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## Modern information and library technologies in the organization of scientific educational environment in higher education institution

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**Abstract.** The modern information and library technologies study is important as libraries are centres of information and scientific activity, contribute to the creation of an effective educational environment and the introduction of the latest technologies, which increases the research level and scientific development. This publication aims were to characterise electronic resources and explore opportunities that contribute to the quality of the educational process and ensure the scientific component through digital library usage at Hryhorii Skovoroda University in Pereiaslav. The study used a mixed-methods approach, including both quantitative and qualitative data collection methods. The main methods of data collection were the Hryhorii Skovoroda University in Pereiaslav library website study and a structured questionnaire survey of students and academic staff about their work with the library's electronic resources. The study results demonstrated that the library has high-quality electronic catalogues and repositories, and has the opportunity to work on international educational and scientific platforms. The survey results indicate that students and academic staff have access to electronic resources and can work effectively at their own convenience from any location. In addition to positive feedback, there are a number of difficulties that students face when working with the digital library. These include stress from the necessary adaptation to work in a dynamic electronic environment,

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insufficiently developed skills to process a large amount of information quickly, correctly and efficiently, and to work on different platforms, especially international ones, such as Scopus, Web of Science, etc. It is also important to keep library users informed about new acquisitions, opportunities for distance work and the specifics of working with existing electronic resources and platforms. The conducted study results can serve as a basis for the implementation of advanced information and library solutions in the libraries activities of higher education institutions, their work improvement and creation of a productive innovative scientific and educational environment

**Keywords:** library collections; digital library; digital resources; scientific platforms; higher education; innovative technologies

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## ■ Introduction

The study relevance is related with the transition to distance and blended learning due to Covid19 and Russia's invasion of Ukraine. To create an educational environment in a higher education institution, the key is the efficient and convenient organisation of libraries, the use of modern information and library technologies that allow students academic staff to work remotely, at a convenient time for them, and have full access to scientific and educational resources. The academic libraries of higher education institutions cover most of the library resources of Ukraine and provide access to them for students and lecturers. In the context of Ukraine's European integration into the European Education Area, the issue of modernising libraries in the application of modern information and library technologies and providing them with highly qualified staff is particularly relevant.

T. Granchak (2019) describes the basic model of the educational Internet space organisation, which guarantees the complexity of the material perception through various means of communication, the acquisition of the necessary professional competences of students, which is ensured by the variability of approaches and partnerships with university libraries. S. Stummeyer (2019) studied the challenges, problems, advantages and potential of using open educational resources in teaching and learning in higher education institutions; the author highlights the possibilities of cooperation between higher education institutions and libraries in this area. According to the author, the issue of educational resources digitisation, which provides new opportunities for distance work on university platforms, including libraries, is of key importance in the transformation of teaching and learning processes at universities. It is the library's role to share its many years of experience with digital media resources to improve the quality of the educational process. N. Kro-pocheva (2021) in her research highlighted the practical issues of creating information and library resources in the field of education and pedagogy in German higher education institutions; described the content and design of university library websites. The scientist described the directions by which university libraries' resources are formed with a single-circuit and double-circuit structure. In universities with a two-circuit structure of libraries, various resources of pedagogical, educational and specialised orientation are more widely reflected. The

authors I. Borodai *et al.* (2022) explore the peculiarities of creating electronic products, developing search information strategies, digitising documents, and introducing innovative information tools in libraries. The researchers describe in detail the main trends in the development of information and communication technologies in serving library users in different countries of the world (Germany, Sweden, Denmark, China, Japan, Korea). O. Hryhor-evska *et al.* (2022) describe the activities of educational libraries as modern resource centres of education and science and a component of the national information space for effective scientific and information support of research and the educational process in higher education institutions. O. Shevchenko & V. Sprinsyan (2022) describe the process of designing the library information resource "Single Library Space", its role, purpose and structure as an important component of the renewal and transformation of librarianship in the higher education system, partnerships between libraries of higher education institutions of Ukraine and joining forces to create a single universal library collection with the prospect of cooperation and communication. Researchers Y. Xiao *et al.* (2023) studied the role of information and library science knowledge in bridging the gap between science and technology; investigated how information and library science knowledge contributes to patented inventions, and identified future trends in scientific and technological innovation in the library and information field.

O. Matviychuk (2023) reveals the peculiarities of educational libraries digitalisation through the introduction of new information and library services, in particular, modernisation of the virtual reference service system, electronic ordering of documents, introduction of modern information and communication technologies in the process of information processing. R.T. Enakrire & B.D. Oladokun (2024) describe the use of artificial intelligence in the libraries' work, which allows solving complex tasks of processing, communication, knowledge representation, and decision-making. The authors prove that artificial intelligence has prospects for application in the provision of innovative library services and allows to quickly find answers to research queries, catalogue and classify library resources, etc.

This article purpose is to assess the current state of organisation of scientific educational environment

by means of modern information and library technologies in the library of Hryhorii Skovoroda University in Pereiaslav, to determine its impact on the quality of education and research in a higher education institution (HEI) and to identify opportunities for further improvement. This study objectives were to analyse the information and library technologies that create a scientific educational environment at Hryhorii Skovoroda University in Pereiaslav, as well as to find out the opinion of students and academic staff on the effectiveness of their application in the professional development of participants in the educational process. The scientific novelty of the study lies in the comprehensive generalisation of modern information and library technologies used to create a scientific educational environment at Hryhorii Skovoroda University in Pereiaslav.

### Materials and Methods

The methodology of this study consisted of a number of stages, including: analysis of literature sources on the issue, which allowed to determine the parameters of the study; sampling, which included a survey of 60 students and 15 lecturers of Hryhorii Skovoroda University in Pereiaslav; data collection methods (questionnaires, surveys, observations, analysis of the website of the higher education institution and the library, comparison and generalisation of results); statistical processing of the collected data (to analyse the effectiveness of the use of modern information and library technologies in the context of a higher education institution and to identify trends in the further improvement and development of the library and partnership of structural units in the HEI, to create an effective modern educational environment and improve the quality of education in general).

The study object is information and library, innovative technologies in higher education institutions libraries. The study subject is the necessary tools system that contributes to the creation of a scientific and educational environment in higher education institutions through the use of information and library technologies (on the example of Hryhorii Skovoroda University in Pereiaslav).

During the academic year 2023-2024, the website of the higher education institution and the library was studied, the students and academic staff work was observed in the library (special attention was paid to the work with electronic documents, catalogues, repository, new acquisitions, Scopus, Web of Science databases, etc.), a face-to-face survey of lecturers and students was conducted, which made it possible to find out their attitude to working in an electronic, digital environment, its effectiveness and convenience.

The questionnaire included a number of questions, in particular: How often do you use the website of the Hryhorii Skovoroda University in Pereiaslav? Is the website of the library of the Hryhorii Skovoroda University in Pereiaslav conveniently designed? Do you use the electronic catalogue for your research and educational

activities? Are you more comfortable using electronic resources or paper ones? Do you have access to the repository? How often do you review new additions to the library collections? Do you have access to Google Scholar, Scopus, Web of Science databases? What advantages and challenges do you see in working with digital resources? Has the quality of your educational and research activities improved in the context of distance learning and work with the digitised resources of the university library? etc.

The survey was conducted in compliance with ethical standards, on a voluntary basis and anonymously (Code of Ethics..., 1997). Participants were fully informed about whether anonymity was ensured, the purpose of the study, how their data would be used, and the risks involved. During the study, a number of materials were described, including questionnaires and surveys designed as special tools for collecting quantitative and qualitative data from students and teaching staff; the Internet and computer software were used to study the website of the higher education institution (Hryhorii Skovoroda..., n.d.), the library website, work with electronic and digital documents, etc.

### Results and Discussion

Since the task of a modern library in a higher education institution is to create a convenient educational research environment for users that allows them to productively navigate the flow of information, quickly find the important, and highlight the main things, the library becomes a full-fledged participant in the educational process and shares responsibility for its quality and efficiency. Therefore, it is possible to increase the efficiency of the library's work by introducing modern information and digital technologies into its activities. They allow to implement various creative projects, interact with interested organisations, institutions and other social partners. The use of the latest library and information technologies in the organisation of the effective operation of the library of Hryhorii Skovoroda University in Pereiaslav is fully reflected on the website of the higher education institution and the library in particular. The library website is a set of logically interconnected software, information and multimedia tools that reflect the efficiency of the institution. It is an effective and convenient way to inform users about the library's capabilities, resources and potential. It is a communication and information tool for image building, advertising services and marketing activities. The site includes a traditional set of contacts, biographical data, advertising information, access points to libraries and external information sources. The library's website promotes the rules for providing services to regular and virtual readers, which include information sources, collections, services such as planned out-of-hours work of the institution, catalogues, card indexes, databases related to all aspects of personal and collective library activities. It presents unique sources

of information such as electronic catalogues, full-text documents, new acquisitions, repositories, conference materials, scientific publications, information about libraries, their services and projects, research activities, scientific, methodological and educational work of the university. The main purpose of the website is to provide information about the library, its services, collections, and events (Demianiuk & Konon, 2022). One of the key tasks of the higher education library is to create a digital library of deep semantic interaction that allows participants in the educational process to logically and consistently search through software in various repositories that combine autonomous classes, objects, and services. It makes it possible to create a significant collection of electronic sources that contribute to fundamental scientific researches. When creating a digital library, developers should take into account the issues of indexing and linking, since searching for information in an electronic catalogue is a search in an indexed collection of objects distributed on the network. So, the repository is an indexed collection of objects. Its work involves establishing links between similar objects from different repositories. In turn, the user perceives them as belonging to the same collection. Both the process of indexing and the process of merging repositories are based on semantic issues. This way, users outside the library can get free access to its online catalogue.

Modern information technologies include information and communication and digital technologies, which have acquired positive trends of improvement in the late twentieth and early twenty-first centuries and have taken an important place in information and library support (Borodai *et al.*, 2022). Information technologies are methods and means of obtaining, transforming, transmitting, storing and using information. Using a number of the above-mentioned technologies, modern libraries create electronic products, develop and improve search information strategies, address the digitalisation of documentary resources issues, introduce innovative means and methods of information protection while maintaining the efficiency of access to it. Accordingly, the most common technological elements of modern information and library services are electronic catalogues, digital libraries, information resources, virtual exhibitions, selective dissemination of information, web portals, and access to full-text databases (Borodai *et al.*, 2022). The library of Hryhorii Skovoroda University in Pereiaslav is quickly adapting to modern conditions, actively uses electronic resources and makes significant efforts to continuously improve and provide quality services to students and academic staff. A number of factors contribute to the successful implementation of innovative library and information technologies in the activities of libraries, including the introduction of an automated open access library system, availability of significant funds, use of experience in analytical and synthetic information processing, creative and fruitful cooperation

with excellent staff, strong government support, cooperation of library institutions, etc. Innovative components of library activities largely depend on the technical basis of this process. This work is a fundamental change in the scientific and practical basis of the modern library of higher education institutions, a new mechanism for implementing the strategic vector of its development (Borodai *et al.*, 2022). Based on the peculiarities of the educational process organisation in HEI, various forms of partnership interaction between lecturers and students are used in distance and blended learning formats, such as webinars, chat forums and discussions, online tests, audio and video lectures, online presentations, real-time webcasting of lectures, etc. Their logical and meaningful combination is intended to provide students with access to educational materials, discussion platforms, and create an appropriate online space. Based on the definition of the virtual environment and the field of study, an online course space or a sequence of distance learning courses is a content complex that is published on the Internet and can be used for educational purposes as part of the study of individual courses or sequences of courses (Granchak, 2019). The available electronic resources reflect the constant development and transformation of libraries, which are constantly adapting to the new challenges of the modern information society. The created information and digital products are aimed at practical use, should be logically constructed and integrate all the material on the chosen topic containing scientifically based research results. Effective use of these tools becomes practical if they are converted into electronic, digital form and all useful information is digitised and placed in a repository or electronic catalogue of the university library.

The modern information society has created all the prerequisites that facilitate changes in information and library services for users. Libraries are being transformed into library and information centres that provide the function of information transfer. To fulfil this task, they need to be properly equipped with machinery, adaptive technologies and devices. This, in turn, contributes to the creation of a virtual educational environment of the library, its own electronic information resources formation and provision of access to information resources of other institutions. It is important to find new ways and means of applying new information technologies, improving the process of providing traditional services, and introducing the latest innovative technologies in library services (Horovyi, 2024). The library acts as a socio-communication institution that ensures the information rights of each individual in access to knowledge, products of both intellectual and creative activity, combines informational, educational and general cultural functions. The model of such a library and information centre was tested at the Hryhorii Skovoroda University in Pereiaslav, which meets the needs of students and academic staff in educational and research activities. The intensive development of digital libraries, repositories, reference and search and

library information resources is underway. Traditionally, digital libraries include electronic documents, databases, a subsystem of hyperlinks, etc. A modern digital library is an integrated library and information system that allows users to accumulate, store and provide access to electronic documents sent in a convenient format.

To create a high-quality system of information and library services for users in a digital library, it is necessary to take into account a number of conceptual components, such as minimising the time spent searching for an electronic version of a publication; software compliance with the process of creating and using the latest integrated formats for data presentation; use of new communication formats in the accumulation and use of electronic information objects in library collections; personalisation of information access procedures.

Augmented reality technology is the latest technology that has been successfully implemented in libraries and can physically increase the interest and motivation of users to visit the library rather than access its collections remotely. Augmented reality is a technology that allows you to introduce sensory data into the user's perception to supplement information about the

environment and improve the perception of information. The use of this technology in the work of the library can significantly increase the amount of information and services that the user receives when physically visiting the institution (with a possible increase in the number of users) (Kunanets, 2023).

The new array of electronic information analysis, the issue of selecting reliable content of electronic sources, the quality of which in the early stages of computerisation was rather uneven, but was in demand and a necessary condition for social development, became a socially significant problem. Computerised libraries are becoming an important intermediary between all producers and users of available electronic information resources in providing high-quality information in a flexible, changing social environment (Horovyi, 2024). Managing a library's reference and information collections is a complex and responsible task. Regardless of the size and type of library, such problems can arise at all stages of the organisation and functioning of reference and information collections. The table below shows the list of problems that arise in the management of reference and information collections of libraries (Table 1).

**Table 1.** Problems arising in the management of reference and information collections of libraries and their characteristics

Problem	Problem characteristics
Increasing the amount of information	<ul style="list-style-type: none"> <li>✓ Growing number of digital documents and resources</li> <li>✓ Requirement for efficient technologies for structuring and indexing information</li> </ul>
Outdated technical infrastructure	<ul style="list-style-type: none"> <li>✓ The need to modernise and update information systems</li> <li>✓ Need for investment and expertise to maintain infrastructure</li> </ul>
Insufficient information literacy of users	<ul style="list-style-type: none"> <li>✓ Requirement for active support of information literacy</li> <li>✓ Need to provide training programmes and user guides</li> </ul>
Cybersecurity and information protection	<ul style="list-style-type: none"> <li>✓ The need to implement protective technologies and data protection programmes</li> <li>✓ Regular audits and training of staff on cyber security</li> </ul>
Artificial intelligence and data analytics	<ul style="list-style-type: none"> <li>✓ Using artificial intelligence to improve service</li> <li>✓ The need to analyse user habits and needs</li> </ul>

Source: developed by the authors

These problems affect the efficiency of reference and information collections management and require a comprehensive approach to address them. Libraries should actively work on innovative solutions, use modern technologies and support information literacy among users to ensure maximum access to knowledge and information in the digital age. In the context of modern technologies and digital transformation, libraries are becoming central points of access to knowledge

and information for society. Their efforts in implementing modern technologies and approaches allow them to provide high-quality and convenient reference and information support for different categories of users, ensuring relevant and personalised services in the digital age. However, there are a number of trends in the development of reference and information collections in the context of modern technologies and digital transformation (Table 2).

**Table 2.** Trends in the development of reference and information collections in the context of modern technologies and digital transformation

Trends	Trend description
Digital transformation	Increased use of digital technologies for storing, processing and accessing information.
Electronic reference systems	Develop electronic systems that provide access to reference resources via the Internet.
Artificial intelligence and machine learning	Using AI to automate data processing, catalogue resources, and improve search.

Continued Table 2.

Trends	Trend description
Augmented reality	Implementation of AR in help systems to increase interactivity and ease of use.
Big data management	Using big data analytics to identify trends and provide insights.
Cloud technologies	Store and share data on cloud platforms for efficient access and collaboration.
Crowdsourcing and collective intelligence	Use of public knowledge and expertise to improve the quality of information resources.
Mobile applications	Development of applications for easy access to reference and information resources on mobile devices.
Virtual libraries	Creating virtual spaces for storing and disseminating knowledge in reference and information collections.
Media convergence	Combining a variety of media formats into a single reference resource for ease of use.

Source: developed by the authors

Trends in the development of reference and information collections in the context of modern technologies and digital transformation are aimed at transforming traditional libraries and information centres into modern, digital and interactive environments that provide easy access to information and personalised services for users. The Hryhorii Skovoroda University in Pereiaslav Library is being modernised and transformed to meet modern scientific and educational needs and to be an effective tool for meeting the information needs of students through the implementation of the following conditions. Introduction of electronic information technologies in modern library activities, active involvement of libraries in the modern social information and communication network; fundamental changes in the acquisition, development and storage of library collections, new principles of creating library electronic resources, with special attention paid to information and analytical resources as a product of a new quality library, created by the library itself as an important public information centre. The introduction of remote work methods can be considered as the most promising direction of development of library institutions, development of diverse and active information and analytical services for participants of the educational process. Libraries are called upon to digitise library collections and disseminate materials necessary for solving urgent scientific and educational problems, scientific progress, formation of spiritual and state values, patriotic education of a new generation of Ukrainians; develop strategic approaches, create an effective process of selecting quality information from the information array of social networks at the request of users, and integrate Ukrainian information resources into the corporate information system.

Therefore, there is a need to unite and apply the latest forms of cooperation between libraries, information centres, research institutes, universities, and scientific societies in order to implement modern, meaningful research and information projects. To do this, libraries need to solve the problems of coordination, cooperation, and integration in the library information

environment, while simultaneously going beyond the established areas of activity and taking on a much wider range of functions (Horovyi, 2024). In the context of the new paradigm of education, libraries are developing, where the priority is given to service activities aimed at improving the efficiency and quality of meeting the information needs of users, joint creation and use of modern information resources. Leading libraries of Ukraine, in particular the library of Hryhorii Skovoroda University in Pereiaslav, as resource centres of the sector and a significant component of the Ukrainian information space, play an important role in scientific and information support of research and educational process in educational institutions, performing the functions of accumulation, preservation and use of documented knowledge that are unique to them. Particular attention should be paid to the search for optimal methodical and methodological solutions that would facilitate the formation of library information resources and the use of appropriate ways to access them. On the basis of educational libraries, a professional information and communication environment is being formed that requires traditional, electronic educational and scientific publications, such as curricula, textbooks, manuals, teaching aids, textbooks, visual aids, workshops, monographs, dissertation abstracts, abstracts, conference proceedings, collections of scientific papers, etc.

According to article 33 of the Law of Ukraine No. 1556-VII (2014), libraries are one of the main structural units of a higher education institution. The activities of educational libraries are determined by the tasks faced by higher education institutions, correlate with standards, educational and professional, educational and scientific and training programmes. Strategic development of this type of libraries is of particular research interest in the period of formation and active spread of the globally accepted concepts of Open Science and Open Education, positioning of university libraries as an open, flexible, intellectual space, scientific, information, social and communication complex. The key values in the context of the formation of information resources of libraries are completeness,

scientificity, innovation and service. University libraries are an example of a high-level management that meets the requirements of quality control, contributes to improving the quality of higher education in universities, paying special attention to constant transformation and modernisation. An important element of their activities, reflected in the relevant strategic documents, is the partnership between libraries, educational institutions, institutions and organisations in Ukraine and around the world.

The survey results of the Hryhorii Skovoroda University in Pereiaslav students on the effective use of the website, digital library, search engine and repository in their educational and research activities reflect mostly positive feedback, but also contain a number of difficulties. Therefore, in order to achieve maximum efficiency of the university's digital library, it is necessary to promote informing library users about new acquisitions, opportunities for remote work and the specifics of working with available electronic resources and platforms. The majority of students (52 out of 60) responded positively to the frequent and effective use of library resources in their educational and research activities. They believe that the advantages of the digital library are remote work in it, flexibility and mobility of its use, the ability to carry out educational and research activities at a convenient time and place, to work with a sufficiently large volume of electronic manuals, textbooks, publications, to work on various scientific platforms such as Google Scholar, Scopus, Web of Science, etc.

Based on the results of the survey and questionnaire of Hryhorii Skovoroda University in Pereiaslav students, the following conclusions can be drawn that the majority of students have a positive attitude towards the use of digital libraries in their educational and research activities. They believe that working in a digital library environment provides more opportunities to study the chosen topic and contributes to better mastering of theoretical material and development of research skills. It is the skills of research in the digital library environment that help to improve the ability to work with search engines, digital documents, electronic resources and platforms, present research results to the public, etc. Despite the generally positive attitude, students also faced some challenges. This includes the stress of adapting to work in the new electronic environment of the library, the ability to process a large amount of necessary information quickly and efficiently, work on different platforms, and process materials correctly.

The academic staff of Hryhorii Skovoroda University in Pereiaslav showed in the survey that the most effective means for independent work of students are distance courses, auxiliary teaching materials and methodological developments, scientific articles posted in the university repository. As a positive aspect of quality teaching and research, lecturers noted the possibility of working on the international platforms Scopus and

Web of Science; constant updating and replenishment of library collections with new acquisitions; holding webinars, seminars and trainings by library staff to inform about the use of library collections, platforms, etc. Among the negative aspects that impede the effective work of lecturers with library collections are the physical workload of academic staff, their lack of mobility and flexibility in times of transformation.

Making a comparative analysis of our own research results and the results of the research of a number of foreign scholars who have studied the use of information and library technologies in creating a scientific educational environment in libraries of higher education institutions, it should be noted that the results of the research by C.A. Rabelo *et al.* (2024) also focus on the student experience in academic libraries. Their results emphasise the diversity of research on academic libraries. According to the research of these scholars, the intellectual structure of student research reveals six dominant themes as follows, the experience of international students; service landscape and service design; the impact of technology; information literacy; psychological and emotional aspects; engagement and motivation. In addition, similar studies of the effective use of electronic library resources were conducted by M. Nahotko & M. Deja (2024). The researchers studied the perception of e-books among first-year undergraduate students in the information management programme and proposed a model of technology perception and identified four dimensions of ebook perception: perceived usefulness, perceived ease of use, attitude to use, and behavioural intentions to use e-books.

Related to the current work are the studies of S. Susmita & Md. Roknuzzaman (2024), who studied the attitudes of library staff to Internet resources and areas of its use in university libraries in Bangladesh. It is determined that wireless technologies, cloud computing, mobile applications, artificial intelligence and semantic search can be considered as the main tools for working in the Internet environment. Among the main areas of library activity where Internet technologies can be used are tracking, book reservation, duplication, user identification, service marketing, resource selection, information networks and resource sharing, etc. The integration of modern technologies and the Internet into the activities of university libraries will result in the potential transformation of ordinary libraries into smart libraries. Productive for the development of the topic discussed in the current article were the studies of Y. Riady *et al.* (2023), which attempted to model the factors that influence the use of digital libraries and user satisfaction with library electronic services. C. DeJunco (2024) explores critical library pedagogy, which aims to teach students to analyse and challenge the structures that determine what information is considered valuable and characterises critical teaching as one of the most important methods in STEM librarianship.

In the course of the comparative analysis, a number of publications on the activities of libraries in international countries were studied. In particular, S. Nakaziba & P. Ngulube (2024) describe the activities of university libraries in Uganda in implementing digital transformation technologies, as well as identify factors that facilitate and hinder the implementation of digital transformation in some university libraries in Uganda. M. Jabeen *et al.* (2024) investigated the current digital trends adopted by public libraries in Baluchistan and also learned about the challenges and potential solutions to digital trends from the users of these libraries. A model for integrating information and communication technologies (ICT) into resource sharing practices to improve service delivery in academic libraries in southeastern Nigeria is described in A.A. Ifeanyi & A. Nancy (2024). A.M. Shamim *et al.* (2024) in their own study examined a number of services and facilities provided by rural public libraries in West Bengal in India and assessed librarians' perceptions of the introduction of information and communication technologies (ICT). In turn, A. Rivera-Macias & B. Caselden (2024) studied and described the activities of libraries in Finland during the Covid19 period and described the challenges faced by public, special and academic libraries in the Helsinki metropolitan area; in particular, they proved the importance of library staff in disseminating knowledge of digital literacy during the pandemic and providing this type of service to users. Researchers M.I. Mairaj & M. Mukaram (2024) investigated the obstacles and identified prospects for the development of a unified catalogue of university libraries in Lahore, Pakistan. As a study result, the researchers described university libraries in Lahore as well-organised and having adequate collections and IT literate staff; well automated, with a quality Internet connection, equipped with integrated software, and following the rules of cataloguing and MARC standards (Machine-Readable Cataloguing). However, in order to create a unified catalogue in the future, the libraries have identified the need to disseminate the available relevant information that will help improve communication with partners, stimulate librarians' activities, realise that sharing is caring, support the initiatives of the Higher Education Commission of Pakistan and practically increase the professionalism of librarians in this area. We agree with the authors' opinion on the importance of introducing information and library technologies into the educational process of higher education. In addition, the authors identify a number of topical issues regarding the organisation of libraries' activities abroad and in Ukraine. Among the related issues are the following: equipment with integrated software, digitalisation and cataloguing of library resources, dissemination of digital literacy knowledge among students and lecturers, quality Internet connection and qualified staff, etc.

The results of the observation, study of the library's website, analysis of literature sources and results of the survey (questionnaire) proved that quality services play an important role in predicting user satisfaction, and user satisfaction was the most significant predictor of usage. In addition, this study developed quality criteria (accessibility, content, flexibility, mobility, technology) that can serve as a guide for stakeholders to improve digital library services, user satisfaction, usage, net benefit, and loyalty.

## Conclusions

Based on the analysis of the results of the survey of students of Hryhorii Skovoroda University in Pereiaslav, the following conclusion can be made: information and library technologies play an important role in creating the scientific and educational environment of a higher education institution and are perceived by the majority of students as effective. These technologies facilitate faster processing of large volumes of scientific sources, access to library collections from any place at any time, mobility of students and academic staff, and help in the development of skills in scientific practice. At the same time, there are certain challenges that require attention. Students faced stress from the need to adapt to working in the changing electronic environment of the library, not fully developed the ability to process quickly and efficiently a large amount of necessary information, work on different platforms, especially international ones, and process materials correctly. The effective implementation of information and library technologies in the practice of the library of a higher education institution is a key factor in improving the quality of education and ensuring the scientific training of students. Digital libraries are becoming effective resources that preserve cultural heritage, support research, provide business support and ensure information literacy of users.

An important aspect of this study is the identification of key problems and trends in the development and operation of reference and information collections of libraries in higher education institutions. The solution of the above problems, in particular the need to use electronic educational resources in distance learning, competent application of artificial intelligence, analysis of users' habits and needs, active support of information literacy, application of innovative technologies for structuring and indexing information, etc. is closely related to ensuring the prospects for the development of digital libraries, reference and information collections, bringing them in line with the requirements of time and users' needs. Modern information and library technologies, if actively and skilfully applied, contribute to the creation of comfortable conditions for effective educational and scientific activities of students and research and teaching staff of higher education institutions and the elevation of scientific work to a new progressive

level, conducting quality research and the development of education and science in general. Prospects for further research include new opportunities for the library to provide access to digitised information for students and researchers, study artificial intelligence (AI) as a tool for future library services, assist users in working with international research platforms, conduct and support relevant research.

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## Conflict of Interest

None.

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## Сучасні інформаційно-бібліотечні технології у організації наукового освітнього середовища у закладі вищої освіти

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**Анотація.** Вивчення сучасних інформаційно-бібліотечних технологій є им, оскільки бібліотеки є центрами інформаційної та наукової діяльності, сприяють створенню ефективного освітнього середовища і впровадженню новітніх технологій, що підвищує рівень наукових досліджень і розвитку науки. Метою написання даної публікації було охарактеризувати електронні ресурси та дослідити можливості, що сприяють якісному проведенню освітнього процесу та забезпеченню наукової складової шляхом використання електронної бібліотеки Університету Григорія Сковороди в Переяславі. У дослідженні використано змішаний підхід, що включає як кількісні, так і якісні методи збору даних. Основними методами збору даних було вивчення сайту бібліотеки Університету Григорія Сковороди в Переяславі та опитування за допомогою структурованої анкети здобувачів освіти та науково-педагогічних працівників щодо їх роботи з електронними ресурсами бібліотеки. Результати показали, що у бібліотеці якісно функціонують електронні каталоги, репозитарії, є можливість роботи на міжнародних освітніх та наукових платформах. Результати опитування свідчать про те, що здобувачі освіти та науково-педагогічні працівники мають доступ до електронних ресурсів та можуть ефективно працювати у зручний для себе час з будь-якого місця. Окрім позитивних відгуків можна виокремити низку труднощів, з якими стикаються здобувачі освіти під час роботи з електронною бібліотекою. Це стрес від необхідної адаптації до роботи у динамічному електронному середовищі, недостатньо сформоване вміння опрацьовувати великий обсяг інформації швидко, коректно та ефективно, працювати на різних платформах, особливо міжнародних: Scopus, Web of Science тощо. Важливою також є вчасна поінформованість користувачів бібліотеки стосовно нових надходжень, можливостей дистанційної роботи та особливостей роботи з наявними електронними ресурсами та платформами. Результати проведеного дослідження можуть слугувати основою для впровадження передових інформаційно-бібліотечних рішень у діяльність бібліотек закладів вищої освіти, вдосконаленню їх роботи та створенню продуктивного інноваційного наукового освітнього середовища

**Ключові слова:** бібліотечні фонди; електронна бібліотека; цифрові ресурси; наукові платформи; вища школа; інноваційні технології