



Применение электронных библиотечных систем при реализации программы магистратуры «Информатизация образования» для повышения качества подготовки студентов

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АННОТАЦИЯ

Проблема и цель. Цифровая трансформация образования предполагает проектирование персональных траекторий на основе инновационных технологий, расширение инфраструктуры образовательных учреждений, интеграцию цифровых коммуникаций, открытых ресурсов и баз данных в учебную работу. Применение электронных библиотечных систем в вузе – одно из условий формирования единого цифрового пространства знаний. **Цель исследования** – выявить возможности применения электронных библиотечных систем при реализации программы магистратуры «Информатизация образования» для повышения качества профессиональной подготовки студентов.

Методы исследования. Информационная деятельность магистрантов поддерживается ресурсами внутренней электронно-библиотечной системы вуза, системы «Лань», информационно-аналитического портала eLIBRARY, поисковой платформы Web of Science. Эксперимент проведён на базе Вятского государственного университета (Российская Федерация). Задействовано 60 магистрантов по направлению подготовки 44.04.01 Педагогическое образование, профиль «Информатизация образования». Интеграция электронных библиотечных систем в дидактический процесс выполнена в рамках дисциплины «Методология информатизации образования». Разработано авторское тестирование из 5 разделов. При статистической обработке данных использован критерий χ^2 -Пирсона.

Результаты. Особенность представленного формата работы: с одной стороны, электронная библиотечная система является объектом изучения (информационная модель, принципы управления, технология поиска и т.д.); с другой стороны, применение электронной библиотечной системы – важное условие профессиональной самореализации выпускников в контексте формирующегося единого цифрового пространства знаний. Предложены задания по работе с ресурсами библиотеки вуза, системы «Лань», портала eLIBRARY, Web of Science (составить список публикаций по вашей теме исследования; сравнить публикационную активность изданий и т.д.). Выявлены статистически достоверные различия в качественных изменениях, произошедших в педагогической системе ($\chi^2 = 8.488$; $p < 0,05$).

Заключение. Определены возможные трудности организации информационной деятельности магистрантов в электронном пространстве научных знаний: на нормативно-правовом, методологическом и техническом уровнях.

КЛЮЧЕВЫЕ СЛОВА

цифровая трансформация образования, программа подготовки, информационная деятельность, технология поиска, база данных, электронное пространство знаний

Для цитирования: Соболева Е. В., Суворова Т. Н., Шулнина Л. А., Марков Р. В. Применение электронных библиотечных систем при реализации программы магистратуры «Информатизация образования» для повышения качества подготовки студентов // Перспективы науки и образования. 2025. № 3. С. 156–169. <https://doi.org/10.32744/pse.2025.3.10>

Поступила: 16.12.2024 | Одобрена: 20.02.2025 | Опубликована: 30.06.2025



Лицензия «С указанием авторства — С сохранением условий». Позволяет перерабатывать, исправлять и развивать произведения при условии указания авторства и лицензирования производных работ на аналогичных условиях.



Application of electronic library systems in the implementation of the master's program "Informatization of education" to improve the quality of students' training

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ABSTRACT

Introduction. Digital transformation of education involves designing personal trajectories based on innovative technologies, expanding the infrastructure of educational institutions, and integrating digital communications, open resources, and databases into academic work. The use of electronic library systems in a university is one of the conditions for forming a common digital knowledge space. *The purpose of the study* is to identify the possibilities of using electronic library systems in the implementation of the master's program "Informatization of Education" to improve the quality of professional training of students.

Research methods. The information activities of master's students are supported by the resources of the internal electronic library system of the university, the Lan system, the eLIBRARY information and analytical portal, and the Web of Science search platform. The experiment was conducted at Vyatka State University (Russian Federation). It involved 60 master's students majoring in 44.04.01. Pedagogical education, profile "Informatization of education". The integration of electronic library systems into the didactic process was carried out within the framework of the discipline "Methodology of informatization of education". According to the structure of the corresponding work program, an author's test consisting of 5 sections was developed. In statistical data processing, the Pearson's chi-squared test was used.

Results. The peculiarity of the presented format of work: on the one hand, the electronic library system is the object of study (information model, management principles, search technology, etc.); on the other hand, the use of the electronic library system is an important condition for professional self-realization of graduates in the context of the emerging single digital knowledge space. Tasks are proposed for working with the resources of the university library, the Lan system, the eLIBRARY portal, and the Web of Science (to compile a list of publications on your research topic; to compare the edition activity of any publications, etc.). Statistically significant differences in the qualitative changes that occurred in the pedagogical system were revealed ($\chi^2 = 8.488$; $p < 0.05$).

Conclusion. Possible difficulties in organizing the information activities of master's students in the electronic space of scientific knowledge are identified: at the regulatory, methodological and technical levels.

KEYWORDS

digital transformation of education, training program, information activities, search technology, database, electronic knowledge space

For Citation: Soboleva, E. V., Suvorova, T. N., Shunina, L. A., & Markov, R. V. (2025). Application of electronic library systems in the implementation of the master's program "Informatization of education" to improve the quality of students' training. *Perspektivy nauki i obrazovaniya = Perspectives of Science and Education*, (3), 156–169. <https://doi.org/10.32744/pse.2025.3.10>

Received: 16 December 2024 | Approved: 20 February 2025 | Published: 30 June 2025



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INTRODUCTION

1. The UNESCO Incheon Declaration, at the level of sustainable development goals (hereinafter referred to as SDGs), defines that a set of measures is needed to: improve national policies and ensure quality lifelong learning opportunities for all, in all structures and at all levels of education [1]. Including the use of information and communication technologies. Within the framework of the UNESCO Intergovernmental Program "Information for All" and the XV International IT Forum (June 18-20, 2024 in Khanty-Mansiysk), the VI International Conference "Information and Communication in the Digital Age: Explicit and Implicit Impacts" was held [2]. The experts also focused on the problems of socio-cultural transformations associated with the development of digital technologies, and their impact on culture and education. As a result, sets of measures were proposed to preserve national languages and national culture in the emerging digital knowledge space.

2. A special role in solving this problem and supporting a set of government measures, according to the conclusions of N. Kalenov, I. Sobolevskaya, and A. Sotnikov, is given to the digitalization of humanitarian knowledge, i.e. the transformation of significant information into digital form to ensure its subsequent effective use [3]. W. Enrique notes that digitalization is accompanied by the process of formation and development of a new type of culture – electronic culture [4]. The accompanying process ensures the conditions for the availability of digital technologies for the masses, increasing the level of their penetration into the social system and all social relations. Including information interaction, and conducting scientific research in the space of electronic libraries. In this regard, as E. A. Mamaeva et al. substantiate, there is a need to train specialists capable of research, training, and creation at the intersection of computer and humanities [5].

3. Digital transformation of library infrastructure has also been elevated to the rank of primary state tasks. The Strategy for the Development of Librarianship (hereinafter referred to as the Strategy) regulates a system of mandatory measures that contribute to the achievement of the SDGs, the formation of a digital space of scientific knowledge, and national security strengthening. In particular, the following [6]: creation of high-quality electronic educational resources; development of partnerships between various educational institutions; improvement of training (retraining) programs for highly qualified specialists; integration of new digital tools and technologies into the users' information interaction, etc.

At the international level, it is assumed that the use of electronic systems in training will support participants in interaction in research, self-education, and professional development, in intercultural communication [7]. Currently, the electronic library system of the Lan publishing house, the educational platform Yurait, the information and analytical portal eLIBRARY.RU, and other resources have been developed and implemented in the Russian digital educational space.

4. According to the objectives of the Strategy, the design and application of electronic library systems should have solved the problem of access to digital and printed materials of a scientific and informational nature. And their subsequent use to support socio-cultural processes. However, according to the conclusions of D. N. Gribkov and N. M. Svergunova, in practice, it turned out that the participants in the interaction are required to have (not always at the proper level) skills in managing these materials, including monitoring their availability, and monitoring compliance with copyright [8].

The content of the master's program "Informatization of Education" includes disciplines within which it is possible to effectively prepare future specialists of the digital society for analytical, research, and project professional activities in a single electronic space of scientific knowledge. In particular, to understand and apply the resources of electronic library systems. The latter, as O. Bourkhouk and E. El Bachari substantiate, causes significant difficulties for most users of information systems [9]. Thus, there is an objective need for additional research on the use of electronic library systems in the training of graduate students. The hypothesis of the study is that the use of electronic library systems in training specialists in informatization and digitalization of education will provide additional resources to improve the quality of their training.

The purpose of the work is to identify the possibilities of using an electronic library system in the implementation of the master's program "Informatization of Education" to improve the quality of students' professional training.

Research objectives:

- to clarify the problems and possibilities of using electronic libraries in training specialists in the informatization of education in the context of the emerging digital space of scientific knowledge;
- to describe the options for using electronic library systems to support various types of educational and professional activities of students, taking into account the specifics of their training;
- to identify factors influencing the quality of using electronic library systems to enhance information interaction;
- to experimentally test the effectiveness of the proposed integration of electronic library systems in master's students training.

MATERIALS AND METHODS

An education informatization specialist is a professional who can develop information and methodological support for educational activities based on knowledge of the cognitive characteristics of the digital generation and the communication advantages of new media, social networks, and computer games. Graduates of the program will be able to apply the acquired competencies in the field of IT to form a single digital knowledge space. The experiment is based on Vyatka State University (hereinafter referred to as VyatSU). The experiment involves 60 master's students in the training program 44.04.01. Pedagogical education, profile "Informatization of education". The average age of students is 24 years (55% – female, 45% – male). In the study, master's students work in the spaces of:

- 1) the internal electronic library system (IELS), which includes documents on all branches of knowledge of the VyatSU electronic library. These documents have an electronic version without a tangible medium or are published on non-traditional information carriers (CD, DVD, etc.). These are both documents created by VyatSU employees and documents acquired from copyright holders;
- 2) the consortium of network electronic libraries (NEL) on the Lan EBS platform. The university has been a member of it since 2020;
- 3) the information and analytical portal eLIBRARY;
- 4) the leading international database Web of Science (WoS).

The internal electronic library system in the presented study is an educational environment that includes a virtual reading room of textbooks and teaching aids from university authors in all areas and specialties, as well as various services. The basis of the VESB is a consolidated bibliographic publicly available DB "Knigoobespechennost" of mandatory lists of literature in the areas and profiles of the university. The main task of the EESB is to combine electronic documents of the participant libraries into a single resource. The purpose of the integration is to provide users with access to full texts of monographs, educational and teaching aids, journals, and scientific articles of teachers of the participating universities. Cooperation is based on a voluntary, contractual basis, as well as the responsibility of the participants for the obligations assumed.

The involvement of graduate students in information interaction in the digital space of scientific knowledge is implemented when studying the discipline "Methodology of Informatization of Education". The materials of the assessment tools fund, compiled by the authors following the requirements of the university and the content of the disciplines' work program, are the basis for determining the control and experimental groups. The test has 50 questions (25 open-ended and 25 closed-ended questions). The number of questions was determined according to the indicators (developed professional competencies in the discipline). The essence of each indicator is deciphered in the Research Program.

The correct answer to an open-ended question was estimated at 2 points. To a closed-ended question – 1 point. Examples of questions are in the Research Program. Thus, based on the results of the control test, master's students could score from 0 to 75 points. Levels of professional training: "unproductive" (from 0 to 29 points), "low-productive" (from 30 to 44 points), "locally designing" (from 45 to 69 points), and "system-designing" (from 70 to 75 points). The full methodology for determining and interpreting the levels is presented in the program and research results.

A control group (30 methodologists of informatization and digitalization of education) and an experimental group (30 methodologists of informatization and digitalization of education) were formed. In statistical data processing, the Pearson's chi-squared test was used.

LITERATURE REVIEW

In the OECD Digital Economy Outlook 2024, international analysts highlight several strategic development areas, including the use of immersive technologies in remote assistance, information services, and navigation systems [10]. The corresponding development of the digital landscape of an institution (including those engaged in information, cultural, and educational activities) presupposes, according to the conclusions of J. Füller et al., the presence of a certain level of the following competencies of the participants in the interaction [11]: knowledge of the capabilities of the Internet, skills in quickly searching for information, the ability to understand the interface of a new service, the ability to create a news feed, etc.

M. Levitsky, V. Grinshkun, O. Zaslavskaya note that modern digital didactics is characterized by the development of online courses, collections of digital resources, electronic library systems to support national policies in the field of transformation and globalization [12]. The authors point out the need to train appropriate methodologists, and mentors in the use of new informatization tools in the emerging electronic knowledge space. S. Khahro and Y. Javed remark that the technological society of the future has set universities the task of improving their educational processes [13]. Especially in relation to how new services can help the self-education and self-development of users of their resources. Teachers should be proficient in methods and tools that can make the educational process in the digital environment more interactive and exciting [14].

I. Pidhorodetska et al. argue that only a combination of scientific and methodological systems that take into account and are oriented towards the intellectual development of students can support the formation of their skills in independent, research and experimental activities with electronic educational resources [15]. Among them, library systems occupy an important place. Y. Yin, H. Peng, H. Liu study the impact of students' educational activities with a cartographic model (database) on their intellectual development [16]. F. Mutia et al., based on the results of an analytical review, conclude that information and communication technologies not only help new format libraries to remain intermediaries between knowledge sources and the reading audience but also increase the efficiency of using computer tools [17]. M. Dogan, K. Tunçer, and H. Arslan determine that the emerging environment of scientific knowledge involves the use of digital technologies to improve the quality of training and activate cognition [18]. F. Liu et al. conducted a comprehensive analysis of the influence and role of museum digital communication in modern education, focused on training IT specialists [19].

Undoubtedly, as V. Seevaratnam, D. Gannaway, and J. Lodge substantiate, the introduction of electronic library systems into student teaching will also require additional training of current teachers and staff [20]. The authors point out that the use of digital platforms and libraries in all educational processes not only increases the efficiency and speed of decision-making (personnel, organizational, methodological) but also improves the professional level of those who work in the new conditions of digitalization and transformation.

According to the conclusions of A. A. Borisov, N. L. Mikitenko, and S. P. Storozheva, the resource and technological diversity in higher education, caused by the development of various types of digital tools, contributes to the unification of electronic educational resources of the country's universities into a single information system [21]. That is the design of databases in which electronic versions of textbooks, reference books, periodicals and scientific publications, and fiction will be stored.

E. R. Rubin and G. R. Rubin formulate that an electronic library is an information center that provides the reading community with access to as many materials as possible [22]. C. Portuguese Castro, M. Rey Castillo, G. M. Zermeño analyze the frequency of students' and young scientists' access to printed and digital publications. The authors conclude that modern researchers prefer the latter when choosing between printed and electronic versions of newspapers and magazines. Moreover, they indicate them as reliable sources of information [23]. Md. N. Islam, Md. H. Rahman highlight the possibilities of artificial intelligence technology for the functioning of electronic libraries [24]: tracking new literature on a given topic and notifying interested users about the receipt of the necessary publications; automatic control of the terms of return of books by readers by sending reminders via e-mail or mobile communications.

L. Hosman et al. specify the factors that limit equal access to quality education and the use of electronic libraries: power outages, problems with an Internet connection, and negative attitude of participants in information interaction to innovative practices [25]. In a subsequent study, the scientists substantiated the need to develop a model of an educational library based on solar energy (SolarSPELL). According to the authors, the corresponding electronic educational resource will be a digital library powered by solar energy and providing user access via an autonomous Wi-Fi network. This experimental model was implemented by M. Z. Gomez, L. A. de la Garza, L. Hosman in the Pacific Ocean islands [26]. The importance of the educational practice presented by the authors lies in the confirmation of the didactic potential of digital libraries and the availability of appropriate means to improve the quality of education. M. Z. Gomez and L. A. de la Garza also describe the principles that should underlie the functioning of such a digital library: voluntariness and equality, respect for another language and culture, legality and legitimacy, coordination and cooperation in filling the content, openness in information interaction [27].

A. Leguina, S. Mihelj, and J. Downey analyzing the role of libraries in reducing social inequality, conclude that electronic library resources are the basis of the space for learning, self-expression, creative exchange, and development [28]. A. B. Antopolsky, studying the electronic information environment that unites heterogeneous information related to various aspects of scientific knowledge, establishes that one of the key functions of the digital knowledge space is the provision of reliable data for solving strategically important problems for Russia using artificial intelligence [29].

N. Rina, L. R. Supratman note that electronic libraries are becoming indispensable assistants in many areas of life [30]. A. M. Petrovsky, S. A. Balanova, and I. A. Kuznetsova determine that the functions of electronic library systems allow users to search by keywords, specific topics, and disciplines [31]. New digital technologies can potentially provide powerful methodological tools for using electronic libraries in organizing the above-mentioned unified Russian digital space of scientific knowledge. And, as B. Bareer, M. Xue, H. Mohammadi, prove using experimental data, the use of electronic library systems in a university allows for the implementation of a differentiated approach to teaching, the development and active use of multi-level assignments, and the design of individual trajectories of knowledge [32].

However, D. N. Gribkov and N. M. Svergunova highlight the following difficulties in integrating electronic library systems into undergraduate education [8]: the need for clear coordination of engineering and technical services; formation of a single consolidated bibliographic database; formulation of a common opinion when concluding a partnership agreement; the complexity of completing the electronic library with the necessary range of resources (both from the outside and the university's publishing house content). D. N. Gribkov and N. M. Svergunova also justify the fact that the currently implemented expansion of the volume of electronic library systems requires: formation of skills for working with digital library resources, both for undergraduates and university teachers; development of university infrastructure for effective access to information and improvement of navigation in a virtual environment.

During the performed analysis, it was found that:

- the introduction of automated control systems, solar-powered libraries, virtual assistants (chatbots), and generative neural networks is an important area of informatization of education and achievement of the SDGs;
- electronic library systems have the didactic and methodological potential for their application in the training of specialists in the informatization of education and the formation of a unified digital space of scientific knowledge in demand by modern society;

- there are regulatory, technical, methodological, and organizational difficulties in using various electronic library systems since each university has its interests and needs.

RESEARCH PROGRAM

In the first stage, the problems of creating and using intra-university and inter-university electronic library resources have been identified. The provisions of the federal standard in the field of training are analyzed, and the types of educational and future professional activities where an education informatization specialist will be able to apply the resources of electronic library systems are determined. The following indicators for assessing the level of professional training are highlighted, according to the work program of the discipline:

applies the norms of professional ethics in the informatization of education (Indicator 1); demonstrates the ability to optimize professional activity (in accordance with the current content of normative legal acts – Indicator 2); can design programs of academic disciplines (Indicator 3); demonstrates the skills of designing educational outcomes of academic disciplines and ways to achieve them (Indicator 4); is able to carry out a critical analysis of problematic situations based on a systematic approach, and develop a strategy for action in the digital educational space (Indicator 5). According to the indicators, 50 control questions were compiled (before and after the experiment): 10 questions for each indicator. Sample formulations:

Indicator 1. List the current regulatory legal acts currently in force in the education system.

Indicator 2. The term "ethics" was introduced into scientific use (Protagoras, Democritus, Aristotle, Pythagoras).

Indicator 3. Select the main components of the effectiveness of the distance learning system (technical, software, information, educational and methodological, organizational, financial support; training center, information resources, methodological and technical support, students, tutors, consultants; technical support, teachers, students; there is no correct answer).

Indicator 4. What is meant by the didactic functions of the learning tool?

Indicator 5. Describe the basics of a systematic approach for the critical analysis of problematic situations arising in the context of informatization of education.

There are 25 open-ended questions and 25 closed-ended questions in total. The correct answer to an open-ended question was estimated at 2 points. For a closed-type question – 1 point. The possibilities of electronic systems "University Library online", "RUKONT", "Lan", "Ibooks", "IPRbooks", "BiblioRossika", "Scientific electronic library", "ZNANIUM.COM ", "YURAYT", "BOOK.ru", "KnigaFond" and others.

The purpose of the comparison is to identify arguments to justify the need to study the principles of operation of various electronic library systems and apply them to form an integrated digital pedagogical system. The resources of library system collaboration for V. P. Astafiev Krasnoyarsk State University and Novosibirsk State Pedagogical University, the experience of integration of Surgut State Pedagogical University, Kuzbass Humanitarian Pedagogical Institute have been studied. It was revealed that they also contain publications necessary for the training of specialists in the informatization of education. But also the resources of interuniversity libraries. Therefore, their capabilities are much wider (and, for the preparation of students of pedagogical specialties, even redundant). Further, the place of work with electronic library systems in the structure of the discipline was clarified. The procedure for quality control of training has been defined – questions for the fund of evaluation funds. According to the results of the author's test, the levels of training of undergraduates were determined. Control and experimental groups were formed.

In the second stage of the study, undergraduates studied the materials of the discipline according to the plan described above.

In the third stage of the study, the factors influencing the quality of the use of electronic library systems to enhance information interaction were identified.

RESEARCH RESULTS

An education informatization specialist in the course of professional training under the master's degree program: gets an idea of new literacy; develops the ability to translate information from one communication language to another; gets experience in the development of electronic educational resources (tests, databases); gets the experience of collaboration in digital pedagogical communication.

As established during the literature analysis, the main task of the electronic library is to combine electronic documents of the university library and its partners into a single resource in order to provide users with access to the full texts of monographs, educational and methodological manuals, journals and scientific articles of teachers. A digital library is not only a repository for books, but also a kind of electronic archive. A place where you can access information both on traditional media and in electronic form. It is a social institution whose activities are aimed at ensuring equal access to information, in the context of the development of the processes of humanization of education, its informatization, openness, and the formation of educational information needs.

It is often in the library that the researcher receives the necessary information since it is an intellectual intermediary between a person and information. Electronic libraries use the electronic format of publications and provide access to remote resources using telecommunication technologies. These are electronic document repositories equipped with the necessary mechanisms for accessing and working with them. Publications of the Consortium of Network Electronic Libraries (SEB) on the EBS Lan platform are available at Vyatka State University. Since 2020, SEB has been creating a single library fund from publications of universities participating in the project. Vyatka State University has been involved in the project since its launch. At the moment, 345 publications of the university are located in the SEB fund, which are actively read. In addition, undergraduates undergo mandatory registration on the eLibrary information and analytical portal and in the Web of Science (WoS) database. Functions of libraries of the new format: support for the achievement of the SDGs and objectives of the Strategy, and development of universities; integration of various printed and electronic sources of universities into a single digital space of scientific knowledge; saving material, time, and labor resources of participating universities to support the efficiency of local university libraries; information interaction and collaboration in the performance of scientific research; support for professional implementation, self-education, and user development.

We will formulate the tasks that arise during the training and professional activities of specialists in the informatization of education, which are solved by the introduction of an electronic library system:

- taking into account the trend of the book's existence and distribution in the form of an online electronic product (and not only in the traditional format of a printed publication);
- the study of changes in reading practice in a youth environment saturated with multifunctional mobile phones and computers ("clip thinking", digital storytelling, etc.);
- changing the nature of information services in the context of the formation of the digital space of scientific knowledge;
- access to virtual exhibitions and references, and extension of literature online.

The process of creating (formulating) requests to the electronic library system, in our opinion, is a key factor in the functioning of the digital space of scientific knowledge. According to the author, the electronic library system is a tool for improving the efficiency of all levels of management and support of the educational process during the transformation of education.

The database "Knigoobespechennost" is the basis of the university's library fund with appropriate digital resources (records). It is an integral part of the educational process quality management system. The key data for the formation of the database "Knigoobespechennost" are: a list of training areas and specialties; curricula and programs of disciplines; bibliographic records from electronic catalogs generated using the automated library and information systems of the university. The peculiarity of the format of working with the resources of electronic library systems presented below is as follows:

- on the one hand, the study of the functions and capabilities of an electronic library system, the availability and use of which is regulated by current regulatory documents in the field of higher education, is an object of study (information model, management principles, relationships between tables, query construction, administration, etc.);
- on the other hand, the use of an electronic library system is an important condition for professional self-realization, social and financial success of graduates in the context of the emerging unified digital space of scientific knowledge.

Next, we will describe the logic of information interaction within the framework of the discipline "Methodology of informatization of education". In the first classes, undergraduates analyzed and identified the possibilities of the electronic library system of the publishing house "Lan", "Yurayt", "IPR SMART", the information and analytical portal eLibrary.RU, and other resources. One of the tasks is the possibility of using the provided resources to implement the work functions of an education informatization specialist. An obligatory part of the educational process in the experimental group is the study of the resources and capabilities of the internal electronic library system and the database "Knigoobespechennost". For example, undergraduates determined that the following tools and technologies were used to develop an information system for managing the Book Security database: Languages: hypertext markup HTML; JavaScript programming (in conjunction with the jQuery library) and PHP; AJAX technologies; XML markup; Zend Framework – a framework for developing web applications in PHP; MySQL database; Apache Web Server; NetBeans Free Integrated Application Development Environment (IDE); Data transfer protocols: HTTP; for sending electronic messages – SMTP protocol; for uploading files to the server – FTP.

As part of the analytical activity with the resources of the SEB, students recorded: where the original publication is located; and whether there is a printed version. For example, publications by W. Shakespeare, and pre-revolutionary books on the benefits of education. Examples of practical tasks in the space of the Consortium of Network Electronic Libraries on the EBS Lan platform:

1. Use the internal electronic library system to compile a list of publications on your research topic. In addition to the output data, specify whether it is possible to work with an electronic copy in the university library.
2. Compare the publication activity of any 3 publications on your topic (the presence of thematic headings and their characteristics, author groups (how representative and whether they correspond to the level of publication), links with other publications, formal indexes, and their dynamics, etc.). Based on the results of the comparison, choose one of the publications where you would like to publish your work. Justify your choice, i.e. specify which criteria are most important to you personally (and why).
3. Make a report in the form of a list of references (at least 30 titles). Sample samples of the design of the bibliographic description for each were in the appendices.

When working with the text in the EBS Lan, undergraduates identified the following possibilities: printing or saving parts of a document; copying a bibliographic record; adding a document to favorites; quoting texts and automatically saving citations to summaries; creating and editing summaries; searching through the text. Undergraduates were also involved in the interuniversity conference. An example of a project to digitalize the scientific knowledge space is "Dictionaries on Chinese culture". Undergraduates justified and demonstrated that working with dictionaries contributes to the development of independence, activation of cognition, and stimulating work activity.

The material was generated using SEB resources, presented in Russian and Chinese, and supported by dynamic graphic images. When creating projects, students explored the exposition environment and communicated with a community of experts, philologists, linguists, and librarians. During the internship, undergraduates completed individual tasks, among which were: developing a model (project) of a sensory load map; writing methodological recommendations for the preparation of texts (digital resources) for the deaf and hard of hearing, as well as options for inclusive mediation based on works of art. In the space of the eLibrary information and analytical portal, undergraduates checked how neural network search allows you to set an annotation, the full text of a scientific article, or even a selection of articles on a topic of interest as a query condition. In addition to searching using a neural network, students experimented with search tools based on joint citation,

viewing publications by users and inclusion in collections, co-authorship, and keyword matching. The undergraduates noted that the latter condition is convenient to use for searching among the fresh receipts at the Scientific Electronic Library.

When working with the resources of the leading international database Web of Science (WoS), undergraduates searched for the authors using the data known about them: surname, initials, field of research, affiliation to the organization. Example of a task with WoS resources: complete a thematic query on the topic "Immersive technologies"; using network and database resources, select the required number of sources; describe each source according to the required GOST standards; using digital technologies to create a bibliographic list of 8-10 sources; accompany each source with an infographic (visual series).

One of the conclusions formulated by the participants of the experiment: "EBS is an indispensable tool for the formation of a bibliographic list of literature. Just copy the bibliographic description of the desired book and paste it into your list". However, the undergraduates of the control group were not involved in the purposeful use of the resources of electronic library systems to solve educational (and professional) tasks. Example of the task: "To perform a bibliographic description of the document", "To make an instruction algorithm for registration on the information portal". After information interaction with electronic library systems, control testing was conducted again and the levels of professional training of undergraduates were re-determined.

System-Designing level – undergraduates are fully prepared for independent activities on the use of electronic library systems to solve educational and professional tasks in accordance with the challenges and requirements of the emerging digital space of scientific knowledge. They accurately use the resources of digital libraries in collecting and analyzing information facts, interpreting results, and designing educational events. Future methodologists of informatization and digitalization of education introduce an element of creativity when completing tasks.

The Local Designing level – the readiness of undergraduates for independent activities in the use of electronic library systems to solve educational and professional tasks in accordance with the challenges and requirements of the emerging digital space of scientific knowledge is sustainable. In standard situations, they successfully use the resources of digital libraries to collect and analyze information facts, interpret query results, and develop educational projects.

Less-Productive level – undergraduates are poorly prepared for independent activities on the use of electronic library systems to solve educational and professional tasks under the challenges and requirements of the emerging digital space of scientific knowledge. They very often need the support of a mentor (supervisor) at the stage of using digital library resources to collect and analyze information facts, interpret query results, and think through scenarios for educational projects.

Unproductive level – undergraduates do not understand the expediency of using electronic library systems to solve educational and professional tasks under the challenges and requirements of the emerging digital space of scientific knowledge. They most often do not use the resources of digital libraries to collect and analyze information facts or interpret query results. Ready-made templates are used when developing scenarios for educational projects. Table 1 shows the results of training undergraduates – specialists in informatization of education.

Hypotheses were accepted: H_0 : the level of professional training in the experimental group is statistically equal to the level in the control group; H_1 : the level in the experimental group is higher than the level of the control group. For $\alpha = 0.05$, χ^2_{crit} is 7.815. It is determined that $\chi^2_{obs.1} < \chi^2_{crit}$ ($0.151 < 7.815$), and $\chi^2_{obs.2} > \chi^2_{crit}$ ($8.488 > 7.815$). Therefore, changes in the level of professional training are not accidental. Let's analyze the dynamics by training levels:

1. In the experimental group, the highest dynamics is observed at the level of "System-Designing" (30% of the total share); the lowest is at the level of "Locally Designing" (3% of the total number).

2. In the control group, the maximum increase was recorded at the "Locally Designing" level (7% of the group); there is no "System-Designing" level (0%). That is, the level of training of participants changed due to the fact that there were shifts in the "Unproductive" and "Locally Designing" levels".

Table 1

The level of professional training of undergraduates before and after the use of electronic library systems in education

Level	Groups			
	Control group (30 students)		Experimental group (30 students)	
	Before the experiment	After the experiment	Before the experiment	After the experiment
Unproductive	4 (13%)	4 (13%)	5 (17%)	2 (7%)
Less-Productive	11 (37%)	9 (30%)	11 (37%)	6 (19%)
Local Designing	13 (43%)	15 (50%)	12 (39%)	11 (37%)
System-Designing	2 (7%)	2 (7%)	2 (7%)	11 (37%)

A comparison of the results shows that learning using electronic library systems contributes to the formation of information resource management skills, including tracking their availability; and activation of analytical, research, and project professional activities of undergraduates in a single electronic space of scientific knowledge. So, the use of electronic library systems in the training of specialists in informatization and digitalization can be considered both as an additional resource to improve the quality of their training and as an important condition for the formation of a unified digital space of scientific knowledge. The latter circumstance is a priority and strategic one at the state level.

DISCUSSION

The presented study was initiated and conducted as a support for a set of activities accompanying the decisions of the UNESCO Incheon Declaration (in terms of ensuring quality lifelong learning opportunities for all) [1]. In particular, due to the functions of new format libraries to achieve the SDGs and the objectives of the Strategy, the development of universities.

The materials of the work complement the conclusions of E. A. Mamaeva et al., on the need to make changes in the training of specialists capable of analytical and research, creative activities at the intersection of computer science and the humanities [5]. The authors' results confirm the generalizations of F. Mutia et al. that information technologies not only help libraries remain intermediaries between knowledge sources and the readership but also increase the efficiency of using computer tools [17]. Moreover, the authors' conclusions on the use of electronic library systems as an important condition for the formation of a unified environment of scientific knowledge develop the ideas of M. Dogan, K. Tunçer, H. Arslan, on their didactic capabilities for improving the quality of education and activating knowledge [18].

The conclusions of the study can also be considered as an option for solving the problems formulated by D. N. Gribkov and N. M. Svergunova, regarding the integration of electronic libraries into the educational processes of the university [8]. As areas for the development and clarification of the results formulated in this work, we can propose:

- at the technological level – clarification of the system of actions for solving the problems of administering the "Knigoobespechennost" DB;
- at the level of the content of the discipline – making changes to the assessment of the level of professional training, the formulation of the tasks themselves for manipulation in the spaces of digital libraries, taking into account the use of information resources for interaction and users with special educational needs.

CONCLUSION

The study describes the activities of undergraduates with electronic resources at the level of the internal electronic library system, the consortium of network electronic libraries on the EBS

Lan platform, the information and analytical portal eLibrary, and the international database Web of Science (WoS). This is a didactic interaction: to search for information, analyze and evaluate it, and then apply it to the informatization of education; to record user (human) requests in a formal (machine) language, i.e. for the propaedeutics of working with artificial intelligence-based systems; to study the principles, limitations, and norms of the functioning of databases and their automated management systems; for self-realization and creative self-expression in the professional search for oneself in the digital space; for intercultural communication and collaboration. The paper identifies the following key features of electronic library systems in the training of education informatization specialists to improve the quality of their professional training:

- the presence of built-in tools for developing information retrieval skills, and the ability to analyze and critically evaluate the result of a user request that contains inaccuracies and uncertainties;
- providing access to additional references and bibliographic and museum collections.

We also note the factors influencing the effectiveness of the use of electronic library systems: the increased influence of automated information processing systems, immersive technologies, and artificial intelligence on the labor market; user experience with a variety of electronic resources, databases, and search systems; features of readers' interests; digital literacy. Difficulties (problems) of organizing collaboration in the digital space of scientific knowledge:

- at the regulatory level: at the stages of concluding license agreements;
- at the methodological level: in the course of providing university teachers with opportunities, based on the data stored in the database "Knigoobespechennost", to decide on correcting the lists of mandatory literature, submitting applications to the university's scientific library for the purchase of new publications and writing off old ones in the disciplines taught;
- at the technical level: when digitizing documents from collections; integrating information resources; and importing the metadata received by the responsible administrator in XML format in the database "Knigoobespechennost" in the personal account via the web user interface on the Internet server;
- at the organizational level: non-compliance of the basic literature fund with the standards and requirements for the provision of the educational process; failure to provide timely information on the provision of students with common educational and methodological literature in electronic form in disciplines of all areas of higher education, etc.

The obtained results can be used to improve: the training of specialists in informatization of education within the framework of the master's program; the functioning of the electronic library system of the university (both from the point of view of administration and expansion of the list of integrated information resources).

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Авторы заявляют об отсутствии конфликта интересов

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Liubov A. Shunina, Roman V. Markov, 2025

The author's declared no conflicts of interest