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Informatization of Education: Reader Personal Account and Electronic Library in University

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This paper reviews historical aspect of informatization in a university, underlines the key part of a library in the past and loss of this role in modern universities. The decrease in demand for library services in higher education is stated. The issue is revealed in the existence of a certain gap between the needs of students and possibilities of informational and educational services of a university (including electronic library) to meet the current demand.

The paper describes experience of the development of an automated information system based on the personal account technology and integrated and perspective library services by the developers of Siberian Federal University.

Keywords: informatization of education, electronic library, personal account, reader's needs, library educational services of university.

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Research area: economics, pedagogy.

Introduction

Historically, library became one of the first objects involved in the process of informatization in higher education due to being in demand and load of library and information services. Processes of book circulation, cataloging, collection counting and calculation of statistical indicators were considered to be the most ready for the use of new information technologies. Librarianship became a priority in automatization and informatization back in the 1980s, at the beginning of the development of integrated library

systems (ILS). E-catalog, being more convenient version of a printed one, is a popular searching tool, actually being the only automated service for readers in some libraries. At the same time until recently library has been the single source of high-quality educational resources in a university. Today university library competes, thanks to the Internet, with all existing information resources of mankind. There is a saturation of the global information infrastructure with Internet services and products; and of course libraries feel and use it as well (according to Library.ru/3/biblionet,

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today 1,840 library websites are available in Russian Federation) [1].

Statement of the problem

In recent years, there is reducing tendency in the relevance of a library, as the main and sometimes the only source of information necessary for teaching in higher education; and, as a result, there is declining in attendance at libraries, while the demand for e-learning courses, which are the modern format of educational content delivery, is increasing. Integrated library system (ILS) standard functions are sometimes used as a tool for the development of digital resources storage. However, given the fact, that library stores legitimized resources and publications, it appears that library storages are inadequate for courses, where lecturers place fragments of other people's summaries, videos, and links to Internet sources.

On the other hand, there are examples of educational processes (including distant learning/ e-learning) automated with the use of digital libraries as a resource support, developed by experts, who are not familiar with the specifics of librarianship. As a result, it is impossible to use the data, stored in such systems, and transfer and data exchange become difficult.

In addition, many universities have the issues of cross-platform, the problems associated with the use of disparate systems, requiring constant "locking" that determines the greater complexity of informatization in general and informatization of educational process in particular.

The other side of the issue is a "gap", which is now present in universities and in general in the system of higher education in context of the library use. Arguably, higher education system and library exist in different dimensions as often a university has a huge library with unique educational materials of various kinds, but a student goes there, at best, for one or two

textbooks and manuals in a year, as all the missing information he/she gets from the Internet. The information in the Internet isn't filtered by the criterion of authenticity neither processed by pedagogical practices; and the knowledge and skills of students often do not allow them to separate quality information from all debris. In terms of existing of this gap, in theory complicated system risks can appear which are spread due to outdated, unreliable or wrongly interpreted information. For example, many Internet users perceive Web-encyclopedia Wikipedia as the only one reliably information resource.

Thus, we can specify the issue as the contradiction between the huge library resource for education and the lack of mechanisms, modern techniques that enable efficient use of this resource.

Theoretical Framework

Theoretical basis for reader's personal account development consists of the works of experts in following key topics and areas: information technology in library, reader information needs, university library mission, readers services, technology of work with information facilities, university education, and etc.

When making design decisions we took into account changes in traditional processes of university libraries caused by the introduction of modern information technology, access to the Internet. The results of new technologies penetration in the process of bibliographic and information services in university libraries can be seen in changing of the shape of available documents and information, the structure and quality of provided services. According to Yuriy Grihanov, library collections researcher and author of several publications on library science, there is a law of metamorphism, which is that the library periodically undergoing structural transformation with changes in methods of

recording and transmission of document information or at least changing information technology. [2]

Consideration of university libraries as a part of higher education system determines an appeal to the works on the problems of higher education in modern conditions. These are works of Russian researchers A. Arsentieva [3], Svetlana Panyukova [4].

Topic of university library mission is not considered by researchers as an independent one. There are works covering the practical activities of university libraries, including abstracts of the mission. These are thesis of Tatyana Markova [5], articles of Nataliya Dobrynina [6], Galina Kudryashova [7].

Questions about the structure of the university library, appropriate organization of services for professionals and students, external functioning of library activity elements are described in works of Ninel Plemnek [8, 9], Tatyana Pyshnova [10, 11].

Appreciable part of library research focuses on the theory and practice of metadata formation, which develop and use formats of bibliographic description of various purpose: *MARC (MARC21, RUSMARC, UNIMARC)*, *ONIX XML*, *BibTEX*, *Dublin Core*. Due to the fact that the current stage of information development is characterized by the proliferation of semantic technologies, ontological models (ontology) are widely used to describe the metadata semantics that define a set of application domain concepts and their relationships. There are special language describing semantics for the work with ontologies in semantic technologies (*OWL*, *RDFS*, *RDF*) [12, 13, 14]. The decisions taken on the base of semantic technologies can allow future realization of new possibilities for personalized information provision of readers through personal account functions.

Development of integrated information resources, construction of library and information

associations, implementation of enterprise technologies such as long-term objectives of development of library technologies considered in works of Yakov Sraiberg [15], Nikolaj Kalenov [16], Oleg Syuntyurenko [17], Aleksandr Vislyj [18], Andrey Zemskov [19], Boris Elepov [20], Marina Terekhova [21].

As a result of studies conducted by research libraries and individual scientists in different periods in some regions [22, 23, 24, 25], it was found that the composition and the nature of reading and information needs of users depend on the changes in industrial, cultural and social activities of people, i.e. on changes in their practices. This is clear from the goals and objectives of a public library, proclaimed in the "IFLA Guidelines for the public libraries work" [26].

Issues of research and meeting information need are studied by many researchers. We can name such experts as Diodor Shehurin [27], V. Faibusovich [28], Ruzhero Gilyarevsky [29] V.Zyabrev [30] Elena Evtyuhina [31] Vladimir Glushko [32] Nikolaj Kartashov [33], whose works address the definition of the essence of such complex socio-psychological phenomenon as information needs of an individual. A significant contribution to the development of this problem was made by Sergey Kogotkov [34] in his concept of information needs formation stages, developed by the author on a basis of activity approach.

Characteristics of a library as a university subsystem, assessment of microenvironment factors impact on its operations, current interaction between a library and university structural divisions are rarely studied. We can note thesis research of Galina Parshukova [35], in which much attention is paid to connection between university information resources and a library. Not without interest is the thesis research of Irina Burger [36], which reviewed and justified organizational structure of a university library

as a subject of information management at a university.

Methods

Personal account technology can be used as a methodological approach to reduce the gap between information needs of students and libraries, which are lagging in the development of search technology and information delivery. It can also be used as a system solution. Thus far practical experience of given technology application was gathered not only in social networks but in the education as well. Nevertheless, theoretical materials and sources describing the methodological foundations of the technology are not available, because most of the works consider description and function of a specific personal account.

Personal account is a personalized virtual workspace of a student, lecturer or employee of a university with private access in which services are provided according to the user status and authority. User can obtain a wide range of services through a personal account. Personal account is designed to control and obtain information on services online, as well as for flexible management of additional services set. Having a computer connected to the Internet is enough for work with personal account.

Discussion

Since 2013, Library and Publishing Complex of Siberian Federal University development team has been working on the Smart Library project, the basic idea of which is to develop an information system with elements of the automated provision of readers with educational and scientific material on the basis of their needs [38, 39]. One of the ideas of the project is that 90% of needs of a reader, who is working / studying in a university, are known in advance and directly connected with the studied / taught disciplines. Students need educational materials for training, while a lecturer needs the current literature on taught subjects. By the end of 2014 the team established the system of connection among the contingent of students and teachers, library books and university curriculum. Data visualization takes place within personal account. Achievements are not limited to that, and in the future, the technology of smart and point information providing to individual requests is expected to be propel to the higher level (Fig. 1).

The project is divided into three modules: basic module, intermediate module and intelligent module. The basic module is often called “fundamental” or “system module”. This module solves the problem of providing literature

Fig. 1. Information Library project “Smart Library”, the structure of the modules

to students and teachers on the basis of data on the taught disciplines. Such services as “My Form”, “Circulation History”, etc. visualize this module. The next module is much more complicated, since it is supposed to implement consideration of scientific and other preferences of a reader (for example, hobby); it will work on the basis of the SRSTI dictionary (State Rubricator of Scientific and Technical Information). The intellectual level works as a search instrument using other two levels as filters.

In the future it is planned to implement such technological and methodological solutions that will allow development of user’s individual information environment. The bulk of services initial set in the personal account has already been formed and presented in a form of traditional items with the amendment that they differ depending on the category of readers (student, graduate student, lecturer, staff, and university administrative staff). Since it is a prototype, for now the login is a reader name, and password is a barcode. At this point the student personal account provides the following services:

- My Form;
- Circulation History;
- Recommended Literature;
- Shopping Cart of “Print on Demand” Service;
- Online Catalog Search;
- Printing Books on Demand.

Lecturer personal account provides an opportunity to view the full range of the SFU Scientific Library services:

- My Form;
- Circulation History;
- My Publications;
- Literature on Taught Disciplines;
- Shopping Cart of Orders to Department;
- Shopping Cart of “Print on Demand” Service;

- Application for the Literature in the Interlibrary Loan;
- Application for Purchase of the Literature for Educational Process;
- Statistics;
- Online Catalog Search;
- Book Supply;
- Printing Books on Demand.

Register entry in IRBIS ILS and library card are required to gain access to the personal account. Registration and issuance of a united library card is carried out in reader’s registration centers of the SFU Scientific Library.

Next, we consider each of those services in detail.

My Form

“My Form” contains information about the documents obtained from the collections of subdivisions operating in the automated issuance mode: given books (title, barcode of each issue, the date of issuance and return, place of issuance – circulation department or reading room), the expiration of the period of document use (expired); the amount of fines for the late return of books.

Circulation History

This personal account service allows keeping a list of all the books read by the user for the entire period of service by the SFU Scientific Library. The issuance date and bibliographic description of publication given to a user are noted in “Circulation History”.

Recommended Literature

This service is intended primarily for students, bachelors and master students of the Siberian Federal University. It contains lists of publications on subjects studied in the current academic year recommended by teachers.

My Publications in "Scopus" and "Web of Science"

With this service SFU teacher can see the whole list of works, published in top journals included in the "Scopus" and "Web of Science" databases. List of publications contains a detailed bibliographic description, the actual citation index for each database, as well as a link to the description of this publication in "Scopus" and "Web of Science".

My Publications in E-library

The service contains a list of publications of Siberian Federal University teachers from RSCI. The service consists of three main sections: general information about the publication activity of an author, information on common indicators, and information on publications of an author. In the general information about the publication activity of the author can be found the total number of the author publications in the E-library database, the citation number and h-index. The bibliographic information and citation index are given in the information on author's publications.

Application for Interlibrary Loan

Interlibrary loan is a form of library services based on the usage of publications from other libraries in case of the absence in its own collection. Customer data is automatically filled in during the login to the personal account. Delivery time is from three days. Copies of the articles are delivered to the customer only in a printed / form.

Literature on Taught Disciplines

This service is designed to display a list of publications recommender by a professor for taught disciplines. The professor can change or add to these lists other publications.

Shopping Cart of Orders to Department

This service is the assignment of ordered books to the user for a certain period of time during which these books become inaccessible for other users. Orders are accepted only on books and periodic literature from the collection of the SFU Scientific Library.

Shopping Cart of "Print on Demand" Service

This service is designed to display all orders made using the service "Print on Demand". Order contains bibliographic records of SFU educational materials with the reference to the full text, number of copies required for printing. In addition, using this service the user can track the status of the order.

Application for Purchase of the Literature for Educational Process

The SFU Scientific Library accepts applications for the purchase of educational materials from teachers and university staff. The library reserves the right to change the number of copies for the literature purchased at the request, with account of readers' demand and the analysis of library needs.

Statistics

The statistics show the attention of library experts, teaching staff, SFU administration to the development of library services. The practical importance of creating a full-fledged accounting system shows how effectively the library organizes its activity. Library statistics can be effective only if the unified approach to information collecting and grouping is applied.

Online Catalog Search

The search is performed on all databases of the electronic catalog simultaneously.

Contextual search can be carried out by a title of publication, author, year of publication, keyword.

Book Supply

Book Supply indicators are calculated using the application “KO-2” to the IRBIS accounting information system (AIS). In addition to the application was designed software module for converting syllabus into IRBIS AIS format. Alongside this experts designed the software module for converting information on users from IRBIS AIS format into the “Dean’s Office” SFU information system. Currently, users can obtain lists of textbooks with information on Book Supply Statistics lists for 2,300 disciplines. 16,711 textbooks are tied to SFU curriculum subjects.

The software module “Book Supply” allows to:

- simplify entering data on the educational process in the record of books of the electronic catalog and reduce input time;
- unload electronic catalog of unnecessary data, thereby reducing the records’ volume and increasing the system speed as a whole;
- combine data from several catalogs.

Printing Books on Demand

“Printing Books on Demand” is a technology of promotion and distribution of publications of the Siberian Federal University (SFU) at the request of users. The service development on the basis of IRBIS ILS allows printing of the required number of educational materials, published in SFU.

Results

Thus far the task of developing a mechanism of personalized virtual workspace for a student, lecturer or university staff member as the first, basic version of a personal account is resolved in the Library and Publishing Complex of SFU. Current version of the personal account does not allow providing fully automated support for educational and cognitive processes. The next step is the development of a full-featured personal account as a system providing interaction and information exchange between automated systems, automated learning management system and integrated information-educational environment; excluding the need for multiple authentication; integrating all information services and resources of the Scientific Library of Siberian Federal University; providing controlled access to them not only from the network of the University, but from the Internet as well.

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Информатизация образования: личный кабинет читателя и место электронной библиотеки в вузе

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Рассмотрен исторический аспект информатизации в вузе, отмечена ключевая роль библиотеки в прошлом, и утрата этой роли библиотеки в нынешних вузах. Констатируется снижение востребованности библиотечных услуг в высшем учебном заведении. Проблематика вопроса раскрывается в существовании определенного разрыва между потребностями обучающихся и возможностями информационно-образовательных сервисов вуза (включая электронную библиотеку) удовлетворить имеющиеся потребности.

Изложен опыт создания автоматизированной информационной системы на основе технологии личного кабинета и интегрированных перспективных библиотечных сервисов разработчиками Сибирского федерального университета.

Ключевые слова: информатизация образования, электронная библиотека, личный кабинет, потребности читателя, информационно-образовательные сервисы вуза.

Научная специальность: 13.00.00 – педагогические науки, 08.00.00 – экономические науки.