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MULTILEVEL INFORMATION SYSTEM FOR RECORDING THE STUDENTS ACADEMIC PERFORMANCE IN THE CUMULATIVE ASSESSMENT SYSTEM

The COVID-19 pandemic has had a major impact on education. All over the world, educational institutions have been forced to switch to distance learning. Due to the current situation, the demand for online education and information resources to support it has grown all over the world. The issue of not only the organization of online learning, but also the processes of electronic assessment of student progress is relevant. The authors analyzed business processes in assessing students' knowledge and existing software. The main disadvantage of the existing systems of support of the educational process at the university is the limited, and sometimes inability, access to them for certain participants in the educational process, especially in the conditions of distance learning. It is determined that a system with functional capabilities is needed for the following actors: student, teacher, head of department, dean and dean's office. The data in the system must be stored in a database, and the interface for accessing them must be possible from any web browser. The work is devoted to the development of such software. The developed system has the architecture of a distributed three-tier information system with access to the database, and consists of the following main links, such as: a web server with developed software as an application server, a database server running MySQL DBMS, a web browser as a client software. The use of a success assessment system provides many advantages, including: improving the quality of information processing, speeding up work processes and increasing the availability of data for all participants in the educational process.

The COVID-19 crisis and unprecedented disruptions in the education system are far from over. Thus, the growing demand for online learning tools and related resources will remain in demand. Therefore, the developed multilevel information system for accounting for student performance is relevant now. This software will also be useful in the traditional form of learning. Because keeping an e-journal will reduce the filling of paper documents, reduce the burden on the teacher and provide easy access to information of other participants in the educational process: students and staff of the dean's office.

Keywords: ICT infrastructure of the university environment for its users, online learning, students' academic performance, multi-level information system for the university, personal accounts of different users, web interface

Introduction. The coronavirus outbreak in 2020 has affected billions of people around the planet. The World Health Organization has officially declared the COVID-19 coronavirus a pandemic [1].

The lockdown affected all spheres of the economy, as well as spheres of personal, social and professional life. This also affected the field of education, including higher education. Governments around the world have decided to close educational institutions in an attempt to contain the global COVID-19 pandemic [1]. An important problem has arisen - it is ensuring the continuity of education.

Most countries in the world have switched to distance learning in the form of radio broadcasting, online platforms and broadcasting lessons via television. In connection with the current situation, the demand for online education and information resources to support it has grown all over the world. Relevant question is not only the organization of online learning, but also the processes of the electronic assessment of student performance [2-4].

Universities of Ukraine were also forced to switch to distance learning. In this state, the subjects of the educational process (students and teachers) are forced to use systems and distance learning, auxiliary means of video communication and conferences. The organization of the educational process under quarantine is a very difficult issue. One of the problems was the task of forming progress journals based on current assessments, preparing intermediate indicators of success and carrying out attestations.

At the SHEI «Pryazovskyi State Technical University» (the SHEI "PSTU"), when teaching applicants for higher education in all educational programs, a system of cumulative point-rating assessment of students' progress is actively used [5]. All basic business processes and functions are reproduced when assessing students and are regulated by many documents on the organization of the educational process. The main documents that regulate the educational process and the process of assessing the quality of education are: regulations on the organization of the educational process at the SHEI "PSTU", regulations on the current monitoring of the progress of students of the SHEI "PSTU", regulations on semester exams and credits at the SHEI "PSTU", regulations on the formation of an individual educational trajectory of training for applicants for higher education at the SHEI "PSTU", regulation on the internal system of ensuring the quality of education of the SHEI "PSTU", regulations on the independent work of students in the SHEI "PSTU" and other [6]. So, the educational process is characterized by its complexity and versatility. Therefore, automation support is required.

During the automation of many processes in modern society, information technology has become an integral part of the life of the individual, society and the state. It is impossible to imagine any institution that does not use automation or information accumulation tools in its work. Such systems provide acceleration of information exchange and regulation of the level of access to various information sources.

An automated system "Dean's office" [7] has also been introduced at the SHEI "PSTU". The automated system "Dean's Office" is a software and technological complex for managing the educational process of an educational institution, designed to organize the work of methodologists and reduce the amount of paperwork. This system has a "Journal" module. And does not imply access to all students. Also, this module does not have a web interface. therefore, its widespread use in the conditions of distance education is problematic. Our university has also introduced a distance education system MOODLE [8]. This system will also not help to solve the problem of forming general gradebooks according to the current grades of students. In this system, grades are given by each lecturer, there is no general summary table, there is no access to information of other participants in the educational process.

That is why the issue of creating an integrated distributed multi-level information system for recording the progress of applicants for higher education has become relevant, which can be freely used by all subjects of the educational process.

Literature review. Of course, experience with online learning and assessment has already taken place. But this form of education did not previously have a massive and compulsory use. For example, in [9] the authors consider various categories of online assessments and various data analysis and visualization tools. The authors studied student-centered online assessment. The researchers analyzed how it helps with online learning and whether corrective action can be taken through the lens of learning analytics. It was concluded that the analysis helps identify students who were less active and who needed to be contacted in terms of both academic performance and engagement. Work [10] is also devoted to the issues of electronic assessment. The authors considered the advantages and problems of using electronic assessment in teaching by different participants: student, teacher, university. They determined that the use of

e-assessment improves student achievement and lowers costs for the institution. But there are also some problems with e-assessment - appropriate technical support and support is needed.

We have analyzed in other universities and institutes organize fixing students' progress. The software provided by the authors to automate the process of keeping a student progress journal was considered. The article [11] highlights the results of a study on the development and implementation of an electronic journal of students (cadets, students) of the National Academy of the State Border Guard Service of Ukraine named after Bohdan Khmelnytsky as an effective tool for streamlining the educational process, which allows more efficient use objectivity of assessment, timely identify educational problems, predict and adjust the further educational activities of students (cadets, students), to motivate their work in the classroom. The current layout of the journal is developed in the format of MS Excel spreadsheets, but in the future it is proposed to build an electronic journal based on the network architecture "client-server". The electronic performance journal is based on the principles of objectivity, impartiality, flexibility, accessibility, convenience and security.

In work [12], software was developed to facilitate the automated processing of student assessment results. The software was developed in the Visual Basic programming language, and the SQL Relational Database Management System was used to manage the database. The developed software is a useful simple user interface; in addition, it controls data management, retrieval and data processing. This provides easier data management than manual document management. This program is useful for saving time on document processing. The article describes the features of data storage more. The authors do not indicate how many types of users of this program.

A system with multiple user roles is described elsewhere. The article [13] proposed a centralized system for managing student academic records. This project was primarily aimed at developing a computerized student academic record management system to improve performance in the student grade registration service. The final grade submission process contains a long chain of participants: faculty, facilitator, dean, dean of instruction, vice president of academic affairs, registrar. The manual system gives inaccurate results for record keeping. Therefore, the authors have developed a system for registering and recording grades, also with functions for creating reports. During development the following tools were used: Windows Server, DevExpress, Microsoft Visual Studio C #, MSSQL and SmartDraw. The authors argue that the Automated Student Academic Records and Grades Management System is usable and acceptable to users as evidenced by usability and acceptance testing. However, there is a need to improve its performance.

The authors of the article [14] also independently developed an automated student results management information system (SRMIS). The system was primarily designed to automatically retrieve raw estimates from Excel files and store them in a database. The results processing system was developed using PHP and MySQL. The use of the system also requires the necessary technical support.

The author of the article [15] cites the experience of using electronic journals at the Drahomanov National Pedagogical University. With the help of "PS-Journal of Success-Web" [16] the teacher makes assessments of disciplines, and can then automatically transfer them to the summary of student assessment. This software module is divided into two types. One is used for teachers, the other - for students. "PS - Journal of Success - WEB for students" allows each student to get acquainted with the results of one's own success, at the same time there is no need to register, you only need to enter your own name and record book number. In this case, parents of students or anyone else also have the opportunity to review performance and personal data. The article also mentions the use of the MOODLE system [8], but has no explanation for the duplication of grades in different systems. It should be noted that the use of the module "PS - Journal of Success - WEB for students" requires commercial support for each user of the system. Therefore, educational institutions use their own developments. For example, the work [17] presents the development of a service-oriented software product. This program allows you to

automate the task of keeping track of the current progress of students, operational control of the current progress of students and allows the teacher to work with an electronic journal online. The general scheme consists of a service, implemented as a console application, and a client. A two-way connection mode is established between the service and the client. In addition, the service connects to the SQL Server DBMS using ADO.NET technology. The experience of organizing educational work on the introduction of electronic journals into the educational process showed the activity of universities in the city of Vinnitsa. The study [18] describes the results of the development and implementation of an electronic journal of visits and student progress at the Department of Human Anatomy of the N.I. Pirogov Vinnitsa National Medical University. The journal was developed by the staff of the department using the MySQL database, the writing language was PHP. Conclusions were made about the advantages of an electronic journal over a paper one.

Thus, the analysis of publications confirms the fact that the use of an electronic journal, first of all, allows you to save teachers' time when analyzing the progress of students on final attestations during the semester. There are also a number of other advantages of switching from a paper student progress journal to an electronic one, namely:

– rational use of teacher's time;

– minimization of the possibility of error due to automatic counting instead of manual;

– wide functionality of the electronic journal, in comparison with the paper one, which will provide better control of progress for the students themselves and will strengthen healthy competition among them.

– automatic entry of marks for testing in the electronic journal will provide quick access to the results of the progress of students, teachers and the head of the department,

– providing the dean's offices with operative information on student grades and quickly identifying students with academic debt;

– reducing the load on the teacher, since the processing of data on missed practical classes and unsatisfactory grades is carried out without the participation of the teacher.

– control of the work of teachers for the timely conduct of lectures, laboratory and practical classes, provided that teachers must mark the students present and give marks during the classes.

Therefore, an urgent task is to develop a distributed information system for recording student progress, access to which will have different types of users.

Functional Requirements. The created system automates such functions of the educational business processes as monitoring the level of students' knowledge and organizing the educational process. Such an automated system should provide functionality for the following actors (subjects of the educational process): student, teacher, head of department, dean and dean's office.

Basic requirements for the system as a whole:

– the system should improve the awareness of students about their own success;

– the system should be integrated with the existing management system of the institution of higher education;

– the system must be web-oriented so that every user has the opportunity to log in and work with it;

– the system should provide convenient means of monitoring the current progress of students by the teachers of the educational institution;

– the system should be easy to use, have a unified interface that is intuitively understandable even for an inexperienced user;

– the system must meet the main principles of usability, which were formulated by Jacob Nielsen [19];

– the system interface, including all error messages, must be in the state language;

– the system should support the simultaneous operation of approximately 2000 users.

The main target audience of the cumulative assessment of success is actually students and teachers. That is, these are people who differ in age, educational level and experience in information technology and software.

To store information about students and their success, it is necessary to use database management systems (DBMS). The main requirements for a DBMS include the following: support for the SQL language for accessing the database; ensuring a quick response to inquiries; implementation of access to data and their editing by several users at the same time; data integrity support; protection of information from unauthorized interference with the database; providing documentation and logging. Access to data should be regulated depending on the role of the user and the availability of authorization to the system. The database should be based on a relational model, in which data for modeling is represented by relationships and tables.

Dynamic websites usually use a database to store content. The server script that interacts with the database must provide a web interface for sending information and displaying the results of a database query. MySQL is one of the most widely used database management systems in the world. MySQL is suitable for small to medium sized applications. MySQL is flexible because it supports a wide variety of table types. Thanks to its open architecture and GPL licensing, MySQL is also suitable for use. A necessary requirement for a web server is that it works stably without failures. Another prerequisite for the server is the ability to connect to it via putty in order to be able to execute commands.

Modeling and design. When modeling a system for recording student progress, the main functions of automation and information accumulation of assessment results on a funded system were analyzed and a model of interaction between users of such a system with such functions was built. The users of the system will be such subjects of the educational process: student, teacher, head of department, dean and dean's office. The system use case diagram (Figure 1.) shows the main groups of business rules and functions that must be implemented in the information system for all envisaged actors.

Fig.1. System use case diagram

A user with the "student" role should be given access to view information regarding his individual curriculum: about the disciplines that are taught in the current semester, about the results of the previous semester. The student can also get acquainted with the accumulated points for each discipline and view in detail the structure of the accumulated points in accordance with the forms and methods of assessment created by the teacher on the scale of the educational institution.

The system also provides the student with the opportunity to choose an educational trajectory for detailed viewing, since in the modern educational space it is possible to simultaneously receive higher education in several educational programs and individual curricula.

A user with the role of "teacher" can perform the following main functions that the system must implement:

– viewing information about all subjects of the current semester, provided to the user by load;

– viewing the gradebook for each subject, which is provided according to the load. The provision of the functionality for editing marks in the journal should depend on whether the user is the main teacher or assistant in a particular subject;

– the ability to add, edit and delete marks in the gradebook, print the gradebook table;

– means of adding, editing, copying and deleting controls on the gradebook page.

The user role "head of department" has the full functionality of the "teacher" role and has the following extensions to perform additional work:

– viewing all subjects allocated by the teaching load for the teachers of the department;

– appointment of key teachers and assistants for each discipline;

– displaying a list of all groups that are assigned to the department;

– export of information to MS Excel file (list of students of the group that was selected by the user).

Users with the "Dean's office" role are allowed to view all the groups that are in the faculty and their grades. They are also given the opportunity to print and export the selected certification sheet to a MS Excel file.

A user with the "dean" role combines the "teacher" and "dean's office" roles with their respective functionality.

Results. So, the information system itself, which was developed to solve the problem and provide the appropriate functionality, was designed as a distributed web-oriented system with information storage in a remote database under the control of an active SQL server. User work with the system does not require additional costs for installing and configuring client software, since to work with the system, it is enough to use a web browser on any device.

After opening the main page of the site where the system is located, the user is asked to authenticate and determine his role in the system as Figure 2 shows.

Fig.2. User authorization

The user can enter his personal account by entering his email and password. If the user does not have an account yet, it is necessary to click on the "Register" button. A window will open, shown in Figure 3. In this window, the user needs to enter a login, which is an e-mail, password and registration code, which is issued for each group by the teacher. After that, you need to click on the "Confirm" button and enter your data in the authorization form.
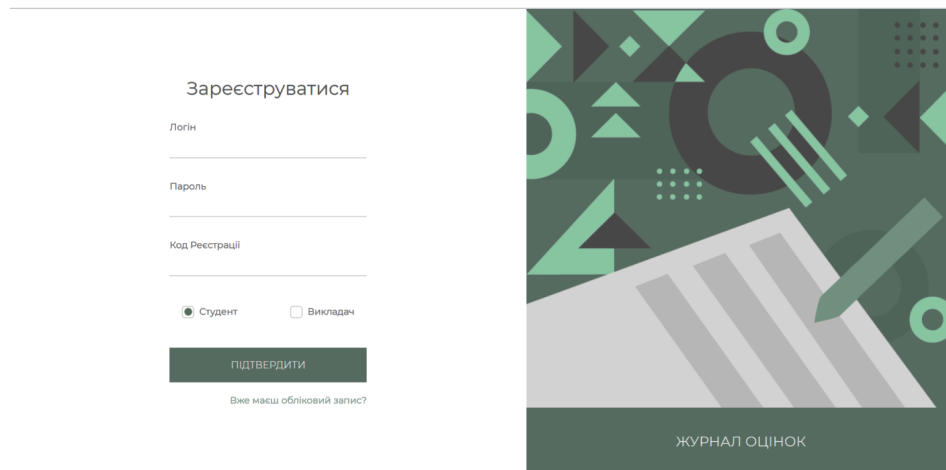
Fig.3. User Registration

The first level of the system corresponds to the student's personal account. If a student studies in different specialties, then it is enough for him to have one account to use the system. The main page displays data on the success for the first, second certification, the final form of control and the results for each of the subjects as Figure 4 shows. In a collapsed form, similar information is available for preliminary semesters.

Факультет інформаційних технологій – Комп'ютерні науки – КН-17

5 СЕМЕСТР 2019/2020 НАВЧАЛЬНОГО РОКУ

Поточні предмети	A1	A2	Форма контролю	Підсумки
Веб-дизайн та сучасні веб-технології	0 / 0	0 / 0	Дифзалік	0 / 100
Комп'ютерні мережі	4 / 28	0 / 28	Екзамен	4 / 100
Математичні методи дослідження операцій	0 / 0	0 / 0	Екзамен	0 / 100
Операційні системи та системне програмування	0 / 28	0 / 28	Екзамен	0 / 100
Організація баз даних і знань	10 / 10	0 / 0	Залік	10 / 100
Статистика промисловості та статистичний облік на підприємстві	0 / 20	0 / 5	Залік	0 / 100

> 4 семестр 2018/2019 навчального року

Fig.4. The list of semester subjects

The link on the name of the subject leads to a detailed view of the scores. For example, such a window is shown in Figure 5.

The second level of the system belongs to the teacher's personal account. The main page contains the subjects of the current semester, provided by load as Figure 6 shows. Also, the teacher is provided with additional information: the group, the final form of control, the number of hours and the number of credits.

Факультет інформаційних технологій – Комп'ютерні науки – КН-17

5 СЕМЕСТР 2019/2020 НАВЧАЛЬНОГО РОКУ

Статистика промисловості та статистичний облік на підприємстві

Контроль	Оцінка	A1	A2
Реферат 1	0 / 5.00	+	
Лабораторна робота 2	0 / 5.00	+	
Лабораторна робота 3	0 / 5.00	+	
Лабораторна робота 4	0 / 5.00	+	
Лабораторна робота 1	0 / 5.00		+
Залік	0 / 100.00		
Підсумки	0 / 100	0 / 20	0 / 5

‹ На головну

Fig.5. The list of control types by subject

Пахальчук Євгеній Вікторович		87 тиждень (05.05.2021)	Вийти

ОСІННІЙ СЕМЕСТР 2019/2020 НАВЧАЛЬНОГО РОКУ

Поточні предмети	Група	Кінцева форма контролю	Кількість годин	Кількість кредитів
Веб-дизайн та сучасні веб-технології	КН-17	Дифзалік	120.00	4
Комп'ютерні мережі	КН-17	Екзамен	105.00	3.5
Комп'ютерні мережі	КН-17	Екзамен	105.00	3.5
Операційні системи та системне програмування	КН-17	Екзамен	110.00	3.67
Організація баз даних і знань	КН-17	Залік	120.00	4

Fig.6. Teacher's personal account

The log page shows a table, for example as Figure 7 shows. The first column of the table contains a list of students for whom the subject is taught. The first line of the table contains a list of control measures. Additionally, information is provided on the maximum scores for each form of control. Above the table are the forms of control and their maximum score, which have already been added to the table by the teacher. The table reflects the following information:

– name and surname of the student being assessed;

– mark on the success of a particular student for a specific type of control;

– control by which the student's success is assessed. It is added by the system teacher using the "+" button. Initially, the table has only columns with the value of the first, second attestation, the final form of control and the total;

– calculating the success of students in accordance with the first, second certification and the results, consisting of these values and marks in the form of control.

ОСІННІЙ СЕМЕСТР 2019/2020 НАВЧАЛЬНОГО РОКУ

Комп'ютерні мережі

КН-17

Роздрукувати таблицю

Лабораторна робота – 4.00   Відвідування та конспект – 4.00   Модульна контрольна робота – 8.00   Екзамен – 40.00

Контроль / Прізвище, ім'я студента	ВтаК	ЛР 1	ЛР 2	ЛР 3	ЛР 4	МКР 1	Атестація 1	ВтаК	ЛР 5	ЛР 6	ЛР 7	ЛР 8	МКР 2	Атестація 2	Екз	Підсумки	+
Слюсаль Данило							0							0		0	
Аллл Віталій							0							0		0	
Акимченко Анастасія							0							0		0	
Афендіков М.......							0							0		0	
Бикал Дмитро							0							0		0	
Єрьоміна Анатолій							0							0		0	
Глись Данило							0							0		0	

Fig.7. The example of a table with student grades

The teacher has the ability to add, edit and delete control events, and set the points scored by students for each control event. An example of the interface for this is shown in Figure 8. In order to add a new control, the user needs to click on the button with the "+" sign. After that, a modal window for adding control will open as shown in the Figure 8 a).

The window for adding control reflects such options for filling out as a control form, for example, an abstract or laboratory work, control number, maximum control score, a stage of work, which for some forms of control may have the meaning of "execution", "report preparation", "protection" and switch for belonging to the first, second certification or other. If the user wants to create a control with similar data, but different numbers, then he needs to click on the "Copy" button.

In order to edit control data, the user needs to click on the control name to open a modal editing window as shown in Figure 8 b). The system has the ability to print a journal table with scores using the "Print table" item.

Додати контроль ✕

Форма контролю

Реферат ▾

№ контролю   Оцінка

Етапи роботи

Не обов'язково ▾

● А1   ☐ А2   ☐ Інше

Зберегти   Скопіювати

Редагувати контроль ✕

Форма контролю

Лабораторна робота

№ контролю   Оцінка

3   4.00

Етапи роботи

Не обов'язково ▾

● А1   ☐ А2   ☐ Інше

Оновити   Видалити

a)   b)

Fig.8. Modal windows for adding and editing control forms

There is a user in the system - the "head of the department". He has the full functionality of the "teacher" role and has additional functionality. For example, the head of the department can assign the main teachers and assistants for each discipline, as shown in the Figure 9., display a list of all groups that are assigned to the department, and more.

Also, the system allows you to assign not only lecturers to subjects, but also assistants in subjects. Assistants usually help to conduct practical and laboratory exercises. The head of the department himself can choose and appoint a teacher as an assistant in the required subject.
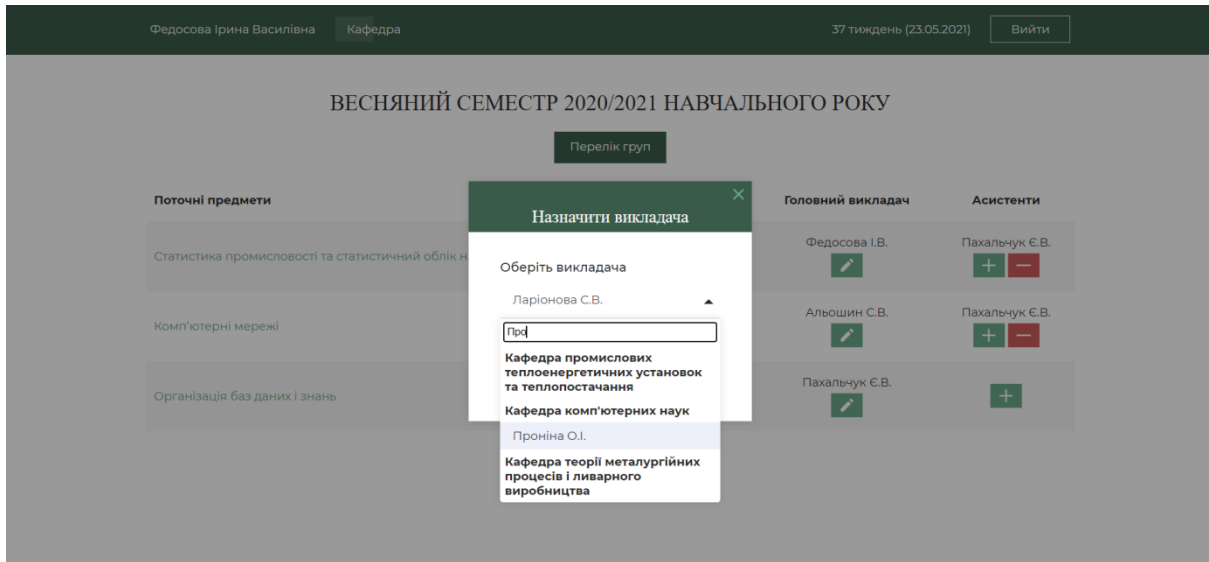

Fig.9. The example of the functionality of the head of the department's personal account

The third level refers to the users of the dean's office, who have the ability to view all student groups at the faculty and generate appropriate attestation reports. An example of the interface is shown Figure 10.
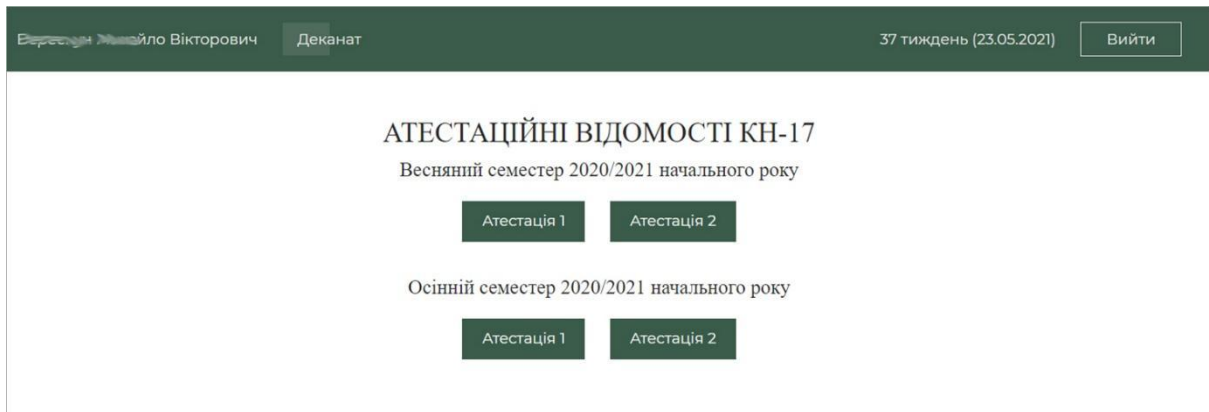

Fig.10. The example of the functionality of the dean's personal account

Thus, modeling, design and development of a multi-level information system for cumulative assessment of students' progress in higher education institutions was carried out. For the system development, PHP Framework Laravel, a collection of Webpack packaged modules, HTML5 markup language for web pages and style sheets were used together with the SASS \ CSS3 stylistic table compiler.

This system is necessary to improve the quality of information processing, speed up work processes and increase the availability of data for different types of users, especially in a remote form. The developed system fully complies with the provided model of user interaction with the

system both in terms of the list of business rules and for access to the corresponding functions. The proposed system is also integrated with the existing university management system.

Conclusions. As a result of the work, an analysis was carried out of the main business processes and functions to be automated when creating a multi-level system for recording student progress. Modeling, design and development of personal accounts of different types of users (student, teacher, head of department, dean's office and dean's office) were carried out for a multi-level information system for the cumulative assessment of students' progress in higher educational institutions. The developed system fully complies with the provided model of user interaction with the system both in terms of the list of business rules and for access to the corresponding functions. The system has the architecture of a distributed three-tier information system with access to the database, and consists of the following main links, such as: a web server with developed software as an application server, a database server running MySQL DBMS, a web browser as a client software.

The use of a success assessment system provides many advantages, including: improving the quality of information processing, speeding up work processes and increasing the availability of data for all participants in the educational process.

The COVID-19 crisis and unprecedented disruptions to the education system are far from over. The development of events caused by a pandemic is likely to be a turning point in the development of the education system. With the increasing frequency of virtual education experiments under the threat of a pandemic, consumers can get a new hybrid education product. It can be assumed that even after the end of the pandemic, online teaching will continue to be in high demand. Consequently, the growing online learning tools and accompanying resources will continue to be in demand. The developed multilevel information system for registering student progress is relevant for the traditional form of education too. Because keeping an e-journal will reduce the filling of paper documents, reduce the burden on the teacher and provide easy access to information of other participants in the educational process: students and staff of the dean's office.

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БАГАТОРІВНЕВА ІНФОРМАЦІЙНА СИСТЕМА ДЛЯ ОБЛІКУ АКАДЕМІЧНОЇ УСПІШНОСТІ СТУДЕНТІВ У СИСТЕМІ НАКОПИЧУВАЛЬНОГО ОЦІНЮВАННЯ

Пандемія COVID-19 справила великий вплив на освіту. У всьому світі заклади освіти змушені перейти на дистанційне навчання. У зв'язку з обставинами зріс попит на програмні засоби онлайн-освіти та інформаційні ресурси для її підтримки. Актуальним є питання не лише організації онлайн-навчання, а й процесів, що забезпечують інформування та контроль щодо оцінювання успіхів учнів. Автори проаналізували бізнес-процеси, потреби учасників та наявне програмне забезпечення, що застосовуються для фіксації оцінювання якості знань студентів. Основним недоліком наявних систем підтримки освітнього процесу в університеті є обмежений, а іноді й неможливий доступ до них певних учасників освітнього процесу, особливо в умовах дистанційного навчання. Визначено, що в умовах дистанційної форми наявні системи не мають функціональних можливостей для організації доступу до результатів оцінювання знань для всіх учасників освітнього процесу: студента, викладача, завідувача кафедри, співробітників деканату. Для надання таких можливостей у системі інформація повинна зберігатися в базі даних, а інтерфейс для доступу до них повинен мати можливість працювати з будь-якого веб-браузера. Робота присвячена розробці такого програмного забезпечення. Розроблена система має архітектуру розподіленої трьохрівневої інформаційної системи з доступом до

бази даних і складається з таких основних ланок, як-от: веб-сервер із розробленим програмним забезпеченням як сервер додатків, сервер баз даних під керуванням СУБД MySQL, веб-браузер як клієнтське програмне забезпечення. Використання цієї системи оцінювання успіхів дає багато переваг, серед яких: підвищення якості обробки інформації, прискорення робочих процесів та підвищення доступності даних для всіх учасників освітнього процесу.

Криза COVID-19 та безпрецедентні збої в системі освіти ще далеко не завершені. Отже, зростаючий попит на засоби онлайн-навчання та відповідні ресурси залишатимуться затребуваними. Тому розроблена багаторівнева інформаційна система для обліку успішності студентів актуальна зараз. Також це програмне забезпечення буде корисне й при традиційній формі навчання, оскільки ведення електронного журналу скоротить заповнення паперових документів, зменшить навантаження на викладача та забезпечить зручний доступ до інформації інших учасників освітнього процесу: студентів та співробітників деканату.

Ключові слова: ІКТ-інфраструктура університетського середовища для його користувачів, онлайн-навчання, облік успішності студентів, багаторівнева інформаційна система для університету, особисті облікові записи користувачів, веб-інтерфейс