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## **Integrating new library services into the University Information System**

*(Włączenie nowych serwisów bibliotecznych do Systemu Informacyjnego Uniwersytetu)*

**Słowa kluczowe:** dostęp on-line, repozytoria, zautomatyzowany system informacyjno-biblioteczny, plan tematyczny i typologiczny, Biblioteka Naukowa Narodowego Uniwersytetu Politechniki Lwowskiej

**Abstrakt:** Artykuł opisuje nowe serwisy, które Biblioteka Naukowa Narodowego Uniwersytetu Politechniki Lwowskiej oferuje swoim użytkownikom. Pozwalają one uczelni na zwiększenie jakości bezpieczeństwa informacji w procesie edukacji, a także na automatyzację procesu budowania i przepływu list zalecanej literatury. Dzięki nowym serwisom w Bibliotece listy zalecanej literatury są zgodne z aktualnymi standardami bibliograficznymi, automatycznie dopasowywane do tematu wykładów, a także wciąż uaktualniane.

**Keywords:** on-line access, repositories, Automated Library Information System, thematic and typological plan, Scientific Library of Lviv Polytechnic National University

**Abstract:** The article describes new services that the Scientific Library of Lviv Polytechnic National University offers to its users. These services allow university to increase the quality of information security in the educational process and automating the building and circulation process of suggested reading lists. With the new library services the lists of recommended literature are consistent with current bibliographic standards. These lists are automatically adjusted to the subject of lectures and constantly updated.

The problem of on-line access to scientific information is a vital issue in Ukraine nowadays. A few years ago, the center of access to scientific information was the library, but with the development of information technologies the Internet took over the library's place. This change was caused by the latest development in information technologies in Ukrainian libraries.

However, due to global commercialization of scientific resources, the Internet may not always provide all the necessary information. Taking into consideration the tendency of scientific community to turn to electronic documents and the expansion of the range of services, libraries have to organize their work in such a way as to satisfy the information requirements of the user as soon and as well as possible.

To solve this problem, the automation of library processes is being conducted. This involves:

- computerization of workplace;
- creation of a data center for storage and processing of large-scale data sets;
- selection/development of one's own and support of appropriate hardware and software;
- alteration of the principles of library management, taking into consideration new forms of service, etc.

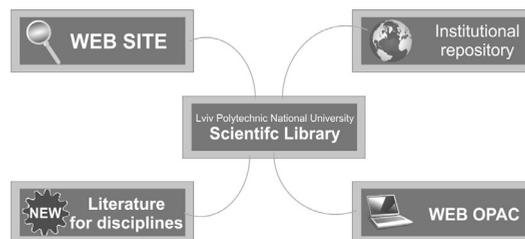
Solving one problem of library informatization leads to a range of other problems. For example, the computerization of the workplace involves:

- selection and justification of the computer equipment purchase;
- equipping the workplace (a desk, a chair, peripheral devices, etc.);
- access to network resources (connection to the local area network and electric power supply network);
- selection and purchase of software;
- following occupational safety and health requirements (organization of appropriate lighting, safe work with the computer, air-conditioning, heating, choice of room for installing the computer, etc.);
- servicing of computer equipment (repair, software updates and technical support);
- training staff to work with the computer;
- development of appropriate documentation (safety instructions, work with appropriate software, etc.).

All-inclusive library automation is a difficult task to implement in the field of information technologies. It requires enrollment of skilled librarians, systems analysts, linguists, and programmers.

Basically, the problem lies in the lack of funding. Therefore, libraries are trying to solve their problems by themselves, waiting for a state subsidy or sponsors, or in the worst case leaving the traditional approach to customer service.

**Figure 1.** The Scientific Library web services



**Source:** Self-elaboration.

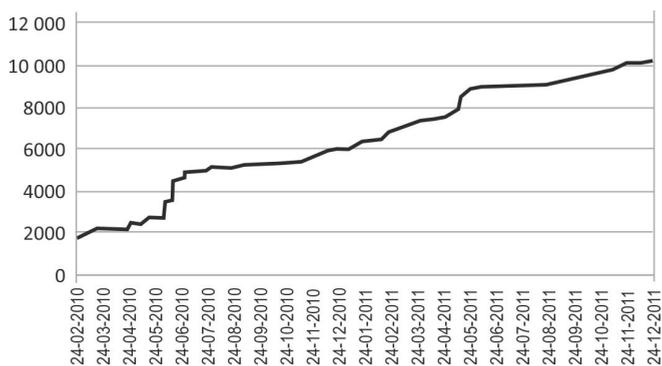
Informatization of the Scientific Library started in 2007 and a large amount of work has been done by now. At present the Scientific Library has the following services – the library website, a repository, an electronic catalogue (OPAC), and a new service – literature for disciplines.

Now briefly about each information resource.

The library website (<http://library.lp.edu.ua/opac/>) plays a significant role in the life of the library, as it is the primary means of library events representation on the Internet. The website has been built with the help of Drupal CMS (<http://library.lp.edu.ua>).

Lviv Polytechnic National University Institutional Repository (<http://ena.lp.edu.ua>) is an institutional repository of Lviv Polytechnic National University. It was created on May 15, 2010. Currently the repository contains more than 10 000 items. The cumulative growth of items in the repository can be seen in figure 2 below.

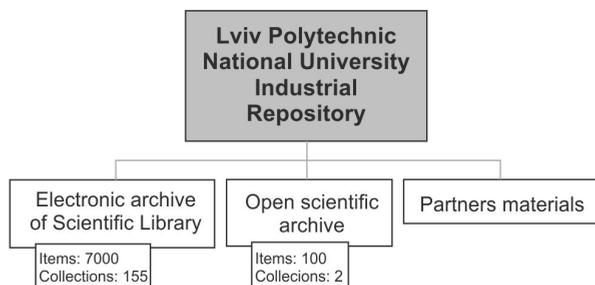
**Figure 2.** The dynamics of Lviv Polytechnic National University repository growth



**Source:** self-elaboration.

The next figure shows the repository structure.

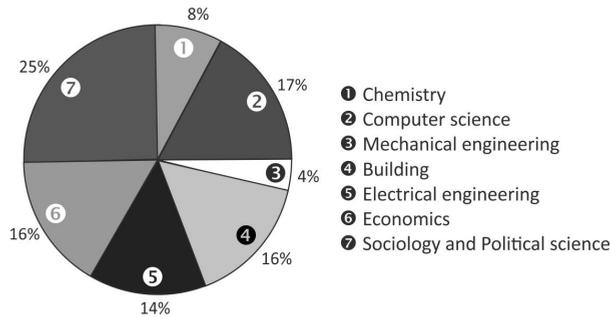
**Figure 3.** The repository structure



**Source:** self-elaboration.

*The Electronic Archive of the Scientific Library* community contains materials which include journals and conference proceedings published at Lviv Polytechnic National University [1]. The *Open Scientific Archive* community has been established for the purpose of publishing research materials by registered users. *The Partners material* community includes scientific materials from the Scientific Library partners. The scope of documents in the archive covers different fields of scientific activity. As it can be seen in figure 4, the main field is technical sciences (69%).

**Figure 4.** Fields of scientific activity in repository



**Source:** self-elaboration.

With regard to the quantity of documents, it occupies the 4th place in Ukraine and with regard to the webometrics – the 5th.

The following is a detailed presentation of a new service that has been established in the library with the aim to recommend literature for particular subjects.

The module of literature recommendation can be reasonably implemented into various areas of library activities:

- into the electronic catalogue;
- to study a certain subject;
- to create bibliographic sources;
- to investigate a subject area;
- to start a scientific research (very important for postgraduate students, holders of a master's degree in order to write an appropriate qualifying paper, where the first part consists of a literature overview);
- in case the user of the library cannot clearly enunciate his request (for example, when the user uses a keyword “computer” for searching for required literature).

To analyze the fund in the Automated Library Information System (ALIS) of the Scientific Library, a thematic and typological plan (TTP) is to be developed, where one of the points is providing a certain group of readers with appropriate relevant documents [2].

Thus, every point of the plan can be represented as the relation between the subject of a special document classifier (taking into account the aspects of the fund) and a group of readers (taking into account features of the readers).

This approach is realized in the ALIS and it defines the relationship between the subject that students study and the literature from the library funds which the teacher recommends within the course.

The analysis of the TTP allows to determine the availability of literature for subjects, departments and other subdivisions. Such an analysis is necessary for every university subdivision accreditation, and for the library – in order to identify the book fund complementation priority areas.

The basic data for registration of literature demand consist of the results of the thematic and typological plan analysis and the analysis of refusals and offers of book suppliers.

Within the ALIS, the procedure of library funds complementation with specific documents on the stage of needs analysis involves automatic calculation and data representation of book availability for all subjects, which refer to a given document.

The indicators of book availability play a major role in determining the needs of libraries in a certain document. The accuracy of these data depends on:

- defining the subject parameters in the TTP;
- identification of document belonging to the list of literature, recommended within the course;
- identification of the structural subdivisions relation in the higher educational establishments with documents allocation places.

While defining the subject in the TTP, its name, the identifier (ID) and the classification codes of the UDC and the BBK have to be set. The names of the subjects will be used in the TTP in the future and the classification codes allow to automatically build relations between a subject and a document.

The relation between a document and a subject can be built in two ways. The first and most effective is a clear indication of the subject related to a particular book. This is done when identifying the needs when providing the literature for the course leads to the purchase. The second way is identifying the relation of the document to the subject when we create or edit the bibliographic description, and the subject is not indicated [3].

The definition of the subject may be considered as an additional classifier with the definition of sections or topics of the subject catalogue. It should be noted that the establishment of communication between subjects and documents using the UDC or the BBK classification is the most effective way for a retrocatalogue when it is impossible to determine exactly which subject the literature refers to.

In order to save the cost and time for processing data on book availability and a thematic and typological plan, one needs to implement a common university information system with access to the information about the studying process introduced by the educational departments (a list of courses, a number of students, etc.), and the information created in the library (materials of the electronic catalogue, authority files of the ALIS, etc.).

The main tasks of integrating information systems of the University and the ALIS are:

- synchronizing the information from the directories of different information systems (lists of departments, subjects, areas of training, recommended literature, etc.);
- exchange transfers of e-documents and change of technological processes;
- ensuring the principles of data single-entering and a personal responsibility for the information quality;
- reducing the number of errors during the transformation and transmission of information to/from the library;
- needs to create specialized portals for the simplification of access to educational and scientific materials.

The construction of a separate web module of the ALIS, which will realize the basic functions of the TTP, will allow:

- to efficiently receive the information from teachers and departments about the TTP changes due to the web interface implementation;
- to update the subject references;
- to increase the availability level of literature for a given university department;
- to include rarely used literature into the learning process;
- to plan the purchase of new literature;
- to popularize the “new incomings” into the library fund;
- to schedule the supply of literature for students every term;
- to identify the priority literature which is key in the subject studies;
- to involve experts (librarians, teachers of related subjects, etc.) in the references development for a given subject.

Let us consider the technology of literature recommendation for a particular course. When teachers develop subject references, they use their own expertise, but not always do they coordinate the formed list with the literature available in the library.

Consequently, their students may not always receive the necessary amount of books in the library. At the same time, the library can have analogue literature, but the teacher does not indicate these items in a given reference list.

Introducing the literature recommendation module for the course will allow:

- to minimize the time for the selection of literature by making the process automated;
- to inform the teacher about the library fund which refers to his subject area;
- to update the references (replace, remove or add literature to the subject);
- to improve book availability indices of the subjects.

This module has been developed and implemented in the Scientific Library of Lviv Polytechnic National University.

Users have been offered two schemes of work with the subject references:

- an offline module with the web access;
- an integrated module from the electronic catalogue.

Let us consider the principle of the offline module with the web access.

It is a separate webpage where the user is offered to look for the necessary subject and review the recommended references (<http://ena.lp.edu.ua/ttp/>).

If the user thinks that the available references have to be changed, a form is offered where the user can enter his requirements and the list of reference changes. On the same webpage the user can use the function of literature recommendation for a given course.

The generated list is analyzed by the teacher. The marked literature that can be attached to the subject goes to the librarian, who analyzes it and makes the necessary changes (Fig. 5).

Figure 5. An example of literature recommendations for the course of Business Basics

**Література, що рекомендується для вивчення дисципліни - Основи підприємництва**

Номер пп	Автор	Назва	Рік видання	Місце видання	Видавець	УДК	Мова	Електронна версія	К-сть примірників	К-сть стр.
1	Петровч І. М., Захарчн Г. М., Терехух А. А.	Організація підприємництва в Україні	2000	Л.	Оксарт	65.012.32(075.8)	Українська	Ні	15	320 с.
2		Малий бізнес та підприємництво в ринкових умовах господарювання	2002	К.	Вид-во Європ. ун-ту		Українська	Ні	2	307 с.

**Додатковий список літератури, який рекомендує бібліотека**

Мітка	Автор	Назва	Рік видання	Місце видання	Видавець	УДК	Мова	Електронна версія	К-сть примірників	К-сть стр.
<input type="checkbox"/>		Логістика	2010	Л.	Вид-во Нац. ун-ту "Львів. політехніка"	65.012.32	Українська	Ні	3	344 с.
<input checked="" type="checkbox"/>	Назарова Галина Балєнтиївна, Іванцов Олег Вікторович, Дороської Олексій Федорович	Управління розвитком діяльності промислових підприємств	2010	Х.	Вид-во ХНЕУ	65.012.32	Українська	Ні	1	240 с.
<input type="checkbox"/>		Менеджмент та підприємництво в Україні: етапи становлення і проблеми розвитку	2006	Л.	Вид-во Нац. ун-ту "Львів. політехніка"	65.012.32	Українська	Ні	2	192 с.
<input checked="" type="checkbox"/>	Князь Святослав Володимирович, Георгіаді Неллі Георгіївна, Князь Олег Володимирович	Основи управлінського консультування	2006	Л.	Вид-во Нац. ун-ту "Львів. політехніка"	65.012.32	Українська	Ні	35	156 с.
<input type="checkbox"/>	Князь Святослав Володимирович, Георгіаді Неллі Георгіївна, Князь Олег Володимирович	Фінансовий менеджмент	2006	Л.	Вид-во Нац. ун-ту "Львів. політехніка"	65.012.32	Українська	Ні	35	184 с.

Source: self-elaboration.

The web module of the TTP provides the following services:

- an overview of the lists of recommended literature from the library funds;
- an overview of statistical book availability indices for the course;
- a thematic search of the literature for the courses;
- a search for analogous literature;
- establishing of recommendations about the relevance of the literature for the course and the necessary TTP changes;
- a feedback function;
- a literature ranking for the rank forming in the electronic catalogue of the ALIS;
- updating user profiles in the ALIS readers;
- making orders for a literature purchase for the learning process.

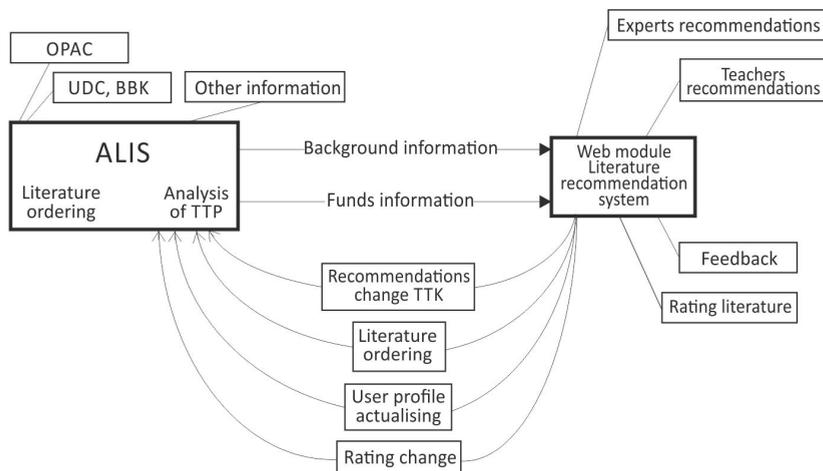
Results of the data updates by the TTP web module users are temporarily fixed in the module database.

For processing and permanent storage of the results of web module work one may use:

- regular automatic data export in the ALIS (for the updates of user profiles in the ALIS, a literature ranking for the rank forming in the electronic catalogue of the ALIS);
- sending automatic information to the library employees via e-mail (for the function of feedback);
- regular data export in the ALIS after moderation and spam filtering (for establishing the recommendations about the relevance of the literature for the course and the necessary TTP changes, making orders for a literature purchase for the learning process).

The scheme of moderation of the data entered by the TTP web module users is shown in Figure 6. The function of moderation is conducted by the librarians relying on official information about current the library fund, the TTP, orders and purchasing plans.

**Figure 6.** The scheme of data exchange between the ALIS and the Literature recommendation system



**Source:** self-elaboration.

The moderation of the data entered by the TTP web module users is necessary in order to:

- remove spam from the web module and the remains of attack attempts on the web module, database and the ALIS;
- remove erroneous and duplicate users' messages;
- specify users' data in order to create orders and determine the purchase priority;
- specify users' data in order to disclose the funds and inform about analogous literature;
- specify users' powers for order formation or literature recommendations for a given course of the department.

The article describes a new service that the library offers to its users. It will allow the university to improve the quality of information security of educational and management processes, and automation of the formation and circulation of lists of the recommended literature.

The teacher will receive a number of joined benefits: the lists of the recommended literature designed according to the current bibliographic standards, the intelligent algorithms of literature automatically selected for the courses, and the notification about new books related to his course.

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