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Language as an important means of information encoding

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Abstract. The purpose of the article is to study the significance of language as a means of encoding information, to prove its influence on the process of storing and transferring information. The research methodology consists in the application of various approaches: analytical – to study the literature on the topic of the article, systematic – to study the language as a means of coding information using general scientific methods, first of all systematisation and generalisation, as well as a comparative historical method. The scientific novelty lies in the fact that the paper shows the importance of language as a necessary means of encoding information. Since ancient times, language has been a necessary means of communication in society. It did not have such clearly defined forms, was inarticulate, did not have specific rules and was not standardised, but with the development of society, language becomes more normalised. This played a very important role in the existence of mankind, because with the help of language, our ancestors managed to pass on a huge amount of experience, customs, traditions, cultural heritage and certain norms to their descendants, and today we already consider the concept of language as a tool for encoding the necessary information in various systems. And from this, accordingly, there arises a need to study language as a means of encoding information. Conclusions. Due to the need to encode information, a variety of techniques began to appear to solve this problem. Of course, methods of encoding information with the development of mankind have changed from a simple shift of the alphabet to the emergence of modern digital systems. And as a result, the emergence of the programming language as a special subtype of the artificial language is a consequence of the development of computing technology. This is how special font complexes began to appear to designate characters in electronic computer technology and systems built into it

Keywords: language; information; communication; information encoding

The relevance of the topic of the study

Since ancient times, language has been an important and necessary means of communication in society. It did not have such clearly defined forms, it was inarticulate, it was not normalised, but with the development of society, the language has become more standardised and normalised. This played a significant role in the existence of mankind, because with the help of language, our ancestors managed to transfer a huge amount of experience, customs, traditions, cultural heritage and certain norms to their descendants, and today we already consider the concept of language as a tool for encoding the necessary information in various systems. Hence, there arises the need to study language as a means of encoding information. Accordingly, the purpose of the article is to clarify the significance of language as an important means of encoding information, to prove its direct influence on the process of storing and transferring information. The scientific novelty is that the paper analyses the importance of language as a necessary means of encoding information.

Analysis of studies and publications

It is generally known that language is one of the main means of transferring information. The well-known researcher V.M. Bryzhko (2017) argued that for a person, an individual piece of "information" is only messages

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or data that may reduce (or not reduce) the recipient's ignorance, and its subject connection may indicate (or not indicate) the emergence of an information product (Bryzhko, 2017). The problems of symbolic character of language and its individual levels, the essence of general concepts of system and structure, and the connection of language with society were studied by the linguist O. Melnychuk (1981). The pragmatic approach to the analysis of communicative aspects of language is analysed in the scientific research by L.R. Bezugla (2012). The well-known linguist M.P. Kochergan (2006) investigates the system-forming properties that a language system endows an object with and which it does not have outside the system. The fundamental properties of artificial languages, the features of modern programming languages in view of their connection with natural language are analysed by I.P. Biskub (2015), who came up with the idea of creating a universal artificial language for communication with a computer using the UNL language as an example. The terminological definition of artificial languages, their interpretation in the synchronic and diachronic aspect was carried out by A. Volkov & M. Skab (2001). A detailed description of the principles of development and implementation of modern programming languages was made by M. Gabrielli & S. Martini (2010). R. Sebesta's (2009) work deals with the study of the concept of programming languages, a critical assessment of their current and future state. However, there is still no thorough study on the features of language as a means of encoding information in the scientific literature.

Presentation of the main material

From time immemorial, in every society the main way of encoding information has been a language; furthermore, in each state it can be different or even several languages can be used at the same time. An example with the designation of snow: in the Eskimo language – more than 30 names, in the Ukrainian language – up to half a dozen.

It should be noted that today there are many methods for encoding information, but one of the first was the cryptographic method. Cryptography (Greek: *krypto* – secret; *grafo* – writing: secret writing) is a type of special writing that makes it possible to write down a written text recorded in natural written language in a way that makes its letter-by-letter recognition maximally complicated. Cryptography consists of two opposite processes – encryption and decryption of texts. Encryption is changing the image of characters in the text, their codes or order based on certain predetermined rules. Such rules are called the key. Cryptography is used when there is a need to make the text available (understandable) only to a certain circle of recipients who know the key (for the rest of the recipients, the text must be incomprehensible) (Kuleshov, 2000).

As researchers note, in the 5th century BC Spartans began to encrypt military messages. To do this, the senders and recipients of the text were to have sticks of the same diameter. The sender of the text spirally wound a narrow tape around one of the sticks and wrote down the desired text horizontally. The recipient had to wind the tape around the similar stick and read the text horizontally in the same way. A different diameter of the stick made it impossible to read the text (the letters shifted vertically, resulting in a gobbledygook). This method of encrypting texts was called the Skytala cipher after the name of its inventor.

Later in the 1st century BC, the Roman commander Julius Caesar encrypted his messages in a slightly different way, shifting the second (encrypting) tape of the alphabet several positions relative to the first one, presented in the correct sequence. Then, in the text, instead of each letter, he substituted the one that stood in the second line of the alphabet. As a result, the word empire after encryption took on the following form: жймгнжщ (this is if we translate the system of that time into Ukrainian).

Later in the 16th century, Blaise de Vigener created another original method of encryption, which was based on a table specially formed from the alphabet. To encrypt the text using this table, for each letter of the text it was necessary to indicate its two coordinates: horizontal and vertical. In this case, the same letter received different codes depending on the line from which it was selected. Coordinates could be recorded both with letters and numbers (Kuleshov, 2000).

In contrast to information encryption, the concept of "decryption" is also used. Decryption is the restoration in the text, based on the key, of the primary image of the characters, their codes or order. Decryption is possible without knowledge of the key, but in this case, it requires much more time to reconstruct the text (Kuleshov, 2000).

Usually, cryptography is practically not used in mass media (except for some crossword puzzles). However, sometimes mass media workers need to use cryptography during journalistic investigations or when performing the functions of foreign correspondents. It should be noted that among the cryptography methods, the following are distinguished:

- one-dimensional, two-dimensional, three-dimensional encryption keys – for encryption on paper;
- email encryption via mailboxes;
- file passwording using different methods.

According to S. Kuleshov (2000), the most striking achievement of the past was the deciphering of ancient Persian, Acadian, and Sumerian texts (Grotefend, 1802), as well as ancient Egyptian writing (Champollion, 1822). The basis for deciphering by Grotefend was a comparison of the titles of two kings, and for Champollion, a comparison of the names of the kings (in the first and second cases, the titles and names were presented in different languages, one of which was known).

Another way of encoding traditional writing, which until recently was used in electrical communication channels, is called the Morse code after the surname of its author. Characters in the Morse code are encoded using short ("dots") and long ("dashes") electrical signals. In this case, the dot is considered a unit of duration. The duration of the dash must be equal to the duration of three dots. The pause between signals in a letter (of alphabet) is equal to one dot, and the pause between letters is equal to three dots (Kuleshov, 2000). It is known that the Cyrillic version of this alphabet is based on the external (graphic) similarity of the letters with the Latin ones. In cases where Cyrillic letters do not have graphic analogues, codes are assigned to them arbitrarily. In the Morse code, there are also notations for punctuation marks (period, comma, exclamation mark, question mark, semicolon, colon, parentheses, hyphen, quotation marks) and special signals (section boundary, erasure of previous character, beginning of transferring, readiness to receive, start of action, end of transferring). It should be noted that the total number of "dots" and "dashes" in codes denoting letters depends on the frequency of letters in texts (the more frequently a letter is used, the shorter its designation). Due to the transition to the use of computer technology (respectively, digital codes), the use of the Morse code (analogue signals) has recently been declining. It should be noted that today it is used most often by radio amateurs.

According to scientists, with the advent of computers, in order to organise their communication with people, a task arose – to create special fonts (font sets) for them, in which letters are indicated not by graphic (as in traditional writing), but by digital images (digital codes). A corresponding graphic image of the character was "attached" to each such digital code (Kuleshov, 2000). It should be noted that the font sets supplied with the Windows operating system include Ariel, Courier New, Times New Roman as mandatory ones. In addition, each such font set includes 224 characters, among which there is the Latin alphabet, and some others may also be present.

UNICODE font sets contain approximately 60000 characters. Each such set consists of alphabets and hieroglyphs of most languages of the world. Accordingly, in these font sets:

- codes from 0 to 8191 (hexadecimal codes 0...1FFF) are assigned to the alphabets of all European languages, Hebrew, the alphabets of Arabic and Indian languages, as well as phonetic signs;
- codes 8192...12287 (hexadecimal 2000...2FFF) – for punctuation, mathematical, technical symbols and ornaments;
- codes 12288…16383 (hexadecimal 3000…3FFF) – for phonetic Chinese, Japanese, and Korean writing;
- codes 16384...59391 (hexadecimal 4000...E7FF) – for Chinese, Japanese and Korean characters, as well as Han calligraphy;
- codes 59392...64023 (hexadecimal E800...FDFF) – for private use;
- codes 64024...65535 (hexadecimal FE00...FFFF) – to ensure compatibility with other fonts (Toftul, 2006).

Interestingly, researchers identify three stages in creating font sets. At the first stage, each character (including each letter) was encoded with one byte. Since a byte can represent no more than 256 different combinations of binary numbers, such a font set could contain no more than 256 characters. In fact, only 224 codes (starting from the 32nd to the 255th) were used to encode characters in such a font set, and the remaining 32 (from the 0th to the 31st) were used to encode the commands of displays and printers. The graphic representation of letters had only one single letter shape (like on a typewriter). Such type sets were recorded permanently in special chips of displays and printers. Such fonts were used, for example, by the MS DOS operating system (Kuleshov, 2000). At the second stage, just like at the first one, each character continued to be encoded with one byte, however, the graphic representation of the characters could already be varied (for example, in the fonts Courier New, Times New Roman, Ariel). Such fonts were no longer permanently recorded in special display or printer chips, but were used as regular computer information support, which, like any programmes, can be installed and, if necessary, removed. To present information about the graphic design of a character in these font sets, special standards were developed. A very large number of such digitised fonts were developed. They were used with other types of operating systems (these were systems like the Windows family). Such fonts contained: in the area of codes from 32 to 127 – in particular, letters of the Latin alphabet (lower and uppercase); in the area of codes from 128 to 255 – either Latin letters with diacritical marks (for languages based on the Latin alphabet), or letters of other alphabets (Greek, Cyrillic, Hebrew, Arabic, etc.). Thus, the code zone from 128 to 255 was variable, which excluded the possibility of communication between people who used different alphabets (for example, simultaneously Latin with diacritics and Cyrillic, Arabic and Cyrillic) (Kuleshov, 2000). At the third stage – its emergence was caused by the needs of the Internet – in order to ensure the possibility of communication between people exchanging information in different languages (for example, based on the Latin alphabet and hieroglyphs), it became necessary to significantly expand the number of characters (mainly letters, ligatures and hieroglyphs) in these font sets. As a result of the search, font sets were created in which one character was encoded not by one, but by two bytes (two bytes make it possible to encode more than 60000 different combinations of binary numbers, and, therefore, characters). Such fonts are called UNICODE. Like the fonts of the second stage, they are used in operating systems such as the Windows family (Kuleshov, 2000).

Conclusion

Language has made a significant development path from the simplest function of ensuring society's communication to the creation of artificial languages by mankind itself to meet the need for fixing and communicating concepts in certain narrow circles. Thus, certain means of encrypting information began to appear, ranging from cryptography to modern computer systems, without which we can no longer imagine our daily life. In addition, the rapid globalisation of all spheres of human activity has given impetus to the strengthening of international contacts between individuals and entire communities. These processes constantly contributed to the emergence of artificial languages that would be universal and accessible for performing specific tasks.

Methods of encoding information in the course of human development have changed from the simplest shift of the alphabet to the emergence of modern digital systems – programming language as a special subtype of artificial language, which is a consequence of the continuous development of computing technology.

This is how special font sets began to appear to designate characters in electronic computer technology and systems built into it. And in the course of time and further development of science, these systems in the future will require new approaches to their study and thorough scientific research.

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Innovative technologies and methods in the management of higher education establishment library

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Abstract. The purpose of the article is to analyse and summarise the features of a modern approach to library management in a higher education establishment (HEE) involving the introduction of innovative technologies and methods. The research methodology is based on the use of general scientific and special methods, in particular, analysis and synthesis, comparison, generalisation, and system-structural analysis. Scientific novelty. The essence and typification of library innovations, the goals of software for managing the library of a higher education establishment and the specifics of managing the process of library changes are clarified. The factors influencing the effectiveness of library innovation processes are outlined. Conclusions. Current trends worldwide are determined by the transition of information provision and delivery from traditional models to electronic and web formats. It is determined that the library of a higher education establishment can use artificial intelligence to provide users with alternative educational services. It has been established that the modern approach to library management is to implement innovative technologies and methods that enable the library of a higher education establishment to be efficient, accessible and convenient for users. The advantages of library automation have been identified. Implementing innovative technologies and methods, such as electronic resource management systems, library process automation systems, and electronic document management, enables university libraries to improve access to information and optimise management processes, as well as help predict and respond to changes in user and market needs. It has been established that developing a digital library facilitates the generation of reports that help staff obtain data on document flow. It is determined that the advantages of an integrated library system include increased productivity, reduced operating costs, improved control, improved speed, reduced errors, increased range and efficiency of administration

Keywords: modern HEE libraries; library management; innovative technologies; electronic resources; information space; information resources; optimisation; repository; digitalisation; digital resources; artificial intelligence

Relevance of the research topic

The modern library of a higher education establishment (hereinafter – HEE) is important in the lives of students, lecturers, and researchers who study new scientific areas, conduct differentiated research, among other activities. Due to the growing amount of scientific information available on the Internet, it has been established that the library of a higher education establishment should introduce innovations, new information

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technologies and methods to ensure the effectiveness of its activities. In other words, libraries must constantly adapt to use technological advances and master new tools and strategies to meet the needs of users in the digital media era (Horban & Gaisyniuk, 2023). Technologies should be integrated to leverage shared knowledge and available resources, leading to innovative levels of functionality and enabling future generations to collaborate.

In the process of management, libraries of higher education establishments face the problem of ensuring intensive, efficient processing and preservation of information received in electronic form, as well as insufficient automation of management processes, which in turn leads to delays and errors in the provision of services to users. To solve these problems, it is necessary to ensure the implementation of innovative technologies, artificial intelligence, automated library management systems, and other differentiated methods, as well as to use social media to communicate with users and promote library services. The innovative component of library activity largely depends on the technical basis of this process. The uniqueness and peculiarity of the role of libraries in public life necessitates a radical change in the scientific and practical foundations of the modern library of a higher education establishment, the search for new mechanisms for implementing strategic vectors of its development (Barabash *et al.*, 2023). Given this, it is relevant and necessary to study the peculiarities of the modern approach to the management of the higher education library, in particular the introduction of innovative technologies and methods.

Recent research and publications analysis

Only a small number of scholars have studied modern approaches and specific features of implementing innovative technologies and methods to ensure effective library management. In particular, the scientific works of V. Barabash *et al.* (2023), O. Voskoboynikova-Guzeva & N. Tereshchenko (2021ab), Y. Horban & N. Gaisyniuk (2023), O. Kolomiets & O. Golovata (2020), S. Aithal *et al.* (2016), B. Asid (2020), L. Bills (2000), C. Brundy (2015), O. Christopher & D. Yusuf (2018) reflect the study of the modern approach features to the management of the library of a higher education establishment based on the introduction and application of differentiated innovative technologies and methods.

The activity of the HEE library as a centre for the accumulation and storage of socially significant information is studied in the work of O. Kolomiets & O. Golovata (2020). The authors analyse the interaction process between the university library and users of information resources in modern conditions, which arises under the influence of the development of information technology in the library sector and education in general. O. Voskoboynikova-Guzeva & N. Tereshchenko (2021ab) consider the library of a higher education establishment (on the example of domestic and foreign institutions) as an intellectual space, a complex scientific, information, social and communication complex, a key information resource of the university that participates in modernisation processes and contributes to improving the quality of research, learning and teaching, as well as the values (ethical, socio-economic, communicative) that form the basis for building a strategic development of the library.

Analysing the current state and prospects of library development, S. Rzhechytska (2023) notes that digital optimisation of the activities of the Ukrainian HEE library, despite the slow pace of transformation, is now gaining a characteristic priority of generating an online product, so the information resources of a modern library should combine all possible formats; Y. Horban & N. Gaisyniuk (2023) emphasise that it is important for libraries to use the opportunities provided by digital technologies and adapt their services, facilities and policies accordingly.

A number of domestic researchers believe that based on educational libraries formation and development of professional information and communication environment takes place, so in the context of the new paradigm of education, the philosophy of an educational library is developing, where service activities, joint creation and use of modern information resources are prioritised (Grigorevska *et al.*, 2022).

The purpose of the article is to study and summarise the features of the modern approach to library management of a higher education establishment, which involves the introduction of innovative technologies and methods. To achieve this goal, the following tasks have been defined: to analyse innovative technologies and methods of managing an academic library and to identify the main objectives of software for managing a library of a higher education establishment.

Main research material

At the beginning of the twenty-first century, a phenomenal paradigm shift in the provision of library and information services took place around the world. The consequences of the information and communication technologies' impact on every sphere of human development are obvious, and their influence on library and information services is difficult to overestimate. New technologies and means of communication have contributed to the development and emergence of electronic services in libraries, which have become the basis for the formation of digital libraries (Esew & Ikyembe, 2013). Current trends worldwide are determined by the transition of information provision and delivery from traditional models to electronic and web formats (Christopher & Yusuf, 2018). Thus, the vision of a library of a higher education establishment is impossible without interactivity, which is based on the values of openness, accessibility, innovation, and service, as well as multifunctionality, convenience, and networking (Esew & Ikyembe, 2013).

The modern approach to library management is to implement innovative technologies and methods that enable the library of a higher education establishment to be efficient, accessible and user-friendly. In turn, the library enhances the competence of members of the university community by expanding the offer of resources and services, information and media education (Voskoboynikova-Guzeva & Tereshchenko, 2021a). Currently, the process of library management faces unpredictable challenges in the information technology age, in particular, in providing differentiated information services to users. The existing principles of library management are becoming ineffective, so libraries need to assess and measure the impact of information technology on them, which in turn will improve the quality of services.

In the early 1990s, HEEs began the process of library automation, collecting and reporting data on academic library operating costs, staffing, and collections for accreditation and annual reports. To properly support their role, academic libraries' content offerings go far beyond the books on the library shelves and offer vast collections of scholarly articles and digital materials such as photographs, documents, or manuscripts, managed by an integrated library system or ILS, combined with online catalogues to show a fraction of the total collection or library collections.

Library automation can be defined as the use of computers to perform traditional library operations such as acquisitions, circulation, cataloguing, and reference and serials control. Automation is used to reduce the amount of time staff spend on repetitive activities that must be performed in any well-functioning library. In addition, library automation is a way to restructure its functions and rethink its services to adapt the institution to the new conditions and needs of the academic, teaching, and learning community. If the modernised library and information centre are properly planned and implemented, the automation of the HEE library should unite and help students to become skilled information users and promote their lifelong learning (Asid, 2020). Table 1 shows the innovative technologies and methods used to manage the library of a higher education institution.

Table 1. Innovative technologies and methods for HEE library management

Innovative technologies and methods	Description
Electronic resource management system (ERMS)	ERMS is a software that enables an HEE library to manage electronic resources such as databases, e-journals, books, etc., as well as to store, control and provide access to electronic resources and monitor their use.
Integrated library systems (ILS)	ILS is software that enables the library of a higher education establishment to manage the catalogue of books and periodicals, book orders and other processes. This innovative technology enables the library to improve information processing and retrieval, reduce processing time, and optimise the user experience.
Virtual libraries	A virtual library is defined as an online service that provides users with access to the library's electronic resources, enables them to quickly and conveniently find and obtain the information they need, and allows them to make requests for documents from any location with an Internet connection.
Organising electronic document management	Electronic document management is defined as the process of exchanging documents between differentiated departments of a library using electronic means. This technology allows the university library to process documents quickly and conveniently, reduce processing and storage time, store data electronically and reduce the cost of printing and storing paper documents, as well as allows for a high level of confidentiality and security of document processing.
Interactive technology applications	Allows users to use the library conveniently and efficiently based on the developed and implemented interactive screens, audio guides, tips and other tools.
Artificial intelligence technology implementation	AI ensures the efficient operation of the library based on the developed systems that are endowed with the functions of providing recommendations to users regarding literature based on the analysis of their interests and previous requests. AI also assists librarians in the automatic distribution of books and procurement planning.
Using multimedia tools	To ensure efficient and effective learning of new information, librarians create video and audio materials and develop virtual expositions that allow library visitors to learn about interesting topics and materials.
Using speech processing technology	Some higher education libraries are using voice-activated tools to help search and navigate the library catalogue and are developing systems that automatically translate texts from one language to another, which is again a positive trend for those higher education institutions with international students.
Using information and analytical systems	These systems enable the analysis of statistics on the use of library resources, user behaviour, and other indicators that allow librarians to make decisions about how to improve their work.
Using electronic catalogues and databases	It allows users to find the materials they need quickly and efficiently, and librarians can provide access to databases containing scientific articles, e-books, videos and other scientific resources.

Table 1. Continued

Innovative technologies and methods	Description
Using virtual tours	Libraries use virtual tours to allow users to get acquainted with the institution and its services, which in turn can be especially useful for new users who do not know how to use the library of an HEE.
Mobile applications	Libraries of higher education establishments develop mobile applications for using the services of the university on a mobile device.
Extended services and applications	HEE libraries can introduce differentiated programmes and services that meet the needs of users, such as readers' clubs, lectures, workshops, meetings with writers, etc.

Source: compiled by the author based on A. Llewellyn (2019), M. Naveed *et al.* (2021), R.O. Okunlaya (2022), L. Pellack (2022)

The implementation of innovative technologies and methods, such as electronic resource management systems, library process automation systems, and electronic document management, enables higher education libraries to improve user access to information and optimise management processes and can help higher education libraries to anticipate and respond to changing user and market needs.

One of the technological innovations of digital transformation that a university library can use to provide users with alternative educational services is artificial intelligence. This technology helps to make the right decisions for obtaining and sharing information, teaching and research. However, even though generative artificial intelligence can revolutionise not only the work of libraries but also any activity, the available literature confirms the low level of using this technology by university libraries to provide innovative alternative services (Okunlaya, 2022).

Integrated library systems (ILS) are designed to manage the library of a higher education establishment, but the process of managing electronic resources is a rather difficult task for ILS. In order to overcome these problems, ILS vendors are working on next-generation library catalogues to provide a single search interface. New generation library systems are compatible with resource description and access (RDA), where specific features of library systems include cloud-based, authorised login and unified workflows, knowledge base, electronic resource and licence management; they are superior to older ILSs and take some time to reach their peak (Yang, 2013).

The integrated library system was to be used to make it easier for libraries to carry out their processes faster and more accurately, to make libraries keep records and to help them generate the necessary reports (Bills, 2000), which in turn improved and revolutionised the library process, in particular, acquisition, cataloguing, circulation control, book reservations, online catalogues and many other services became more efficient compared to the manual system. In addition, several other benefits include increased productivity, reduced operating costs, improved control and speed, reduced errors, and increased range and depth of administration (Kochtanek & Matthews, 2002; Naveed *et al.*, 2021). The SIMS (Srinivas Institute of Management Studies) library has a Windows-based higher education library management software developed by a team of experts and library professionals to perform the main functions of the library and to meet the user's needs. Figure 1 illustrates the main goals of HEE library management software.

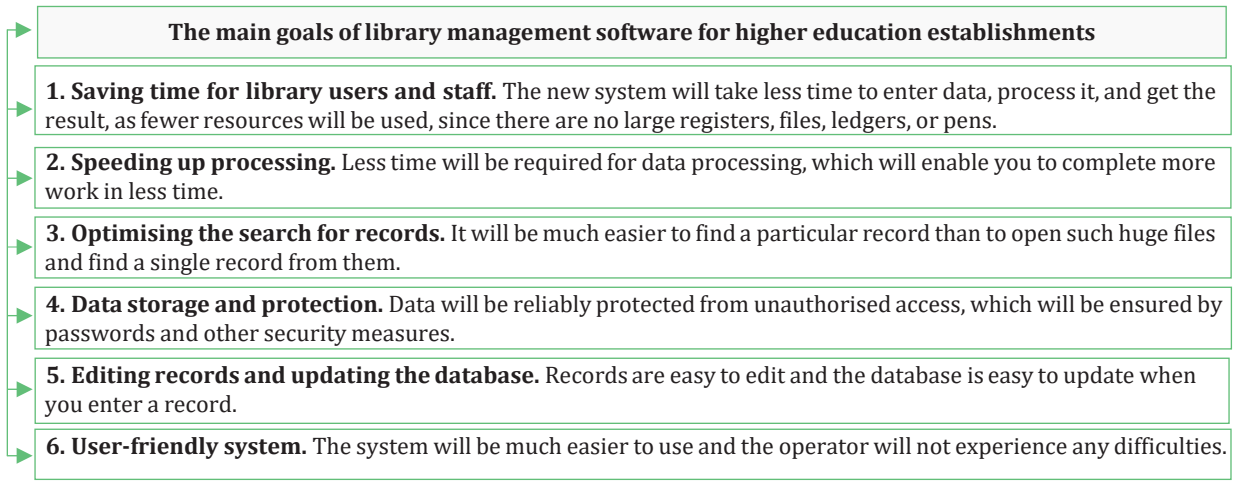

Figure 1. The main goals of library management software for higher education establishments
Source: compiled by the author based on S. Aithal *et al.* (2016)

The SIMS library system should provide information such as the availability of a particular book by title; the availability of a book by a particular author; the availability of a book by barcode number; and the number of available copies of the required book. The library management system of the HEE should also be able to generate reports on the documents available in the library, so appropriate printouts should be created for each record (loan/return) made in the system. The system should provide security provisions such as "Authenticated Login", where everyone will have a user ID and password; a record of system users should be kept in a log, and complete backup and restoration of the system should be provided (Aithal *et al.*, 2016).

Managing a library in a higher education establishment is defined as a labour-intensive process where librarians are responsible for day-to-day activities, ensuring the safety of resources, meeting the readers' demands for books they need, etc. One of the important features of an automated library system is the management module, which helps to organise and administer key operations where librarians no longer need to catalogue books or track circulation activities manually. The system can also automate the actions of an external user, allowing students to easily access materials and not face any procedural delays. On the other hand, sometimes forgetting to return books within a set time frame can cause problems, so the software sends notifications to users reminding them of the return date or overdue dates.

The creation of a digital library facilitates the generation of detailed MIS reports, which helps staff obtain data on book circulation and information related to the production and submission of publications. In addition to integrating OPAC (Online Public Access Catalogue), the digital library of a higher education establishment has a digital catalogue that helps users search for books, journals, and other various reading materials, and M-OPAC (Mobile – Online Public Access Catalogue) allows readers to do the same by entering the name and title of the author (Poonam, 2023).

Thus, digitalisation helps to expand the capabilities of the automated library system, which enables the optimisation of basic administrative activities, providing library staff with the ability to work efficiently.

Conclusions

Based on the conducted analysis, it can be concluded that the introduction of innovative technologies and methods is a prerequisite for ensuring effective management of the library of a higher education establishment. At present, the library of a higher education establishment has to meet the needs of students and lecturers in access to up-to-date and relevant information, as well as manage resources and services through the use of innovative technologies and methods. Thus, effective management of an HEE library includes both providing access to the necessary research and educational information and understanding the needs and requirements of users, analysing data and planning strategies, which in turn involves the efficient use of resources and high-quality library services.

The research findings can be used in differentiated areas related to library work, education and innovative technologies that will increase the efficiency and productivity of the university library, improve the quality of user service, and reduce time and resources spent on routine work. The results of the study can have a significant impact on improving library services and the process of library management in higher education establishments. Further research can be aimed at determining the impact of innovative technologies and methods on the quality of user service and the effectiveness of resource management in HEE libraries.

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Інноваційні технології та методи в управлінні бібліотекою закладу вищої освіти

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Анотація. Мета статті – дослідити та узагальнити особливості сучасного підходу до управління бібліотекою закладу вищої освіти, що передбачає впровадження інноваційних технологій і методів. Методологія дослідження базується на використанні загальнонаукових і спеціальних методів, зокрема аналізу та синтезу, порівняння, узагальнення, системно-структурного аналізу. Наукова новизна. З'ясовано сутність і типізацію бібліотечних інновацій, цілі програмного забезпечення для керування бібліотекою ЗВО та специфіку управління процесом бібліотечних змін. Окреслено чинники, що впливають на ефективність бібліотечних інноваційних процесів. Висновки. Сучасні тенденції в усьому світі визначаються переходом надання та доставки інформації від традиційних моделей до електронних і вебформатів. Визначено, що бібліотека ЗВО може застосовувати штучний інтелект для надання користувачам альтернативних освітніх послуг. Встановлено, що сучасний підхід до управління бібліотекою полягає в імплементації інноваційних технологій та методів, які надають змогу бібліотеці ЗВО бути ефективною, доступною та зручною для користувачів. З'ясовано переваги бібліотечної автоматизації. Імплементація інноваційних технологій і методів, таких як система управління електронними ресурсами, системи автоматизації бібліотечних процесів та організація електронного документообігу, надає змогу бібліотекам ЗВО покращити доступ до інформації та оптимізувати процеси управління, а також допомогти прогнозувати та відповідати на зміни потреб користувачів і ринку. Встановлено, що створення цифрової бібліотеки сприяє формуванню звітів, які допомагають персоналу отримати дані щодо документообігу. Визначено, що до переваг інтегрованої бібліотечної системи належать підвищення продуктивності, зниження вартості експлуатації, покращення контролю, покращення швидкості, зменшення помилок, збільшення діапазону та ефективності адміністрування

Ключові слова: сучасні бібліотеки ЗВО; управління бібліотекою; інноваційні технології; електронні ресурси; інформаційний простір; інформаційні ресурси; оптимізація; репозитарій; цифровізація; цифрові ресурси; штучний інтелект

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Accommodation of activities of Ukrainian libraries under marital law

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Abstract. The purpose of the article is to provide an argumentative identification of a qualitatively new direction in the activities of Ukrainian libraries under martial law – socio-productive. The methodological basis of the article is based on general scientific methods such as abstract and logical, analysis, cognitive, and synthesis. Dialectical, objectivity, systemic, and structural-functional approaches to scientific knowledge are applied. The scientific novelty of the article consists in revealing the peculiarities of the functioning of Ukrainian libraries under martial law. Such traditional areas of activity in the conditions of the Russian-Ukrainian war, as information and communication, information and advisory, scientific, socio-cultural and local studies, should be supplemented with socio-productive ones. The proposed material enriches the theory of modern librarianship about the changing role of libraries in society under the influence of socio-political processes, determining the new quality of the Ukrainian library institute as an active participant in nation-building processes. The practical significance of the obtained results lies in the application of the acquired best experience of library practice in the activities of library institutions of all systems and departments in order to positively strengthen their image and reputation. Conclusions. In the conditions of the Russian-Ukrainian war, the library social institute immediately reacted to the events in the state, changing the algorithm of its functioning with a reorientation to socio-political requests. Among the main traditional areas of activity, the socio-productive one definitely stood out. That is, the library has shown itself as an adaptive system that rationally transforms the work algorithm in order to maintain the optimal state in accordance with the changing conditions of the external environment. The genesis of the strategy for the development of the Ukrainian library and information sphere is consistent with the strategies of national economic, social and humanitarian development

Keywords: llibrary science; library and information sphere; library; areas of activity of libraries; martial law

Relevance of the research topic.

Public libraries of Ukraine are an integral part of the information and communication system of the state, therefore, from the moment of gaining independence, they developed their activities as basic centres for the provision of various services to all categories of users, successfully implementing their mission "to provide the activities of society as a whole and a specific person with integrated and synthesised knowledge, accumulated by humanity in the process of historical development" (Slobodianyk, 1995). By the accommodation of the activities of the libraries of Ukraine in the conditions of martial law (lat. *assommodatio* – adaptation), we understand their expansion, which resulted in the ability to adapt to social and political changes in the state and became a procedural mechanism of the institutional functioning of the library institution. "At each specific historical stage of development, the functions of any social institution, including libraries, are inevitably improved and adjusted in accordance with the socio-cultural situation, socio-political, economic life of society" (Bashun, 1999).

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Analysis of current research and publications

The issue of studying the main areas of library activity is outlined in the publications of Yu. Artemov, O. Bashun, O. Vasylenko, T. Vylegzhanina, O. Voskoboynikova-Guzyeva, I. Vrublevska, S. Garagula, I. Davydova, V. Dobrovolska, V. Zagumenna, O. Klymenko, T. Koval, L. Konoval, O. Kuzmenko, N. Kunanets, K. Lobuzina, O. Maryina, Yu. Palekha, O. Pestretsova, O. Serbin, O. Sokur, G. Soloidenko, V. Soshinska, L. Cherednyk, G. Shemayeva and others. Theoreticians and practitioners of librarianship analyse the peculiarities of the functioning of libraries in the information society and knowledge society, characterise the traditional and innovative areas of library activity.

According to H.V. Shemayeva (2013), the mastering of modern information technologies by libraries had a fundamental effect on the expansion of the functional and content range of library activities, and contributed to the strengthening of communication interaction. The researcher singled out modern directions of cooperation of the library as an institution: library-user, library-library, library-social and communication structures, library-government, library-business. O. Voskoboynikova-Huzieva (2014) revealed the content and features of social partnership, stressing that the cooperation of book collections with state and local authorities, enterprises and organisations, public associations and individual citizens under modern conditions is an important factor in solving urgent problems of the library industry. The scientist proposed an effective concept for the development of social partnership in the library and information field.

O. Mariina (2012) considered the directions of library development taking into account the drastic changes that are taking place in the information infrastructure of society. O.Z. Klymenko & O.L. Sokur (2023) emphasise that the genesis of the library and information activity of the libraries of scientific institutions of the National Academy of Sciences of Ukraine in the system of scientific communications results in the use of modern technologies of electronic data processing and helps the harmonious combination with full-text databases to increase the efficiency of information search, in particular, contributes to the elevation of the intellectual and spiritual potential of Ukrainian society through the dissemination of scientific knowledge of Ukraine and popularisation of the assets of Ukrainian science in the world in general. S. Harahulia (2015) analysed the current trends in the processing of electronic sources of scientific information, revealing the methodological principles and models of integration of electronic sources of scientific information in scientific libraries.

Positive examples of library cooperation using the example of corporate cataloguing of regional universal scientific libraries of Ukraine within the framework of the successful project of the Yaroslav Mudry National Library of Ukraine "Culture of Ukraine" were highlighted by T. Vylehzhanina (2013). The researcher concluded that the successful operation of Ukrainian libraries requires the creation of conditions for their effective interaction within the framework of the development of powerful corporations in order to ensure high-quality service to the modern user. T.M. Koval & L.O. Turovska (2016) developed and presented various user service models that were formed under the influence of the introduction of modern technologies in the scientific library.

Therefore, Ukrainian scientists and practitioners state that with the introduction of the latest technologies, which were rapidly integrated into library processes, they gave a tangible impetus to all areas of the library industry. Improvement of service work in libraries – traditional centres of public preservation and use of information – made it possible to significantly expand the circle of users, including outside book collections. A conceptually new information environment requires a worthy response from the modern library to the challenges of the age – the age of social upheavals (the introduction of large-scale quarantine restrictions caused by the spread of the infectious disease Covid-19, the full-scale aggression of the Russian Federation against independent Ukraine and the introduction of martial law in the country). Now we are talking about the transformation of the library as a social institution.

The purpose of the article is the argumentative identification of a qualitatively new direction in the activity of Ukrainian libraries under martial law – socio-productive.

Presenting main material

Ukrainian librarianship has been enriched by scientific studies on theoretical-methodological, scientific-applicative, and organisational-technological directions of library functioning. As N.E. Kunanets (2014) emphasises, "the analysis of the processes of library activity in the context of social communication is complicated by the need to study their impact on the external environment, but it allows us to consider the book collection based on different levels of its perception – individual characteristics, social status and the role played by the book collection in the social environment".

The influence of external factors (globalisation, informatisation, the European vector of Ukraine, decentralisation among others) and internal factors (the introduction of the latest information and communication technologies into library practice, the transition to a remote form of work, online reference and bibliographic and information and advisory services) caused the expansion of tasks, filling functions with new content, which resulted in the introduction of innovative forms, types and methods into library practice. "The implementation of new communication service strategies involves the formation of new advantages through the definition of target groups of online users, the study of their information needs and the individualisation of

library services, the determination of priorities regarding the fullness of content and the selection of network channels for the provision of information products and services, the introduction of creative forms and methods of library services in order to support constant communication and interest of the Internet audience" (Yarema, 2022).

The development of the information society, and today, widespread digitalisation, have a positive effect on the processes of library practice. "Ukrainian library science and practice attests to the perspective of the formation of the national information space through integration as an integral component of the global information technologisation of Ukrainian society" (Klymenko & Sokur, 2023). According to S. Harahulia (2015), "technical and technological modernisation of library activity ensured the strengthening of the information function of the modern library".

In the modern socio-economic conditions of the transition to new economic relations and, above all, martial law, "the library social institution appears as an active component of public communications, global information exchanges and informational influences; the emergence of research dedicated to the scientific and informational support of branch science <...> in the conditions of European integration and globalisation processes; research of the library from the standpoint of media space, in particular in the system of public use of social media, or as an equal partner in its creation; increasing attention to interaction and coordinated formation of consolidated information resources of libraries, archives, and museums" (Voskoboynikova-Huzieva, 2014).

The occupation of parts of the Donetsk and Luhansk regions, the annexation of the Autonomous Republic of Crimea in 2014 became the beginning of a great and long war of Ukraine for a sharp turn towards the states of the democratic camp, the development of which is based on universal human values and principles of humanism. "But it is precisely the conscious European choice of citizens, the support of the country's movement towards the European Union, the establishment of European identity in Ukrainian society that is an extremely important component of Kyiv's entry into the European community, the return of Ukrainians to the European family of nations" (Klymenko & Sokur, 2023).

The implementation of the norms of international law into national legislation, the reform of all branches of Ukrainian society, the entry of librarianship into the information industry, increasing the information potential of libraries, integration into the global cultural-educational-scientific space prompted a change in the paradigm of librarianship and the search for new strategies for the development of the country's library and information sphere. "Today, the activities of libraries are enriched by the content of <...> functions that contribute to interaction with the external environment, the establishment of democratic and humanistic principles of development, and the provision of free access to information" (Kuzmenko & Zahumenna, 2021).

The full-scale invasion of the troops of the Russian Federation on the territory of independent Ukraine on February 24, 2022 changed the life of every Ukrainian forever and divided the world into democratic people-cantered countries and totalitarian ones that secretly or openly support the ethnocide of our people and the destruction of unique Ukrainian cultural heritage. "A large number of people who are getting education were forced to go abroad. However, the need for access to electronic information resources has become more acute, and the only such window is the library website. In view of the demand for electronic information resources, which has increased significantly, in connection with events in the state, library websites must meet the requirements of users" (Rzheusky & Kunanets, 2023). The task of protecting the intellectual, spiritual and cultural heritage of the Ukrainian people became particularly urgent.

In extremely difficult conditions, having recovered from the first weeks of hostilities and huge losses, the librarianship of Ukraine continued to function, fulfilling the tasks assigned to it as fully as possible, to which were added the struggle for the information space, countering fake information, increasing media literacy of the population, support and possible social protection of internally displaced persons, assistance to the Armed Forces of Ukraine, and so on. "Librarians mobilised, adapted and optimised in the context of adequate response to difficulties and problems that, unfortunately, accompany our present in real time" (Serbin, 2023). In this way, the Ukrainian library social institute immediately reacted to the events in the state, changing the algorithm of its functioning with a reorientation to social and political requests.

At this stage of the Russian-Ukrainian war, libraries are actively engaged in information-communication, information-advisory, scientific, socio-cultural and local history activities. "The main activity of libraries is the demand of readers (real and potential) for various types of library and bibliographic services and products. Thus, the work of libraries is evaluated not by the number of assortments produced, but by the number of services and products demanded (used) by readers" (Bashun, 1999).

From the second half of the 19th century, libraries were co-participants in nation-building processes. In our opinion, the national-orientalist content of the activity of the Ukrainian library institute is based on the social production function and the function of public welfare. Today, its scientific basis is serious multi-faceted scientific research, scientific conferences of various levels (other events on the functioning of the library and information sphere of Ukraine in conditions of

war), numerous publications in professional periodicals of librarians practitioners reveal the issues of peculiarities of work in conditions of active hostilities and occupation, destruction of funds and loss of cultural objects, which confirm the transformation of the modern scientific doctrine of librarianship.

We consider it expedient to single out a new direction in the activity of Ukrainian libraries – socio-productive, aimed at consolidating the people of Ukraine to fight against the Russian occupier, which proved their institutional stability in the conditions of the modern Russian-Ukrainian war. The socio-productive direction includes the following tasks:

- memorialisation of wartime events (collection of documents about destruction and losses);
- volunteer movement and charity (various one-time actions and long-term projects);
- support of internally displaced persons and migrants;
- assistance to the Armed Forces of Ukraine (weaving of camouflage nets, production of masks for helmet wearers, tailoring of adaptive clothing for the wounded) (Serdiuk & Herasymov, 2022);
- eradication of Soviet narratives.

It should also include the work of a library institution as a safe space, a temporary shelter, a comfortable place to work on a computer (for the purpose of distance learning for students, schoolchildren or remote work for new lands and those who have currently lost their property). Libraries have become community centres for the collection and distribution of "humanitarian aid, distribution and delivery of humanitarian aid, food preparation points for temporarily displaced citizens and refugees" (Novalska, 2022), which significantly positively strengthens the image of institutions, because it is focused on raising national consciousness and pride for its people, who came out against the tanks with their bare hands and flags. The scientific novelty of the article lies in the disclosure of the peculiarities of the functioning of Ukrainian libraries under martial law. Such traditional areas of activity in the conditions of the Russian-Ukrainian war, as information and communication, information and advisory, scientific, socio-cultural and local studies, should be supplemented with socio-productive ones. The proposed material enriches the theory of modern librarianship about the changing role of libraries in society under the influence of socio-political processes, determining the new quality of the Ukrainian library institute as an active participant in nation-building processes. The practical significance of the obtained results lies in the application of the acquired best experience of library practice in the activities of library institutions of all systems and departments in order to positively strengthen their image and reputation.

Conclusions

In the conditions of the Russian-Ukrainian war, the library social institute immediately reacted to the events in the state, changing the algorithm of its functioning with a reorientation to socio-political requests. Among the main traditional areas of activity, such as information-communication, information-advisory, scientific, socio-cultural, and local studies, the socio-productive one definitely stood out. That is, the library has shown itself as an adaptive system that rationally transforms the work algorithm in order to maintain the optimal state in accordance with the changing conditions of the external environment. The genesis of the strategy for the development of the Ukrainian library and information sphere is consistent with the strategies of national economic, social, and humanitarian development.

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None.

Conflict of Interest

None.

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Акомодація напрямів діяльності бібліотек України в умовах воєнного стану

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Анотація. Метою статті є аргументоване виокремлення якісно нового напряму у діяльності бібліотек України в умовах воєнного стану – соціо-продуктивного. Методологічну основу статті становили загальнонаукові методи абстрактно-логічний, аналізу, когнітивний, синтезу. Застосовано діалектичний, об'єктивності, системний та структурно-функціональний підходи наукового пізнання. Наукова новизна статті полягає в розкритті особливостей функціонування українських бібліотек в умовах воєнного стану. Такі традиційні напрями діяльності в умовах російсько-української війни, як інформаційно-комунікаційний, інформаційно-консультативний, науковий, соціокультурний та краєзнавчий, аргументовано доповнити соціо-продуктивним. Запропонований матеріал збагачує теорію сучасного бібліотекознавства про зміну ролі бібліотек у соціумі під впливом суспільно-політичних процесів, визначення нової якості українського бібліотечного інституту як активного учасника націєтворчих процесів. Практичне значення одержаних результатів полягає у застосуванні набутого кращого досвіду бібліотечної практики у діяльність бібліотечних закладів усіх систем і відомств задля позитивного зміцнення їхнього іміджу та репутації. Висновки. В умовах російсько-української війни бібліотечний соціальний інститут одразу відреагував на події в державі, змінивши алгоритм свого функціонування з переорієнтацією на суспільно-політичні запити. Серед основних традиційних напрями діяльності достеменно виокремився соціо-продуктивний. Тобто бібліотека проявила себе як адаптивна система, котра раціонально трансформує алгоритм роботи задля збереження оптимального стану відповідно до зміни умов зовнішнього середовища. Генезис стратегії розвитку української бібліотечно-інформаційної сфери узгоджується зі стратегіями загальнодержавного економічного, соціального та гуманітарного розвитку

Ключові слова: бібліотекознавство; бібліотечно-інформаційна сфера; бібліотека; напрями діяльності бібліотек; воєнний стан

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Open access to scientific resources of institutional repositories of Ukrainian higher educational institutions for information and library direction

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Abstract. The purpose of the article is to analyse the level of providing open access to scientific resources in Ukrainian higher education institutions' institutional repositories for information and library direction. The research methodology is based on general scientific and special cognition methods, including analysis, synthesis, monitoring and comparison. The scientific novelty of the work consists of expanded ideas about the possibilities of activating the work of higher educational institutions' institutional repositories for information and library direction as a component of determining their ratings at the world level through the maximum realising open-access provision to their scientific resources for developing scientific and technical progress. Conclusions. The article analyses the institutional repositories of 10 higher education institutions for information and library direction by using Webometrics, QS World University Rankings, and SimilarWeb. The analysis of using the level of institutional repositories testified to its inadequacy. The research based on using web analytics by SimilarWeb made it possible to identify four leaders of higher education institutions in terms of the number of users' visits to their repositories: West Ukrainian National University (WUNU), National Aviation University (NAU), Ternopil National Technical University named after Ivan Puluj (TNTU). Geographical, gender, age, thematic diversification of higher educational institutions' institutional repositories, as well as the level of their using the main communication channels (direct appeal, regular search, referrals, e-mail, social networks) thanks to the analysis of their websites' traffic were determined. The recommendations for improving information culture for scientific and pedagogical staff, students, librarians, management of higher educational institutions for information and library direction, and all participants of scientific communication were given through activating their using institutional repositories to promote them in the global scientific and educational space as components in increasing the rating positions of higher educational institutions in Webometrics and QS World University Rankings thanks to providing open access to scientific resources for developing scientific and technological progress

Keywords: institutional repository; higher education institution; open access; scientific resources; training for information and library specialists; communication channels; information culture

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Introduction

Globalisation of society is impossible without ensuring open access to its scientific assets for the development of scientific and technological progress. Programmes, projects, and other documents of many international organisations (EU, UNESCO, IFLA, and others) are aimed at ensuring access to global knowledge of society by providing open access to information relevant to consumers in the context of the world experience of disseminating research results of scientists (Open Access). It is the institutional repositories, as a component of the implementation of the concept of open science, that play an important role in ensuring consumer access to information in the global society. This actualises the problem of the current research through the study of the dynamics of providing access to scientific information of institutional repositories of higher education institutions of Ukraine, where specialists are trained in the speciality 029 "Information, library and archival studies", who are potential future employees of libraries, whose components are such repositories. The specified problem is relevant and timely in Ukraine in the crisis conditions of martial law, which caused the need for blended, and in some regions only online training, as well as in the context of the implementation of the relevant legislative documents (the Resolution of the Cabinet of Ministers of Ukraine "Regulations on the National Repository of Academic Texts of Ukraine", Concept of the State Targeted National Cultural Programme for the Creation of a Unified Information Library System "Library – XXI") (Approved by the Cabinet…, 2009).

The problem of studying the essence and institutional repository functionality in the context of open access to library information resources attracts the attention of many researchers. Today, there is no unified definition of the concept of "institutional repository", which is usually defined as:

- an electronic collection of processed and preserved intellectual products of an academic society, which ensures its distribution and provision access to it (Levchenko, 2018);
- an organised collection of digital documents and a set of services around it, which represents the results of scientific research in online access, and also ensures their long-term, reliable storage (Official website of Zenodo, 2022).

Some aspects of the problem of open access to scientific information through developing institutional repositories were studied by domestic and foreign scientists, in particular: O. Karpenko & N. Kobyzhcha (2023), N. Levchenko (2018), V.P. Oleksiuk & O.R. Oleksiuk (2012), Y.I. Palekha (2018), T. Yaroshenko (2011), R. Crow (2002), M. Mičunović *et al.* (2021) and others.

Ensuring open access to scientific knowledge and public assets is carried out following the principles of the Budapest Open Access Initiative, the Berlin Declaration on Open Access to Scientific and Humanitarian Knowledge, the Bethesda Declaration on Open Access Publications, the Scottish Open Access Declaration and the Open Access Concept of the International Federation of Library Associations and Institutions (IFLA) (Karpenko & Kobyzhcha, 2023).

There are two ways to advance scientific knowledge in open access: green (open-access repositories) and golden (open-access journals). The green path involves placing the publication in institutional repositories in the state of the non-peer-reviewed and peer-reviewed preprint, published post-print, and its revised version after publication. Scientists' self-archiving of their works is an important component of institutional repositories. All this ensures free and prompt consumers' access to relevant scientific information in real time through the possibilities of open access to publications, data, peer review of scientific research, and software (Official website of Zenodo, 2022).

Modern scientific communication is impossible without developing institutional repositories as a treasure of scientific works, whose current number in the world is 3922 according to Official website of Euroosvita (2023).

The purpose of the article is to analyse the level of providing open access to institutional repositories' scientific resources of higher education institutions in Ukraine in the information and library direction.

Materials and Methods

The research methodology is based on general scientific and special cognition methods, including analysis, synthesis, monitoring and comparison. At the same time, the study of the dynamics of changes in the institutional repositories' work takes into account the results of the study of institutional repositories conducted last year.

To analyse the dynamics of providing open access to scientific information at institutional repositories of higher education institutions (HEI) that train specialists in the speciality 029 "Information, library and archival studies", the following ones were selected: National University of Kyiv named after Taras Shevchenko (KNU), National Aviation University (NAU), Lviv Polytechnic National University (LNU LP), National University of Lviv named after Ivan Franko (LNU), West Ukrainian National University (WUNU), Dnipro National University named after Oles Honchar (DNU), Ternopil National Technical University named after Ivan Puluj (TNTU), National Aerospace University "Kharkiv Aviation Institute" (KhAI), Donetsk National University named after Vasyl Stus (DNU), and Ivano-Frankivsk National Technical University of Oil and Gas (IFNTUNG).

The selection of universities was determined by the results of the Official website of Euroosvita. Webometrics Ranking of World Universities (2024) taking into account the rating for information and library higher education institutions. The methodology for comparing

the mentioned higher education institutions also took into account the following:

- visibility indicators (the number of external networks linking to the university's web pages);
- openness (the number of files available on the university website in pdf, doc, docx, ppt, pptx formats, indexed by Google Scholar);
- excellence (the scientific publications of higher education institutions' authors in journals indexed in the SCOPUS database, which are included in the 10% of articles most cited in their scientific fields according to the Scimago Group version within 5 years (Karpenko & Kobyzhcha, 2023).

Results

Institutional repositories are an important component of increasing the rating of higher education institutions, as they provide an opportunity to spread the scientific works of university researchers in the global scientific and educational space by adding them to the repositories directly by the authors. Selected institutional repositories, except for the repository of DNU named after Oles Honchar, work on software (software) DSpace (developed by the Massachusetts Institute of Technology), which allows integration of the electronic repository into international registries (ROAR, OpenDOAR, and others). The institutional repository of DNU named after Oles Honchar works as a realisation of the diploma project of the university's students.

The Webometrics ranking determines the ranking of HEIs in the world, on the continent and in the country, taking into account their open-access provision to repositories, research results, educational materials, and so on. It should be noted that out of ten higher education institutions that train specialists in the field of information, library and archival studies, three of them appear in the QS World University Rankings (2024), as shown in Table 1. Compared to 2023, LNU LP improved its rating (from 1001-1200 in 2023 to 951-1000 in 2024), while LNU worsened it (from 801-1000 to 1201-1400), and KNU did not fundamentally change it (651-700 in 2023, 681-700 – in 2024) (Karpenko & Kobyzhcha, 2023). Three higher education institutions were included in the analysis of higher education institutions in 2024 and 2023: Dnipro National University named after Oles Honchar, Ternopil National Technical University named after Ivan Puluj, and Donetsk National University named after Vasyl Stus.

Table 1. Rating of higher education institutions for information and library direction according to the criteria of transparency, openness, and excellence

HEI	The institutional repository's Internet address	Webometrics (Ukraine/ continent/world)	Visibility (Impact)	Openness	Excellence	QS World University Rankings
KNU	https://ir.library.knu.ua/home	3/558/1473	2889	1122	1611	681-690
NAU	https://er.nau.edu.ua/	4/688/1859	1469	1670	3009	–
LNU LP	https://ena.lpnu.ua/home	9/942/2819	5164	6553	1471	951-1000
LNU	http://dspace.lnulibrary.lviv.ua/	10/983/2976	1370	8368	3083	1201-1400
WUNU	http://dspace.wunu.edu.ua/	12/1007/3048	3944	1602	4130	–
DNU nm Oles Honchar	https://repository.dnu.dp.ua/	14/1043/3227	3654	2103	4393	–
TNTU	https://elartu.tntu.edu.ua/	21/1210/3948	6312	2334	4686	–
KhAI	https://dspace.library.khai.edu/xmlui/	23/1221/4015	4874	8368	3244	–
DNU nm Vasyl Stus	https://r2.donnu.edu.ua/	26/1265/4253	6986	2724	4946	–
IFNTUNG	http://elar.nung.edu.ua/	31/1291/4335	6071	8368	3921	–

Source: developed by the authors

At the same time, some higher education institutions in 2024 retained their positions in the national ranking, in particular LNU LP, WUNU and KhAI, some improved or worsened them such as NAU (from 5th to 4th place), IFNTUNG (from 33rd to 31st place), KNU (from 3rd to 2nd place), LNU (from 8th to 10th place).

Comparing the dynamics of changes in the activity of higher education institutions by the visibility in terms of the number of external networks with links to the web pages of higher education institutions, we can state that DNU named after Vasyl Stus (6986), TNTU (6312), IFNTUNG (6071) are leaders, and outsiders are: LNU (1370), NAU (1469), KNU (2889). The openness indicator regarding the number of documents on the website of the Higher Education Institution indexed in Google Scholar indicates the leadership of LNU, KhAI, IFNTUNG (8368) and the insufficiency of this factor in KNU (1122), WUNU (1602), NAU (1670). According to the index of excellence concerning the citation indices of higher education institutions' authors in the Scopus database, the leaders are Donetsk National University named after Vasyl Stus (4946), TNTU (4686), Dnipro

National University named after Oles Honchar (4393), and the outsiders are LNU LP (1471), KNU (1611), NAU (3009).

The analysis of the dynamics of providing open access to scientific information of institutional repositories was carried out using the analytical tool SimilarWeb.com according to the criteria of visiting repository websites; by geographic, gender, and age characteristics of their visiting; by channels that generate traffic to the websites of HEI repositories; by thematic consumers' requests. Figures 1 and 2 show the statistics of institutional repository visits within three months.

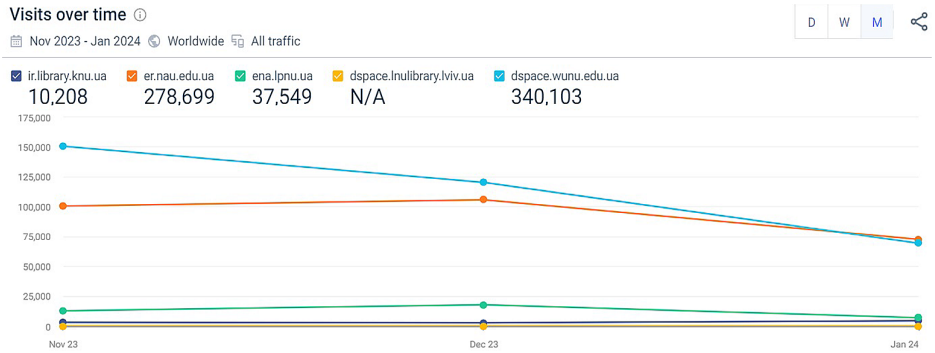

Figure 1. Statistics of repository visits of KNU, NAU, LNU LP, LNU, WUNU
Source: developed by the authors

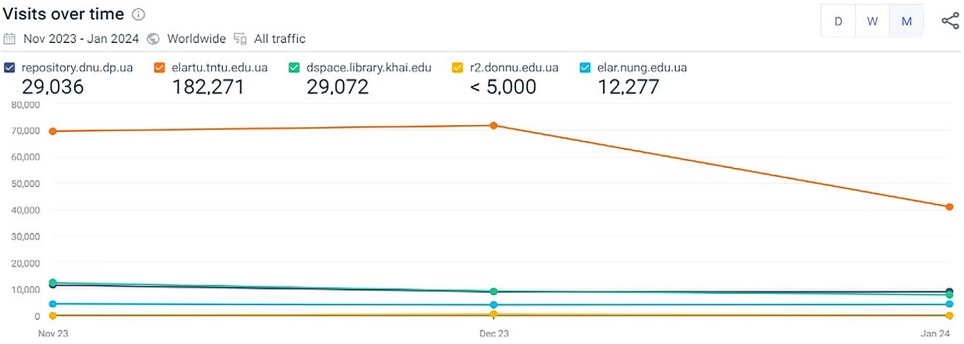

Figure 2. Statistics of repository visits of Oles Honchar DNU, TNTU, KhAI, Vasyl Stus DNU, IFNTUNG
Source: developed by the authors

According to the above analytics, it can be asserted that WUNU (340, 103) and NAU (278,699) remained the leaders in visits to institutional repository websites, as in 2023, followed by TNTU (182, 171) in 2024, while LNU (the number of visits was not indicated due to its insufficient) and KNU (10, 208) remained outsiders, as in 2023, and in 2024 DNU named after Vasyl Stus joined them too (less than 5000 visits). At the same time, it should be noted that compared to 2023, KNU has improved its results, given that it had less than 5000 visits in 2023.

The geography, gender, and age of the audience visiting the institutional repositories of higher education institutions were also analysed, as shown in Figures 3-8.

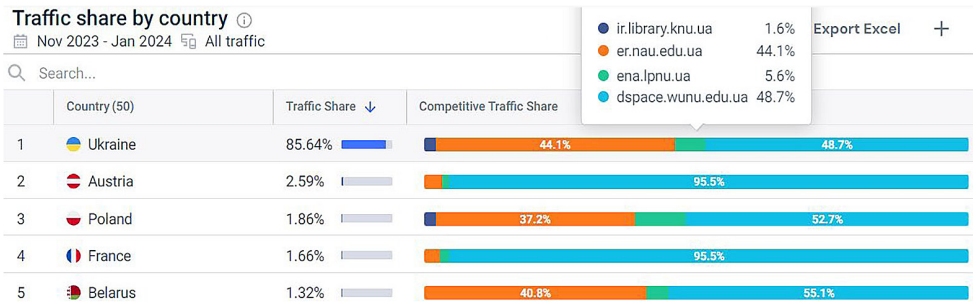

Figure 3. Statistics of repository visits of Oles Honchar DNU, TNTU, KhAI, Vasyl Stus DNU, IFNTUNG
Source: developed by the authors

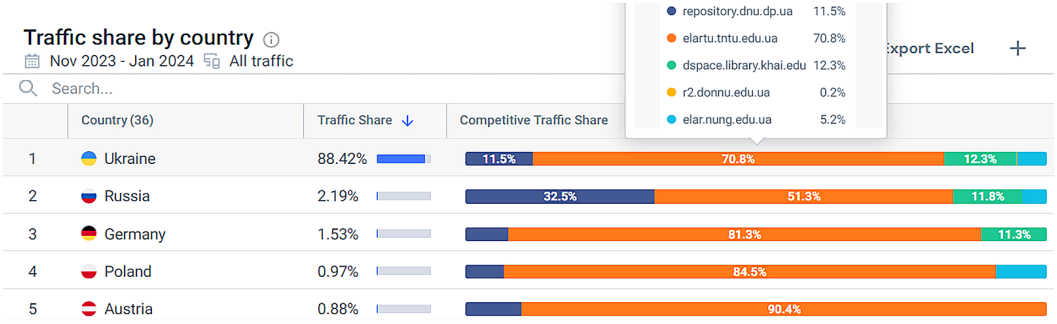

Figure 4. Statistics of repository visits of DNU named after Oles Honchar, TNTU, KhAI, DNU named after Vasyl Stus, IFNTUNG by visit's geography

Source: developed by the authors

According to the above analysis, the websites of all higher education institutions' institutional repositories are used mainly in Ukraine. Due to insufficient use of the LNU website, the geography of its visit is not indicated, which makes it an outsider among the institutional repositories under investigation. In addition to visitors from Ukraine, institutional repositories of WUNU and NAU are visited by users from Austria, France, Poland and Belarus, KNU – from Poland, DNU named after Oles Honchar and TNTU – from Russia, Germany, Poland, Austria, KhAI – from Russia, Germany, IFNTUNG – from Russia and Poland. Figures 5-8 demonstrate gender and age priorities in institutional repository visits.

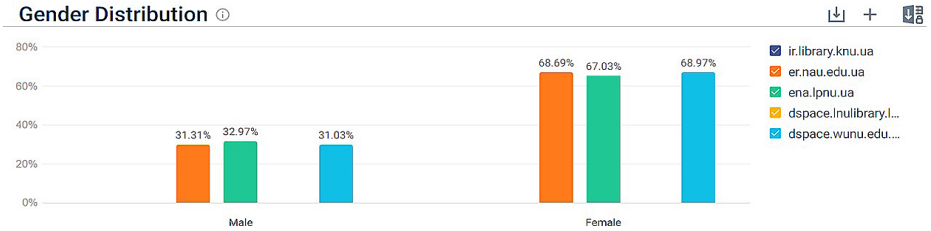

Figure 5. Statistics of repository visits of KNU, NAU, LNU LP, LNU, WUNU by gender characteristic

Source: developed by the authors

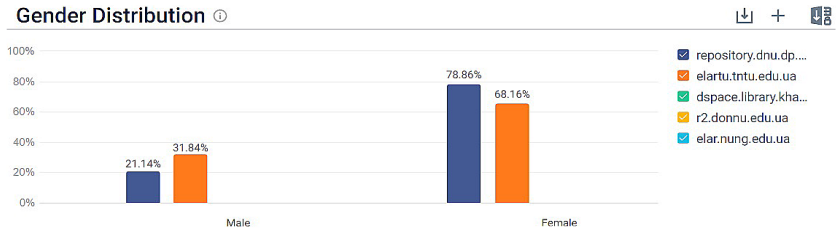

Figure 6. Statistics of repository visits of Oles Honchar DNU, TNTU, KhAI, Vasyl Stus DNU, IFNTUNG by gender characteristic

Source: developed by the authors

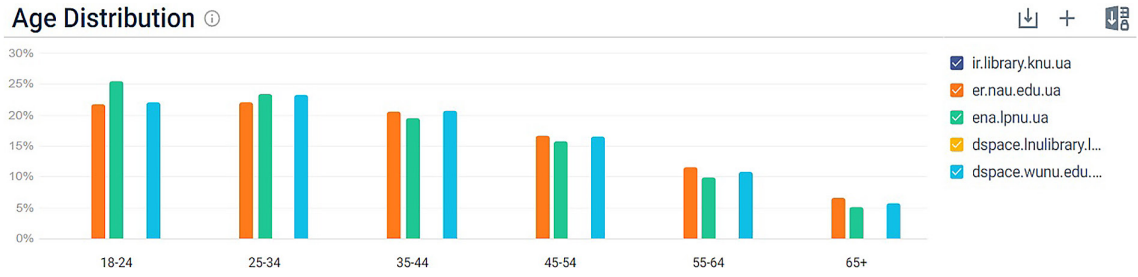

Figure 7. Statistics of repository visits of KNU, NAU, LNU LP, LNU, and WUNU by age characteristic

Source: developed by the authors

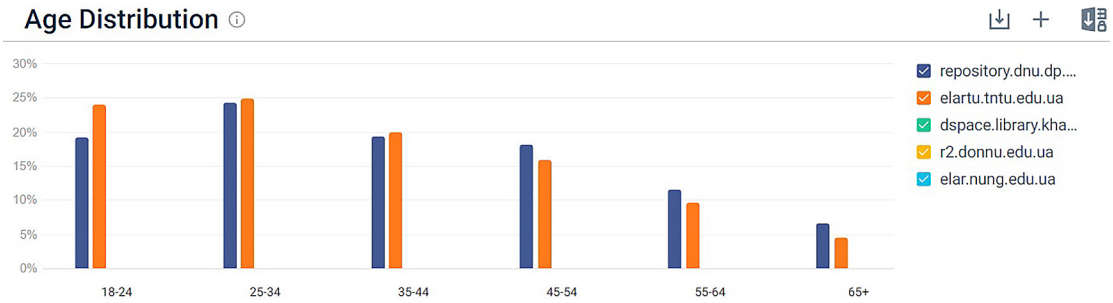

Figure 8. Statistics of repository visits of DNU named after Oles Honchar, TNTU, KhAI, DNU named after Vasyl Stus, IFNTUNG by age characteristic

Source: developed by the authors

As can be seen from Figures 5-8, the leaders in visiting institutional repositories are female representatives of five out of ten higher education institutions: NAU, LNU LP, WUNU, DNU named after Oles Honchar, TNTU aged 18 to 65+. At the same time, young people aged 18 to 34 prevail, and the smallest group of representatives is 65+. The thematic requests of visitors to the websites of institutional repositories of higher educational institutions were also analysed, which is presented in Figures 9-16.

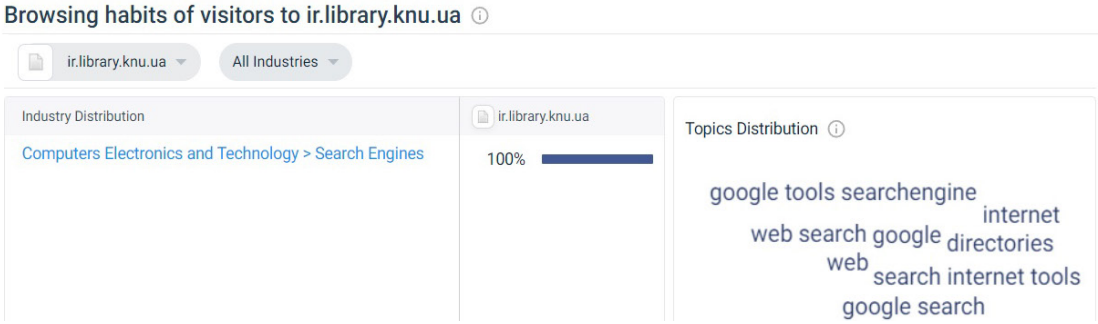

Figure 9. Thematic user requests of the KNU institutional repository

Source: developed by the authors

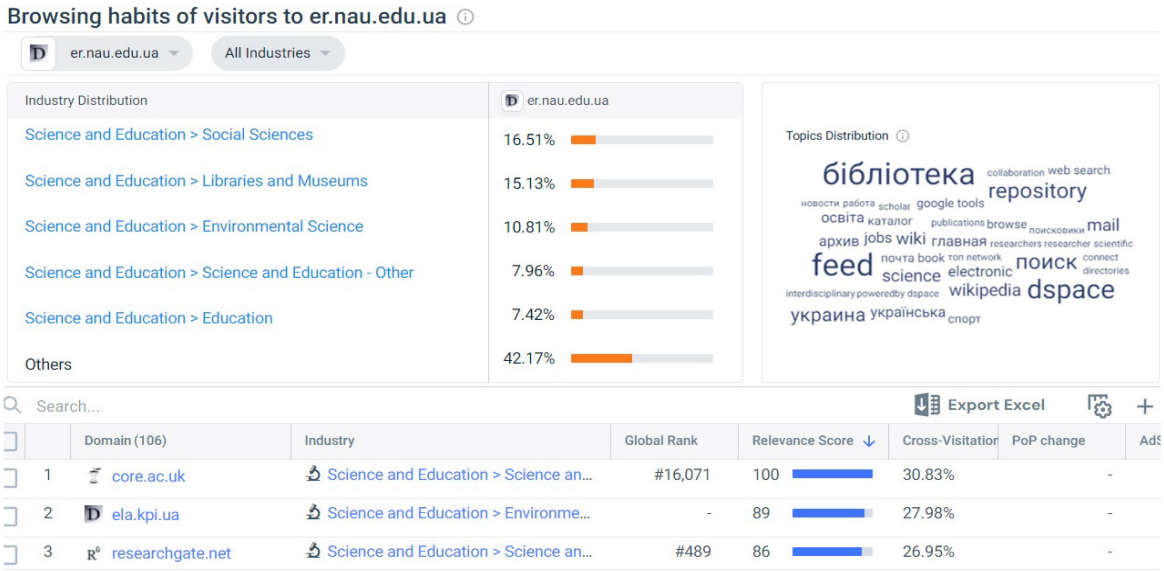

Figure 10. Thematic user requests of the NAU institutional repository

Source: developed by the authors

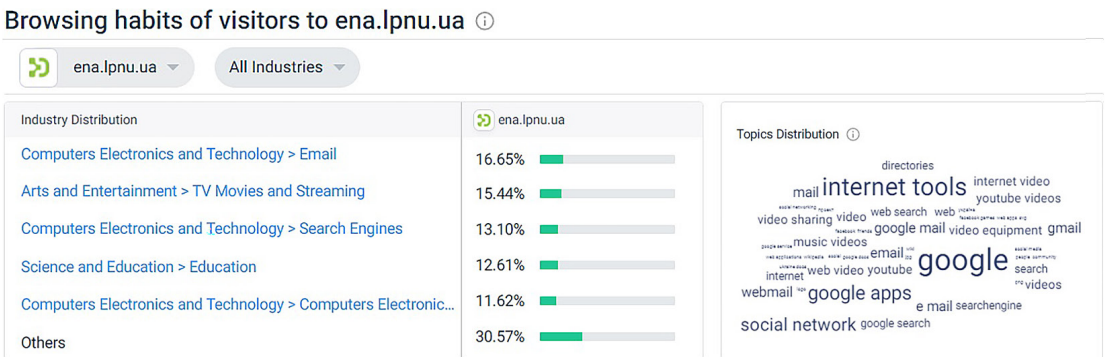

Figure 11. Thematic user requests of the institutional repository of LNU LP

Source: developed by the authors

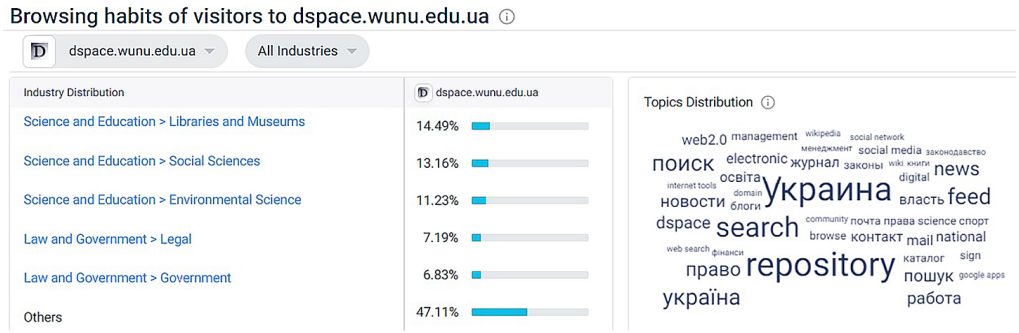

Figure 12. Thematic user requests of the WUNU institutional repository

Source: developed by the authors

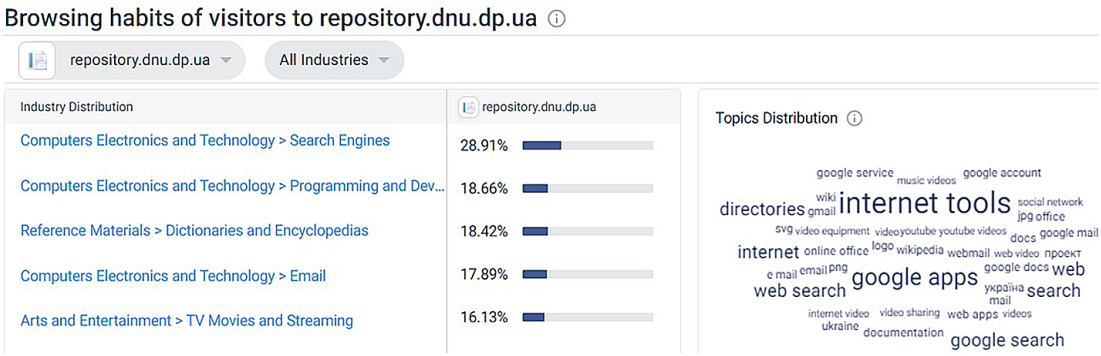

Figure 13. Thematic user requests of the institutional repository of DNU named after Oles Honchar

Source: developed by the authors

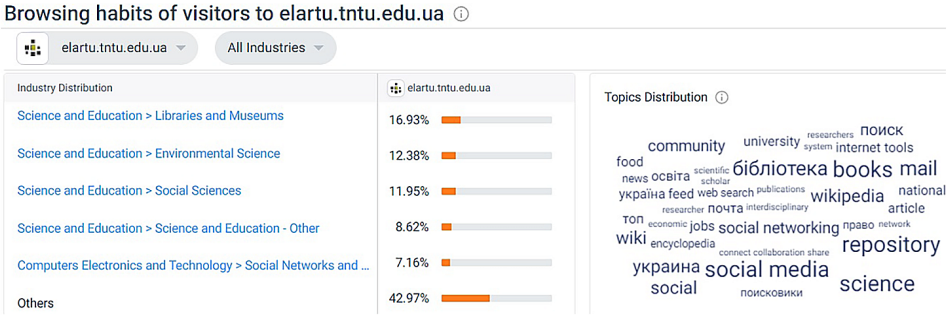

Figure 14. Thematic user requests of the TNTU institutional repository

Source: developed by the authors

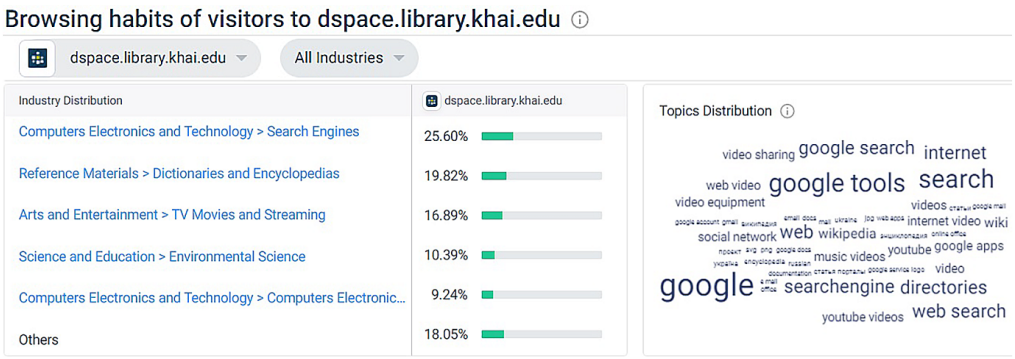

Figure 15. Thematic user requests of the KhAI institutional repository
Source: developed by the authors

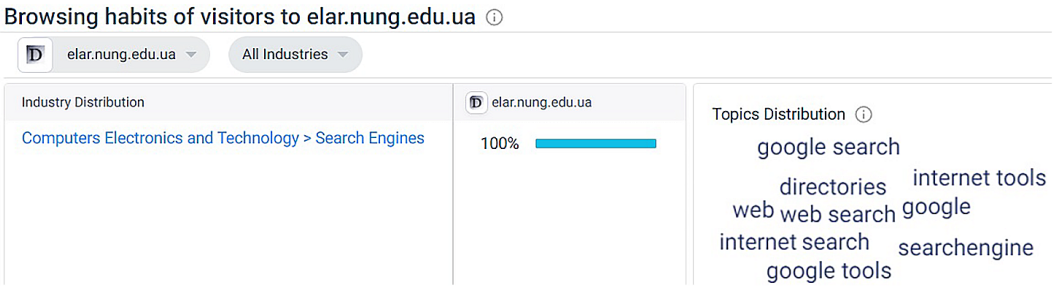

Figure 16. Thematic user requests of the IFNTUNG institutional repository
Source: developed by the authors

The analysis of the thematic user requests of the institutional repository websites proved that their diversification is present in visiting the NAU, LNU LP, WUNU, DNU named after Oles Honchar, TNTU, and KhAI, as shown in the corresponding figures. In KNU and IFNTUNG, the thematic requests are limited only to search engines. No thematic user requests were found on the websites of the LNU and DNU named after Vasyl Stus repositories for the lack of appeals to them.

An analysis of the channel statistics that generate traffic to the institutional repository websites of the higher education institutions was also carried out, which is presented in Figures 17-18. At the same time, all available channels were analysed, namely:

- direct channel regarding direct input of the repository link by users;
- organic search channels, the results of which are not affected by paid advertising; this is the traffic that the website receives from conversions from search results;
- referrals regarding the receipt of traffic through affiliates, links, content partners, news; i.e. transitions from third-party websites;
- e-mail, i.e. transitions from e-mail;
- social networks, i.e. promotion of information about websites from social networks;
- channel of paid search;
- display advertisements: traffic sent through known advertising platforms from other domains.

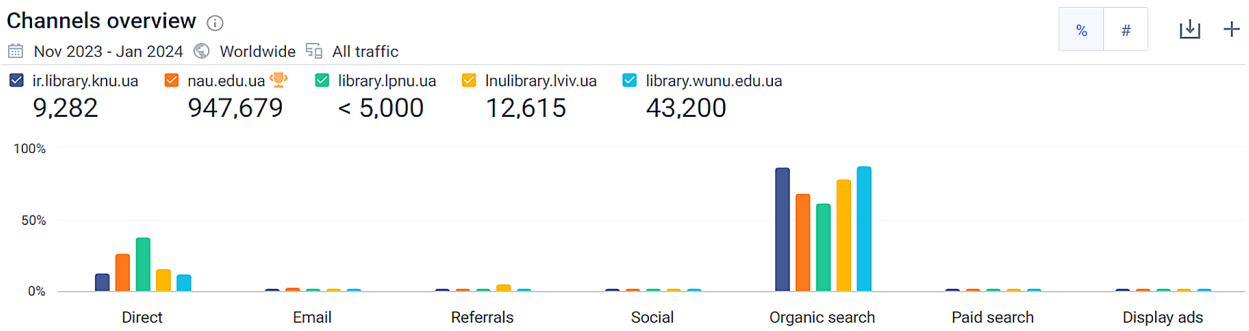

Figure 17. Channels that generate traffic to the websites of the KNU, NAU, LNU LP, LNU, and WUNU repositories
Source: developed by the authors

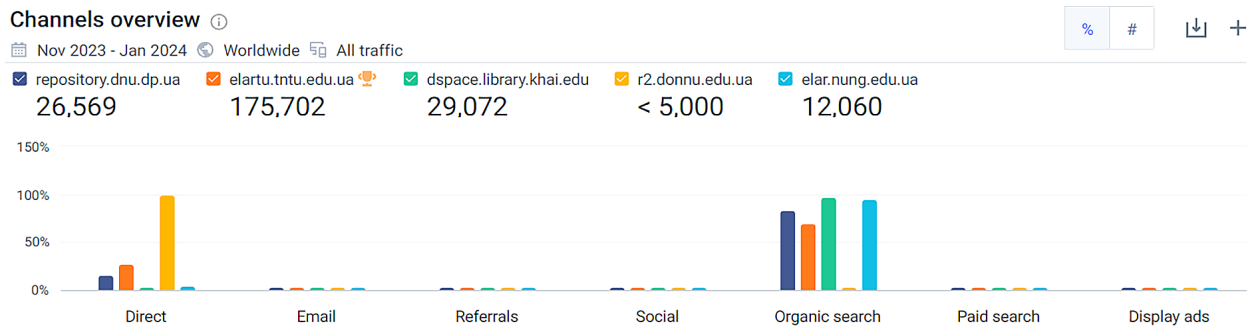

Figure 18. Channels that generate traffic to the websites of DNU named after Oles Honchar, TNTU, KAI, DNU named after Vasyl Stus, and IFNTUNG repositories

Source: developed by the authors

The analysis of the statistics of traffic channels to the websites of institutional repositories of higher education institutions proved that the main channels for their use are the following:

- direct: DNU named after Vasyl Stus (100%), LNU LP (38.03%), TNTU (27.95%), NAU (26.72%), DNU named after Oles Honchar (16.15%), LNU (15.82%), KNU (13.21%), WUNU (12.20%), IFNTUNG (4.47%), KhAI (1.9%);
- normal search (original search): KhAI (97.30%), IFNTUNG (95.53%), WUNU (87.77%), KNU (86.79%), DNU named after Oles Honchar (83.81%), LNU (78.70%), TNTU (69.95%), NAU (68.95%), and LNU LP (61.97%);
- referrals: LNU (5.47%), NAU (0.74%), TNTU (0.67%), WUNU (0.03%), DNU named after Oles Honchar (0.03%);
- e-mail (email) – NAU (2.89%), KhAI (0.8%);
- social networks (social): TNTU (1.42%), NAU (0.69%). At the same time, the priorities of social networks are shown in Figures 19-20.

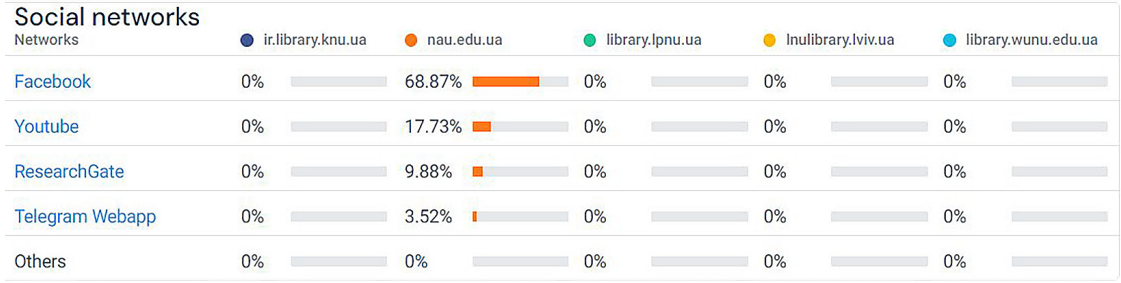

Figure 19. Social networks that contain links to the institutional repository wesites of KNU, NAU, LNU LP, LNU, WUNU

Source: developed by the authors

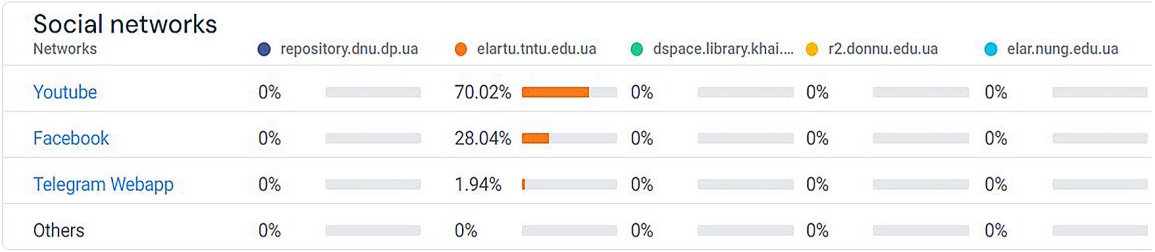

Figure 20. Social networks that contain links to the institutional repository websites of DNU named after Olea Honchar, TNTU, KAI, DNU named after Vasyl Stus, IFNTUNG

Source: developed by the authors

According to the data in Figures 19-20, it can be stated that links to institutional repositories are actively used in the social networks of NAU (Facebook, YouTube, ResearchGate, Telegram) and TNTU (Facebook, YouTube, Telegram). Due to insufficient use of social networks, information about other universities is not indicated.

The scientific novelty of the article lies in expanding the understanding of the possibilities of activating the institutional repository work of higher educational institutions of the information and library direction as a component of determining their ratings at the world level through the maximum implementation of their provision of open access to scientific resources for the development of scientific and technical progress.

Conclusions

The conducted analysis of the level of open access to scientific resources of institutional repositories of information and library higher education institutions allows us to state that the "green way" of access is not sufficiently developed, even in those higher education institutions (KNU, LNU LP, LNU) that are included in the QS World University Rankings. At the same time, the institutional repositories of WUNU, NAU, and TNTU are the leaders in terms of visits by their users, while KNU, DNU maned after Vasyl Stus and LNU are outsiders, despite a slight improvement in visits by KNU users compared to the previous year. The results of the analysis of traffic to the institutional repository websites of higher educational institutions by geographical, gender, and age characteristics indicate that they are used mainly in Ukraine, as well as in Austria, France, Poland, Belarus, Russia, and Germany. Due to the insufficient use of the institutional repository website of LNU, it is an outsider of the study according to the specified parameters. The majority of visitors to institutional repositories are women aged 18 to 34, the smallest – women aged 65+. In the absence of sufficient data, KNU, LNU, KhAI, DNU named after Vasyl Stus, and IFNTUNG are outsiders according to this criterion.

The obtained analytical data regarding the thematic user requests of the institutional repository websites of higher educational institutions are characterised by their diversification in the fields of computer technologies, science and education, art, jurisprudence among others. At the same time, there is a limitation in the user requests of KNU and IFNTUNG only to information in the field of computer technologies, and there is no information about the thematic focus of user requests of institutional repositories at LNU and DNU named after Vasyl Stus.

The results of the study of the use of communication channels proved that the most influential of them is direct access to the repository website as an indicator of its recognition and loyalty of the audience, in which DNU named after Vasyl Stus is the leader, while KhAI is the outsider, despite the fact that last year this university was ahead of the others in the use of this communication channel. Conventional search as a communication channel is popular among all researched institutional repositories of HEIs. LNU has remained the leader in the use of referrals, the same as it was last year. The channel of transitions from e-mail is used only by NAU and KhAI, and the channel of social networks for the promotion of institutional repositories is used by TNTU and NAU, although these channels are used at a low level. However, it is the channel of social networks that should be given more attention, since it is an effective marketing tool for popularising information about the object of promotion.

Thus, to increase the effectiveness of providing open access to scientific resources at institutional repositories, it is possible to recommend to higher educational institutions' staff for information and library direction to improve their information culture regarding the active use of institutional repositories through the following steps:

- to the management of higher educational institutions to develop an action plan for the promotion of institutional repositories through organisational, PR and advertising activities with the involvement of mass media;
- to organise professional development, conducting training with academic staff on filling repositories with their research papers and updating the curricula for the training of future specialists to increase the effectiveness of scientific communication and the ranking of higher education institutions;
- to open up the opportunity for students to make proposals for the inclusion of relevant topics and/or disciplines in the curricula, which will contribute to the success of their careers as future specialists in providing open access to scientific resources;
- to provide an opportunity for the library employees of educational institutions, through the use of all communication channels, including the channel of social networks, to attract users through social networks activity and a strategy of interaction with them based on SMM-promotion. (The advantages of using this channel are not only additional traffic to the website, but also increasing the loyalty and recognition of institutional repositories, setting up effective advertising and the opportunity to receive feedback from users).

The implementation of the proposed recommendations for improving the information culture of the participants in the scientific communication of information and library-based higher education institutions will contribute to ensuring open access to scientific resources not only through the "golden path", but also through the "green pass", by intensifying work on filling institutional repositories and promoting them in the global scientific and educational space, which in turn will increase access to scientific publications of higher education institutions, their citation level, and the ranking of the university for the prosperity of scientific and technical progress.

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Відкритий доступ до наукових ресурсів інституційних репозитаріїв ЗВО України інформаційно-бібліотечного спрямування

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Анотація. Мета статті полягає в здійсненні аналізу рівня забезпечення відкритого доступу до наукових ресурсів інституційних репозитаріїв закладів вищої освіти (ЗВО) України інформаційно-бібліотечного спрямування. Методологія дослідження базується на загальнонаукових і спеціальних методах пізнання, зокрема аналізу, синтезу, моніторингу та порівняння. Наукова новизна роботи полягає в розширенні уявлень про можливості активізації роботи інституційних репозитаріїв ЗВО інформаційно-бібліотечного спрямування як складової визначення їх рейтингів на світовому рівні через максимальну реалізацію забезпечення ними відкритого доступу користувачам до наукових ресурсів задля розвитку науково-технічного прогресу. Висновки. У статті проаналізовано інституційні репозитарії 10 ЗВО інформаційно-бібліотечного спрямування через застосування Webometrics, QS World University Rankings, SimilarWeb. Проведений аналіз рівня використання інституційних репозитаріїв засвідчив про його недостатність. Дослідження за веб-аналітикою SimilarWeb дало змогу визначити чотирьох лідерів ЗВО за кількістю відвідування їхніх репозитаріїв користувачами: Західноукраїнський національний університет (ЗУНУ), Національний авіаційний університет (НАУ), Тернопільський національний технічний університет імені Івана Пулюя (ТНТУ). Визначено географічну, гендерну, вікову, тематичну диверсифікацію інституційних репозитаріїв ЗВО, а також рівень використання ними основних каналів комунікації (пряме звертання, звичайний пошук, реферали, електронна пошта, соціальні мережі) завдяки аналізу трафіків їх сайтів. Надано рекомендації щодо підвищення інформаційної культури науково-педагогічним працівникам, здобувачам вищої освіти, бібліотекарям, керівництву ЗВО інформаційно-бібліотечного спрямування, усім учасникам наукової комунікації через активізацію ними використання інституційних репозитаріїв для просування їх у глобальному науково-освітньому просторі, як складових у підвищенні рейтингових позицій ЗВО у Webometrics та QS World University Rankings завдяки забезпеченню відкритого доступу до наукових ресурсів задля розвитку науково-технічного прогресу

Ключові слова: інституційний репозитарій; заклад вищої освіти; відкритий доступ; наукові ресурси; підготовка фахівців інформаційно-бібліотечного спрямування; канали комунікації; інформаційна культура

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Formation and use of audiovisual documents: Directions and forms

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Abstract. The purpose of the article is to investigate the directions and forms of the use of audiovisual documents in the archives of Ukraine. The methodological basis of the article was the following methods: abstract-logical, analysis, source research, classification, cognitive, synthesis, generalisation. Such approaches of scientific knowledge as dialectical objectivity and structural-functional are applied. The scientific novelty of the article lies in the presentation of the peculiarities of the functioning of audiovisual documents in Ukrainian archives. The following areas of use of audiovisual documents are distinguished: informative, educational, cultural and educational, scientific. The following forms of engagement of archival audiovisual documents are presented: organisation of online exhibitions, preparation of radio and television broadcasts, creation of an audiovisual product for presentation on the Internet. Exhibition work as a form of using archival audiovisual documents has its own characteristics – exhibiting, for example, photo documents in originals or copies. The proposed material enriches the theory of modern archival science about the changing role of the archives of Ukraine, which have accumulated a significant fund of film, audio, photo, and video recordings. Conclusions. Audiovisual documents as carriers of film, photophone, and video information characterise the image and sound that determine the specifics of living in the actual environment of use or potentially such a possible one prolonged in time, that is, their preservation in collections, archive funds, libraries, museums, and other institutions. Two important directions in the activity of audiovisual archives of Ukraine were identified – preservation of documents and providing access to them to a wide range of users. Work on media projects involves the close cooperation of archives and intermediaries (project developers) in the use of information resources of audiovisual documents: choosing a topic, developing a script, preparing textual support, selecting and copying documents, but the main analytical and synthetic work remains with archivists

Keywords: document; audiovisual documents; archives of Ukraine; media space; information resource; information; digital technologies

Relevance of the research topic

Traditional printed text as a way of recording, distributing and storing information occupies a dominant position, but the attention of most users dynamically focuses on another format of its existence – audiovisual. Vivid scientific discourses in philosophy, aesthetics, information science, librarianship, archival science, document studies, source studies, jurisprudence and other sciences have become an integral attribute of the study of audiovisual documents. The creation and preservation of audiovisual "witnesses" of difficult times is one of the most important, socially significant practical tasks of today's archivists with the aim of preserving information, enabling its use in the creation of information products (including media products), as well as for the integral formation of collective memory.

Analysis of current research and publications. Already in the 19th century, the first generalisations appeared regarding the features, format, and possibilities of audiovisual documents as sources of information and means of communication, based on source studies and

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archival approaches to the study of audiovisual documents. Ch.-V. Langlois & Ch. Seignobos (1898), S. Muller *et al.* (1898) developed the general principles of presentation of a new type of document (including an archival one) containing an image or sound, the prospects of its inclusion in a host of archival sources, storage units, and its significance for cultural and historical heritage.

In the Ukrainian scientific tradition, the first publications on personal practical experience and empirical observations about audiovisual documents on the pages of archival periodicals belong to historians-archivists and source scholars in 1925-1938. Archivists M. Bazanova (1960; 1971) and L. Kvitchenko (1964) and others presented opinions based on practical experience in publications in the "Scientific Information Bulletin of the Ukrainian SSR Archive Department". Approaches of V. Bezdrabko (2017), I.N. Voitsekhivska *et al.* (2018), I. Pasichnyk (2002), I.N. Voitsekhivska (2010) were based on comparative analysis, historical-chronological, typological, classification and other principles. N.N. Kushnarenko (2006) focused on the study of the classification of documents according to the method of documentation, features of the medium, form, construction and content of photo, phono, film and video documents, the author confirms their separateness as a species. In recent decades, we note the beginning of the historiographical discourse in the Ukrainian scientific space, the subject of which is the history of the study of audiovisual documents (Bezdrabko, 2008). Different directions and forms of using archival audiovisual information are highlighted in the thematic works of T. Yemelianova (2004; 2007; 2010). Y.S. Kalakura (2022) rightly emphasises the tests and specifics of the activity of archives in the extraordinary conditions of russian aggression against Ukraine, which acquires exceptional importance in view of their functions (informational, cultural, scientific, memorial, educational) and M. Palienko (2022).

The purpose of the article is to investigate the directions and forms of the use of audiovisual documents in the archives of Ukraine.

Presenting main material

From the moment of the appearance of audiovisual documents, reflections related to the study of this phenomenon are actually counting down, challenging the usual concepts of a document, a source, a work of art, the essential or permanent identity of which was "disrupted" again by the latest possibilities of recording, preserving, distributing information and using it. Despite the differences in interpretations that exist in national and foreign traditions, the fundamental determinants of content – image and sound – remain unchanged (Bezdrabko *et al.*, 2021; Official website of Universitätsarchiv, 2024). These two characteristics determine the specifics of living in the current user environment or potentially such a possible one prolonged in time. In the latter case, it is about their preservation in collections, archive funds, libraries, museums, other institutions, for example, educational institutions (Official website of Universitätsarchiv, 2024) or judicial authorities (Audio-visual documentation…, 2022), which is the result of their activities aimed at stockpiling funds.

Audiovisual information, which is in a "state of rest" in the archives, in the process of use is introduced into social circulation and media practice. Audiovisual documents are a social phenomenon, therefore there is a wide range of information needs for audiovisual information. The constantly growing media space itself produces audiovisual information and, at the same time, creates the need for retrospective information for the implementation of media projects. Two important areas of activity of audiovisual archives – preservation of documents and provision of access to them require the following problems to be solved: development of a legal framework for storage and preservation of audiovisual documents; giving archives the right to store, copy and provide access to funds under predetermined conditions; consideration of legal restrictions affecting access to audiovisual documents and therefore, resolving the conflict between access and protection of rights to objects of intellectual activity; ensuring that the distributed copies created must be preserved and available for future use. These questions concern not only archives, but also all institutions for the preservation of film, audio, photo, and video records – libraries, museums, as well as film studios, television studios, radio stations, and other organisations related to the audiovisual industry. Both archives and developers of media projects adhere to basic scientific principles in matters of using archival information: objectivity, historicism, and comprehensiveness. The principle of comprehensiveness require optimal completeness of information provision, that is, a representative set of archival sources that would satisfy the information needs of a potential or actual consumer of information.

An important method of updating archival audiovisual information is the correlation of the needs of users, even their cultural level, with the content of information contained in audiovisual documents. The selection of archival audiovisual documents for use in media projects, precisely those that are relevant, informative, contain new and useful information for consumers and the transmission of information through mass communication channels, is a creative process – shared by archivists and intermediaries.

In the theory of information use, directions and forms of use are distinguished. The concept of "directions of use" is closely related to the goals that are achieved through the use of information. The goals of media projects can be as follows: to inform, educate a mass audience, popularise cultural heritage, or more ambitiously – to investigate the problems faced by modern society. Important directions (goals) of the use

of audiovisual documents in media projects are informative (publication of documents in the media for the purpose of informing the public about the composition and content of audiovisual documents), educational (dissemination of knowledge), cultural and educational (stimulating interest in archives, preserving cultural heritage, revealing the significance and the value of audiovisual documents as historical and cultural monuments), scientific (delineation of important political and social problems of our time, the origins of which should be sought in early periods of history).

Various directions of use of retrospective information are represented by forms of involvement of archival audiovisual documents. The most common in media projects are the organisation of online exhibitions, the preparation of radio and television broadcasts, the creation of an audiovisual product for presentation on the Internet (using the information of audiovisual documents in documentaries, popular science, journalistic films). Work on media projects involves close cooperation between archives and intermediaries (project developers) in the use of information resources of audiovisual documents: choosing a topic, developing a script, preparing textual support, selecting and copying documents. It should be recognised that the main analytical and synthetic work remains for archivists. Exhibition work as a form of using archival audiovisual documents has its own characteristics – exhibiting, for example, photo documents in originals or copies.

Project work involves a number of important measures: multifaceted development of the theme and conceptual foundations of the exposition, spatial design of the exhibition, which will have a certain informational emphasis, definition of the circle of archival documents, their selection and systematisation, compilation of a list of exhibits, annotation of photo documents, preparation of musical and audiovisual accompaniment using archival sound recordings and newsreels.

The effect of using archival audiovisual information in media projects depends on the nature of the information involved in the project (here, archives and mediators play a decisive role as informants who convey information to the collective consumer), as well as the consumers themselves (their interest in information, subjective and objective) objective factors influencing the perception of information). We can talk about the effectiveness of using retrospective audiovisual information when mediating media projects when the results of this use coincide with the expectations or goals of the collective consumer of information – a mass or local audience. An important role in increasing efficiency is assigned not only to consumers as carriers of information needs, but also to archives and developers and implementers of media projects. The latter should be well oriented to the relevance of information, the information needs of consumers, the characteristics of the audience and the degree of its training, the ability to perceive the value and usefulness of information, the efficiency of using information resources.

The informative effect of the use of retrospective audiovisual information in media projects is the social resonance caused by the presentation of audiovisual documents in the media space – discussions on forums, in social networks, increased interest in archival heritage, and therefore an increase in demand for archival information. The cultural and educational effect of using audiovisual information in media projects is manifested in raising the cultural level of the collective consumer of information, the formation of value orientations and a careful attitude to the historical and cultural heritage.

We interpret the aesthetic effect of media projects involving audiovisual documents as promoting the development of aesthetic views, the formation of aesthetic tastes and preferences. Although this effect is directed at people's subjective consciousness, it indirectly affects their social behaviour. The use of archival film, photophone, and video information in the media space also has a scientific effect. First, the media projects themselves are to a certain extent an intellectual product (development of the conceptual foundations of the project, examination and scientific processing of sources, selection of retrospective information presentation methods). Secondly, media projects identify current problems in the life of society and are a kind of incentive for scientific studies, the object of which will be the study of these problems.

The scientific novelty of the article lies in the presentation of the peculiarities of the functioning of audiovisual documents in Ukrainian archives. The following areas of use of audiovisual documents are distinguished: informative, educational, cultural and educational, scientific. The following forms of engagement of archival audiovisual documents are presented: organisation of online exhibitions, preparation of radio and television broadcasts, creation of an audiovisual product for presentation on the Internet. Exhibition work as a form of using archival audiovisual documents has its own characteristics – exhibiting, for example, photo documents in originals or copies. The proposed material enriches the theory of modern archival science about the changing role of the archives of Ukraine, which have accumulated a significant fund of film, audio, photo, and video recordings.

Conclusions

Audiovisual documents as carriers of film, photophone, and video information characterise the image and sound that determine the specifics of living in the actual environment of use or potentially such a possible one prolonged in time, that is, their preservation in collections, archive funds, libraries, museums, and other institutions. Two important directions in the activity of audiovisual archives of Ukraine were identified – pres-

ervation of documents and providing access to them to a wide range of users.

Important areas of use of audiovisual documents are informative (publishing documents in the media with the aim of informing the public about the composition and content of audiovisual documents), educational (spreading knowledge), cultural and educational (stimulating interest in archives, preserving cultural heritage, revealing the significance and value of audiovisual documents as historical and cultural monuments), scientific (delineation of important political and social problems of our time, the origins of which should be sought in the early periods of history).

Different directions of use of retrospective information are represented by the following forms of involvement of archival audiovisual documents: organisation of online exhibitions, preparation of radio and television broadcasts, creation of an audiovisual product for presentation on the Internet (use of information from audiovisual documents in documentary, popular science, journalistic films). Exhibition work as a form of using archival audiovisual documents has its own characteristics – exhibiting, for example, photo documents in originals or copies. Work on media projects involves the close cooperation of archives and intermediaries (project developers) in the use of information resources of audiovisual documents: choosing a topic, developing a script, preparing textual support, selecting and copying documents, but the main analytical and synthetic work remains with archivists.

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Формування та використання аудіовізуальних документів: напрями і форми

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Анотація. Метою статті є дослідити напрями і форми використання аудіовізуальних документів в архівах України. Методологічну основу статті становили такі методи: абстрактно-логічний, аналізу, джерелознавчого пошуку, класифікаційний, когнітивний, синтезу, узагальнення. Застосовано такі підходи наукового пізнання, як діалектичний об'єктивності та структурно-функціональний. Наукова новизна статті полягає представленні особливостей функціонування аудіовізуальних документів в українських архівах. Виокремлені такі напрями використання аудіовізуальних документів: інформаційний, навчальний, культурно-освітній, науковий. Представлені такі форми залучення архівних аудіовізуальних документів: організація онлайн-виставок, підготовка радіо і телепередач, створення аудіовізуального продукту для представлення в мережі Інтернет. Виставкова робота як форма використання архівних аудіовізуальних документів має свої особливості – експонування, наприклад, фотодокументів в оригіналах чи копіях. Запропонований матеріал збагачує теорію сучасного архівознавства про зміну ролі архівів України, які накопичили значний фонд кіно-, аудіо-, фото-, відеозаписів. Висновки. Аудіовізуальні документи як носії кінофотофоновідеоінформації характеризують зображення та звук, що зумовлюють специфіку побутування в актуальному середовищі користування або потенційно такому можливому, пролонгованому в часі, тобто їх збереження в колекціях, фондах архівів, бібліотек, музеїв, інших установ. Виявлені два важливих напрями в діяльності аудіовізуальних архівів України – збереження документів та надання до них доступу широкому колу користувачів. Робота над медіапроєктами передбачає тісну співпрацю архівів і посередників (розробників проєктів) у використанні інформаційних ресурсів аудіовізуальних документів: вибір тематики, розроблення сценарію, підготовка текстового супроводу, відбір і копіювання документів, але основна аналітико-синтетична робота залишається за архівістами

Ключові слова: документ; аудіовізуальні документи; архіви України; інформаційний ресурс, інформація, цифровізація, цифрові технології

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Information and communication technologies in the research of reading rooms and libraries of Lemkivshchyna

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Abstract. The purpose of the work is to research and study innovations, information and communication technologies, as an important aspect of contemporary historical and socio-communicative studies, as well as the development of library and archival affairs. The research methodology encompasses a set of general scientific methods such as systematization, generalization, forecasting, comparison, and structural-functional analysis, conducted to analyse the current development of technologies in the library field and the needs of information and communication support. The scientific novelty lies in the comprehensive and systematic analysis of information and communication technologies. The importance of information and communication technologies in library and archival affairs, the implementation of progressively new means of processing, preserving, and analysing sources is determined. Their integration into library affairs, prospects, development paths, and applications are explored, particularly in the study of reading rooms and libraries of Lemkivshchyna. Conclusions. The development of information and communication technologies is an important aspect of societal development, particularly science. The result of innovative development in archival and library affairs is information and communication technologies (including software and hardware), as well as the improvement of product and service quality formed by them, forms, methods, and management technologies. Thus, we can argue that the development of information and communication technologies is one of the key aspects of the development of library and archival affairs because transforming them into consolidated sources of information allows for a new approach to studying the history of Lemkivshchyna and re-evaluating the history of information institutions in the region. The study of library and archival affairs of Lemkivshchyna involves the development of an information system based on innovative ICT, which will enable the formation of a consolidated information array

Keywords: information and communication technologies; library; reading room; Lemkivshchyna; innovations; consolidated sources of information; databases; geoinformation system

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Relevance of the research topic

The term "Information and Communication Technologies" (ICT) is defined as a diverse set of technological tools and resources used for communication and the creation, dissemination, storage, and management of information (Blurton, 1999). ICT encompasses a wide range of rapidly evolving technologies, including telecommunications technologies (telephony, cable, satellite, television and radio, computer conferences, video conferences), as well as digital technologies (computers, information networks) and software applications (Chisenga, 2006).

The development of ICT is often associated with innovative activities in library affairs, facilitated by the rapid development of Internet technologies and the updating of products and services provided by libraries (Chesbroug, 2010). This also includes the implementation of forms, methods, and management technologies aimed at enhancing the reputation of libraries, archives, and reading rooms, improving the quality of services provided, and creating a high-tech communication environment (Busel, 2012-2019). Analysis of research and publications. The issues of modern information technologies in the activities of libraries and archives are the subject of research by many Ukrainian and foreign scholars. Information and communication technologies have become a scientific achievement through the research of N. Matviychuk (2014), V. Likhovid (2016), T. Koval (2016), K. Lobuzina (2012), K. Lobuzina *et al.* (2016), N.E. Kunanets (2012, 2014), N.E. Kunanets *et al.* (2017), N.V. Veretennikova (2016), H.S. Bylovs & T.V. Onipko (2018). Issues of access to electronic documents have been addressed by T. Yaroshenko (2009) and K. Lobuzina (2012). The establishment of modern scientific communication systems, which is the basis of research, has been studied by I. Davidova (2009), H.V. Shemaieva (2016) and N.E. Kunanets (2014). The purpose of the study is to research and study innovations, information and communication technologies as an important aspect of contemporary historical and socio-communicative studies, and the development of library affairs. The innovative activities in library and archival affairs are driven by the demands of modern society, as they are closely linked with other areas of activity [2, 208]. The implementation of innovations is mostly influenced by economic and social opportunities, technical equipment, and technological processes in libraries, as well as the increasing demand for new types of services and expanding access to resources (Stephens, 2012). Experts in the library and archival field have different views on the implementation of innovations. Innovations contribute to the dissemination of advanced library and archival practices, enable the formation of new directions for the functioning of library and archival institutions, and improve their work by using ICT and transitioning to a digital information environment (Haliso, 2007).

According to T.V. Koval (2016), "innovations in libraries are examples of activities (services, products) that are characterised by absolute or relative novelty, go beyond existing traditions, and elevate professional activity to a qualitatively new level". From a philosophical aspect, "innovations in the library are those that contribute to the fulfilment of the library's social functions" (Sprinsian, 2019). Based on the analysis of existing library innovations, we have developed a generalised classification presented in Figure 1.

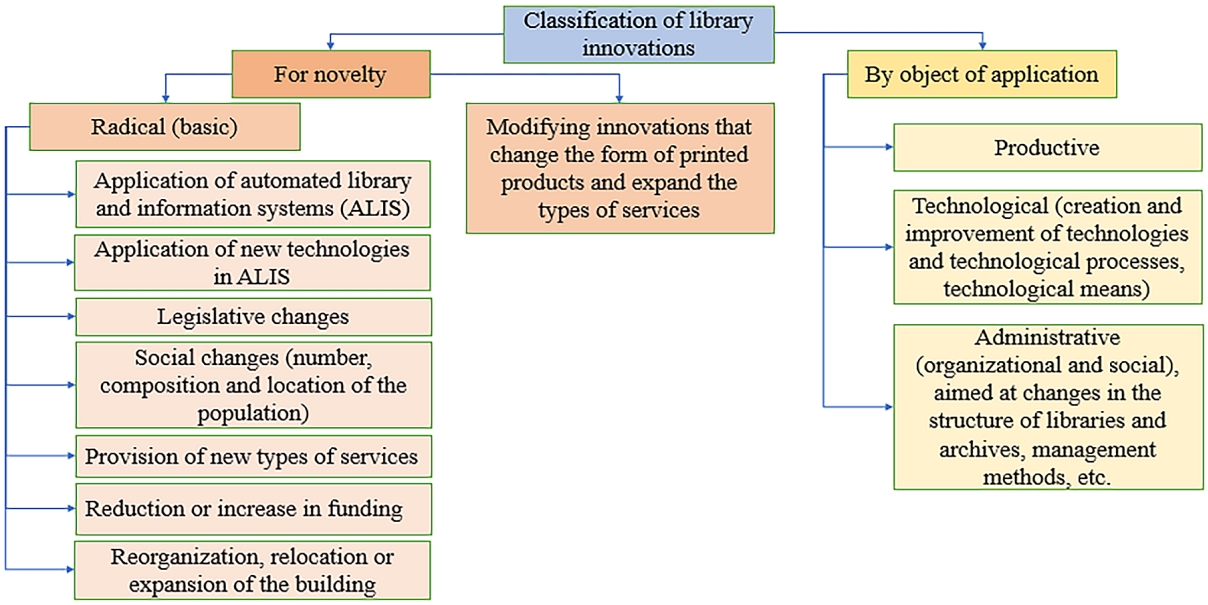

Figure 1. Classification of library innovations

Source: developed by the authors

Specialists in library and archival affairs are engaged in studying various aspects of innovative activities, such as identifying trends (Pavlenko, 2010), summarising foreign library experience [28, 5], and ensuring prompt service delivery. One of the most important indicators of effective library and archival work is promptness and accessibility (Dobrovolska & Cherednyk, 2022).

Innovations manifest in the application of new technological automation techniques, bringing qualitative changes to information search processes. Their implementation allows for the introduction of electronic document delivery technologies. Users can gain access to licensed, corporate, and paid electronic resources. Significant attention is given to the development of search web services, online information retrieval technologies, message organisation, and references. Special emphasis is placed on service innovations in providing individually tailored services (Garagulya, 2014).

The innovative development of libraries and archives is inevitable; it should ensure comfortable working conditions and contribute to the transition from inert and outdated working principles (Haliso, 2007).

A.S. Onyshchenko & L.A. Dubrovina (2011) emphasise the importance of transitioning library information activities to the electronic environment, particularly regarding the availability of electronic information resources, electronic versions of printed and manuscript documents, in the format of a library of a nationwide information resource of scientific orientation.

Researchers assign an important role to the development of library affairs in the field of socio-communicative technologies (Yaroshenko, 2009). Despite the relevance of classical libraries and archives, scholars and users are increasingly turning to electronic resources. The latest developments in library and archival affairs allow for the creation of accessible information retrieval, which involves the creation of databases and data exchange capabilities (Lobanovska, 2012). The use of modelling methods, systems analysis for the formation of a perfect information retrieval process system is important, allowing the creation of electronic information support for the scientific activities of various social institutions (Veretennikova, 2016).

ICT enable the exploration of library affairs development directions, involving the use of information services and databases, and the use of search engines allows this to be done more qualitatively (Kunanets, 2014).

The innovative development of archival and library affairs should contribute to improving the quality of products and services offered (Bilous & Onipko, 2018). Services provided by libraries and archival institutions are quite diverse, and the application of innovations sets the task of creating new approaches to user service (Klymenko, 2020).

The services provided by libraries should be of high quality, ensuring access to the necessary information for users, and may involve the use of computers, information networks, and specialised software applications. ICT allows for the automation of work processes and speeds up service delivery (Haliso, 2007). Thanks to ICT, libraries have extensive opportunities for organising information for further use and increasing their informational potential. This is facilitated by the use of specialised information management systems and library digitisation, which allows for shared access to information resources and document delivery services (Mphidi, 2014). ICT enables efficient cataloguing and classification of works, improving the quality of information services (Perez, 2020). Their use in academic settings accelerates message delivery, facilitates learning, and research (Lapo & Davletyarova, 2020).

The study of library and archival affairs in the Lemko region involves the development of an information system based on innovative ICT, which will allow for the formation of a consolidated information array. The majority of materials from libraries, reading rooms, and archives are located within the territory of Poland. The state programme for the development of libraries and archives in Poland includes digitising the collections of state archives and providing unrestricted access to them for users. The formation of a unified information database (UID) containing an electronic catalogue of documents, metric books, collections, represents an opportunity to create material and cultural heritage from the history of libraries in Lemkivshchyna. Given that these materials are legally considered part of Poland's cultural heritage, the most optimal and straightforward way to access these sources is through electronic digitised documents. For comprehensive research on the issue, it is necessary to gather data from various sources of information and systematically integrate them into various types of information resources, which collectively form an adequate information model of the subject area for analysis, processing, and in-depth study.

At the initial stage of the research, it is important to collect information about document repositories (libraries, archives, museums, reading rooms) and transform them into consolidated sources of information, repositories, and data spaces that contribute to the preservation and provision of access to quality information sources, facilitating their use by a wide range of users, researchers, and students.

The Lemko ethnographic group is one of the largest in Ukraine and is considered one of the largest diasporas in the world. Therefore, consolidated information resources could combine data not only from Ukrainian libraries, archives, and museums but also from other countries where Lemkos live. That is why the development of a geographic information system (GIS) that consolidates information about libraries in Lemkivshchyna regardless of their territorial location has become a pressing task. The consolidated GIS of

libraries, archives, and museums in Lemkivshchyna is seen as a modern socio-communicative system that, based on its own and external information resources, generates a wide range of relevant consolidated information products and services. In creating such a GIS, it is proposed to use the methodological foundations and tools of socio-communicative engineering – a new engineering theory, the relevance of which is determined, in particular, by the acute need to establish constructive scientifically grounded rules and principles of socio-communicative relations in the information society. The GIS being created should be built on a platform that allows its further integration into the national information resource. It will now consider the creation of a consolidated database (UID) on the history of Lemkivshchyna using geographic information technologies. Its main purpose is to store available information about cultural heritage objects and material values, as well as electronic references to archival materials or copies of archival materials.

In creating the consolidated UID related to the libraries of Lemkivshchyna, we apply an approach that has practical implementation in relational databases, which involves using one-to-many relationships (1→∞). The database consists of the following tables: "Villages", "Archives", "Believers", "Deaneries", and "Reading Rooms". These tables are interconnected using keys – identifiers, which allows for the implementation of a relational structure (Fig. 2). The filling of the UID occurs during the study of information about a particular village, as research or processing of literature and various archival materials progresses. Thus, the database becomes a repository of obtained data and is convenient for further work, distinguished by a high level of clarity, and allows for the quick generation of necessary reports.

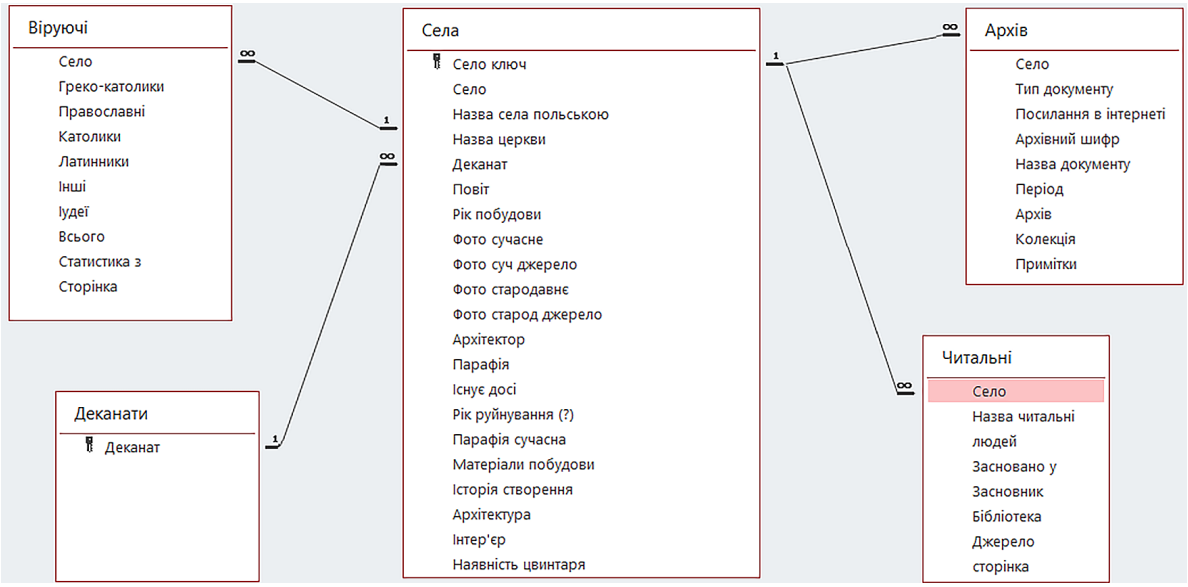

Figure 2. Structure of Relationships in the Created UID

Source: developed by the authors

The created UID, which is a software product, in accordance with Directive 96/9/EC (1996), may be subject to protection under copyright law (Skliarov *et al.*, 2023). The consolidated data contained therein belong to publicly available information, which is not subject to protection and can be freely distributed. This issue is still under-researched and may be the subject of further investigation.

Since the UID of data is linked to a geographic information system, it allows for more detailed exploration, storage, updating, and analysis of information related to the libraries of Lemkivshchyna. Scientific novelty lies in the comprehensive and systematic analysis of information and communication technologies, their integration into library affairs, and the prospects and ways of development and application, particularly in the study of reading rooms and libraries in Lemkivshchyna.

Conclusions

The result of the innovative development in archival and library affairs is information and communication technologies (including software and hardware), as well as the improvement of the quality of the product and services formed by them. Thus, we can assert that the development of information and communication technologies is one of the key aspects of the development of library and archival affairs because transforming them into consolidated sources of information allows for a new approach to studying the history of Lemkivshchyna and also offers a fresh perspective on the history of information institutions in the region.

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"Osint" and "consolidated information" in the terminological field of information and analytical activity

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Abstract. The purpose of the study is to reveal the content of the terms "OSINT" and "consolidated information" in the terminological field of information and analytical activity, to identify similarities and differences between them. Research methodology. General scientific research methods of analysis and synthesis were used; the method of comparative analysis to compare the essence of the terms OSINT and consolidated information; the method of content analysis in the study of texts and documents; the hypothetical method to substantiate the synonymity of the terms OSINT and consolidated information. The scientific novelty lies in the identification of analogies between the terms "OSINT" and "consolidated information", which form a terminological series in the scientific discourse and practical field of information and analytical activities. Conclusions. The terminological field in the scientific discourse and in the field of practical information and analytical activities is characterised by the formation of a synonymous series, which includes the terms "OSINT" and "consolidated information", which are actually designations of the concept of "information and analytical activities". An analysis of the content of these terms shows that the difference is that the content of the concept of "consolidated information" does not indicate a specific field of activity, while OSINT retains the relevant connotations in the application of the term in other areas. OSINT in its meaning, regardless of the scope of use in intelligence activities, is a type of information and analytical activity which is gaining active development in the modern information and communication space to perform a wide range of tasks in social practice aimed at searching, collecting and analysing information from open (publicly available) sources which are not classified or restricted

Keywords: OSINT; consolidated information; information and analytical activities; terminology

Relevance of the research topic

Information and analytical activities are systemically important in all areas of social practice – from the implementation of special measures aimed at supporting national interests and state policy to competitive intelligence, HR, and business analytics.

It should be noted that in the scientific discourse, along with the established concept of "information and analytical activity", the terms "consolidated information" and "OSINT (Open Source Intelligence)" are present as components of the terminological field – a set of terms connected by a common content and common semantic properties.

Taking into account that synonymy is caused by the constant development of science accompanied by the

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emergence of new concepts and the desire to give each concept the most accurate name, it seems relevant in this context to clarify the meaning of the terms "OSINT" and "consolidated information" inherent in the field of information and analytical activity for the unambiguous perception of texts in scientific discourse.

Analysis of research and publications

In the field of attention of representatives of philological science are the studies of general scientific terms. Thus, in the article by H.I. Krokhmalna (2017) attention is paid to the definition of the general scientific term "analysis". The researcher notes that the term indicates the most general features of the concept without indicating belonging to a particular scientific field, which confirms the "neutrality" and general scientific characteristics of this word unit. However, when combined with other lexemes, this term is able to specify the scope of use and a certain branch.

The term "information and analytical activity" is not yet standardised, its essence and content remain the subject of scientific studies. Thus, researchers distinguish two levels of information and analytical work (Soroka & Soroka, 2012):

1. The information level is the search, collection, storage, and dissemination of information.

2. Analytical level – generalisation, classification of information, its analysis and transformation, development of conclusions, proposals, recommendations and forecasts.

In scientific publications, there are definitions of information and analytical activity, in which the authors focus on its various components. Thus, in particular, in the definition by V.M. Varenko (2014) the technological processes of processing and retrieval and the obtained information and analytical products are emphasised:

Information and analytical activity is a specific kind of intellectual and mental activity of a person, in the process of which, as a result of a certain algorithm of sequential actions to search, accumulate, store, process, and analyse primary information, while new, secondary analytical information is formed in the form of an analytical report, review, forecast, etc.

In the definition of information and analytical activity, proposed in the article by V.V. Zahumenna & O.I. Kuzmenko (2022), the value component for the end-user of the information and analytical product is highlighted:

Information and analytical activity is a specific multi-level type of information activity aimed at analysis, generalisation of information circulating in society (analytical component) for the development of information and analytical products (intellectual component) both to meet the information needs of users in various industries, and to make management decisions.

It should be noted that the above definitions are complementary and outline the information and analytical activities in its main aspects. In the system of law enforcement, the term analytical intelligence is also used (Movchan, 2017), which is defined as a special form of information and analytical work, which is based on the organic unity of all forms of this work and consists in the acquisition of new knowledge about an object or phenomenon on the basis of analytical processing of the obtained operational and investigative information about persons, events, objects of operational interest. Referring to the linguistic analysis of the terms "intelligence" and "search", the authors of the publication consider the phrases "analytical intelligence" and "analytical search" to be synonymous.

Publications devoted directly to OSINT topics cover applied issues of using OSINT technologies in various fields (Matviienko & Tsyvin, 2023; Pashkovskyi, 2022; Yarovyi, 2019), and the consolidated information is considered in the aspect of training specialists (Krokhmalna, 2017; Matviienko, 2008), available textbooks on consolidated information (Matviienko & Tsyvin, 2014), the formation of consolidated resources of institutions is considered in the context of the national cultural and historical heritage (Lypak, 2019).

These and other scientific publications outline the content field of information and analytical activities, offer its definitions, identify the applied aspects of the use of OSINT and consolidated information, and serve as a theoretical and methodological basis for further study of subject issues and problems in this area.

The purpose of the study is to reveal the content of the terms "OSINT" and "consolidated information" available in the terminological field of information and analytical activities, and to identify analogies and differences between them.

Statement of the main material

The general principles of OSINT activities are formulated in Washington Plett's book "The Work of Strategic Intelligence. Basic Principles", published in 1957, which set out the principles and methods of information work of strategic intelligence and the possibility of using the knowledge and methodology of social and natural sciences in this work (Platt, 1957). As the author noted, one of the goals of the book he wrote was to initiate the development of the doctrine of information intelligence.

W. Plett, outlining the topic of his research, notes that it is devoted to the information work of intelligence, which covers all types of activities carried out by an intelligence researcher, who has been tasked with concluding an information document on any issue. W. Plett defines information work as the process by which "raw" facts are transformed into completed products of intelligence activities intended for the bodies that implement or develop the political course of the country. W. Plett's information work includes all types of activities related to the planning, control, and coordination of information work, and editing of information documents (Platt, 1957).

Information intelligence work has become a factor in the formation of OSINT as one of the intelligence disciplines (Intelligence Collection Disciplines) in the activities of US intelligence services, along with such as HUMINT (Human Intelligence) – obtaining information with the help of human intelligence, (IMINT Imagery Intelligence) – collecting intelligence information based on a large number of images, etc.

In 2001, the concept of OSINT was outlined in the NATO Open Source Intelligence Handbook (2001), which recognised OSINT as an important component of NATO's future vision and defined OSINT as unclassified information that has been specifically identified, selected, refined and disseminated to a selected audience to achieve a specific purpose.

The document states that OSINT is a major new "force" in 21st century information operations and emphasises that OSINT is not "new", that states and organisations have always understood the value of direct observation, systematic reading, and legitimate acquisition of information services. What is new in OSINT is the combination of such trends as the spread of the Internet as a tool for disseminating and sharing open information; the associated "information explosion" in which published knowledge is growing exponentially (NATO Open Source Intelligence Handbook, 2001).

The U.S. National Intelligence Estimate (U.S. National Intelligence, 2011) presents six steps of the intelligence cycle, where OSINT is listed as one of the sources of intelligence: planning and management – data collection – processing and use – analysis and product production – dissemination – evaluation, and discloses their content:

- planning and management – identifying customer requirements and planning activities;
- data collection – the collection of raw data related to the five main sources of intelligence (GEOINT, HUMINT, MASINT, OSINT, and SIGINT) required to produce a finished product; raw data sources may include, but are not limited to, news reports, aerial photographs, satellite imagery, and government and public records;
- processing and use – converting raw data into an understandable format that can be used to produce a finished product;
- analysis and production – synthesis, evaluation, analysis, and preparation of processed information for inclusion in the finished product;
- distribution – transfer of the finished product to the customer; at this stage, gaps can be identified, after which the exploration cycle starts again;
- evaluation – continuous assessment and feedback from customers to adjust and improve activities and analysis to better meet the changing and evolving information needs of customers.

OSINT, as an information and analytical activity, using a set of measures, tools and methods to obtain and analyse information from open sources in the context of the active development of digital technologies, conceptually corresponds to the concept of "space of flows" proposed by the Spanish sociologist Manuel Castells (Saracevic & Judith, 1981). His idea is that in the age of digital technologies, when a network society is being formed, a new type of space emerges – the space of flows based on a continuously changing space of interactions. M. Castells considers this concept in a continuous connection with the concepts of social action and social time and hypothesises that the space of flows is the dominant spatial form of the network society.

M. Castells defines the concept of "space of flows" as material support for social practices distributed in time and transmitted over distance, and understands flows as purposeful, repetitive, programmed sequences of exchanges and interactions between physically separated positions occupied by social actors in the economic, political, and symbolic structures of society. Such exchanges and interactions form information flows in social space, both in the traditional and digital space of interaction.

The concept of "information flow" is used by Ukrainian researchers mainly in the study of narrowly focused information flows in the activities of enterprises of various industries in their internal and external economic activities. In the context of OSINT activities, the focus is on information flows that are formed in the mass communication system, in particular, in the information field of Internet communications, as a result of the reflection of social activities of society members.

Information flows are analysed in three ways:

- syntactic – formal rules (parameters) for building an information flow and the relationship between its elements are established;
- semantic – each element of the information flow is interpreted;
- pragmatic – the degree of usefulness of each element of the information flow for the purposes of the study is defined (Yezhova, 2002).

When analysing information flows in the constantly changing Internet information environment, OSINT research is based on the laws and patterns of growth, concentration, dispersion (Bradford's Law), aging of information and sources, the theory of information retrieval and consolidation of information inherent in the theory of information and analytical activity. Among the methods and technologies used in OSINT are information expertise, information diagnostics, information monitoring, and information modelling of situations.

The study of information flows, as the essence of OSINT activities, is carried out using the types of analysis inherent in information and analytical activities:

1. Quantitative analysis takes into account such parameters as the number of information sources, their volumes, indicators of information dissipation and its obsolescence, the number of authors, the number of user reactions.

2. Qualitative analysis is based on studying the content of information, determining the value, reliability and completeness of information related to ideas, research methods, physical principles, design solutions, technical, economic and operational characteristics of products, economic and marketing factors, etc.

3. The analysis of information links involves identifying the relationship between individuals, countries, events, the intensity of these links, channels of information transmission, and changes in links over time and space.

4. The analysis of the structure of the information flow is aimed at identifying the type structure of documents (changes in the relationship between different types and types of documents), as well as facts, methods, and concepts, which makes it possible to study the stages of development of a particular area.

Today, the use of modern OSINT tools and technologies outside the subject area of special services is carried out for such tasks as checking counterparties, job candidates, competitive intelligence and business security, using the original meaning of the term "intelligence" (to examine, investigate, study something for a specific purpose), free from semantic shades depending on the scope of use (Official website of Sidcon Consulting Company, 2023).

Consolidated information. For the first time, the concept of "consolidated information" came into scientific and practical use from the title of the UNESCO Symposium on Information and Consolidation (Colombo, Sri Lanka, 12-15 September 1978). A detailed definition was proposed by T. Saratsevych (1986) in his book "Information Consolidation. A Guide to the Evaluation, Restructuring and Repackaging of Scientific and Technical Information".

Consolidated information is open knowledge that has been specially selected, analysed, evaluated and possibly restructured and reformatted to serve the urgent decisions, problems and information needs of consumers or a social group that otherwise cannot access this knowledge effectively and efficiently because it is not readily available in its original form and is spread across many documents. The criteria for selecting, evaluating, restructuring and repackaging this knowledge are determined by potential consumers.

In the national terminology of information activity, the concept of "consolidated information", which appeared in the early 1990s, was perceived as a designation of a promising set of methods of scientific and information activity.

DSTU 5034:2008 (2009) provides the following definition: Consolidated information is information that is selected from dispersed and/or hard-to-reach information sources, analysed, evaluated, structured (if necessary), and modified to be used for direct problem solving or meeting information needs.

The main processes related to information consolidation are listed below (Saratsevych, 1986):

- studying potential users to determine the criteria for all other processes;
- selection of information sources that potentially contain the most useful information for solving certain problems and information needs of the user; selection can be made from a variety of primary and secondary sources;
- assessment of information in terms of its quality, reliability and validity;
- analysis to identify and highlight the most prominent characteristics;
- restructuring (if necessary) the identified information into content that can be used by users in the most efficient and effective way; this may include synthesis, summarisation, rewriting, simplification, revision, modern presentation, etc;
- packaging/repackaging of the restructured information into a form that will increase the potential for its use (restructuring refers to the content or essence of information, while packaging deals with the means, format and form of its presentation);
- disseminating information in a way that encourages and facilitates its use;
- user feedback, assessment of efforts, adjustments.

Comparison of the OSINT intelligence cycle, as set out in the US National Intelligence Report (2011), and the content of the information consolidation process, as described in the manual "Information Consolidation Course: A Guide to Training and Education in Information Analysis, Synthesis and Repackaging" (Saratsevych, 1986), shows their actual identity, which is obvious, given that both concepts represent information and analytical activities in their essential components. The difference lies in the fact that the content of the concept of "consolidated information" does not indicate a specific area, while OSINT, having emerged from the sphere of intelligence activities, still retains the relevant connotations in the application of this term.

Without further searching for analogies, terminological correspondences, methods and methodological approaches, we note that the terms "OSINT" and "consolidated information" used in the field of information and analytical activities are actually synonymous.

The scientific novelty lies in the identification of analogies between the terms "OSINT" and "consolidated information", which form a terminological series in the scientific discourse and practical sphere of information and analytical activities.

The above considerations of the relationship and correlation between the terms "OSINT" and "consolidated information" in the context of information and analytical activities allow us to draw the following conclusions:

1. The terminological field in the scientific discourse and in the field of practical information and analytical activities is characterised by the formation of a synonymous series, which includes the terms "OSINT" and "consolidated information", which are actually designations of the concept of "information and analytical activities".

2. An analysis of the content of these terms, as set out in the policy documents that initiated and develop their use, shows that the difference lies in the fact that the content of the concept of "consolidated information" does not indicate a specific field of activity, while OSINT, having emerged from the field of intelligence, retains the relevant connotations in the application of this term in other areas.

OSINT in its meaning, free from semantic shades depending on the scope of use in intelligence activities, is a type of information and analytical activity that is actively developing in the modern information and communication space to perform a wide range of tasks in social practice to search, collect and analyse information from open (publicly available) sources that do not have classification or access restrictions.

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Ternopil region museums in the age of social media: From preservation to interaction

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Abstract. Purpose of the research. The article is devoted to the current topic of museums' role in modern society, which is characterised by the widespread use of social media as the main communication and information channel. The research methodology is based on the use of general scientific and special research methods: analysis, synthesis, generalisation, systematisation of materials, induction, and deduction. The novelty of the study lies in the comprehensiveness of the research on the social media activity of museums in the Ternopil region. The authors investigate how museums adapt to new audience requirements and use social media as a tool to attract visitors, promote cultural heritage, and create a dialogue with the public. The article is based on a comparative analysis of the experience of different museums that use social media to achieve their mission. The authors put forward a hypothesis that museums in the era of social media are moving from preservation to interaction, becoming not only cultural but also social institutions. Conclusions. The author emphasises that museums are important carriers of cultural memory and identity, but their role is changing due to the spread of digital technologies and social media. Social media provide museums with opportunities to increase visibility, attractiveness, and accessibility, as well as to collect feedback, take into account the needs and interests of the audience, and form communities and partnerships. The author analyses how museums use social media for various purposes, such as informing, educating, entertaining, promoting, engaging, collaborating, and socialising. The authors also consider the challenges and benefits of using social media for museums, such as the changing role of visitors, competition with other sources of information and entertainment, and the need to maintain relevance and quality of content. The article concludes that museums in the era of social media should reconsider their mission and strategy to meet current trends and audience expectations. It is determined that museums should move from preservation to interaction, i.e. put not only exhibits in the centre but also people who visit them, creating opportunities for them to learn, communicate, participate, and co-create

Keywords: museums of the Ternopil region; analysis of the museum website; analysis of museum social media; electronic culture; virtual museum

Relevance of the research

Cultural heritage digitising in local museums is an important step in preservation and engagement with the public. This process opens up new opportunities for access, research, and promotion of cultural values ensuring their long-term exposure and study. Cultural heritage digitising facilitates global access to unique objects, preserving them for future generations and facilitating the exchange of knowledge and cultural experience. Digitalisation of monuments allows the conversion of information about museum objects into an electronic format which ensures their more effective preservation and creates an opportunity for a wide range of people to study and research their artifacts. With the use of digital technologies, it is possible to create virtual

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exhibits that allow museum visitors to explore collection of objects online.

Analysis of research and publications

Cultural heritage preservation and popularisation has been a question of active scientific exploration for a long time. However, in the period of accelerated digitisation of the global space, new opportunities and prospects have appeared in this segment. In particular this applies to social media. Scientists such as N. Rodionova & H. Hairapetian (2021), Zh. Myna (2021), V. Orlyck *et al.* (2021), D.O. Zirka (2020), M. Butyrina & V. Ryvlina (2021). Aspects of social networks using for museum popularisation in Ukraine and abroad are in the works of A.D. Belova (2022), M. Rosoha & Zh. Myna (2022). At the same time the rapid development of social media requires further exploration in this direction and in particular taking into account the regional aspect.

The purpose of research is to analyse the activity of the museums of the Ternopil region in social networks and the effectiveness of their social communications.

Presentation of the main material

For the effective development of museum industry, it is necessary not only to digitise, store, and record the objects, but also to ensure citizens' interest and access to them. So virtual attractions and 3D objects have little value by themselves without a viewer. In order to popularise and make exhibitions and expositions accessible, museums can offer the following online activities:

- publication of online educational materials that can be used by teachers and students including games and tests for learning;
- virtual events, online exhibitions, meetings, online lectures, webinars and workshops;
- development of augmented reality instruments to create an immersive visitor experience;
- providing the possibility of buying tickets, reproductions or souvenirs online;
- virtual tour design that allows you to visit museum expositions online;
- creation of an interactive and user-friendly website with comfortable navigation;
- development of virtual models for individual exhibits of the entire museum;
- availability of interactive online exhibitions where users can interact with objects;
- active use of social networks for publishing news, photos, and videos with audience involvement though groups, events, and discussions.

We will now take a closer look at some tools that museums should apply as a priority. These include the presence of museum websites the ability to order tickets or services online, as well as social networks or blogs maintained by museum staff.

According to the Resolution of the Cabinet of Ministers of Ukraine No. 1388 "On approval of the list of museums and reserves in which museum objects that are state property and belong to the state part of the Museum Fund of Ukraine are stored" (2021) there are 34 state museums in Ternopil. A sample of 10 well-known museums in Ternopil and the region is offered for analysis. First of all, we will analyse the availability of the website and the most important criteria for its convenience.

A user-friendly website for a museum is an extremely important part, as it influences the visitor's experience and can determine their interaction with the museum online. Here are some key aspects and benefits as a user-friendly website:

- easy navigation: a convenient menu structure and clear rules allow visitors to easily find the necessary information, reducing the time spent by the client to reach a specific page or section;
- adaptive design: the site must be adapted for different types of devices (computers, tablets, mobile phones) for optimal display on any service;
- aesthetics: an attractive and aesthetics look that reflects the atmosphere of the museum based on the use of high-quality photos and graphics to create an impression of museum exhibits;
- loading speed: speed is a key factor for the satisfaction of visitors and improving the website's position in search engines;
- interactivity: the use of interaction elements, such as QR-codes, animations, videos and interactive galleries, the possibility of commenting, feedback, and asking questions for visitors;
- new and high-quality content: clear and interesting content that reflects the collection, events, and history of the museum, ensuring the relevance of information and regular content updates;
- SEO optimisation: using keywords and SEO strategies to improve the website's visibility in search engines;
- online services: ease of ordering tickets, online gift shop, contact details.

Therefore, we can conclude that most of the analysed museums have the website quality problems such as the lack of adaptability, speed, and interaction. Poor aesthetics and outdated content are also common trends. The Les Kurbas Memorial Manor Museum and the Bohdan Lepkyi Literary Memorial Museum could not be analysed due to the absence or non-functioning of the website.

The most optimal, in the opinion of the author, is the website of the Ternopil Regional Museum of Local Lore, which, in addition to speed, the absence of virtual tours and the ability to buy tickets with payment online, has all the main characteristics for the convenience of the user.

It would be appropriate to single out the aesthetics of the websites of the Terebovlia Museum-Workshop and the Borshchiv Museum. There modern design attractively distinguishes them against the background of the outdated templates of many others.

Table 1. Analysis of the comfortable using of museums websites of the Ternopil region

Name and museum website	Navigation	Adaptability	Aesthetics	Speed	Interaction	Content	SEO	Services
Berezhany Museum of Local Lore https://bkmuseum.at.ua/	+	-	-	-	-	- (2014)	-	Tickets reservation on the tel.
Borshchiv Regional Communal Museum of Local History https://verteba.com.ua/	+	+	+	-	-	- (2021)	+	Tickets reservation on the tel.
Kopychyntsi Museum of Theatre Art https://kopychyntsi.com.ua/archive/kultura/kopychynets-kyy-muzey-teatral-noho-mystetstva/	-	-	-	-	-	- (2006)	-	-
Kremenets Literary and Memorial Museum of Julius Slovatsky http://mjsk.te.ua/	+	+	-	-	-	+ (2023)	+	
Bohdan Lepky Literary Memorial Museum http://lepkiy.te.ua/website doesn't work	-	-	-	-	-	-	-	-
Les Kurbas Memorial Manor Museum website is absent	-	-	-	-	-	-	-	-
Pochaiv History and Art Museum https://museum-portal.com/ua/muzeyi/97_pochayivskiy-istoriko-hudozhniy-muzey	-	+	+	+	-	-	-	3D tour
Terebovlia Museum-Workshop https://mm.terebovlia.info/	+	+	+	-	-	- (2019)	+	Tickets reservation on the tel., master-classes
Ternopil Regional Local History Museum https://tokm.com.ua/	+	+	+	-	+	+ (2024)	+	Tickets reservation on the tel., master-classes, quests, meetings
Ternopil Regional Art Museum https://artmuseum.te.ua/	+	+	-	-	-	+ (2023)	+	Tickets reservation on the tel.

Source: developed by the author

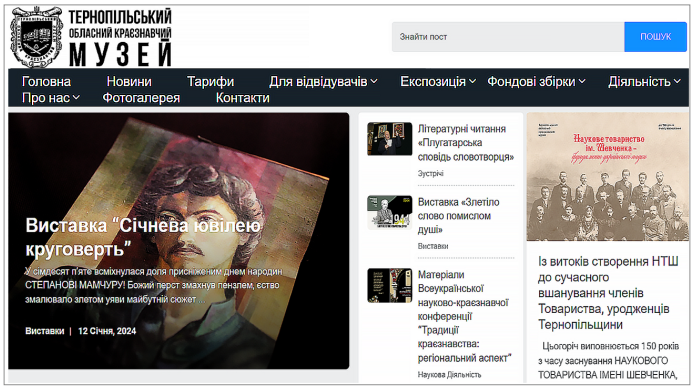

Figure 1. Interface of the Ternopil Regional Museum of Local History

Source: developed by the author

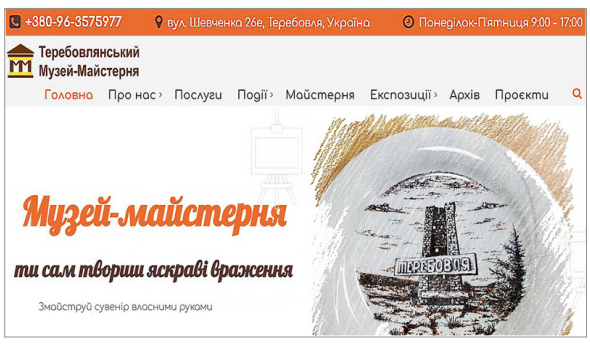

Figure 2. Terebovlia museum-workshop

Source: developed by the author

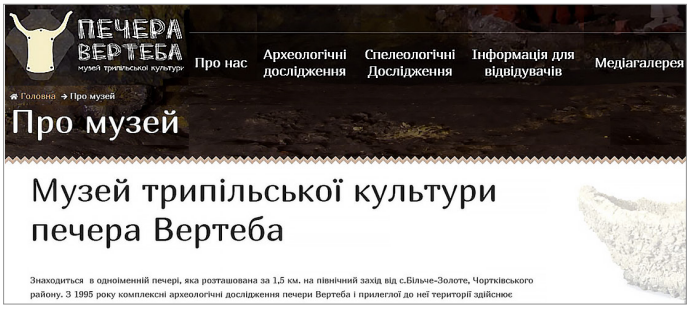

Figure 3. Interface of Trypillia culture museum verteb cave

Source: developed by the author

The Pochaiv Museum of History and Art has not got a full-fledged website, but its webpage on the state museums portal is qualitatively presented with a modern 3D tour.

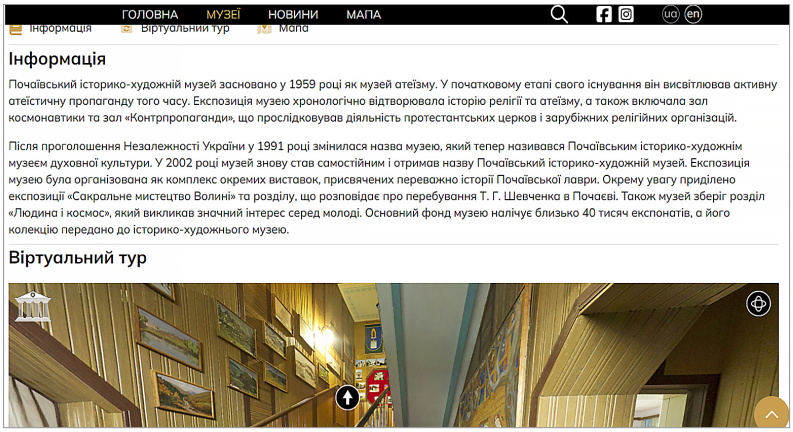

Figure 4. Virtual tour of the Pochaiv history and art museum

In conclusion, a balanced and functional website is important for promoting the museum, attracting visitors and ensuring user comfort. In addition to the website, museums also maintain their social media. One of the main advantages of using social networks is their wide audience. Millions of people use popular platforms such as Facebook, Instagram, X (Twitter) and others. It gives museums the opportunity to convey their message to a wider audience. They can create posts, photos, videos, and other content that captures the attention and interest of social media users. This allows demonstrate the uniqueness and interest of museum exhibits and events, which stimulates the desire to visit the museum personally. Social networks also give museums the opportunity to interact with their audiences. Museum staff or academics can answer questions, provide additional information and connect with visitors through comments, private messages and other forms of communication. It helps to build relationships with your audience and create a positive image of the museum. It would be underlined that social networks allow museums to create campaigns and promotions aimed at attracting new visitors.

Social media management for museums is an important aspect of communication with audience and promotion. Here are the most important indicators and features in the management of social networks by museums:

- growth in the number of subscribers: indicates an increase in the audience's interest in the museum and the effectiveness of communication strategies;
- interaction and involvement: the number of likes, comments, reports indicate how actively the audience communicates and interacts with the museum's content;
- conversion: registration for events, purchase of tickets, participation, and promotions, which evaluates the effectiveness of social networks in transforming the audience into active visitors;
- frequency and regularity of publications: regular content helps to maintain the interests of the audience and increases webpage recommendations.

Among the features that should characterise social media is the planning and publication of diverse, interesting and educational content; active response to comments and messages, public wishes of the; influential persons or experts involvement to increase influence and expand audience; creation events that attract the attention and interaction of the audience: publication of high-quality photo and video materials, compliance with trends; creating and maintaining an active

community in which the audience can discuss and share impressions. The indicated features help museums to build a successful strategy in social networks, supporting the interaction and interest of the audience.

We will briefly analyse the management of popular social networks by the mentioned museums. Social network X is not particularly popular, none of the museums mentioned has an official page or tweets.

Table 2. Museums of Ternopil region pages presence in popular social media

Name of Museum	Facebook	Instagram	YouTube	TikTok
Berezhany Museum of Local Lore	+	+	-	-
Borshchiv Regional Communal Museum of Local History	+	+	+	-
Kopychyntsi Museum of Theatre Art	+	+	+	-
Kremenets Literary and Memorial Museum of Julius Slovatsky	+	-	+	-
Bohdan Lepkyi Literary Memorial Museum	+	+	+	+
Les Kurbas Memorial Manor Museum	+	+	-	-
Pochaiv History and Art Museum	+	-	-	-
Terebovlia Museum-Workshop	+	+	-	-
Ternopil Regional Local History Museum	+	+	+	+
Ternopil Regional Art Museum	+	+	-	-

Source: developed by the author

Analysing the presence of museum in various social networks, we can draw the following conclusions. All museums have a Facebook presence, which is a good practice for interacting with the audience and publishing various content. Most museums also use Instagram to visually present their exhibits and events. Video content, especially short videos, has gained immense popularity in the current environment, so creating channels on You Tube and TikTok is a great way to promote your museum online.

We will briefly examine the pages of each museum separately. The Berezhany Museum of Local Lore actively maintains a Facebook page due to which it received 2000 likes and more than 2400 followers, which is a food result for the district museum page [https://www.facebook.com/profile.php?id=100076229239160]. The profile contains up-to-date information, contacts and several positive reviews. The museum is mentioned in the local media. The lack of planned events from the end of 2021 can be mentioned among the shortcomings. The Instagram page does not have similar results [https://www.instagram.com/berezhanchkiikraieznavchii/]. About 200 followers with more than 370 posts is a rather insignificant number. Engagement is also low: approximately 1-2 likes per post and rare comments. Other shortcomings include a small number of videos, lack of contact information for the museum and profile sections.

The Borshchiv Regional Communal Museum of Local History [https://www.facebook.com/bormuzey] has a well-organised Facebook page with more than one and half thousand readers and likes. The page is constantly updated and contains a lot of relevant information. Positive trends are visible on the Instagram network [https://www.instagram.com/bormuzey/]. With a small number of readers (about 200) the interaction with the posts is high-quality. The average number of marks is a good example of page maintenance. Among the recommendations: supplementing the profile headings with contact information and the museum location.

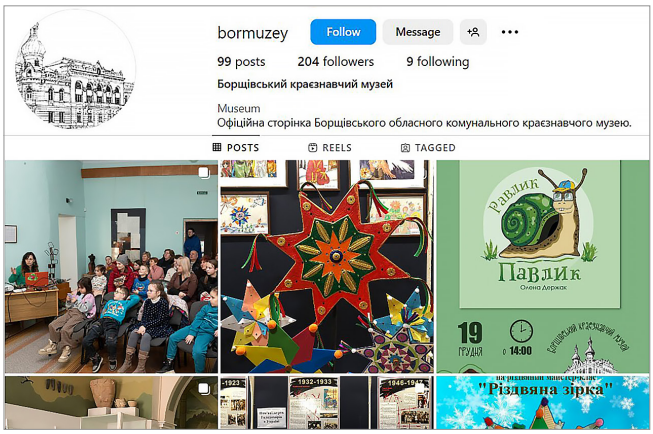

Figure 5. Instagram of The Borshchiv Regional Communal Museum of Local History

Source: developed by the author

The museum's YouTube channel [https://www.youtube.com/@user-eq5bi5zp9m] periodically adds videos views vary from several dozen to several thousand per video. The channel has low interaction, only 79 subscribers and published 20 videos. The video about cave excavations was of particular interest to viewers. It is proposed to publish similar videos in the future for the purpose of education and the audience interest.

Kopychyntsi Museum of Theatre Art does not have a separate profile but a public group [https://www.facebook.com/groups/483145121725769/]. There are about 1000 participants. Discussions are constantly published and gain from 20 likes. The Instagram page [https://www.instagram.com/museum_kopychyntsi/] is not maintained and has only 5 posts in 2022. The video hosting channel [https://www.youtube.com/@user-oy8kb7ot6l] has only 3 videos and 13 followers.

The Kremenets Literary and Memorial Museum of Julius Slovatsky [https://www.facebook.com/museumjs] maintains a high-quality Facebook page. The profile contains contact information constantly publishes photos and videos, events, and historical facts. As of the beginning of 2024, the page has about 900 likes and more than 1,000 readers. The page is often mentioned by visitors and media. YouTube channel [https://www.youtube.com/@user-od1il2ep3b] posted only 1 video in 2020 and is no longer updated.

Bohdan Lepkyi Literary Memorial Museum constantly publishes information on its Facebook page but the contact information points to a site that is not working [https://www.facebook.com/profile.php?id=100063792090409]. The page has more than 800 readers but it has little interaction – about 10-15 likes per post. The museum often exhibits both artists and amateurs so there are often notes and references. The museum's YouTube channel [https://www.youtube.com/@user-pk6ld3wn2i] contains a brief description and site information which unfortunately is not working. The channel has 50 videos and more than 300 followers. The average views are several dozen per video. Individual videos have more than 1000 views. In 2023, the museum also created a profile on TikTok where with a small number of subscribers, it has about 5000 views of short videos [https://www.tiktok.com/@museumlepkiy]. The Instagram page is updated, contains 281 publications and 326 followers [https://www.instagram.com/museum_lepkiy/]. The interaction is not significant but the system of publications and a large number of Reels deserve attention.

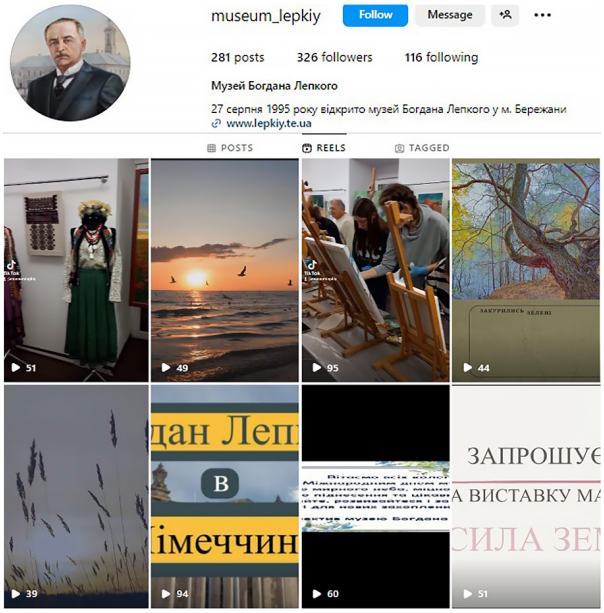

Figure 6. Instagram Bohdan Lepkyi Literary Memorial Museum
Source: developed by the author

Les Kurbas Memorial Manor Museum has been running a Facebook page since 2017 [https://www.facebook.com/profile.php?id=100016728044369]. Maintaining a page not on behalf of an organisation but on behalf of an individual can be called not quite correct, so it is not possible to analyse statistical data. The average number of likes in posts is 50. The organisation provides answers to user comments. The museum Instagram page has about 50 posts and contact details in the profile headings. Information is published more seldom than on Facebook [https://www.instagram.com/kurbas_museum/].

Pochaiv History and Art Museum does not have a separate official profile but a public group [https://www.facebook.com/groups/1046086412099942]. The page is updated and regularly publishes information and has more than 1200 subscribers. Among the disadvantages are low interaction, no more than 20 likes and single comments.

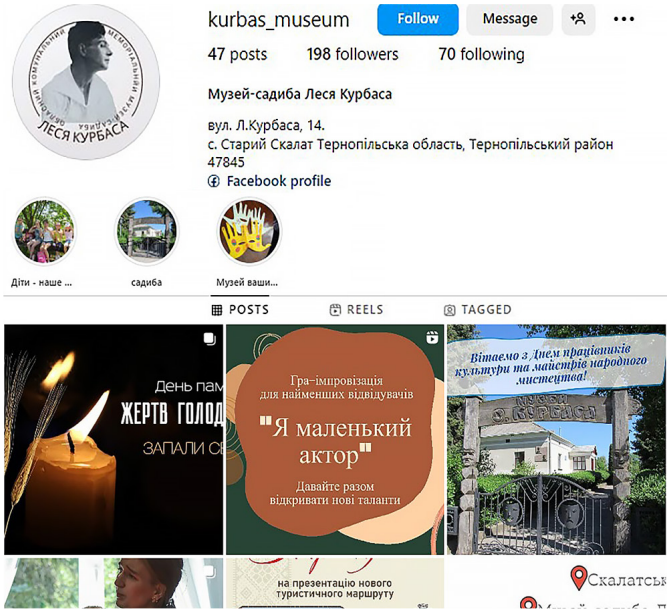

Figure 7. Instagram of Les Kurbas Memorial Manor Museum
Source: developed by the author

Terebovlia Museum-Workshop constantly publishes events and photos, as well as provides information about events and workshops [https://www.facebook.com/museumworkshop]. The page has 1200 likes and more than 1400 readers. Publications have an average of up to 20 likes and comments from the audience. The Instagram page has about 700 followers. Thanks to the latest promotion tools through Reels the short videos have thousands and tens of thousands of views which is an excellent result for the district museum [https://www.instagram.com/museum_workshop_/].

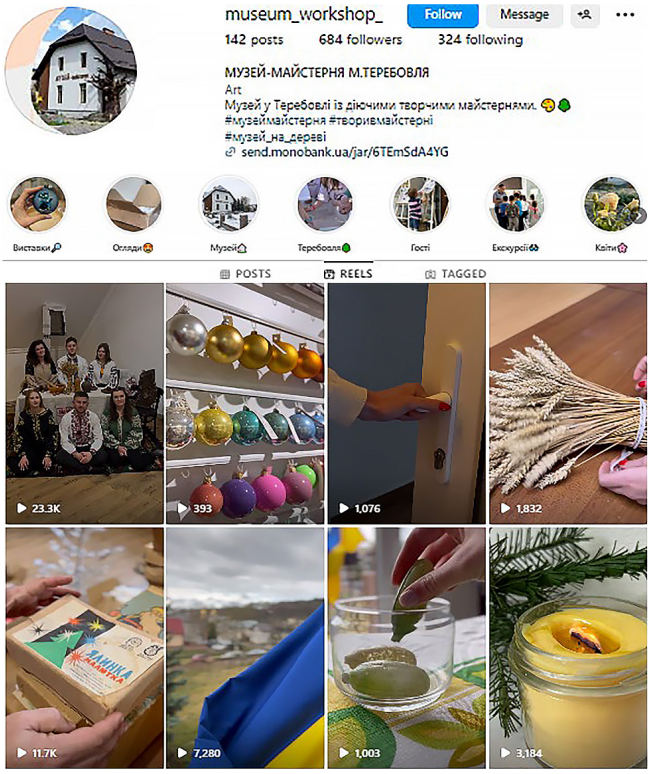

Figure 8. Instagram of Terebovlia Museum-Workshop
Source: developed by the author

Analysing the social pages of Ternopil Regional Local History Museum we can follow the system and uniformity of the names which makes the search for the museum more convenient for the user. The standard logo and information indicate the professionalism of the organisation and the bright design visual appeal. All social networks of the museum are constantly updated employees of the institution publish photos, videos, and events. In addition, the museum also maintains a Telegram channel with updates and news [https://t.me/museum_ternopil]. There are more than 3800 readers on the museum's Facebook page, and announcements reflect events with the opportunity to contact and purchase tickets [https://www.facebook.com/museumternopil1913]. The museum has a rating of 4.5 points out of 5 possible.

The museum Instagram page has a professional look, fixed stories by topic and more than 1100 publications and 1000 followers [https://www.instagram.com/museum_ternopil1913/]. The video hosting channel [https://www.youtube.com/@ternopil.museum1913] published 184 videos and almost 300 subscribers. TikTok with short videos has a total of about 100000 views and more than 7000 likes [https://www.tiktok.com/@museum_ternopil1913].

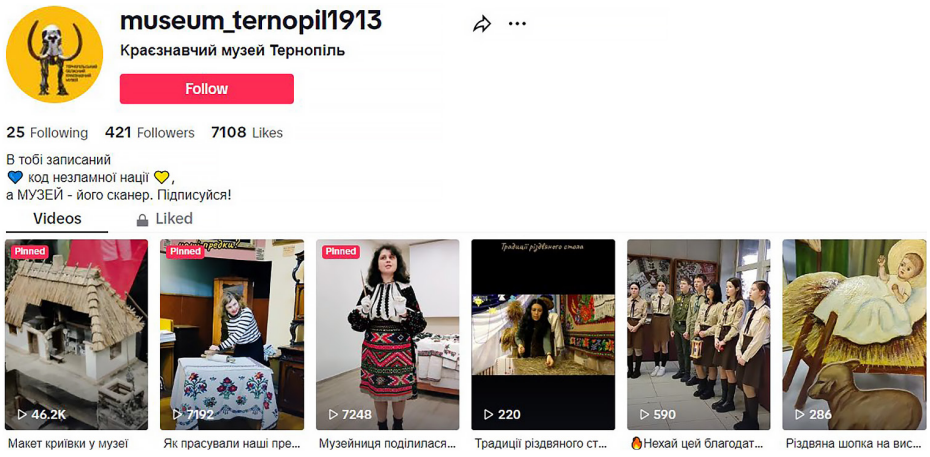

Figure 9. Instagram of Ternopil Regional Local History Museum
Source: developed by the author

The Ternopil Regional Art Museum has more than 1300 readers and more than 1000 likes on its official Facebook page. The page has contact information and frequently updates information [https://www.facebook.com/profile.php?id=100063648422802]. There are not many photos and video content on the page, the average reaction to a publication is about 20 likes, so the reaction of the audience is rather low. The page on the Instagram platform has about 650 followers and 150 publications [https://www.instagram.com/art.museum_ternopil/]. The page is updated frequently but not systematically; there are low-quality photos but there is interaction with the audience.

The scientific novelty of the research consists in a systematic analysis of the methods of using digital instruments for the popularisation of museum heritage based on which hypotheses are put forward regarding the potential and directions of development of these instruments for the formation of a museum digital space is attractive to the user.

Conclusions

The analysis of social networks of the museums of Ternopil Region provides valuable information about their online preserve and interaction with the audience. A high-quality website and popular social media can provide a museum with many advantages: providing access to museum information for users from all over the world through virtual space; the possibility of creating virtual exhibition and online tours; creation of educational resources; development of online community for communication, exchange of ideas and interaction with visitors; using social networks for advertising museum events, exhibitions, and attracting new visitors; capturing the attention of different groups of the audience, in particular young people.

The success of museum social networks depends on the number of followers, the level of interaction, the regularity of publications and the variety of content. Optimal use of popular platforms such as Facebook and Instagram as well as experiments with the latest trends, such as InstagramReels and TikTok, can improve the effectiveness of the museum's online presence. The approach to maintaining the website and social media of the Ternopil Regional Museum of Local History which is reflected in views and assessments, can be called a benchmark, but not an ideal. In general, recommendations for other museums in the region may include improving interaction with the audience, regularly updating content, using a variety of formats (photos, video, texts among others) and optimising profiles with contact information and location.

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Музеї Тернопільщини в епоху соціальних мереж: від збереження до взаємодії

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Анотація. Мета дослідження. Стаття присвячена актуальній темі ролі музеїв у сучасному суспільстві, яке характеризується широким використанням соціальних мереж як основного каналу комунікації та інформації. Методологія дослідження полягає в застосуванні загальнонаукових та спеціальних методів дослідження: аналізу, синтезу, узагальнення, систематизації матеріалів, індукції та дедукції. Новизна дослідження полягає в комплексності дослідження активності музеїв Тернопільщини в соцмережах. Автори досліджують, як музеї адаптуються до нових вимог аудиторії та використовують соціальні мережі як інструменти для залучення відвідувачів, популяризації культурної спадщини та створення діалогу з громадськістю. Стаття базується на порівняльному аналізі досвіду різних музеїв, які використовують соціальні мережі для реалізації своєї місії. Автори висувають гіпотезу, що музеї в епоху соціальних мереж переходять від збереження до взаємодії, стаючи не лише культурними, а й соціальними інституціями. Висновки. Автори статті підкреслюють, що музеї є важливими носіями культурної пам'яті та ідентичності, але їхня роль змінюється у зв'язку з поширенням цифрових технологій та соціальних мереж. Соціальні мережі надають музеям можливості для збільшення видимості, привабливості та доступності, а також для збору зворотного зв'язку, врахування потреб та інтересів аудиторії, формування спільнот та партнерств. Автори аналізують, як музеї використовують соціальні мережі для різних цілей, таких як інформування, освіта, розвага, просування, залучення, співпраця та соціалізація. Автори також розглядають, які виклики та переваги несе використання соціальних мереж для музеїв, такі як зміна ролі відвідувачів, конкуренція з іншими джерелами інформації та розваг, необхідність підтримувати актуальність та якість контенту. В статті зроблено висновок, що музеї в епоху соціальних мереж повинні переглянути свою місію та стратегію, щоб відповідати сучасним тенденціям та очікуванням аудиторії. Визначено, що музеї повинні переходити від збереження до взаємодії, тобто ставити в центр не лише експонати, а й людей, які їх відвідують, створюючи для них можливості для навчання, спілкування, участі та співтворчості

Ключові слова: музеї Тернопільщини; аналіз вебсайту музею; аналіз соцмереж музею; електронна культура; віртуальний музей

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Creation of an online library of qualifying works of students of the SCIA department

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Abstract. The purpose of the article is to develop an information resource for the placement of qualification papers of students of the Department of Education and Research. The research methodology is based on the methods of analysis and synthesis, as well as on the use of informational, system-structural, and functional approaches. The scientific novelty of the work lies in the development of informational and functional models of the process of creating an online library of qualifying works of students of the SCIA department. Conclusions. A goal tree has been developed, the general purpose of which is to create an online library of qualifying works of students of the SCIA department. In order to achieve the set goal, a division was made into three first-level goals, which in turn are divided into smaller goals and sub-goals, each of which has an individual means of achieving the goal. An information model of the problem was built in Peter-Chen notation, which contains 6 entities related to each other with connections. The notation presents the "Supervisor" (as the student's mentor), who manages the "Student" (the author of the qualification work). "Student" performs "QW" (study carried out by the student), which is reviewed by "Reviewer" (critic of qualification work). "QW" is contained in the "Online Library" (website of qualifying papers), which is visited by the "User" (interested person). A functional model of the given task is provided in the form of context diagrams and detailed processes. The first context diagram shows the process of "Filling the online library of the QW" and four external entities: "Secretary of the examination board", "Manager", "Reviewer" and "Student". The second context diagram shows the process "Organisation of the work of the online library" and two external entities: "Administrator" and "User". Three systems for managing site content are considered, namely: Drupal, Joomla and WordPress. After a detailed analysis of each CMS, WordPress was chosen as the ideal solution for the task, due to its simplicity, flexibility, and the ease of use and management

Keywords: online library; electronic library; qualifying papers; student's scientific work; library web resource

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The relevance of the research topic lies in the significance of a qualification work as one of the most crucial means of enhancing the quality of specialist training. It is mandatory for each student and encompasses various forms of educational work, including writing scientific papers, performing practical and laboratory work, and undertaking independent tasks. As such, the storage and dissemination of these works among students, lecturers, and employers can help demonstrate the professional maturity of the graduate, showcasing their overall scientific, theoretical, and specialised training, as well as their ability to apply the knowledge acquired at the university to solve specific scientific and practical problems. This ultimately equips them for independent professional activity.

Libraries are experiencing a decline in popularity in the current era; however, this does not indicate a decrease in people's interest in reading. Given the current level of development and popularisation of information technologies, libraries must adapt to retain readers and actively encourage people to read. Consequently, online libraries have gained prominence, offering electronic copies of documents that can be easily accessed. The vast majority of these online libraries provide access to books, allowing readers to download or read them entirely or partially. The online library can rightfully be called the library of the 21st century, having established a network that connects it with the world through advanced electronic technologies. It is a social institution that aims to ensure equal access to information, provide quality information, and cater to educational information needs, all within an open, humanised, and informatised environment. Access to technical, social, and educational information is an integral part of the online library's offerings. We invite you to join the online library revolution, which provides the convenience of reading from anywhere in the world.

Analysis of research and publications

In developed countries, information holds paramount significance in the domains of production and consumption. It significantly influences the progress and outcome of various fields such as science, technology, and culture. The creation of online libraries is being actively pursued as they serve as a crucial addition to the digital learning environment. Many countries are working towards the development of electronic libraries, with the United States initiating the trend in the 1980s, followed by Great Britain in the early 1990s. Japan is currently executing the "Electronic Libraries of the 21st Century" project, while Germany is implementing the "Global-Info" project, among others (Mendel, 1999).

It is important to take note of global initiatives that aim to establish an online library, foremost of which is the "World Digital Library" project (2024). The World Digital Library (WDL) provides free online access to a vast collection of materials that represent the cultures of various countries in multilingual formats. The "World Digital Library" has set forth its primary objectives as promoting international and intercultural understanding, expanding the number and variety of cultural content available on the Internet, providing resources for lecturers, scholars, and other interested individuals, bridging the digital divide within and between countries, and collaborating with partners possessing culturally significant collections and digitisation capabilities to enhance the site and broaden the range of available materials.

From 2006 to 2008, the "European Digital Library" project (2020) was implemented. The project aims to integrate the bibliographic catalogues and digital collections of the national libraries of Belgium, Greece, Iceland, Ireland, Liechtenstein, Luxembourg, Norway, Spain, and Sweden into European libraries. The main tasks of the project are to improve the multilingual capabilities of European library portals, to find effective ways of cooperation between European libraries and non-library cultural initiatives, and to expand the marketing and communication activities of European libraries.

Another global project is Europeana (2024). Europeana and the World Digital Library are separate initiatives. Europeana focuses on Europe and European collections within European libraries, archives, and museums. Institutions participating in the Europeana project are also invited to contribute to the World Digital Library project. Europeana offers access to digital resources from museums, European libraries, electronic archives, and audiovisual collections. This facilitates the development of open access and networking opportunities for users (Ivanova, 2011).

Creating an online library system is an invariable requirement of the era of transition of world society from industrial to information society. Only a plan to create and provide information resources for mass users based on the latest information technologies of the country can bring Ukraine to the level of advancement in the protection of digital heritage. There are thousands of online libraries and millions of electronic publications in the Internet environment. Several very interesting branch online libraries have appeared in Ukraine in recent years. One of such libraries is "Ukrreferat" (2024). There are the following main sections: Ukrainian abstracts, Ukrainian textbooks and questions and answers. Each section contains smaller subsections for convenient use of the library. Thus, the first two sections of the library are structured according to the alphabetical index by subjects. The main page contains Quick Document Search and interesting selections such as Most Popular and New Documents. Documents can be downloaded to a computer or read together on the website. The website also contains a separate section for users who did not find the necessary document and want to order work from specialists, the developers note that the work will be affordable and professional. Prices for services are indicated on the website.

Next, you should consider the website of the "Student's site" electronic library. The website contains course and thesis papers that can be downloaded only after payment has been made. The purpose of this library is to help students carry out their unique scientific research, and the works posted on the site guide them in the sequence of tasks. The menu contains the following sections: "Main page", "Courses and diplomas", "Our blog on the website", "Diplomas to order", "Search", "Recommend", "FAQ", and "Contacts". According to research areas, the "Course and Diploma" section contains 14 categories. After choosing the desired work, the user sees the content of the work, conclusions, and a list of used sources. To download a file with the full text of the study, you need to pay UAH 50, as indicated on the site's main page, a symbolic fee for secretarial services. The site also contains a separate section for users who did not find the required document and wish to order work. In the "FAQ" section, the user will receive answers to frequently asked questions, and by turning to the "Contacts" section, they can write a letter to the e-mail box. The evolution of libraries from conventional to electronic ones is an important step in building an information society. There are many such online libraries, their existence is now an integral part of everyone's life.

The purpose of the research is to develop an information resource for the placement of qualification papers of students of the Department of Social Communications and Information Activities (SCIA).

Presenting main material

One of the most important means of improving the quality of training and education of specialists in the "Information, library and archival studies" specialty is students' qualification papers. The gradual increase in the amount of knowledge, abilities, and skills that students acquire in the process of performing scientific work ensures the solution of such basic tasks as the formation of a scientific worldview, mastery of methodology and scientific research, the ability to solve practical tasks, and the skills of independent research work. Qualification papers of the Lviv Polytechnic National University include bachelor's and master's theses (Qualification Work, 2022). When writing the qualification paper, the branch standards of higher education of Ukraine regarding the training of specialists with the assignment of the educational qualification level "bachelor" or "master" are taken into account. Consideration and approval of scientific content should be unified and reflect the process of development and achievement of topic selection (Methodological guidelines, 2017).

It is worth noting that every work of a student, in the absence of plagiarism, is an object of copyright. Dissemination of works on the site is possible only with the consent of the authors, the scientific supervisor, as a general rule, is not a co-author of such works (Copyright on Scientific Work, 2021). Each qualifying paper posted on the created website must contain the following information: name of the qualifying paper; information about the author (author's name, academic title); subtitle data (information explaining the title, type of publication, etc.); annotation; Keywords; information about the scientific supervisor (supervisor's name, academic title).

The master's or bachelor's thesis must be designed following the established requirements and saved in PDF format. Placing the full text will reduce time spent on searches if necessary (Shulzhenko, 2007). According to the need, you can consider 2 distribution methods: paid or free. In case of payment for the work, the buy er will be able to receive the full text of the qualification work only after making the payment. The creation of an online library of qualifying works of students of the SCIA department requires information modelling, which involves the use of diagrams, schemes, and graphs to describe the processes of the assigned task. The creation of models (informational and functional) will help to structure the available information and display each process for further execution. Formal problem model. The implementation of the process of creating an online library involves the development of a goal tree (Fig. 1), which demonstrates the division of the general goal into sub-goals, tasks, and individual actions. Creating an online library of qualifying works of students of the SCIA department is the general goal of the goal tree, which involves explaining the process of creating an online library at the department.

The overall goal of the goal tree is divided into three first-level goals:

1. Defining the main aspects of creating an online library, which demonstrates the process of preparing for the creation of a library.

The goal is divided into two sub-goals of the second level:

- Preparation of documentation support – collection of necessary documents without which the creation of an online library is impossible. The goal is divided into two sub-goals of the third level:
  - Obtaining consent for publication – the student's consent to distribute their work to individuals. The means of achievement is a statement.
  - Plagiarism check – the report of the qualification work check for academic plagiarism, the originality of the text should be at least 70%. The means of achievement is anti-plagiarism.
- Verification of compliance with the requirements for writing the QW – carrying out the review of the QW following the established requirements for writing the QW. The means of achievement are methodical guidelines for writing the QW.

2. Formation of a set of data on QW, which involves the collection of necessary data on qualification works.

The goal is divided into three sub-goals of the second level:

- Formation of individual data of qualification works – processing of data about QW, in particular

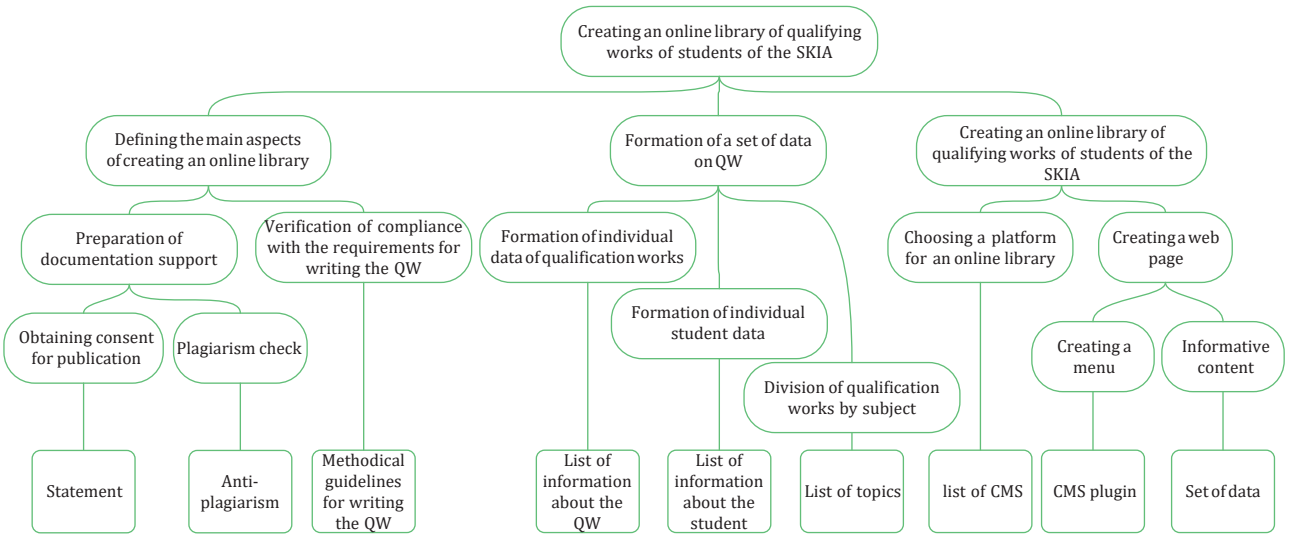

Figure 1. Tree of goals for creating an online library

Source: developed by the authors

topics, annotations, keywords, feedback, reviews, etc. The means of achievement is a list of information about the QW.

- Formation of individual student data – processing of data about the author of the QW. The means of achievement is a list of information about the student.
- Division of qualification works by subject – formation of lists of QW and division according to the research topic. The means of achievement is a list of topics.

2. Creating a library web page – filling and preparing an online library website.

The goal is divided into two sub-goals of the second level:

- Choosing a platform for an online library – analysing the existing management systems and making a choice according to the needs. The means of achievement is the list of CMS.
- Creating a webpage – preparing a website for use. The goal is divided into two sub-goals of the third level:
  - Creating a menu involves creating a navigation in the online library. The means of achievement is a CMS plugin.
  - Informative content – dissemination of all processed data about the QW. The means of achievement is a set of data.

Information model of the problem. An entity-relationship model is a data model that can be used to describe conceptual schemas developed using common building blocks. For "Creating an online library of qualifying works of students of the SCIA department" the Peter-Chen notation was chosen (Fig. 2).

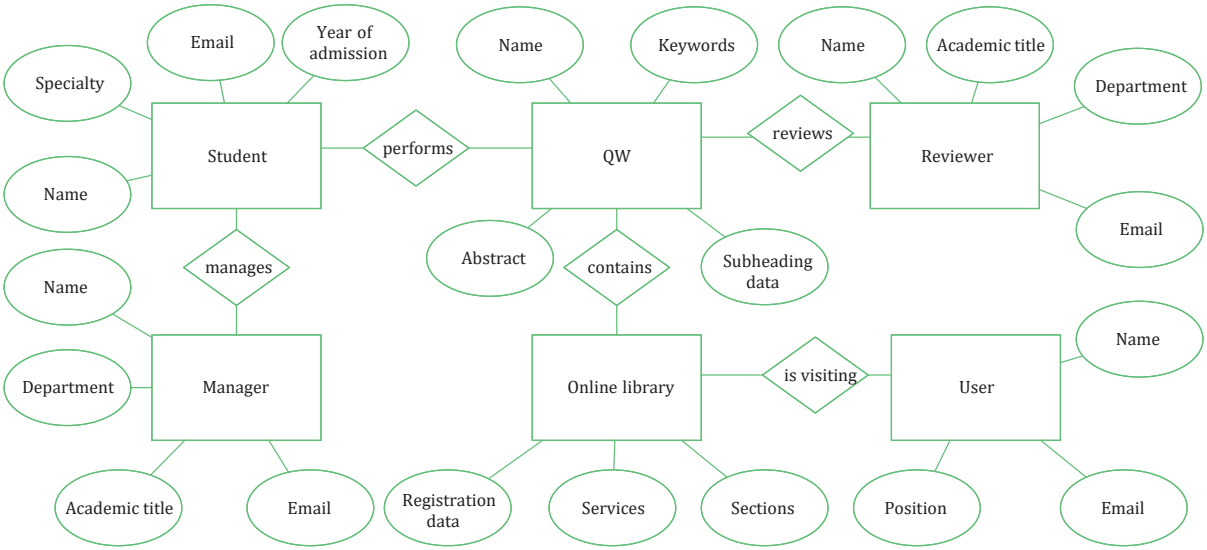

Figure 2. Information model in Peter-Chen notation

Source: developed by the authors

In the notation of Peter-Chen, the information model of the task contains 6 entities, displayed in the form of rectangles: "Manager", "Student", "QW", "Online library", "User", "Reviewer" and related links tongues displayed in the form of rhombuses. Each entity, respectively, contains attributes. "Student" – the author of the qualifying paper, which will be placed in the online library, contains 4 attributes:

- Name – surname, first name, and patronymic of the student;
- Specialty – the name of the specialty chosen by the student, where they studied during the period of writing the qualification work;
- Email – corporate e-mail address;
- Year of admission – the year of starting studies in the chosen specialty.

"QW" – research carried out by a student, designed following the requirements, contains 4 attributes:

- Topic – the name of the study;
- Keywords – a list of research keywords;
- Abstract – a short abstract of the research;
- Subheading data – information explaining the title, type of publication, etc. "Manager" – the student's mentor during the qualification work, contains 4 attributes:
- Name – surname, first name, and patronymic of the manager;
- Department – the name of the department where they teach;
- Academic title – the academic title of the manager;
- Email – corporate email address.

"Reviewer" – a critic who reviews the qualification work, contains 4 attributes:

- Name – last name, first name and patronymic of the reviewer;
- Department – the name of the department where the reviewer teaches;
- Academic title – the academic title of the reviewer;
- Email – corporate email address.

"User" – a person interested in viewing or using the qualification work, contains 3 attributes:

- Name – last name, first name, and patronymic of the user;
- Email – corporate e-mail address;
- Position – place of work and position of the user.

"Online Library" – a website on which qualification papers are posted, has 3 attributes:

- Registration data – data of the user who sends a request to review the qualification work;
- Services – special features of the online library;
- Sections – pages of the online library.

Functional model of the problem. The data flow diagram (DFD) is a useful tool for modelling the functional requirements of a designed system. It helps in selecting the elements that collect information, that is, the data that carry an information flow in the system.

The context diagram (Fig. 3) provides an overview of the process of "Filling the online library of the QW" along with four external entities: "Secretary of the examination commission", "Manager", "Reviewer", and "Student". The student sends their qualifying work with all the data necessary for publication to the secretary of the examination board for verification. The secretary checks for errors and the presence of all necessary files. After that, according to the performed check, the secretary forms the result and sends a confirmation to the student. The supervisor sends feedback on the student's qualifying work for review. The secretary checks for errors and the availability of all necessary data. After that, according to the performed check, the secretary forms the result and sends a confirmation to the manager. The reviewer sends a review to the student's qualifying work. The secretary checks for errors and the availability of all necessary data. After that, according to the performed check, the secretary forms the result and sends a confirmation to the reviewer.

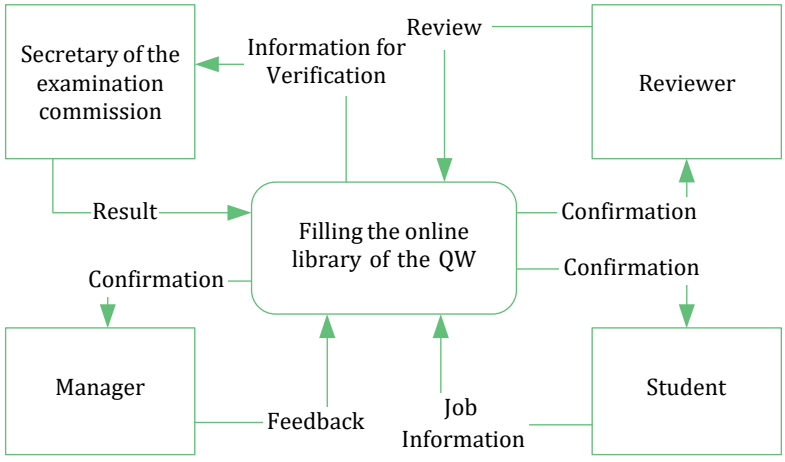

Figure 3. Context diagram of the process of "Filling the online library of the QW"
Source: developed by the authors

The next stage involves detailing the main process of "Filling the QW online library", breaking it down into sub-processes. This results in the decomposition of the main function into sub-functions (Fig. 4). The input information includes "Data set about the QW", "Feedback" and "Review" – necessary data to populate the online library. Accordingly, this information is processed in three processes: "1.1. Processing information from the student", "1.2. Processing feedback from the manager" and "1.3. Processing review from the reviewer". At this stage, information received from external sources is prepared. From process 1.1. the information "Data set about the QW" is stored in the "QW" data repository. From process 1.2, information "Formed feedback" is stored in the "Feedback" data store. From process 1.3, information "Created review" is stored in the "Reviews" data store. These data repositories will store all the information received by the online library for further analysis and publication.

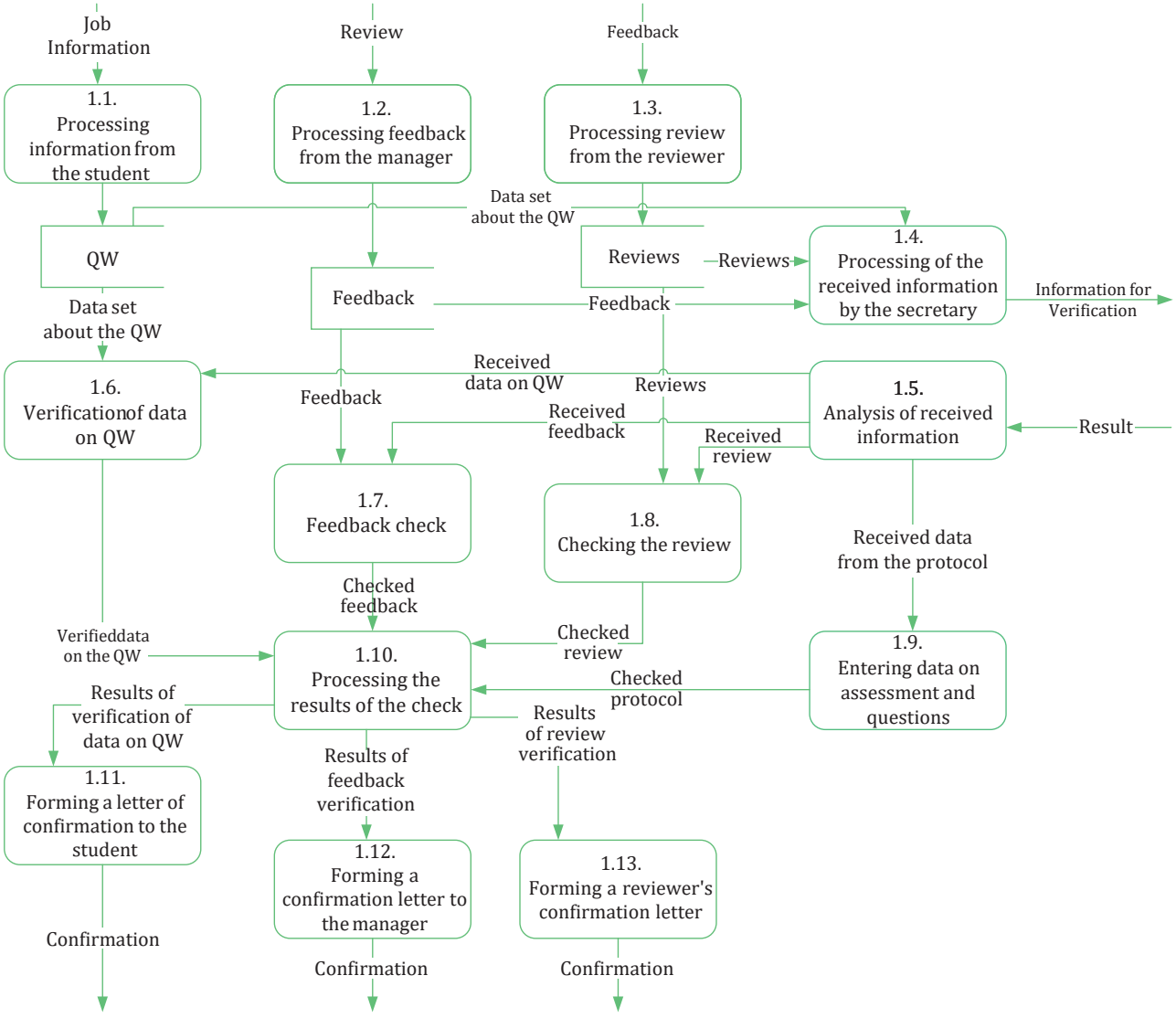

Figure 4. Detailing the main process of "Filling the QW online library"
Source: developed by the authors

From the above-mentioned repositories, three data flows into the process "1.4. Processing of the received information by the secretary" information about the "Data set about the QW", "Feedback' and "Review" are received. At this stage, all information about the qualification work is collected for further analysis. The output from the process is "Information for Verification". Information about the "Result" of the check is included in the process "1.5. Analysis of received information", where the provided information is studied to identify errors or inconsistencies.

Information on "Received data on QW" together with information on "Data set about the QW" from the data repository "QW" is sent to the process "1.6. Verification of data on QW". Here, the received information is compared with the information from the data

warehouse. "Verified data on the QW" flows through the information flow to the process "1.10. Processing the results of the check", where compliance with the requirements for filling the online library of data on the QW is determined.

Information about "Received feedback" together with information about "Feedback" from the "Feedback" data store is sent to the process "1.7. Feedback check". Here, the received information is compared with the information from the data warehouse. "Checked feedback" flows through the information flow to the process "1.10. Processing of inspection results", where compliance with the requirements for filling the online feedback library is determined.

Information about the "Received review" together with information about the "Review" from the "Reviews" data store is sent to the process "1.8. Checking the review". Here, the received information is compared with the information from the data warehouse. "Checked review" flows through the information flow to the process "1.10. Processing of inspection results", where compliance with the requirements for filling the online review library is determined.

Information about "Received data from the protocol" is sent to the process "1.9. Entering data on assessment and questions", which involves recording information from the protocol in the online library. In the process "1.10. Processing the results of the inspection" is the formation of a general result on the data of the QW, feedback, and review. Three streams of information about "Results of verification of data on QW", "Results of feedback verification" and "Results of review verification" are respectively received in three processes, namely "1.11. Forming a letter of confirmation to the student", "1.12. Forming a confirmation letter to the manage" and "1.13. Forming a reviewer's confirmation letter". In these processes, letters are generated for the student, supervisor, and reviewer with confirmation and/or comments about the provided information. Output information from processes is "Confirmation".

An important stage in the creation of an online library is the organisation of its work, so it is necessary to consider this process in detail. The context diagram (Fig. 5) shows the process of "Organisation of online library work" and two external entities: "Administrator" and "User".

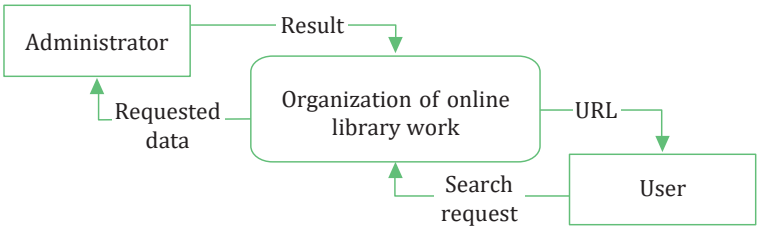

Figure 5. Context diagram "Organisation of online library work"
Source: developed by the authors

The user of the online library sends a search request, where they indicate all the necessary data about themselves and the qualification work. The administrator receives the requested data and forms the result according to the processed data. The administrator generates a URL link containing the qualification work file and sends it back to the user. We will consider the details of the process of "Organisation of online library work" (Fig. 6).

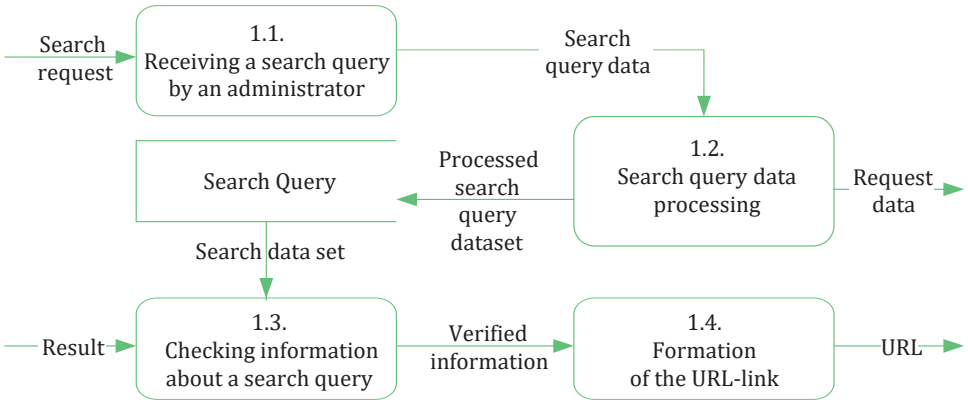

Figure 6. Details of the process of "Organisation of online library work"
Source: developed by the authors

Input information is "Search request" – a filled-in form with all the necessary information for processing. The information is included in the process "1.1. Receiving a search query by an administrator". "Search query data" is included in the process "1.2. Search query data processing", where the received information is processed. Information about the "Processed search query dataset" is written to the "Search query" data store. The output information from the process is "Request data".

After processing the search query in the process "1.3. Checking information about a search query" the data stream "Result" is received, as well as information from the repository "Search query" – "Search data set". Here, the received information is compared with information from the data warehouse. "Verified information" is included in the flow of information in the final process of "1.4. Formation of the URL-link". At this stage, the administrator creates a response letter for the user. The output from the process is a "URL".

Selection of technological solutions to the problem. The process of creating an online library of students' qualification works involves choosing a system in which all the necessary stages from creation to its further use will be implemented. Therefore, we need to determine which system is most suitable for this. The choice must be made based on the analysis of the data obtained during the construction of models of the given task, and it is also necessary to ensure compliance with the goals and tasks set. You can create an online library on the website of the CMS system. The content management system is software that allows you to create your website or other information resource. Today, such systems have a wide range of functions, such as plugins (extensions), each of which is responsible for its elements. To create an online library website, you need to choose from a variety of systems available, the most popular of which are Drupal, Joomla, and WordPress. After analysing three systems, CMS WordPress was chosen to create an online library of students' qualifying papers. The system is an ideal solution for performing tasks, as it includes simplicity, flexibility of use, ease of publication, the ability to manage users, and a Ukrainian-language interface.

Conclusions

The development and implementation of the project on the creation of an online library of student' qualifying papers made it possible to solve a number of important tasks, in particular, formal models of the process of creating an online library of students' qualifying papers of the SCIA department were created. A goal tree has been developed, the general purpose of which is to create an online library of qualifying works of students of the SCIA department. To achieve the set goal, a division was made into three first-level goals, which in turn are divided into smaller goals and sub-goals, each of which has an individual means of achieving the goal. An information model of the problem was built in the Peter-Chen notation, which contains 6 entities connected by connections. Each entity, respectively, contains its attributes. The notation presents the "Supervisor" (as the student's mentor), who manages the "Student" (the author of the qualification work). "Student" performs "QW" (study carried out by the student), which is reviewed by "Reviewer" (critic of qualification work). "QW" is contained in the "Online library" (website of qualifying papers), which is visited by the "User" (interested person). A functional model of the given task is provided in the form of context diagrams and detailed processes. The first context diagram shows the process of "Filling the online library of the QW" and four external entities: "Secretary of the examination board", "Manager", "Reviewer" and "Student". In the process of detailing the main process, it was divided into 13 sub-processes and displayed in the diagram. The second context diagram shows the process of "Organisation of the work of the online library" and two external entities: "Administrator" and "User". The detailing process contains 4 sub-processes shown schematically. The selection of technological solutions for the creation of an online library of qualification papers was made. Three systems for managing website content are considered, namely, Drupal, Joomla, and WordPress. After a detailed analysis of each CMS, WordPress was chosen as the ideal solution for the task, due to its simplicity, flexibility, and ease of use and management.

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Innovative activity and transformational processes in development of public libraries in Ukraine under the influence of world trends of digital society and current realities

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Abstract. The purpose of the study is to highlight the peculiarities of innovative changes in the activities of contemporary public libraries in Ukraine, related to the digitalisation of society, and to identify the main trends of their development considering domestic realities such as full-scale military actions, information, and cyber warfare, reforms in the provision of cultural services. The research methodology involves the application of general scientific and special methods, namely, methods of analysis, synthesis, comparison, and generalisation, as well as the method of documentary and content analysis, which allows for achieving the stated goal. The scientific novelty of the work. The study identifies the main trends in the development of public libraries in the digital age, specifically in the context of domestic realities, and substantiates the peculiarities of innovative changes in public libraries in Ukraine, both during the state of war and as trends of post-war revival and modernisation. Public libraries in this context are considered socio-cultural institutions that contribute to community and individual development, providing informational, educational, and cultural-artistic services. Conclusions. Despite active combat actions, missile threats, and the destruction of library premises as well as critical infrastructure of regions directly affecting the activities of all institutions and the livelihoods of citizens, public libraries in Ukraine continue to operate with a focus on global trends, particularly by utilising the opportunities of information and communication technologies, creating internet resources, and implementing digital services. Analysis of the websites of regional universal scientific libraries has allowed determine the level of digitalisation development of leading public libraries in Ukraine and the direction of their further development

Keywords: public library; innovative library activities; digital society; libraries during RF military aggression against Ukraine

Relevance of the research topic

The digitalisation of society, the rapid development of information and communication technologies, the implementation of artificial intelligence, the Internet of Things, and other cutting-edge advancements in all spheres of human life highlight the question of library transformation, the integration of technological innovations into their activities, and the development of innovative products and services. However, in contemporary realities, libraries in Ukraine are facing not only challenges determined by the digital age but also external threats such as physical destruction (complete or partial ruin) due to combat actions, terrorist attacks, vandalism, and marauding by occupiers (RF), and others. Military actions have led to significant migration processes, impacting the composition of library users and their needs. Public libraries, as social institutions, have become hubs and co-working spaces for internally displaced persons and volunteers. “Invincibility Centres” have been established in libraries, and training sessions on medical and first aid assistance are conducted. Libraries have intensified their activities in digital education, media literacy, information hygiene,

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cybersecurity, bibliotherapy, and art therapy. All these events are currently unfolding and require tracking, documentation, and analysis. Thus, the relevance of the research is further reinforced by its chronological boundaries. We examine innovative activities and transformational processes in the development of public libraries in Ukraine in the 2020s (2020-2024) and attempt to identify the main trends in the development of public libraries in Ukraine under the influence of global trends in the digital society and domestic military and post-war realities.

Analysis of research and publications

Research on this topic involves analysing scholarly investigations related to its components, among which it is worth highlighting: innovative activities of libraries in the conditions of society informatisation in the digital age; transformation and reorganisation of public libraries as socio-cultural institutions; the activity of libraries in Ukraine in the conditions of Russian armed aggression.

Works by domestic researchers are dedicated to innovations in the library sphere: O. Voskoboinikova-Huzieva & A. Brovkin (2003; 2005), O. Voskoboinikova-Huzieva (2014), I. Davydova (2008; 2010), T. Vilehzhianina (2009; 2018), O. Isaienko (2009), Ya. Khimich (2012), V. Medvedieva (2015), O. Skachenko (2015), N.V. Kovalchuk (2019), and others.

Libraries in the digital age have been examined in the works of O.Y. Maryina (2017), V.O. Kopaniova (2020), O. Kobeliev (2020), K.V. Lobuzina *et al.* (2020), O. Onyshchenko (2021), S. Denbovetzkyi (2022), V. Dobrovolska & L. Cherednik (2023), N. Senchenko (2023). Thus, characterising the level of development of the problem, it can be argued that the issue of innovative activities of libraries in Ukraine remains constantly in focus both for library science theorists and library practitioners. Research into the specifics of library activities in the digital age is also relevant. However, and this is justified by the essence of "innovation" itself, which over time loses its relevance and novelty, library innovations constantly evolve in response to external challenges, thus requiring continuous research, description, analysis, and forecasting. This is especially true when we talk about innovations related to digital technologies.

The purpose of the article is to highlight the features of innovative changes in the activities of modern public libraries of Ukraine, which are related to the digitisation of society, and to determine the main trends of their development, taking into account the challenges of today.

Presenting main material

According to the Law of Ukraine "On Innovative Activity" – "innovations are newly created (applied) and (or) improved competitive technologies, products or services, as well as organisational and technical solutions of a production, administrative, commercial or other nature that significantly improve the structure and quality of production and (or) social sphere" (Law of Ukraine No. 40-IV, 2002).

Innovative activity in libraries has its own history, which covers stages and various technological changes. Library innovations emerged, were introduced, and changed (became habitual, traditional components of activity, or were replaced by other innovations) especially rapidly in the last two decades.

If we analyse the main theoretical studies in library science and the practical activities of libraries today (early 2024), we can identify the key directions of innovative development for libraries in the digital age. In our view, modern public libraries are evolving as socio-cultural institutions aimed at providing users with free access to information and creating conditions for learning, research, creativity, and civic engagement. The use of modern information and communication (digital) technologies in libraries contributes to ensuring the accessibility of information, convenience in its retrieval and utilisation, the development of digital literacy among the population, and overcoming digital inequality. Considering the main trends in the development of public libraries in the digital age, such general trends can be identified as:

- creation of library electronic resources and digital collections;
- provision of remote access to resources and virtual services;
- interactive interaction with users through social networks;
- use of web 2.0 and artificial intelligence technologies;
- work on improving digital (information, media) literacy of the community and library users;
- preservation of cultural heritage.

Intending to confirm or refute our views and as part of conducting a certain experiment, we turned to artificial intelligence – "ChatGPT" – an artificial intelligence model by OpenAI, with a question regarding its characterisation of the current state of innovations in libraries, and obtained the following theses. Firstly, as an introductory or initial statement, the chat proposed the following – "the current state of innovations in libraries involves the use of advanced technologies and strategies to ensure access to information and convenience for users" (Characteristics of the Current..., 2024). We believe that it is impossible not to agree with him. And this thesis is content-wise quite close to the one we mentioned above. Secondly, the chat offered 6 directions and their concise characteristics to the "main aspects of modern innovations in libraries":

1. Electronic access to resources: Libraries provide electronic access to their book collections, journals, scholarly articles, audio, and video materials through online catalogues and digital resources.

2. Open access to information: The use of open-source software and free technologies helps make access to knowledge free and maximally open.

3. Digital literacy: Training programmes and courses in digital literacy help users acquire skills in working with electronic resources and information technologies.

4. Remote services: The use of video conferencing, online consultations, and other remote services allows libraries to provide services to users who cannot physically visit the library.

5. Digital collections and interactive services: Creating digital collections, multimedia materials, interactive exhibits, and services (such as virtual tours) expands users' possibilities in perceiving and using information.

6. Community and collaboration: Using social media, forums, and other online platforms fosters the formation of user communities and collaboration with other libraries and cultural institutions (Characteristics of the Current..., 2024).

As we can see, artificial intelligence's understanding aligns closely with ours. Moreover, analysing the internet resources of libraries, including library websites, blogs, and social media pages, will allow us to substantiate these characteristics with specific examples. In this publication, we will limit ourselves to examples taken from the official websites of Regional Universal Scientific Libraries (RUSL), which, according to Ukrainian law, are the main libraries of the region. We will rely on the trends we have identified and verify the theses proposed by ChatGPT.

We have reviewed and analysed the websites of all RUSLs; however, a detailed description of each website according to each criterion should be the subject of separate research and corresponding publications. We will only summarise and identify the main trends. Additionally, since we are interested in the issue of "transformational processes in the development of public libraries in Ukraine" not only "under the influence of global trends in the digital society" but also in the context of "domestic realities" of the russian armed aggression against Ukraine, special attention should be paid to RUSLs in regions that have suffered the greatest losses due to occupation, bombardment. As examples for this publication, we will characterise the websites of Donetsk, Luhansk, Zaporizhzhia, Mykolaiv, and Sumy RUSLs.

Regarding the Donetsk RUSL website, the Google search engine and other internet resources that provide access to Ukrainian library websites indicate the web address https://library.donetsk.ua/. This is the website of the Donetsk RUSL before the occupation. Since Donetsk has been temporarily occupied since 2014, the library's website exists in its then-current version, making it informative only for studying the history of the library's development rather than its current realities. However, it is worth noting that as of 2014, it was a powerful, innovative library that offered its users electronic services, including "virtual exhibitions" and "virtual reference services", a "virtual new arrivals hall", and the "Electronic Library of Donetsk Region" (a digital full-text database of printed works by authors from Donetsk region and books about Donetsk region, as well as periodicals, analytical-methodological, and bibliographic publications), the creation of which began in 2007, electronic document ordering, and more (Official website of Donetsk..., 2024).

The website of the Luhansk RUSL, along with its recent history (2014-2022, 2022-2024), deserves separate research. The Luhansk Regional Universal Scientific Library, or the "Good Library", has been evacuated twice: from Luhansk to Starobilsk, and from Starobilsk to Cherkasy. "In addition to offline work in the centre of Ukraine, part of the team implements the project of a travelling library and works in a hybrid format in Dnipro, Kyiv, and Transcarpathia" (Official website of Luhansk..., 2024).

The "Good Library" is a truly innovative library institution that promotes books and reading without a physical library collection, offering "litohliadky" (literary reviews), author streams, and interactions with writers. The Luhansk RUSL is part of the project "Libraries – Hubs of Digital Education" with its own project, the "Mobile Digital Hub of the Travelling Library" in Cherkasy. Among the library's services are training sessions on media literacy and cybersecurity, a "Media School" (a series of educational workshops: copywriting, SMM management, graphic design, copyright, cybersecurity, inclusive language), and the "Code Club" – a programming club for children and youth. Registration for services is done online through Google Forms. Becoming a library member is also possible online (Official website of Luhansk..., 2024).

The library's presentation on the Internet is aptly described (in the library's style) and clickable (with hyperlinks) on the "First Travelling Library" page. There, in particular, it is stated that "all the assets of the Good Library over the past years are presented on its main Internet resources", namely: "the official website, the Library community on Facebook, We hang out on Instagram, We tweet on Twitter, We accelerate on YouTube, We create on Telegram, We communicate from the heart on Anchor" (The First Travelling..., 2020). So, despite the physical destruction of the library by the military aggression of the Russian Federation, thanks to the professionalism and creativity of its leadership and librarians, we can say that the Luhansk Regional Universal Scientific Library, or "Good Library", or "The First Traveling Library", meets the criteria of a library of the digital age. As a methodological centre for libraries in Luhansk, it is already shaping primarily an ideological and philosophical platform for the post-war reconstruction of libraries in the Luhansk region.

The website of the Zaporizhzhia Regional Universal Scientific Library (2024) features a modern design and offers services such as "virtual reference", "electronic document delivery", "pre-ordering literature from the

electronic catalogue" (via phone or email), and "virtual exhibitions". Among the library's resources are an electronic catalogue and local history materials titled "About Zaporizhzhia Region" (including, for example, Galleries of Stories – materials posted on YouTube). Regarding the current realities, although part of the region's territory is still occupied, and some parts have been liberated, no information regarding the full-scale invasion was found during the website review. There is no informational page for internally displaced persons, nor information about the library's operation during air raid alerts. Upon reviewing the website, it was also noted that in some sections, the website switches to the Russian language, which is unacceptable and requires correction and continuous monitoring. It is also necessary to conduct a review of the quality of the library's collection. For example, in the "E-library" section, under the "Audiobooks" subsection, books of a religious nature are presented in the language of the aggressor country. The same language is used for electronic books in other sections (Official website of Zaporizhzhia…, 2024). Therefore, in this case, digital "preservation of cultural heritage" turns into the preservation of "colonial dependency". We can only speculate about the challenging conditions under which the librarians of the Zaporizhzhia RUSL work. There may be issues with staffing, including IT specialists. However, it is impossible to confirm or refute these assumptions with the available information on the website.

The website of the Mykolaiv Regional Universal Scientific Library (2024) has numerous sections and subsections rich in information. The site features a visitor counter, a calendar, links to the library's presence on social media, and users can rate and share each article on Facebook. In the context of our research, we focus only on some sections/subsections of the site. In the "Activities" section, the following subsections are of interest to us: "Directions of the Mykolaiv Regional Universal Scientific Library's Work" (including "providing free access to information through the library's collections and the global Internet network, organising library-bibliographic and information services", "technical and methodological support for the functioning of the regional library computer network, the integrated corporate catalogue of libraries; introduction of advanced computer technologies into the practice of libraries in the region; implementation of cultural, educational, and publishing activities; implementation of information and library projects and programs; studying and disseminating innovative experience in library work, organising continuous professional education for library personnel in the region"). In the "Library Publications" subsection, full-text electronic documents are presented, including "Local History Publications", "Bibliographic Indexes", "Methodological Materials", and "Information Publications". In the "Scientific Publications" subsection, full-text articles by library staff in professional periodicals are provided. The "Projects" subsection contains information about library projects, but only from 1996 – from "Creation of the Local Library Computer Network" to 2011 – "Introduction of Internet Services using Wi-Fi technology". The section concludes with a subsection that characterises modern realities, "How to Act in the Event of Terrorist Threats". In the "Events" section, you will find "News", "Event Calendar" (currently featuring the library's event programme for January 2024, divided into offline format, online format, and book exhibitions), "Event Archive", and a separate subsection labelled "Relevant (for library users)", which covers topics such as how to use the "virtual reference" service or information about "Paid services provided by the Mykolaiv Regional Universal Scientific Library starting from February 1, 2023", and "Electronic document delivery", among others. In the "Chronicle of Cultural Life in the Mykolaiv Region" subsection, a monthly digest is provided (starting from March 2012 up to the present). In the "Resources" section, the following subsections are presented: "Collections", "Electronic Catalogue", "Electronic Databases 'Virtual Library', "Virtual Exhibitions", "Electronic Library of Local Publications" (including "electronic museum of pre-revolutionary local publications"), "Inclusive Library" ("Audio Library of Recordings Dedicated to Our State", "SoundedBook Inclusive Library Project"), "Prybuzhzhia Portal" (regional information portal), and "Web-library 'Arkasy Heritage' (a comprehensive electronic information resource project supported by the Ukrainian Cultural Foundation). In the "Services" section, there are subsections for "Virtual Assistance" and "Paid Services". The "Media/ Interactive" category includes "Guides" (Video guide to the library), "Blog" (Mykolaiv RUSL Blog 'Book Continent' (2011-2021)), "Guest Book" (interactive communication with users, feedback), "Photo Gallery" (Photo Museum of MRUSL), "Video Gallery" (videos about the library from the media), "Honorary Readers of the Library" (interactive presentation "Gallery of Honorary Users 'Golden Names' with the ability to download individual pages), and "Useful Resources Inet" (search engines, official information resources). In the "Libraries of the Region" section, there are two subsections: "Library of Mykolaiv Region" (currently, generalised information as of 01.01.2023) and "Black Album of Affected Libraries of Mykolaiv Region", which provides information and photo materials about the destruction of libraries (Official website of Mykolaiv…, 2024).

Analysing the website of the Sumy Regional Universal Scientific Library (Official website of Sumy…, 2024), it is worth noting that on its main page, in addition to the main menu, which we will return to later, there is a "Temporary operating mode (during martial law)" with a comment stating that "in case of an air raid alert, services are suspended. Users should proceed to the nearest bomb shelter", and a link to an interactive map of bomb shelters in Sumy. Additionally, there is a

banner link to the All-Ukrainian Mental Health Programme "How are you?" and a section "For Internally Displaced Persons" with interactive sections: Regulatory documents, Hotlines, Addresses of territorial executive authorities, Free legal aid, International assistance, What is needed to obtain a certificate of internally displaced persons, How to receive housing subsidies for internally displaced persons, Conditions for assisting with accommodation to internally displaced persons among minors who have moved without parental supervision, Volunteer assistance, Search for missing persons, Humanitarian aid centres. This list of literature for improving well-being characterises the current domestic realities and the relevance of the library's resources and its communication with website visitors. Advertising banners (images) at the top of the website draw attention to the "Mobile Literacy Course for Seniors" called "Smartphone for Everyone", as well as to the library's Telegram channel "We're on Telegram", which can be accessed via QR-code. Illustrated is also the section "New Arrivals", where visitors can not only get information about a book and see its cover but also have the option to share this information to their social media accounts or email, as well as access the library's podcast channel, the library's YouTube channel "Library's Latest Videos", library blogs – "About the Most Interesting from the Library's Life" and "Practical Guide", and view the "archive" of arrivals. From the main menu sections/subsections, we note the "Publications" of the library (the electronic newspaper for book lovers "In Focus" (pdf), Calendar of Significant Dates, and more). In the "Local History" section, we highlight the "Historical Studies – Media and Educational Project" (9 videos created by the RUSL in 2023). The remaining sections, traditional for the RUSL, include "Useful Pages", "For Specialists", "Electronic Catalogue", and "Virtual Bibliographic Reference" (Official website of Sumy…, 2024).

The general analysis of the websites of regional universal scientific libraries confirms that all these libraries have electronic catalogs and also create their own digital collections. Among the digital collections of the RUSLs, there are often library's own publications in various formats – from PDF documents to multimedia presentations posted on YouTube, as well as regional historical materials and unique collections. Among the virtual services of the RUSLs, commonly found are "virtual reference" and "virtual exhibitions", "virtual tours of the library". However, "online library booking", "electronic document delivery", "RSS" feed distribution' still remain "innovative services", as well as online streams of library events, library podcasts.

RUSLs are represented on social media, and websites provide links to these pages. We do not conduct a detailed analysis; however, it can be noted that the vast majority of RUSLs have their own pages, and pages on Facebook and YouTube, and presence on other social media platforms varies. Libraries also have their own blogs. As for the use of artificial intelligence in libraries, directly such information was not found on the websites.

Regarding the work on "enhancing digital (informational, media) literacy of the community, library users", RUSLs have Internet centres and regional training centres in their structure, which provide training on digital literacy. The announcement of such training sessions is posted on the website. Unfortunately, due to the ongoing war, some training and internet centres in certain regions are temporarily closed.

"The preservation of cultural heritage" as one of the main trends in the development of public libraries in the digital age is presented in RUSLs through its local history activities: creating electronic databases, digitising existing and publishing new full-text materials of various formats. Scientific novelty lies in identifying the main trends in the development of public libraries in the digital age within the context of domestic realities, and in substantiating the peculiarities of innovative changes in public libraries in Ukraine, both during wartime and as trends in post-war revival and modernization. Public libraries are considered in this context as socio-cultural institutions – "multifunctional public cultural spaces" that contribute to community and individual development, provide informational, educational, and cultural-artistic services, and integrate users into the digital society.

In conclusion, despite active military actions, rocket threats, and the destruction of both library premises and critical infrastructure in regions directly affecting the activities of all institutions and the livelihoods of citizens, public libraries in Ukraine continue to operate with a focus on global trends. They utilise the opportunities of information and communication technologies, create internet resources, and implement digital services. Currently, RUSLs have their websites and are present on social media, maintaining professional thematic blogs. All RUSLs websites contain information about their digital resources, including electronic catalogues, collections of electronic publications, their own publishing activities, virtual exhibitions, virtual reference services, user training in digital literacy, and more.

However, most RUSLs have not yet fully utilised the opportunities of the digital society such as artificial intelligence, and virtual and augmented reality. Ukrainian public libraries, including RUSLs, should pay more attention to digitising their resources, updating information on their websites, and implementing new digital library products and services.

Comprehensive practice-oriented library research, summarising existing library practices, and project (grant) activities of library institutions should contribute to the development of new adapted and in-demand models for domestic public libraries that meet the requirements of the time and the needs of users.

It is also worth remembering that innovative changes in libraries are carried out by their staff, so

the issue of professional library education, training, and professional development of librarians, as well as the formation of their professional self-awareness, becomes relevant.

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Project activity as the communication systems innovative functioning: The Ukrainian libraries experience

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Abstract. The purpose of the article is to highlight the leading Ukrainian libraries project activities as a factor of their innovative functioning. The research methodology is based on the application of systemic-structural and activity approaches, which led to the complex use of generally-logical and theoretical methods used in humanitarian research. The scientific novelty of the obtained results lies in clarifying the role and significance of libraries project activities, summarising the most relevant projects implemented by leading libraries of Ukraine, as well as in highlighting the characteristic consequences of innovative library projects implementation and their classification depending on the target nature. Conclusions. It has been established that the characteristic features of the projects are their clear purpose, uniqueness, as well as: social and cultural significance and social effect; for users – new services and new opportunities; for libraries and library specialists – implementation of innovations, professional development, modernisation of production processes, etc. It has been emphasised that thanks to the implementation of innovative projects there were: a) significant transformation of library technologies and functional areas of library activity; b) fully justified attraction to corporatism in the information and search systems creation and information resources consolidation; c) innovative transformations in the library-information service system for users; d) arrangement of innovative library space. The whole set of library projects is grouped according to the purpose: social and communication projects, technological and functional projects. It has been concluded that the project activity of libraries expands and at the same time enriches the libraries' functional capabilities and their information and resource base, promotes new services mastering and their development, and also establishes libraries as an important social and cultural institution and space for communication

Keywords: library; communication system; project; project activity; library project; Ukrainian cultural fund; charity fund

Relevance of the research topic

Comprehensive social and cultural changes characterising the modern stage of society's development have increased not only the information processes and information importance, but also the libraries status, which have become an inclusive space for self-education, the embodiment of the relationship between

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accumulated knowledge, technologies (library, digital) and communication between people. Increased user demands for library services and their quality force libraries to master new library, information and communication technologies, use modern means of obtaining and processing information, and create innovative library products. Under these circumstances, the need for further progressive innovative functioning, capable of ensuring the social and cultural mission assigned to them – information support for the society development and the country's documentary heritage preservation, becomes obvious for library professionals. One of the innovation implementation directions is project activity – "the key priority of the new time, the innovation management basic tool" (Lobanovska, 2017) of libraries. The libraries' project activity, as an innovative, creative activity that "presupposes the reality transformation" (according to I. Lobanovska), is considered in the context of "libraries' implementation of the social and communicative function within the framework of the social partnership conceptual model" – a multivariate relations complex, a special type of interaction between library, information institutions, state and local authorities, libraries, public organisations, enterprises, associations and individual citizens, the purpose of which is to ensure (resource, organisational, intellectual, etc.) the maximum satisfaction of the informational, sociocultural, educational needs of society through implementation joint projects and activities" (Lobanovska, 2017). Indeed, the libraries' project activities are aimed, in particular, at the development of new products and services, consolidation of the library community, establishment of relations with other institutions, professional development of librarians, etc. However, as library practice shows, the libraries' project activity is spontaneous, accompanied by various difficulties of an organisational, economic and other nature, but this does not prevent libraries from taking an active part in the development and implementation of numerous projects quite diverse in content. The analysis of this experience and its consideration in library practice is the key to improving the library services quality, forming the library image as one of the means ensuring communication, a democratic source of access to knowledge accumulated by mankind, social and cultural space, etc.

Analysis of research and publications

Separate aspects of libraries' project activities are highlighted in the works by T. Kolesnikova (2016), I. Lobanovska (2017), K. Lobuzina (2020), O. Klymenko & O. Sokur (2021), and others. In particular, the article by O. Klymenko & O. Sokur (2023) is devoted to the current normative and legal framework of Ukraine analysis regarding the National Electronic Library of Ukraine development, starting from the end of the 90s of the 20th century to the present day. In another publication, "Library Projects of National Scientific Library and Information Complex" (Klymenko & Sokur, 2021), the researchers consider the concept "library project" and study the project activities of the V.I. Vernadsky National Library of Ukraine. I. Lobanovska analyses corporate library projects as a means of forming information resources (Lobanovska, 2017). The digital library project was analysed in her work by K. Lobuzina (2020), focusing attention on its definition, structure, and organisational forms. The author considers the digital library project concept "as an intellectual interdisciplinary product of library specialists and scientist's creative cooperation in the field of social and humanitarian sciences". T. Kolesnikova focuses attention on the Ukrainian Library Association project "BiblioSynergy: supporting scientific research" (Kolesnikova, 2016). Despite the accumulated research results, the project activities of Ukrainian libraries still did not receive adequate coverage.

The purpose of the article is to highlight the leading Ukrainian libraries project activities as a factor in their innovative functioning.

Presenting main material

Project activity has been one of the priority areas of Ukrainian libraries activity since the mid-1990s, when the projects development and implementation made it possible to introduce innovations into library practice, expand professional communication, offer new services and improve traditional ones. In recent years, the libraries' project activities have been directed, in particular, to the creation of electronic archives, information and library resources digitisation, etc. In 2016, the Cabinet of Ministers of Ukraine approved the "Library Development Strategy for the period until 2025 "Qualitative changes in libraries to ensure sustainable development of Ukraine", which states: "The strategy creates the basis for the state policy and decision-making development in the field of culture, education and science, including decisions on financing library institutions, special programmes and projects" (Order ofthe Cabinet of Ministers of Ukraine No. 219-p., 2016). In this context, the library project is "a set of actions systematised by terms, budget and mechanism to attract new readers to the library and acquaint the maximum number of users with library services, including through mass media and social networks" (Klymenko & Sokur, 2021). An illustrative example of such a project is the grant project from UNESCO to create the National Electronic Library of Ukraine (NELU) as a nationwide centralised information and communication system. The issue of the National Library of Ukraine creation has been repeatedly raised – similar projects have been discussed among Ukrainian librarians for more than two decades. However, "only against the background of the Russian Federation full-scale aggression did understanding of their importance come, because now, more than ever, the problem of protecting the information space of Ukraine and the cultural heritage of our people, in

particular, in the part of the historical and documentary heritage stored in libraries, archives and museums, by digitising and creation of a reliable system for storing and organising access to digital copies of national memory objects 24/7" (Klymenko & Sokur, 2023).

This project is implemented in cooperation with the All-Ukrainian Public Organization "Ukrainian Library Association" and the Ministry of Culture and Information Policy of Ukraine. On 14 February 2023, at a coordination meeting of the AUPO "Ukrainian Library Association" representatives, the Ministry of Culture and Information Policy of Ukraine (MCIP), the State Archives Service of Ukraine, national libraries, state, university and public book collections of Ukraine, as well as museums and archival institutions of the country, it was announced about the start of the project to create the National Electronic Library of Ukraine with the financial support from UNESCO and the International Federation of Library Associations and Institutions (IFLA) (Ukrainian library association, 2022). The goal of the project is "to protect the Ukrainian cultural heritage in terms of documentary heritage located in memory institutions throughout Ukraine (libraries, archives, museums, etc.), by digitising it and creating a reliable system of preservation and access to digital copies of objects via the Internet on a long-term basis" (Ukrainian library association, 2022). Such project will contribute to international cooperation, exchange of experience on issues of national heritage objects' digitisation, Ukraine's integration into the world cultural, scientific, educational and information space. The NELU project implementation will take place in four stages during 2024-2029 (How will work…, 2024). In particular, at the first stage of project implementation, the working group members studied the leading foreign libraries experience in creating national-level electronic libraries in countries such as Poland, Estonia, Latvia, Germany, and prepared the project "Concepts for the Creation of the National Electronic Library of Ukraine" (How will work…, 2024). MCIP has developed a draft Decree of the Cabinet of Ministers of Ukraine "On approval of the Concept for the creation of the National Electronic Library of Ukraine" (MCIP is working…, 2024).

With the Ukrainian Cultural Fund (UCF) formation for the purpose of cultural and artistic projects state financial support, projects related to the electronic archives and libraries creation are also sent to participate in contests for grant programmes. In particular, in 2018, among the winning projects was the project "Electronic Archive of the Ukrainian Print Press", presented by "Digital Country" LLC in Kyiv. This is a specialised portal that combines libraries and archives online resources on Ukrainian history and periodicals of different times. Thanks to this portal, it became possible to search for periodicals located in various libraries of Ukraine (the actual budget of the project amounted to almost 738.7 thousand UAH) (MCIP is working…, 2024).

Libraries of various levels and subordination also take an active part in the UCF grant programmes. Thus, in 2019, the project "Books digital collection in the Collections of the Odessa National Scientific Library "Treasures of Ukraine" with an actual budget 400.5 thousand hryvnias received a grant from the UCF (Annual report…, 2019). The goal of the project is to digitise the Odesa National Scientific Library funds, which stores more than 200000 rare books. As part of the project, documents were digitised and open online access to them was provided 24 hours a day. Such digital archive creation contributed to the preservation and popularisation of the Ukrainian cultural heritage, as well as to the provision of educational, research and cultural needs of users.

Kharkiv V. Korolenko State Scientific Library presented the project "Kharkiv literary and artistic journals electronic collection of the first third of the 20th century", supported by the Ukrainian Cultural Fund in the "Cultural Heritage" sector with an actual budget 41.1 thousand UAH (Annual report…, 2019). The online resource presents an archive of 6 periodicals (110 issues), the publication of which was often unsystematic, so their sets are few, sometimes represented by only one issue. Therefore, these magazines are not available in most libraries of Ukraine. The resource allows the reader, based on these publications, to remotely get a complete picture of the life of Ukraine in the first third of the 20th century (Annual report…, 2019).

Projects aimed at digitising the funds and information resources of libraries, archives, and museums gained special importance during the COVID-19 pandemic, because due to quarantine restrictions, almost all activities went online. In the 2021 grant season alone, 21 projects from libraries were submitted to various grant programmes (Laguta, 2021), most of them were submitted to the "Innovative Cultural Product" programme. In particular, Korolenko Chernihiv Regional Universal Scientific Library (from 2023 – named after Sofia and Oleksandr Rusov) submitted the project "Virtual Library of Photography of Chernihiv Region" (LOT-5 "Cultural Heritage") (Register of the Innovative Cultural Product program, 2024) the purpose of which is to preserve the Chernihiv region material historical and cultural heritage. The project implementation will make it possible to organise Chernihiv photo artists' exhibition projects, as well as to create Chernihiv photography album from 1880 to 1920 with scientific articles by leading historians. An equally interesting project was presented by the Dnipropetrovsk Regional Universal Scientific Library named after Cyril and Methodius, the first Slavic languages teachers – "From the Scythians to the Stars" (LOT-4 "Literature and Media") (Register of the Innovative Cultural Product program, 2024). The project's goal is to create a new cultural product: the book "Seven Wonders of Dnipropetrovsk Region" reprint with AR-realisation

and interactive educational components. "The project result will be a printed and e-book published on the DniproKultura portal, a mobile ap plication with an AR WonderBook function, which will allow filling the publication with a game AR quest, an animated 3D character, geolocation of objects, audio content, which will significantly deepen book perception and will become a platform for interactive acquaintance with significant Dnipropetrovsk region man-made objects" (Register of the Innovative Cultural Product program, 2024). Lutsk city branch library No. 6 for adults of the centralised library system submitted the project "Library under the open sky" (LOT-7 "Urbanism and public spaces"), which involves "creating a mobile summer reading room under the open sky" to unite people around a common interest-reading (Register of the Innovative Cultural Product program, 2024).

The analysis of the projects registers for competitive programmes of the Ukrainian Cultural Fund shows that every year there is an increase in the applications number submitted by the libraries of Ukraine. For the 2022 UCF grant season, 68 projects have already been submitted from Ukrainian libraries of various profiles and levels: 18 projects for the "Culture without barriers" programme (Laguta, 2022); for the "Audiovisual Art" programme – 1 project (Laguta, 2022); for the programme "Innovative cultural product" – 29 projects (Laguta, 2022); on the programme "Research. Education. Residences. Scholarships" – 3 projects (Kravchenko, 2022); for the "Cultural heritage" programme – 14 projects (Kravchenko, 2022); for the "Grand Event" programme – 1 project (Kravchenko, 2022); for the programme "Culture. Regions" – 2 projects (Kravchenko, 2022). So, the most projects from libraries for UCF grant programmes in 2022, as in the previous year, were received for the "Innovative Cultural Product" programme. However, the 2022 grant season never took place due to the Russian Federation full-scale invasion on February 24, 2022.

With the grant season partial renewal in 2023, among the winning projects of UCF grant programmes, the project "Shevchenko Scientific Society book heritage (1874-1913): digital collection", developed by V. Stefanyk National Scientific Library of Ukraine in Lviv (the actual project budget is 999.9 thousand UAH) (Register of the Cultural Heritage program, 2022). This project "is dedicated to the 150th anniversary of the Shevchenko Scientific Society and is intended to attract the attention of Ukrainian society to the political heritage of the Society and the selfless activities of its members" (Register of the Cultural Heritage program, 2022). Making digital copies of original documents of Shevchenko Scientific Society is a valuable source for the study of Ukrainian culture.

In addition to the Ukrainian Cultural Foundation, public organisations, charitable foundations, and international partners provide financial and other support to library projects. The project "Bibliosynergy: Support for Scientific Research", launched in 2016 by the section of university libraries of the All-Ukrainian public organisation "Ukrainian Library Association", deserves attention (Ukrainian library encyclopedia, 2024). This is a partnership project of higher educational institutions libraries, "aimed at creating a professional environment (website) for communication between like-minded people and the implementation of new practices of supporting scientific research" (BiblioSinergy..., 2016).

Among library projects supported by charitable foundations, it is worth noting the projects of the "Library Country" charitable foundation, created in 2015. In particular, among the latest projects supported by the foundation, one should highlight the competitions "Book Grants for Libraries of Ukraine", "Libraries – Soldiers of the Information Front", "Network Library Shelter" and others (Charitable foundation..., 2023).

The projects initiated at the national level by the national libraries of Ukraine should also be noted. In particular, the V. Vernadsky National Library of Ukraine is the main coordinator of such national information projects: the abstract database "Ukrainika Scientific", the electronic library of professional periodicals "Scientific Periodicals of Ukraine", the electronic library "Ukrainika", the information portal "Science" Ukraine: access to knowledge", etc. (Klymenko & Sokur, 2021). On the initiative of the Yaroslav Mudry National Library of Ukraine, the project Electronic Library "Culture of Ukraine" was launched in 2010, the main goal of which is defined in the project concept: "integration of the Ukraine's peoples culture into the European and global information space, strengthening cultural ties and creating a positive image of Ukraine in the world" (Order of the Ministry of Culture of Ukraine No. 1094/0/16-1..., 2011). Today its fund consists of 4 main collections: Cultural Studies, Art, Ethnography, Cultural Institutions, which are systematically replenished. Currently, almost every library develops projects and publishes them on its website, as well as on social network pages.

The scientific novelty of the obtained results lies in elucidating the library project activities role and significance, summarising the most relevant projects implemented by leading libraries of Ukraine, as well as highlighting the characteristic consequences of the innovative library projects implementation and their classification depending on the target nature.

Conclusions

Innovative methods of modern libraries functioning are determined not only by the need to improve their activities, but also by the opportunities provided by the projects. The library projects characteristic features are a clear goal, uniqueness, and also: for society – sociocultural significance and social effect; for users – new services and new opportunities; for libraries and library

specialists – introduction of innovations, professional development, production processes modernisation, etc. As a result of the projects implementation, libraries contribute to their positioning in society not just as sociocultural, information and communication institutions, but as communication systems in the meaning of communication channels and at the same time semantic messages. Thanks to the implementation of innovative projects, the following occurs: a) significant transformation of library technologies (from routine and ineffective to digital) and functional areas of library activities; b) a completely justified inclination towards corporatism in the creation of information retrieval systems and the information resources consolidation; c) innovative transformations in the system of library and information services to users, in particular, the new services emergence; d) arrangement of innovative library space capable of ensuring intellectual development and implementation of creative initiatives of library users.

The entire set of library projects can be grouped into certain categories depending on their target nature: 1) projects of a social and communication nature (aimed at updating the relations "library-society", "library-users"); 2) technological (aimed at the active development of digital technologies and their extensive implementation in library practice); 3) functional projects (provide for expanding the functions of libraries, including as educational institutions). So, the project activities of libraries expand and at the same time enrich the functionality of libraries and their information and resource base, contribute to the development of new services and the new services development, and also establish libraries as an important social and cultural institution and communication platform.

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Проєктна діяльність як чинник інноваційного функціонування комунікаційних систем: досвід українських бібліотек

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Анотація. Мета статті – висвітлити проєктну діяльність провідних українських бібліотек як чинник їх інноваційного функціонування. Методологія дослідження ґрунтується на застосуванні системно-структурного та діяльнісного підходів, що зумовило комплексне використання загальнологічних і теоретичних методів, які застосовуються у гуманітарних дослідженнях. Наукова новизна одержаних результатів полягає у з'ясуванні ролі та значення проєктної діяльності бібліотек, узагальненні найбільш актуальних проєктів, що реалізуються провідними бібліотеками України, а також у виокремленні характерних наслідків реалізації інноваційних бібліотечних проєктів та їх класифікації залежно від цільового характеру. Висновки. Констатовано, що характерними ознаками проєктів є їхня чітка мета, унікальність, а також: для суспільства – соціокультурна значущість і соціальний ефект; для користувачів – нові послуги і нові можливості; для бібліотек і фахівців бібліотек – впровадження інновацій, професійний розвиток, модернізація виробничих процесів тощо. Наголошено, що завдяки реалізації інноваційних проєктів відбувається: а) істотна трансформація бібліотечних технологій і функціональних напрямів бібліотечної діяльності; б) цілком обґрунтоване і виправдане тяжіння до корпоративності у створенні інформаційно-пошукових систем та консолідації інформаційних ресурсів; в) інноваційні перетворення у системі бібліотечно-інформаційного обслуговування користувачів; г) облаштування інноваційного бібліотечного простору. Усю сукупність бібліотечних проєктів згруповано залежно від їх цільового характеру: проєкти соціально-комунікаційного характеру, технологічні та функціональні проєкти. Підсумовано, що проєктна діяльність бібліотек розширює і водночас збагачує функціональні можливості бібліотек та їхню інформаційно-ресурсну базу, сприяє освоєнню нових сервісів та розробці нових послуг, а також утверджує бібліотеки як важливий соціокультурний інститут і комунікаційний майданчик

Ключові слова: бібліотека; комунікаційна система; проєкт; проєктна діяльність; бібліотечний проєкт; Український культурний фонд; благодійний фонд

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Documentation and registration of damages and destructions of cultural heritage objects during the armed aggression of Russia against Ukraine

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Abstract. The purpose of the study is to highlight the main aspects of accounting and registration of national cultural heritage of Ukraine, to describe the current state of documentation of crimes committed by the Russian Federation against Ukrainian cultural heritage on the territory of Ukraine, and to outline the prospects for digitisation and creation of an online register of cultural heritage of Ukraine. The methodological approach of the study is based on the use of both general scientific and specific methods of cognition. These include: terminological analysis, systems analysis, as well as methods of analysis and synthesis, logical analysis, and visualisation of research results. The scientific novelty of this work lies in the systematisation and analysis of methods for documenting and registering damages and destructions of cultural heritage objects caused by Russia's armed aggression against Ukraine, which allows for a deeper understanding and assessment of the scale and consequences of such actions on cultural heritage. Conclusions. The protection and preservation of unique cultural heritage during the war have become priority tasks for cultural institutions across Ukraine. Currently, the documentation of destruction and damage caused by Russian occupying forces is particularly critical. Cultural values are always at high risk during armed conflicts. The military actions of the Russian Federation have led to horrific crimes against cultural heritage, including the destruction and mass exodus of cultural values, the scale of which is shocking. Fully assessing the damage in combat zones and occupied territories remains impossible. Active evidence collection of Russia's war crimes against Ukrainian culture is ongoing. The situation in the war with Russian occupiers highlights a blatant disregard for international norms and UNESCO conventions concerning the protection of cultural objects and art collections, as well as violations of all established laws and customs of war, which constitute a large-scale military crime

Keywords: accounting and registration of cultural heritage objects; historical and cultural heritage; cultural monuments; historical monuments; archaeological monuments; documentary monuments; war crimes

Relevance of the research topic

In the long history of Ukraine, our historical and cultural heritage serves as an extraordinarily valuable spiritual, economic, and social asset, which constitutes a key element of national pride and an important aspect of our country's international representation. The attitude of a society to its cultural heritage becomes a measure of its social maturity and orientation towards democratic development. Crimes against cultural heritage, which are unfortunately relevant for Ukraine today, have a very complicated procedure for proving them, and therefore require careful, timely accounting, registration, and documentation of damage and destruction.

Analysis of research and publications

Many provisions of international treaties, in particular the Hague Conventions on the Law of War on Land and Sea of 1899 and 1907, the Additional Protocols to the Geneva Conventions of 1977, and the Rome Statute, are devoted to the protection of cultural heritage. In particular, Article 8 of the Rome Statute of the International

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Criminal Court qualifies direct attacks on buildings related to religion, education, art, science, or charity, as well as historical monuments, as war crimes. And in 1954, a separate Convention for the Protection of Cultural Property in the Event of Armed Conflict was dedicated to the protection of the cultural heritage of mankind. Ukraine acceded to the Convention on the basis of the Law of Ukraine No. 30 (2020, April). The Resolution of the Cabinet of Ministers of Ukraine dated 12 August 1992 created a register of national cultural property (Resolution of the Cabinet of Ministers of Ukraine No. 466 (1992, August).

Documentation of crimes against cultural heritage began with the annexation of Crimea, where 534 crimes were recorded, according to the Crimean Institute for Strategic Studies, a non-governmental organisation. According to periodic reports by the Ministry of Culture and Information Policy, the relevant committee of the Verkhovna Rada, a number of news outlets and agencies, the number of crimes reaches several thousand (from 2014 to August 2023, 1624 cultural heritage sites were damaged) (Ministry of Culture and Information Policy, 2022). According to the Ministry of Culture and Information Policy, from February 24, 2022, to January 25, 2024, the Russian Federation destroyed or damaged 902 cultural heritage sites in 17 regions of Ukraine (Karandeiev, 2023).

The problems of destruction of cultural heritage were discussed at a number of scientific conferences, including an international conference held in Lviv on 18 May 2023. United for Heritage, dedicated to the investigation of crimes against Ukraine's cultural heritage, the head of Eurojust, Ladislav Hamran, stressed that through crimes against Ukraine's cultural heritage, Russia "is trying not only to destroy Ukrainian traditions and culture, but also the right of Ukrainians to exist" (Hamran, 2024).

UNESCO also records, registers, and documents cultural heritage sites, implementing a number of protection and restoration projects. As of 18 December 2023, the list compiled by UNESCO totalled 863 sites (Ministry of Culture and Information Policy, 2022). Scholars, cultural figures, publicists, etc. pay great attention to the accounting of aggressor crimes and damage to cultural heritage. First of all, we should mention L.A. Dubrovina (2020), O. Zbanatska, & V. Dobrovolska (2022), H. Mamedov (2023), M. Kabatsii (2023), R. Karandieiev (2023), V. Troian (2024), O. Shchur (2021). According to K. Busol, the authors of the publications consider the problems of accounting, registration, and documentation "is now being carried out not only for litigation, but also for art projects, for a potential truth commission, for nuanced educational programmes, for Ukrainian and international academic research and media publications" (Shchur, 2021).

The purpose of the Article is to highlight the main aspects of accounting and registration of the national cultural heritage of Ukraine, to describe the current state of documentation of crimes committed by the Russian Federation against Ukrainian cultural heritage on the territory of Ukraine, and to outline the prospects for digitisation and creation of an online register of Ukraine's cultural heritage.

Summary of the main material

Cultural monuments are the core of memorial culture, which characterises the intellectual and spiritual state of society. They require special attention and organisation not only of state accounting, but also of examination of cultural values and involvement in socio-cultural activities.

The Ministry of Culture has created the State Register of the National Cultural Heritage of Ukraine (hereinafter – the SRNCHU), launched by the Resolution of the Cabinet of Ministers of Ukraine dated 12 August 1992 No. 466, which aims to conduct state accounting and create an electronic resource of monuments of exceptional historical, artistic, scientific, or other cultural value, objects of material and spiritual culture that are important for the formation of the national identity of the Ukrainian people and determine its contribution to the world cultural heritage. Such registration allows to activate the significant potential of cultural and artistic monuments stored in national memory institutions: museums, libraries, archives (Resolution of the Cabinet of Ministers of Ukraine No. 466, 1992).

The rules for registration, protection, restoration, and use of national cultural heritage objects are established by the current laws on historical and cultural monuments, legislative and regulatory acts related to the archival, library, and museum funds of Ukraine, as well as directives from central executive authorities. These rules are mandatory for all institutions, enterprises, organisations, and citizens who own cultural heritage objects. They are closely linked to the broader cultural legislation, including the Law of Ukraine No. 1068-XIV "On the Export, Import, and Return of Cultural Values" (1999); Law of Ukraine No. 39 "On the Protection of Cultural Heritage" (2000); Law of Ukraine No. 2778-VI "On Culture" (2010). On April 30, 2020, the Law of Ukraine came into effect, which confirms Ukraine's accession to the Second Protocol of the Hague Convention of 1954 on the Protection of Cultural Property in the Event of Armed Conflict (Law of Ukraine No. 39, 2020).

In 1997, the State Register of Scientific Objects of National Heritage was established, ratified by the Resolution of the Cabinet of Ministers of Ukraine on February No. 174 (1997), with subsequent amendments. In 2001, a separate State Register of Immovable Monuments of Ukraine (SRIMU) was formed, created by the Resolution of the Cabinet of Ministers of Ukraine No. 1760 (2001), which approves the procedure for determining the categories of monuments for the inclusion of cultural heritage objects.

These approaches are also based on key UNESCO normative documents: Convention for the Protection of Cultural Property in the Event of Armed Conflict (1954); Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property (1970); Convention concerning the Protection of the World Cultural and Natural Heritage (1972), Convention for the Safeguarding of the Intangible Cultural Heritage (2003), etc., which define the concept and composition of cultural property.

It should be noted that Ukraine has joined these international agreements and developed a series of national laws and regulatory acts that form the legal foundation for the operation of archives, libraries, and museums as cultural institutions within the legal framework of cultural values and heritage. Although these concepts are not identical, they are closely interconnected.

Cultural values, the creative component of the cultural process, and cultural products as documents from the sphere of cultural heritage and cultural values, which are also under the jurisdiction of the Ministry of Culture and create the space of national culture, have also become the object of official registration. In addition, the undoubted achievements of cultural management include the regulation of the concept of cultural monuments, cultural property and their typological and species composition, as defined by the Regulation on the State Register of Cultural Monuments:

- historical monuments – buildings, structures, memorials, and objects associated with the most important historical events in the life of the nation, the development of science, technology, culture, and the life and work of prominent figures;
- archeological monuments – settlements, mounds, remains of ancient settlements, fortifications, industries, canals, roads, ancient burial sites, stone sculptures, rock images, ancient objects, areas of the historical cultural layer of ancient settlements, and archaeological finds that are outstanding monuments of national culture and characterise certain stages of historical development;
- monuments of urban planning and architecture – unique ensembles and complexes, individual architectural objects, as well as related works of monumental sculpture and painting, decorative and applied arts, gardening and parkland, and natural landscapes;
- monuments of art – outstanding works of monumental, fine and decorative and applied art;
- documentary monuments – unique acts of statehood, other important archival materials, film, photo and audio documents, ancient manuscripts, rare printed publications. Other objects of exceptional value in terms of history, culture, ethnology or science may also be included in the ICHA (Resolution of the Cabinet of Ministers of Ukraine No. 466, 1992).

The Russian invasion caused significant destruction of not only infrastructure but also cultural monuments. Protecting and preserving the unique heritage during the war has become one of the main tasks of cultural institutions in all parts of our country. Currently, it is crucial to document and register the damages and destructions of cultural heritage sites caused by Russian occupying forces in Ukraine.

Since the beginning of the Russian aggression on the territory of Ukraine in 2014, Ukrainian cultural heritage sites have been under constant threat and vandalised by the invaders. Since 24 February 2022, the enemy has been shelling peaceful cities in Ukraine and destroying the cultural heritage of an entire nation. The situation with the preservation of Ukrainian cultural heritage became particularly acute when the regular army units of the Russian Federation started a large-scale war in Ukraine. War always means losses: human, material, and cultural.

In different regions of our country, numerous architectural monuments have been damaged or completely destroyed, including those that house museums, libraries, university faculties, and other cultural and educational institutions, and sacred architecture has been destroyed. On April 30, 2020, Law of Ukraine "On the Accession of Ukraine to the Second Protocol to the Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict, 1954" (2020) came into effect. According to the Hague Convention, cultural properties include:

- objects that hold significant value for the cultural heritage of any people, including architectural, artistic, or historical monuments, both religious and secular; archaeological findings; building complexes that possess historical or artistic interest; art objects, manuscripts, books, and other items of artistic, historical, or archaeological significance; scientific collections, significant collections of books, archival materials, or reproductions of the aforementioned property;
- buildings whose primary purpose is the preservation or display of the aforementioned movable cultural properties, including museums, large libraries, archival storage facilities, and shelters designed to protect these values in the event of armed conflict;
- locations where a significant number of the aforementioned cultural properties are concentrated, known as "centers of concentration of cultural properties" (Ministry of Culture..., 2022).

Ukraine's accession to this document was extremely important, as Ukraine has a vast and diverse cultural heritage that reflects its complex history and the civilisational influences that have been directed at it at different times, and monuments and memorial complexes are a symbol of a particular event or era.

The Ministry of Culture and Information Policy of Ukraine has initiated data collection and created a platform for the systematic registration of relevant information. The website features examples of war crimes, including the destruction of historical buildings

(architectural monuments), ancient cemeteries, monuments, religious buildings, art objects, and natural landmarks, as well as buildings of cultural institutions such as theaters, museums, and libraries. The website also documents the destruction of archaeological sites, including burial mounds, ancient earth fortifications, and excavations; incidents of injury or death of civilians due to the use of force and weapons by occupying forces during attacks on cultural objects; and the looting and robbery of property from museums, libraries, and other cultural institutions by the occupiers (Ministry of Culture…, 2022).

The destruction of cultural heritage objects is classified as a war crime. The actions of the Russian Federation against Ukraine have been properly documented. In particular, the Human Rights Committee keeps track of platforms engaged in documenting and investigating crimes by Russia against the civilian population of Ukraine. As of April 22, 2022, there are 19 such platforms operating both in Ukraine and abroad. Among them, there is a specialised resource that provides detailed documentation of war crimes against humanity and cultural heritage committed by the Russian military (Official website of Verkhovna Rada of Ukraine, 2022).

On March 9, 2022, the Ministry of Culture and Information Policy of Ukraine initiated a process to collect data on the damage and destruction of cultural heritage objects caused by Russian occupying forces in Ukrainian territory, and developed a special resource for their systematic documentation. The Ministry called on witnesses of such acts in all regions of Ukraine to send photos and videos documenting the destruction directly through this online resource to the Ministry of Culture and Information Policy. (Ministry of Culture…, 2022).

To record a crime, you need to leave information about yourself; describe the violation with the exact location and all the details (victims, damage, etc.); upload photo or video evidence. Next, you need to fill out a questionnaire in which you indicate:

1. Your contacts (full name of the witness, date of birth, phone number, e-mail, alternative channel of communication with the witness (link to Facebook, Instagram, Tik-Tok, etc.).

2. Information about the event: Source of information (A – personally discovered, B – discovered on the Internet, C – discovered by another person); name of the object; region; place of the event; date of the event; date of recording of the testimony; list of objects (old buildings; historical monuments, historical cemeteries; archaeological objects – mounds, ramparts of ancient earthworks, etc., excavation sites; religious buildings; works of art (paintings, frescoes, etc.); theatres; cinemas; libraries; monuments (memorials, obelisks, plaques); cultural heritage sites (history, architecture and urban planning, monumental art, landscape art, science and technology); museums and reserves; natural monuments, etc.); information about the event; photos or videos of the crime.

The losses can be divided into two blocks: physical damage to buildings and losses related to movable cultural heritage, such as museum archival and library values that were damaged and destroyed, or taken from the occupied territories and actually stolen. These areas form the two main projects that the Ministry of Culture and Information Policy is currently working on: the digitisation of all immovable heritage, and an online register that will include a list of all architectural and archaeological heritage sites.

Another important project currently being worked on by the Ministry of Culture and Information Policy is the digitisation of Ukraine's museum collection. Today, there are more than 12 million museum objects in Ukraine. The main problem is that all museum records are kept in the museums themselves in paper form (Ministry of Culture…, 2022).

The creation of a unified register of electronic records of museum collections will allow for quick reference to the number, list and condition of all objects in all museums. Thus, it will not only allow for control and monitoring of the state of cultural heritage in Ukraine, but also for the return of exhibits stolen by Russia. The international community helps implement projects to preserve Ukraine's cultural heritage. International partners offer not only financial assistance but also advice and share their experience.

Ukraine enjoys strong support from museum colleagues and monument conservationists around the world. In particular, all the leading associations, including intergovernmental ones, and professional networks – UNESCO, the International Committee of the Blue Shield, the International Council of Museums (ICOM), the International Council on Monuments and Sites (ICOMOS), the International Council on Archives, the International Council on Libraries, charitable foundations, individual institutions – museums and others – have offered assistance. This support is expressed in various forms – from statements and museum flash mobs to financial or organisational assistance, offers of internships or scholarships for professionals, etc. (Official website of Verkhovna Rada of Ukraine, 2022).

The Association of Architects of Lithuania has launched an international European cultural project titled "UREHERIT. Architects for Heritage in Ukraine: Recreating Identity and Memory". The project involves collaboration between European and Ukrainian experts in the fields of heritage, architecture, design, and engineering, as well as with local authorities and communities of Ukrainian cities to preserve and restore Ukrainian cultural heritage.

An consortium of 11 organisations has joined in the implementation of the project, including the Association of Architects of Lithuania as the project coordinator, Architects of Sweden, the Federal Chamber of Architects and Chartered Engineering Consultants of Austria (BKZT), the Institute of Technology and

Architecture of the Royal Danish Academy (IBT), the Romanian Union of Architects, the National Council of Architects, Planners, Landscape Professionals, and Environmentalists of Italy (CNAPPC), the Federal Chamber of German Architects (BAK), the Estonian Association of Architects, the National Union of Architects of Ukraine, the Ro3kvit Urban Coalition, the Kharkiv School of Architecture, and the Architects' Council of Europe as an associated partner.

The program encompasses scientific research, seminars, public discussions, various events, and the development of professional development programs and educational courses for architectural schools. The project will last 36 months, until April 2026, and it is anticipated that the following recommendations will be developed:

- methodologies for assessing the value of heritage and damage assessment;
- strategies for revitalising valuable heritage in a sustainable, economically beneficial, and culturally significant manner;
- a comprehensive approach to the reconstruction of Soviet-era housing in Ukraine;
- methodology for organising public participation in heritage protection, including city forums and workshops on "Healing through Heritage Restoration";
- conducting architectural competitions with accompanying financial consultations;
- application of cutting-edge technologies in heritage conservation;
- updating curricula of architectural schools;
- content and organisation of continuous professional development programs to facilitate sustainable heritage restoration.

An important role is played by Ukrainian civic initiatives that protect cultural heritage in wartime and support professionals who find themselves in difficulty due to hostilities or occupation. Among them are the Heritage Rescue Headquarters, whose members are members of the specialised working group under the Ministry of Culture and Information Policy, the Museum Crisis Centre, and the Ukrainian Emergency Art Fund.

The scientific novelty of this work lies in the systematisation and analysis of methods for documenting and registering damages and destructions of cultural heritage objects caused by Russia's armed aggression against Ukraine, which allows for a deeper understanding and assessment of the scale and consequences of such actions on cultural heritage.

Conclusions

War inevitably leads to casualties. People die, cities suffer destruction, and cultural heritage becomes a target for annihilation. Russian occupying forces commit horrific crimes against humanity and mercilessly destroy Ukraine's cultural wealth. The scale of destruction and removal of cultural values from Ukraine by Russian occupiers is shocking. Currently, it is difficult to fully assess the extent of damage and destruction of cultural heritage objects located in combat zones and temporarily occupied territories.

Currently, the collection of evidence of the Russian Federation's crimes against Ukrainian cultural heritage continues. In the war with the Russian occupier, we have witnessed not only the disregard for international norms and UNESCO conventions in the context of preserving cultural heritage sites and art collections, but also violations of all possible laws and customs of war, which is a large-scale war crime. A clear state position on crimes against cultural heritage should be developed and cooperation with international organisations should be strengthened on this basis.

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Introduction of digital technologies and digitalisation in higher education institutions of Ukraine: Current state and prospects

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Abstract. The purpose of the article is to highlight the issues of introduction of digital technologies into the educational process of Ukrainian higher education and digitalisation of higher education institutions, to characterise the current state, and outline the prospects for their development. The research methodology employs systemic and cultural-historical approaches, as well as techniques of analysis, synthesis, generalisation, description, and comparison. This comprehensive application of methods allows for obtaining substantiated research results. The scientific novelty of this research lies in the analysis of scholarly works on the implementation of digital technologies in higher education institutions, which has enabled a detailed examination of the current state of digitalisation in education, highlighted the key tasks in this area, and identified promising directions for the development of educational technologies. Conclusions. The digitalisation of national education is critical for enhancing its quality, aligning it with modern requirements, and improving its position in global educational rankings. At the same time, there are significant gaps in leveraging the opportunities provided by modern digital technologies, including a shortage of digital tools and educational resources, as well as a low level of digital competence among teachers and students. The main challenges for higher education institutions in Ukraine include the digitalisation of internal processes and the development of digital marketing to ensure effective interaction among all participants in the educational process. The effectiveness of educational digitalisation directly depends on the level of digital literacy and competencies of the educational participants, making it a key direction in the development of digital education. Prospective development directions include systematic support for the digitalisation process, enriching educational institutions with modern technologies and resources, and focusing on the systematic development of digital skills among teachers, researchers, and students

Keywords: higher education institutions; digital technologies; digitalisation in education; quality of education; educational process; digital competences

Problem statement

The current situation in society requires education to quickly adapt to the rapidly changing conditions of technological progress. The widespread introduction and effective use of digital technologies has led to the actualisation of the issue of digitalisation in education. The use of modern digital technologies and tools for transferring knowledge to students, such as computers, gadgets, interactive whiteboards, smart boards, LCD projectors and other visualisation tools, is a necessary step in the development of education and allows for more efficient and interactive learning. Their use not only helps to improve the quality of education, but also provides access to new knowledge and modern educational technologies.

These tasks are especially important now, under martial law, and will be relevant in the near future, during the period of post-war reconstruction of Ukraine, as the processes of introducing digital technologies in

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higher education institutions (HEIs) significantly affect the effectiveness of the educational process, provide access to quality education for all students, and make it possible to organise educational activities taking into account the needs, interests, and abilities of students.

Analysis of research and publications

The importance of introducing digital technologies into the educational process and the significance of digitalisation for higher education institutions are reflected in the works of contemporary researchers, teachers, and scholars. S. Karpliuk (2019), O. Buinytska *et al.* (2020), A. Krutova & S. Staverska (2021), S. Tolochko (2021), Bykov (2022), L. Franko (2022), V. Kremen (2022), I. Yanenkova (2022), E. Hrom (2022), E. Chernovol (2023), L. Filippova *et al.* (2023), O. Bochko, O. Burov, A. Verbytskyi, B. Hrytseliuk, A. Hurzhia, L. Kartashov, T. Koval, O. Kolhatyn, A. Kolomiets, S. Kuzmenko, N. Morse, K. Osadcha, O. Spivakovskyi, T. Sorochan, O. Spirin, and others. All of them, to varying degrees, study and describe the importance and effectiveness of the use of digital technologies in education, the importance of the digitalisation of higher education institutions, develop methods of using digital tools to improve the efficiency of the educational process and study their impact on the quality of education and the development of students.

The purpose of the study is to highlight the issues of introducing digital technologies into the educational process of Ukrainian higher education and digitalisation of higher education institutions, to characterise the current state and outline the prospects for their development.

Outline of the main material

Nowadays, digital technologies are developing rapidly and are becoming increasingly important in science, technology, economics, education, politics, society and the environment. General modern trends in the digitalisation of society are clearly manifested in education. In the context of the digitalisation of education, higher education institutions face special challenges that reflect the need to introduce digital technologies to ensure educational activities at all levels of education.

The term "digital educational technologies" refers to the use of various electronic tools and software aimed at improving the quality of education and ensuring access to knowledge for students and teachers. The digitalisation of education involves enriching the educational process with electronic and digital devices, tools, and systems, as well as establishing electronic communication for information exchange among participants in the educational process, thereby creating an integrated environment that merges virtual and physical spaces into a single cyber-physical space.

Kyiv-based researchers O. Buinytska *et al.* (2020) believe that "one of the main tasks of today is to ensure the digitalisation of higher education institutions that will meet the demands and opportunities of the market, integrate into the global information open educational space, which provides free access for all participants to global digital resources, satisfy students' educational needs in digital products, as well as ensure effective electronic communication and collaboration among all participants in the educational process".

To support stable and effective adaptation to digital education systems, on September 30, 2020, the European Union adopted the Digital Education Action Plan for the period 2021-2027. The main focus of this plan is on developing a productive digital education ecosystem, improving digital skills, implementing digital transformation, and shaping a common vision for high-quality, inclusive, and accessible digital education in Europe (European Commision…, 2020).

The Digital Education Action Plan for 2021-2027 calls for strengthened cooperation at the European Union level in the field of digital education. This is necessary to address challenges arising from the COVID-19 pandemic and to capitalise on emerging opportunities. The plan aims to create opportunities for the educational and professional community, including teachers, students, policymakers, scholars, and researchers at national, European, and international levels (Krutova & Staverska, 2021).

The digitalisation of higher education has been in the focus of the European University Association (EUA) since 2012, with the introduction of Massive Online Open Courses (MOOCs). Currently, the European University Association coordinates projects aimed at developing approaches to institutional development strategies and promoting digitalisation by disseminating best practices, sharing experiences among university leaders, and supporting community development.

Already in 2019, digitalisation was identified as one of the priorities of state policy in Ukraine, which led to the creation of the Committee on Digital Transformation of the Verkhovna Rada and the Ministry of Digital Transformation of Ukraine. According to the Strategy for the Development of Higher Education for the period 2022-2032, approved by the Cabinet of Ministers of Ukraine, higher education institutions must actively implement digital tools and fully transition to modern digital models of education by 2032 to ensure the competitiveness of their educational and scientific activities (Order of the Cabinet of Ministers of Ukraine № 286-p, 2022).

The Higher Education Development Strategy for 2022-2032 sets key objectives for higher education institutions in Ukraine, which include: digitalisation of internal processes; development of digital marketing to facilitate interaction among various educational process participants (teachers, students, administration, applicants); and enhancing the digital competence of both students and teachers (Order of the Cabinet of Ministers of Ukraine № 286-p, 2022).

Digitalisation of education is generally the development of a publicly accessible database containing teaching and learning materials in digital form, the organisation of the educational process in the global information network, the use of modern mobile, cloud and intelligent technologies, and the widespread use of massive open educational courses and resources. There is also an understanding of the digitalisation of education as the process of using digital content in teaching and learning to optimise educational activities or as the modernisation of the content and objectives of education to develop digital competences (Safonov *et al.*, 2022). Undoubtedly, the digitalisation of education radically transforms the educational process and the roles of all its participants. In the context of higher education institutions, it is directly related to the formation of the components of digital competence of lecturers and students.

According to scholars V. Bykov and V. Kremen, digitalisation of education performs two key functions: firstly, the creation of a digital educational environment that includes digital teaching tools, online courses, electronic educational content, and various digital resources and services; secondly, an extensive modernisation of the educational process aimed at preparing individuals for life in a digital society and for professional activities within the digital economy (Kremen *et al.*, 2022).

Thus, digitalisation in education allows for a wider range of services, better communication between students, and the dissemination and use of technology for teaching and learning. When introducing digitalisation into the educational process, it is important for an educational institution to critically reflect on which digital platforms and tools should be used through the prism of the task of "improving teaching". After all, it is extremely important to support universities in general, and lecturers in particular, in building institutional capacity (policies, procedures, staff, infrastructure, resources) to improve teaching and professional development.

In recent years, the COVID-19 pandemic and martial law in Ukraine have led to significant changes in higher education. The problem of organising distance and blended learning, which involves digital communication between participants in the educational process and the use of digital technologies to visualise educational content, has become relevant. In addition to the recognised learning management system Moodle, which is widely used in the higher education system, cloud-based services, including the following tools, have become necessary: a) video conferencing Zoom, Skype, WebEx; b) distance learning: Google Classroom, Microsoft Teams; c) content visualisation: Canva, Prezi, Google Presentations; d) online whiteboards: Padlet, Google Keep, MIRO; e) testing, surveys: Kahoot!, Quizizz, Google Forms; f) Microsoft Forms; g) interactive tasks: LearningApps, Classtime, Wordwall. Considerable attention is paid to the selection of distance learning courses on the educational portals Prometheus, Coursera, EdEra, Diia.Osvita, etc.

Universities are actively working to create their own digital content that takes into account the specifics and areas of bachelor's and master's degree programmes, including e-textbooks, e-courses, and the introduction of SMART, AR, and VR technologies, etc. There are numerous computer classrooms, large-format LED screens and projection equipment for presentations in classrooms, modern technical facilities for distance learning, free Wi-Fi, cybersecurity centres, robotics laboratories, virtual laboratory complexes (VisSim, Modelica, LabView, etc.), professional computer databases by type of activity, and other innovations and trends.

Digital platforms and applications (Adult Learning, Google Classroom, Microsoft Teams, Moodle) are deployed to support the educational process in distance and blended learning, Microsoft 365 cloud services, Google Workspace for Education, as well as digital means of communication with students (BigBlueButton, Zoom, Google Meet, etc.) are used. With the assistance of the Ministry of Education and Science of Ukraine, since 2022, the university has been using free and extended access for 230 licences of Zoom Meetings for Education with unlimited connection time for up to 1000 people at a time, as well as Google Workspace for Education's Teaching and Learning Upgrade with the ability to conduct and record video meetings of training sessions for up to 250 participants and store them directly in the Google Drive cloud storage. Along with this, agreements have been concluded and the digital content of the online educational platforms Coursera (5200 courses and 2200 projects on the Coursera for Campus service), Udemy (13 thousand courses) is used (Kremen *et al.*, 2022).

The digitalisation of education is directly related to the formation of the components of digital competence of lecturers and students. Ukrainian researchers E. Chernovol *et al.* (2023) provide a structure of digital competence, which includes information and media competence, technical competence, communication competence, and consumer competence.

The implementation of the Digital Competence Development Concept by 2025 includes the following key directions: fostering and enhancing digital skills and competencies within society; increasing public awareness of potential risks associated with Internet usage; regulating state policy in the area of digital skills through legal tools and making appropriate amendments to legislation to clearly define the role of digital education and competencies in social life; coordinating actions among executive bodies to promote the development of digital skills and competencies, and creating indicators for monitoring progress in these areas.

Educational institutions at all levels have begun to realise that digitalisation can offer them a number of advantages and new strategies (approaches) to teaching students. In particular, the intensive development of technologies such as augmented reality (AR), virtual reality (VR), artificial intelligence, robotics, blockchain, media education, cloud-based environments,

gamification, STEM/STEAM education have a key impact on the development of digital content for all levels of education (Kremen, 2019).

In addition to the development of immersive learning technologies using virtual and augmented reality, voice interfaces, automation of learning processes (robotic communication), machine analysis of user actions, learning and testing results (using artificial intelligence), certification using blockchain technologies, to trends in education development include inclusiveness and gamification technologies, user identification and personalisation of the learning process, microlearning, socialisation of educational programs, including the exchange of user experience, association by interests and professional competences, a team approach to learning and working in common information bases.

At the same time, the aforementioned "Strategy for the Development of Higher Education in Ukraine for 2022-2032", in the section "Digitalisation", states in particular that "education is currently lagging behind digitalisation, and more efforts are needed to take advantage of the tools and strengths of new technologies, while addressing potential misuses such as cyber intrusion and privacy concerns" (Order of the Cabinet of Ministers of Ukraine № 286-p, 2022).

The Strategy states that the main weaknesses of higher education institutions that affect the quality of higher education at the institutional level and its perception are insufficient implementation of modern standardised models of institutional management; low level of student centricity, in particular, insufficient implementation of opportunities for people with special needs; insufficient consideration of stakeholders' interests in determining the content and areas of training, weak feedback from participants in the educational process; low efficiency of the system of ensuring academic integrity (only 7.7 per cent of higher education institutions have a fully prepared infrastructure for teaching people with special needs, and almost 15 per cent of higher education institutions have not started adapting the infrastructure at all) (Order of the Cabinet of Ministers of Ukraine № 286-p, 2022).

Some researchers also point out the existing problems of digitalisation of HEIs. In particular, K. Haliuk (2022) notes that new educational opportunities that are opening up with the use of modern digital technologies have not yet been realised. Scholars V. Kremen *et al.* (2022) in their scientific report to the General Meeting of the National Academy of Pedagogical Sciences of Ukraine "Scientific and Methodological Support for the Digitalisation of Education in Ukraine: Status, Problems, Prospects", 18-19 November 2022, noted, in particular, that "...the provision of the educational process with the necessary modern equipment and high-quality Internet remains insufficient". This refers to both the technical equipment of educational institutions and the availability of the necessary devices for students and lecturers. The effectiveness of the use of digital tools and systems in the educational process is negatively affected by the insufficient level of digital literacy of teachers and lecturers, their lack of experience and skills in the digital environment, and their poor methodological preparedness for the use of digital learning technologies. There is a shortage of digital tools and electronic educational resources for the full educational and methodological support of the educational process at different levels of education (Kremen *et al.*, 2022).

According to researcher E. Hrom (2022), to address the challenges of digitalisation in Ukrainian higher education institutions, a series of strategic measures regarding the implementation of digital technologies is necessary. These measures include: effectively enhancing the qualifications of the teaching staff to work with digital technologies in the educational process; creating specialised elective courses for students that utilise digital technologies in various fields, including online courses; developing a modern digital educational environment that supports collaborative work on projects, documentation, organising debates, and assessments; establishing an internal regulatory framework that would govern the use of online courses in the educational process and account for the results of their completion; and reorienting universities to teach basic disciplines using the concept of open online courses and courses based on open licenses.

Progressive directions for the development of digital technologies and the digitalisation of education were outlined in a scientific report presented at the general meeting of the National Academy of Educational Sciences of Ukraine titled "Scientific and Methodological Support for the Digitalization of Education in Ukraine: Status, Problems, Perspectives", which took place on November 18-19, 2022. The report focused on the development of scientific and methodological approaches to digitalisation in education, particularly on enhancing the qualifications of scientific, educational, and leadership personnel in the field of education. These include the following: development of a national concept and sectoral, territorial and corporate programmes for the development of digital competence of researchers, research and teaching staff and management personnel of education; further systematic and comprehensive digitalisation of educational, scientific, methodological, organisational activities of higher postgraduate education institutions based on the deployment, administration and use of public and corporate digital cloud-based platforms and services; research of fundamental and applied problems of digital and logistical support for the digitalisation of postgraduate education (Kremen *et al.*, 2022).

The analysis of the state of development of digital technologies and digitalisation of higher education institutions, the study of scientific literature and research on this issue allows us to draw the following conclusions.

Conclusions

Digital technologies and digitalisation of national education are crucial for ensuring its new quality, compliance with the requirements of today and achieving

high positions in the world educational ranking; there are significant shortcomings in the implementation of opportunities in view of modern digital technologies, a shortage of digital tools and electronic educational resources, and an insufficient level of digital competence of lecturers and students. The main challenges for higher education institutions in Ukraine include the digitalisation of internal processes, the development of digital marketing to enhance interactions among all stakeholders, such as teachers, students, administration, and applicants. Effective digitalisation of education is closely linked to the level of digital literacy and competence, as well as the ability of teachers and students to effectively use digital technologies. This constitutes one of the key tasks in the digital transformation of education.

Prospective directions for the development of digital technologies and digitalisation of higher education include: systematic scientific and methodological support for the digitalisation processes in education in Ukraine; equipping higher education institutions with computer tools and national electronic educational resources such as electronic textbooks, digital education platforms, learning management systems, mobile applications, interactive educational content with elements of virtual and augmented reality, 3D models, and simulations; focusing on the targeted development of digital competencies among key participants in the educational process, particularly teachers, researchers, and students; implementing certification to verify the informational and digital competencies of academic and teaching staff; encouraging educational entities to develop and effectively use digital resources, information systems, and technologies; and modernising the content and methodologies of teaching to reflect current digital educational trends.

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