher, the academic subject, and the group in which this teacher has this subject, and indicating the number of substitution hours (Fig. 4).

EDUCATIONAL WORK		PROFESSIONAL LEVEL IMPROVEMENT		METHODOLOGICAL WORK		RESEARCH WORK		ORGANIZATIONAL WORK										
EDUCATIONAL WORK																		
Staff																		
Form of study	No.	Name of academic subjects and types of educational work	Group code	Number of students	Lectures		Practic.		Lab. Works		Exam. Consult.		Exams		Cred. Tests		CP/IGW	
					p	f	p	f	p	f	p	f	p	f	p	f		
FT (1 sem.)	1	Database and knowledge organization	IST-21d, IST-21mb, IST-11dsp	35	36	36							3	3				
	2	Fundamentals of technical and software support of information systems	IST-21mb	11	10	10			48	48			2.2	2.2				
	3	Information systems and technologies in the social sphere	USSZ-11d(m)	8	8	8							1.6	1.6				
	4	Security of integrated and distributed information systems	IST-11d(m)	21	20	20			36	32	!		3	3				
	5	Office computer technologies	TR-11d, PUA-11d, IST-11d	28	42	38	!						3	3				
	6	Office computer technologies	IST-11d	14					42	42								
	7	Preparation of qualification work	IST-21d(m)	4														
FT (1 sem.)		Unplanned			0	0	0	0	0	0	0	0	0	0	0	0	0	
Corr. (1 sem.)		Unplanned			0	0	0	0	0	0	0	0	0	0	0	0	0	
Total for 1 semester					116	112	0	0	126	122	0	0	12.8	12.8	0	0	0	0

Fig. 1. Interface of the module “Teacher’s Individual Work Plan”

EDUCATIONAL WORK		PROFESSIONAL LEVEL IMPROVEMENT		METHODOLOGICAL WORK		RESEARCH WORK		ORGANIZATIONAL WORK	
METHODOLOGICAL WORK									
Development/writing (publication/republication) and implementation into the educational process: handbook, tutorial, practical/laboratory guidelines									
Content	Summary results	Term of fulfillment	Mark						
Content	Final result	Deadline	Select	<input type="checkbox"/>	<input type="checkbox"/>				
Work programs of educational components (subjects, practices, certifications of higher education applicants)									
Content	Summary results	Term of fulfillment	Mark						
Digital technologies in economics	Work program	April 2025	Not completed	<input type="checkbox"/>	<input type="checkbox"/>				
Big Data	Work program	April 2025	Not completed	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
Probability theory	Work program	May 2025	Not completed	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
System analysis	Work program	May 2025	Not completed	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
Educational and methodological materials for independent work of higher education applicants, electronic courses, lecture notes, practicums, methodological recommendations and other printed educational and methodological works									
Content	Summary results	Term of fulfillment	Mark						
Office computer technologies (bachelors)	Methodological recommendations	October 2024	Done	<input type="checkbox"/>	<input type="checkbox"/>				
Office computer technologies (masters)	Methodological recommendations	November 2024	Done	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
Digitalization in developing a startup	Case	December 2024	Done	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
Digitalization in developing a startup	Methodological recommendations	May 2025	Not completed	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
System analysis	Methodological recommendations	May 2025	Not completed	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
Big Data	Methodological recommendations	May 2025	Not completed	<input type="checkbox"/>	<input checked="" type="checkbox"/>				

Fig. 2. An example of filling out the section “Methodological work”

The module “Teacher’s Individual Work Plan” allows creating and viewing (also printing if necessary) a report of the academic workload performance both for

a separately considered teacher and for the department as a whole. A sample of such a report is presented in Fig. 5.

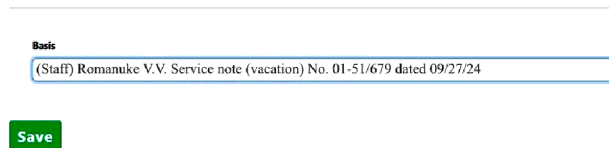


Fig. 3. An example of the comment on the plan change

To fully cover the spectrum of a teacher’s activities, each section consists of subsections.

1. The subsections of the section “Methodological work” are:

1.1. Development/writing (publication/republication) and implementation in the educational process: a textbook, training manual, practical practicum, laboratory practicum.

1.2. Work programs of educational components (subjects, practices).

1.3. Methodological guidelines for independent work of higher education applicants, electronic courses, lecture notes, practicums, methodological guidelines and other printed educational-methodological works.

1.4. Development/implementation of distance learning forms: conducting lecture classes in a distance form, development/implementation of a distance course.

1.5. Development of tasks for monitoring and diagnosing the knowledge of higher education applicants (examination cards for subjects, attestation exam cards, cards for taking entrance exams for educational degrees).

2. The section “Research and development work” consists of:

2.1. Carrying out initiative scientific research.

2.2. Conducting research financed from the general special funds of the state budget of Ukraine and/or from other sources.

2.3. Management and implementation of projects supported by state or international funds, in particular those that promote economic cooperation and development.

2.4. Obtaining grants from Vinnytsia Regional State Administration and Vinnytsia Regional Council.

2.5. Using scientific developments in business activities and their commercialization.

2.6. Preparing and writing scientific monographs or their individual sections.

2.7. Publishing articles in prestigious scientometric databases (for example, Scopus, Web of Science).

2.8. Preparing scientific publications in professional journals or popular science publications, as well as participating in conferences.

2.9. Initiation and implementation of joint scientific research with the support of partner organizations.

2.10. Defense of dissertations for the degree of higher education “Doctor of Philosophy”, “Doctor of Science”.

2.11. Scientific supervision/consultation of dissertations.

2.12. Management of student scientific projects, participation in invention competitions, conferences and qualification studies.

2.13. Development and registration of innovations: obtaining patents for inventions or utility models, confirmation of copyright, creation of technological regulations.

2.14. Participation in scientific events of various levels, such as congresses, symposia, conferences and round tables.


3. The main components of the section “Organizational work” are:

3.1. Monitoring the program’s compliance with educational standards, coordinating the learning process and updating the content of subjects.

3.2. Managing educational programs, supporting accreditation and licensing procedures, developing curricula and professional standards.

3.3. Creating regulatory documents, participating in the development of educational regulations.

3.4. Implementing modern approaches to the educational process, updating professional standards and

Full-time (**full-time**) 1 position 

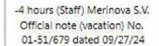


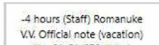


No.	Type of educational work	Training load									Reason for changing the plan (department meeting minutes, memo, other administrative document)
		1st semester			2nd semester			Academic year			
		P	F	Diff.	P	F	Diff.	P	F	Diff.	
1	Conducting lecture classes	116	112	-4	48	0	-48	164	112	-52	1st semester  -4 hours (Staff) Merinova S.V. Official note (vacation) No. 01-51/679 dated 09/27/24  
2	Conducting practical classes	0	0	0	52	0	-52	52	0	-52	
3	Conducting laboratory classes	126	122	-4	46	0	-46	172	122	-50	1st semester  -4 hours (Staff) Romanuke V.V. Official note (vacation) No. 01-51/679 dated 09/27/24  
4	Conducting consultations before the exam	0	0	0	0	0	0	0	0	0	
5	Conducting semester exams	12.8	12.8	0	3.8	0	-3.8	16.6	12.8	-3.8	

Fig. 4. Implementation of changes to the teacher’s initial workload plan

No.	Type of educational work	Educational load									Reason for changing the plan (department meeting minutes, memo, other administrative document)
		I semester			II semester			Academic year			
		Plan	Fact.	Plan change	Plan	Fact.	Plan change	Plan	Fact.	Plan change	
1	Conducting lecture classes	116	112	- 4	48	0	- 48	164	112	- 52	1st semester - 4 hours (Staff) Merinova S.V. Official note (vacation) No. 01-51/679 from 09/27/24
2	Conducting practical classes	0	0	0	52	0	- 52	52	0	- 52	
3	Conducting laboratory classes	126	122	- 4	46	0	- 46	172	122	- 50	1st semester - 4 hours (Staff) Romanuke V.V. Official note (vacation) No. 01-51/679 from 09/27/24
4	Conducting consultations before exam	0	0	0	0	0	0	0	0	0	
5	Conducting semester exams	12.8	12.8	0	3.8	0	- 3.8	16.6	12.8	- 3.8	
6	Conducting credit tests	0	0	0	1	0	- 1	1	0	- 1	
7	Supervision, defense of course projects / IGW	0	0	0	0	0	0	0	0	0	
8	Supervision of qualification works (EL "Bachelor")	0	0	0	66	0	- 66	66	0	- 66	
9	Supervision of qualification works (EL "Master")	40	40	0	30	0	- 30	70	40	- 30	
10	Conducting defense of qualification works	0	0	0	0	0	0	0	0	0	
11	Conducting attestation exams	0	0	0	6	0	- 6	6	0	- 6	
12	Instructing on practices	0	0	0	1	0	- 1	1	0	- 1	
Total		294.8	286.8	- 8	253.8	0	- 253.8	548.6	286.8	- 261.8	

Fig. 5. A report of academic workload performance formed by the tools of the module "Teacher's Individual Work Plan"

creating new educational passports in accordance with the needs of the labor market.

3.5. Conducting scientific expertise: reviewing monographs, curricula, methodological guidelines, dissertation research, and other scientific works.

3.6. Participation in the work of various councils: activity in scientific, educational-methodological, and specialized commissions.

3.7. Organization and holding of events: preparation of conferences, olympiads, competitions, scientific discussions and sports competitions.

3.8. Management of student associations: assistance in conducting scientific seminars, circles, clubs, as well as organization of educational and scientific work at the department or faculty level.

3.9. Participation in the organization, holding of festivals, art forums, Institute Day, Donor Day, etc.

3.10. Fulfillment of the duties of a group mentor.

3.11. Work as part of the admissions committee or participation in ensuring its activities.

3.12. Career guidance work.

3.13. Work in scientific-methodological commissions of the Ministry of Education and Science of Ukraine.

3.14. Work in accreditation, expert councils, sections in professional areas of the Scientific Council of the Ministry of Education and Science of Ukraine.

3.15. Work in a specialized council for the defense of dissertations.

4. The structural components of the section "Professional level improvement" are:

4.1. Fulfillment of the requirements for the award of the academic title of associate professor, professor.

4.2. Increasing the level of pedagogical skills.

4.3. Increasing the level of foreign language proficiency.

The ability to quickly make changes to the module "Teacher's Individual Work Plan" makes it convenient to use, and its electronic format significantly reduces the paper flow of relevant documents.

The developed system "SEL" also contains the module "Plagiarism", the peculiarity of which is that the verification of the uniqueness of qualification works of higher education applicants of the education institution is carried out by comparing them with the works of previous years of students of all degrees of higher education, forms of study, and specialties. Currently, the database contains more than 12,000 works. After checking for plagiarism, the watermarked work is sent to the qualification work supervisor, whereupon it is printed with those watermarks. The presence of watermarks proves to the members of the examination committee that this work has passed the verification for uniqueness. The system also automatically generates a certificate, which indicates the percentage of borrowings: it should not exceed 12 %. The certificate is necessarily checked when a higher education applicant defends the qualification work. Specialists of technical means of education at the Department of Information Systems and Technologies of Vinnytsia Institute of Trade and Economics of State University of Trade and Economics systematically work on improving the functional capabilities of the "SEL", taking into account wishes of teachers, students, and employees of other structural divisions of the Institute. Currently, the system has been improved in such a way that teachers do not need to upload students' qualification works to their own repository: after checking the work for plagiarism, it is immediately uploaded to the teacher's repository.

Vinnytsia Institute of Trade and Economics of State University has a school of pedagogical skills, in the classes of which employees of the education institution improve

their skills and abilities, including the work with the automated system “SEL”. Thus, in the current academic year, classes were held on the topics: “New possibilities for generating reports in the SEL module: “Elective subjects” (report by groups, report by subjects)”, “New possibilities for checking qualification works in the SEL module: “Plagiarism” with subsequent upload to the repository”, “New possibilities for working in the SEL module: “Individual Curriculum” (filling in, generating a report)”.

The presence of a database of personalized workload makes it possible to develop the module “Schedule”, which, in turn, makes it possible to create and maintain a journal of the workload of the teacher in electronic mode, which significantly simplifies the work of both the teacher and the educational and methodological department.

The workload journal page displays all scheduled classes. When one goes to this page, classes additionally assigned by the educational department are automatically registered. If a teacher was substituted, he/she is required to edit the entry by clicking on the pencil pictogram. On the page that opens, the teacher must make the substitution record and enter the topic. If a teacher enters a substitution, this class will not be credited to the report, but will be credited to the teacher who conducted it. As for deletion, only the educational department can delete classes. If a teacher made a mistake, he/she simply edits the entry. To remove a substitution, an empty value is selected in the field. Rows with a red circle mean that a teacher has been assigned to substitution. Such rows will not be displayed in the report; instead, they will be included in the substitutes report. The workload journal also displays information in a separate column about which fund (hourly or full-time) is used to pay for a particular class. This allows quickly creating timesheets for teachers.

Thanks to the developed module, the teacher can view their schedule by academic groups, by specific date, can calculate the number of conducted classes and the number of classes that remain to be conducted in a particular group. The use of a color scheme is quite convenient: in the schedule, lecture classes are shown in yellow, practical classes are in green, and laboratory classes are in blue. The system also provides the ability to:

- 1) view occupied classrooms;
- 2) print pages of the workload journal, the full schedule, and schedules of individual academic groups.

Fig. 6 shows the interface of the module “Schedule”. The automated management system “SEL” is easy to operate. Its convenient and understandable interface allows for quick learning of how to work with.

CLASS #	MON	TUE	WED	THU	FRI	SAT
1	03-02-2025	04-02-2025	05-02-2025	06-02-2025	07-02-2025	08-02-2025
2			F-41d ISTPerek(Lec.) Room No. 48 K-1	F-41d ISTPerek(Prac.) Room No. 51 K-4	IST-11d CompMer(Lab.) Room No. 206 K-4	
3		PUA-11d EIDokPU(Lec.) Room No. 208 K-4	F-41d ISTPerek(Lec.) Room No. 41 K-1	F-41d ISTPerek(Prac.) Room No. 507 K-4	IST-11d CompMer(Lab.) Room No. 307 K-4	
4						
5						
6						

Fig. 6. The interface of the module “Schedule”

Conclusions and recommendations for further research in the field. The implementation of the educational-process automated management system “SEL” at Vinnytsia Institute of Trade and Economics of State University of Trade and Economics demonstrates significant potential for optimizing management, educational, and organizational processes in higher education institutions. This reduces administrative costs, shortens the time for document processing, and improves communication between participants in the educational process.

The peculiarity of the system is the creation of unique modules, such as a system for selecting elective subjects and the module “Teacher’s Individual Work Plan”, which increase the transparency and quality of educational management.

The development of “SEL” takes into account current regulations, state standards, and international requirements for the quality of educational processes, which ensures its versatility and the ability to adapt to realities of Ukrainian higher education.

The system “SEL” is built on a modular architecture, which allows it to be effectively integrated with other tools and systems of the institution, as well as to be scaled according to the needs of different users.

Thanks to a wide range of functional capabilities, “SEL” provides full coverage of the needs of the educational process, methodological, scientific and organizational activities.

In further research, it is advisable:

1. To study the impact of the educational-process automated management system “SEL” on the educational process efficiency, the level of satisfaction of students and teachers, as well as the quality of specialist training.
2. To conduct a detailed analysis of the economic effect of implementing the system “SEL”, in particular, in terms of reducing costs for administrative processes and increasing teacher productivity.
3. To study the possibilities of adapting the system “SEL” to international standards and the needs of foreign partners in the context of academic mobility, international projects and programs.
4. To conduct research into the possibilities of integrating artificial intelligence algorithms for personalizing learning, predicting learning outcomes, and automating complex analytical processes.

The results of further research will contribute not only to improving the “SEL”, but also to developing a general methodology for creating automated management systems for higher education institutions in Ukraine.

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Автоматизована система «SEL» як засіб управління закладом вищої освіти

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Мета. Висвітлення аспектів упровадження автоматизованої системи управління освітнім процесом «SEL», адаптованої під існуючі сталі процеси у закладах вищої освіти (ЗВО) і під реалії вищої освіти України. Зокрема, висвітлення особливостей упровадження модуля «Індивідуальний план роботи викладача», використання якого дозволяє значно полегшити й оптимізувати роботу викладача.

Методика. Для характеристики автоматизованої системи «SEL» використовуються такі методи досліджень, як порівняння й синтез. Для обґрунтування ефективності використання запропонованої системи застосовується метод критичного аналізу, для формулювання рекомендацій із подальшого вдосконалення роботи автоматизованої системи – метод узагальнення.

Результати. Описані аспекти впровадження системи «SEL» у Вінницькому торговельно-економічному інституті Державного торговельно-економічного університету. Система відповідає сучасним стандартам якості, ураховує специфіку вищої освіти України, інтегрується з іншими інформаційними системами й підтримує масштабованість для різних потреб користувачів. Представлені функціональні модулі, зокрема, «Індивідуальний план роботи викладача» й система обрання вибіркової дисципліни, що забезпечують підвищення ефективності, прозорості та якості освітніх послуг. А також деталізовано процес інтеграції модуля «Індивідуальний план роботи викладача» з іншими модулями системи.

Наукова новизна. Полягає у розробці автоматизованої системи «SEL», яка шляхом автоматизації й цифровізації освітніх послуг забезпечує покращення управління ЗВО. Зокрема, використання унікальних модулів «Індивідуальний план роботи викладача» та «Вибіркові дисципліни» дозволяє автоматизувати й полегшити роботу викладача та здійснення здобувачами вищої освіти вибору вибіркової дисципліни.

Практична значимість. Розроблена система «SEL» дозволяє реалізувати основні функції для планування, організації, мотивації й контролю освітнього процесу, наукової, методичної та організаційної діяльності у закладі вищої освіти.

Ключові слова: автоматизована система управління, вибіркові дисципліни, індивідуальний план, заклад вищої освіти

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