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## Evaluation of quality and efficiency of information resources of educational libraries

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### ABSTRACT

The objective of the work was to analyze the quality of the information resources of educational libraries. Methods: A user survey of ten educational libraries was conducted to achieve this objective. Results: It was found that representatives of different target groups visit libraries for different purposes. Students and pupils use the library mainly to carry necessary textbooks and books, communicate, attend events. Academics, lecturers / professors, use it not only to obtain the book, but also to check references and read new publications in the library, use electronic resources, as well as to work on research. Sometimes pupils and students often need the help of library staff, indicating a lack of information literacy. Scholars, lecturers / teachers, are often able to fend for themselves. Electronic resources are the most effective, according to respondents, but visitors to educational libraries also continue to use traditional resources. Conclusions: Research shows that to increase the efficiency and quality of information resources of educational libraries, employees should focus their efforts on improving the information literacy of library users, as well as demonstrating the values of the library, inform about library services and maintain using information and communication technologies.

KEYWORDS: education; libraries; information; library user.

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## Evaluación de la calidad y eficiencia de los recursos de información de las bibliotecas educativas

### RESUMEN

El objetivo del trabajo fue analizar la calidad de los recursos de información de las bibliotecas educativas. Métodos: Se realizó una encuesta a usuarios de diez bibliotecas educativas para lograr este objetivo. Resultados: Se encontró que representantes de diferentes grupos objetivo visitan las bibliotecas con diferentes propósitos. Los estudiantes y los alumnos utilizan la biblioteca principalmente para llevar los libros de texto y los libros necesarios, comunicarse, asistir a eventos. Académicos, conferencistas / profesores, lo usan no solo para obtener el libro, sino también para revisar referencias y leer nuevas publicaciones en la biblioteca, usar recursos electrónicos, así como para trabajar en investigación. A veces, los alumnos y los estudiantes a menudo necesitan la ayuda del personal de la biblioteca, lo que indica una falta de alfabetización en información. Los eruditos, los conferencistas/ profesores, suelen ser capaces de arreglárselas por sí mismos. Según los encuestados, los recursos electrónicos son los más eficaces, pero los visitantes de las bibliotecas educativas también siguen utilizando los recursos tradicionales. Conclusiones: La investigación muestra que para aumentar la eficiencia y la calidad de los recursos de información de las bibliotecas educativas, los empleados deben centrar sus esfuerzos en mejorar la alfabetización informacional de los usuarios de la biblioteca, así como demostrar los valores de la biblioteca, informar sobre los servicios bibliotecarios y mantener utilizando tecnologías de la información y la comunicación.

**PALABRAS CLAVE:** bibliotecas educativas; recursos de información; eficiencia; usuario de la biblioteca.

### Introduction

Lifelong learning is one of the principles of sustainable development. This encourages an increase in demand for information resources and leads to an increase in their number exponentially. A precondition for effective orientation in the information field is users' information literacy.

Libraries are engaged in creation, organisation, storage, withdrawal of information resources, and also reference services. Ensuring sustainable development of document and information resources of libraries and creating a system of universal access to them is one of the priorities of qualitative changes in libraries to ensure sustainable development of the

country. Library staff can be equated with multidisciplinary scholars, because they are the first to get acquainted with new information resources, and effectiveness of information management and creating a quality information service depends on their orientation in modern science. An important task to improve the efficiency of educational libraries is not only to increase the information contained in their holding to meet the needs of users — scholars, lecturers/professors, teachers, students, pupils, but also to inform users about library resources, primary and secondary documents, providing access to library collections. Services provided by libraries include delivery of documents, photocopying, translation of documents, consultations, replenishment of databases, scientific reference resources and providing remote access to resources of other libraries, information centres and networks, etc.

The aim of this study was to assess the effectiveness and quality of information resources of educational libraries through surveying their users. Achieving this aim provided for the fulfilment of following objectives:

- 1) to develop a questionnaire to assess the effectiveness of information resources;
- 2) to conduct a survey of users of educational libraries.

### 1. Literature review

A number of studies deal with the complex problems associated with the transformation of library services and resources under the influence of the spread of electronic technologies. Researchers note that the tools for assessing the quality of library information services are gradually expanding, primarily due to the introduction of information technology into practice (Enakrire & Ocholla, 2017; Kaur, 2018). They affect the sources of information, library services, human resources involved in the library system, and the speed of meeting the users' information needs (Pareek & Gangrade, 2016). Information technologies also save time and human resources for library work: creating and maintaining catalogues, virtual help, electronic search, database creation, document delivery, etc. (Hussaini et al., 2017; Asemi et al., 2020; Yahaya, 2019). Besides, information technology provided the opportunity to remotely access the necessary information and the ability to communicate with libraries regardless of borders (Pareek & Gangrade, 2016; Omeluzor et al., 2017). Electronic information resources have appeared, and virtual reading has been

developing thanks to information technologies in general and electronic libraries in particular (Borisova et al., 2020). Electronic educational libraries are in demand among students, teachers, lecturers/professors, researchers (Anyim, 2018). At the same time, each user pursues his goal: preparation for classes, homework, writing a scientific paper, etc. (Sivakumaren, 2017). Although there are still problems with digitisation of information (Balutagi et al., 2018; Ukangwa et al., 2020), it is believed that electronic information resources have won over the printed ones (Das & Mahapatra, 2018).

Despite the fact that most information resources are electronic, there is still a problem of their preservation (viruses, natural disasters, etc.), which requires library staff to have appropriate qualifications, proper information, communication and technological support (Adetunla & Agbetuyi, 2018).

There is also a need for interlibrary exchange of information, as some libraries keep unique single copies of information sources, which should be available to anyone wishing to read them (Veeramallu et al., 2021).

Social networks make a significant contribution to the communication of libraries and their users. They provide for an effective exchange of information on library working hours, new arrivals to the library holding, ongoing events, etc. In turn, library page visits and user comments can provide feedback (Ahmed et al., 2020; Fasae, 2020).

In general, information resources include published and unpublished primary (created by the author) and secondary (the result of analytical and synthetic processing of one or more primary documents to adapt information to the consumer's information needs) documents on paper and electronic media (books, serial publications, dissertations etc.), factographic, full-text and bibliographic databases (DB). These are catalogues, card indexes, collections of databases, in particular on educational subjects. Textbooks, journals, monographs, newspapers, scientific and technical reports, encyclopaedias, manuscripts, patents, standards (Popoola, 2017; Ponomarenko, 2015), research data (Tenopir et al., 2017) are also considered information resources.

A number of studies have already been conducted to study the effectiveness and the quality of information resources of educational libraries. In particular, a survey was conducted (Veeramallu et al., 2021) to assess the effectiveness of information resources using the following data: web links, arrivals, availability of catalogues, library services, availability

of Internet access. Questionnaires and interviews surveyed user satisfaction with library services (Anyim, 2018; Tetteh & Nyantakyi-Baah, 2019). According to the users of educational libraries, the effectiveness and the quality of information resources include comprehensiveness, accessibility, prompt satisfaction of information needs, ease of use, availability of information in several formats and media (Pareek & Gangrade, 2016).

Surveys of educational library managers conducted in the United States, Canada, and 22 European countries showed that their staff can provide qualified informational advice on finding open-access scientific and educational resources (Cox et al., 2017). However, the issue of improving the methodology for assessing the effectiveness and the quality of information resources of educational libraries remains urgent.

It should be noted that the network of educational libraries of Ukraine is the largest and unites 18,066 libraries of the Ministry of Education and Science of Ukraine and the National Academy of Pedagogical Sciences of Ukraine, including about 15,000 libraries of secondary schools. The methodical centre is Sukhomlynskyi State Scientific and Pedagogical Library of Ukraine. The total library holding is 333.2 million documents. The total number of users is 7.7 million, the number of visits is almost 202 million, 49 million documents are lent out to users annually. Number of employees is more than 20 thousand people.

## 2. Materials and methods

The effectiveness and the quality of information resources of educational libraries was assessed as follows: 1) 10 libraries of Ukraine belonging to the network of educational libraries were selected for research; 2) a questionnaire was developed to assess the effectiveness and the quality of information resources of educational libraries; 3) a survey of library users was conducted; 4) the results of the survey were processed, the factors having the greatest impact on the effectiveness of information resources were determined, and the effectiveness of information resources available in the studied libraries were identified according to users.

The sample involved 10 libraries, in particular, Sukhomlynskyi State Scientific and Pedagogical Library of Ukraine, the Scientific Library of the University of Education Management, libraries of secondary educational institutions No. 132, 156, 277 of Kyiv, the Library of Cherkasy Regional Institute of Postgraduate Education of Teachers, the Library of Nizhyn Mykola Gogol State University, the Library of the State Educational Institution

“Bohuslav Centre for Vocational Education”, the Library of the State Vocational School “Koziatyn Interregional Higher Vocational School of Railway Transport”, the Library of Chernihiv Secondary School No. 35. The sample also involved 804 users of the above libraries, including 125 scholars, 133 lecturers/professors, 82 students, 144 teachers, 270 pupils and 50 parents.

For a more complete acquaintance with the information resources of educational libraries, we also used the data collected and published by specialists of Sukhomlynskyi State Scientific and Pedagogical Library of Ukraine (National Academy of Educational Sciences of Ukraine, 2019).

Quantitative methodology was used in the work. A questionnaire containing 30 questions, answers to which were "Yes" or "No", was developed to assess the effectiveness and the quality of information resources of educational libraries. This questionnaire can be used to determine the target group of respondents, the purpose of visiting the library, to assess whether users have achieved the goal and whether they sought help. The opinions of users of educational libraries studied in this paper on the effectiveness of library and information resources, in particular, electronic (electronic journals, electronic books, electronic catalogues) and traditional, were also collected through the survey.

Besides, a survey of parents of students of vocational educational and general secondary educational institutions was conducted, which allowed studying the opinion of parents about the effectiveness and the quality of information resources contained in the libraries of educational institutions where their children study.

Participation in the survey was voluntary and safe. Anonymity and confidentiality were observed.

Upon analysing the results of the survey, the conclusions were drawn about the information literacy of library users and the degree of effectiveness of information resources of educational libraries, as well as possible areas for improving the process of interaction between users and library staff, its material, technological and intellectual resources focused on meeting the information needs of users by providing access to information products and resources, including remotely, were outlined.

### 3. Results

According to the Law of Ukraine “On the National Informatisation Programme”, the information resource is “a set of documents in information systems (libraries, archives, data banks, etc.)” (Verchovna Rada of Ukraine, 2020). Information resources include scientific and technical literature, documentation, books, periodicals, patent documents, catalogues, design documents, reporting scientific and technical documentation, manuscripts, translations on paper or other media. These also include information systems, information technology, personnel who process information (Maslianko & Lissov, 2007). Different scholars defined the concept of effectiveness differently. In this paper we take the following definition: “Effectiveness is the ability to bring effect, the efficiency of the process, project, etc., which are defined as the ratio of effect, result to the costs that provided this result” (Yashchenko & Romaniuk, 2008, p. 238).

The quality of information resources will be understood a set of characteristics and properties that meet the information requirements and needs of users.

The library users survey was conducted in order to assess the effectiveness and the quality of information resources of Ukrainian educational libraries (see Table 1).

Table 1. Library resources

Library	Sukhomlynskyi State Scientific and Pedagogical Library of Ukraine	Library of Cherkasy Regional Institute of Postgraduate Education of Teachers	Scientific Library of the University of Education Management	Library of Nizhyn Mykola Gogol State University
Holding (approx.)	578,939,000	41,894	106,352	976,448
Holding use (approx.)	210,174	31,162	117,153	103,009
Users, according to the Unified User Register	5,110	2,031	5,113	2,946
Number of visits, including virtual	149,098 (144,109)	28,753 (20,301)	18,003 (5,527)	136,716 (34,591)
Own databases	2	---	---	44,038
Entries in the electronic catalogue	443,481	18,536	---	278,677
Internet representation	Web-portal	Section at the portal	Web-page	Web-site
Availability of the electronic catalogue at the website	Yes	----	---	Yes
Availability of the electronic library at the website	Yes	----	---	Yes

As Table 1 shows, all reviewed libraries have a large holding, they are represented on the Internet or have a separate web-site or a page on the web-site of the institution to which they are subordinated. All of them are in demand among visitors, which depends on the library holding and the availability of an electronic catalogue, electronic library and their own databases, they can meet the information needs of their users. A total of 804 users of the above libraries were surveyed. Table 2 shows the distribution of respondents by libraries and target groups.

Table 2. Sample description

	Target groups	Scholars	Lecturers/ professors	Students	Teachers	Pupils	Parents	Total
Libraries	Sukhomlynskyi State Scientific and Pedagogical Library of Ukraine	21	46	17	23	0	0	107
	Library of Cherkasy Regional Institute of Postgraduate Education of Teachers	14	28	0	65	0	0	107
	Scientific Library of the University of Education Management	67	12	0	0	0	0	79
	Library of NizhynMykola Gogol State University	17	31	65	18	0	0	131
	Library of the State Educational Institution “Bohuslav Centre for Vocational Education”	3	8	0	0	39	10	60
	Library of the State Vocational School “Koziatyn Interregional Higher Vocational School of Railway Transport”	3	8	0	0	40	8	59
	Library of Kyiv Secondary School No. 132	0	0	0	10	50	8	68
	Library of Kyiv Secondary School No. 156	0	0	0	10	50	8	68
	Library of Kyiv Secondary School No. 277	0	0	0	9	50	8	67
	Library of Chernihiv Secondary School No. 35	0	0	0	9	41	8	58
	Total	125	133	82	144	270	50	804

The purpose for which the users visit educational libraries was determined through a survey. The results are presented in Table 3.

Table 3. The purpose of visiting the library and assessment of its achievement

Target groups		Scholars	Lecturers /professor	Students	Teachers	Pupils	
Purpose of visiting the library	Take the book	Yes	66	101	67	140	270
		No	59	32	15	4	0
	Read reference literature	Yes	91	37	8	113	16
		No	34	96	74	31	254
	Prepare for class	Yes	0	54	74	77	29
		No	125	79	8	67	241
	Prepare for the report	Yes	17	8	19	64	85
		No	108	125	63	80	185
	Use e-resources	Yes	106	81	75	78	0
		No	19	52	7	66	270
	Review printed publications	Yes	68	45	11	47	0
		No	57	88	71	97	270
	Use online tools	Yes	16	42	76	34	0
		No	109	91	6	110	270
	Read the news of periodicals	Yes	103	67	2	67	0
		No	22	66	80	77	270
	Read new arrivals	Yes	36	38	1	53	0
		No	89	87	81	91	270
Assessment of achievement of the	The purpose was achieved	Yes	122	129	61	140	167
		No	3	4	21	4	103
	Too much time is spent on achieving the purpose	Yes	9	26	33	27	43
		No	116	107	49	117	227
	They orientated themselves in the information resources of the library	Yes	111	112	13	113	32
		No	14	21	69	31	238
	They had to ask colleagues for help	Yes	2	5	24	5	0
		No	123	128	58	139	270
	They had to seek help from librarians	Yes	7	16	38	18	238
		No	118	117	44	126	32
	There is too much information received	Yes	75	38	29	23	12
		No	50	95	53	121	258
	Enough skills to use information resources	Yes	119	126	22	101	35
		No	6	7	60	43	235

As Table 3 shows, different target groups of respondents pursue different purposes when visiting the educational library. For example, both scholars, lecturers/professors, teachers and students, pupils come for books. All but pupils also use e-resources available in the library. Scholars, pupils, are the most interested in reference books, the least — teachers

and students. Students and teachers most often prepare for classes in educational libraries. Scholars, lecturers/professors and teachers are most interested in news from periodicals. The study showed that scholars, lecturers/professors are better oriented in the information space as a field in which they are experts and related fields of science, and are more independent in finding the necessary information, work with different sources of information, most of all respondents use abstract journals and other information publications.

Teachers, students and pupils prefer to receive particular information, necessary facts and data that can be conveniently obtained from an employee of the educational library.

Scholars, lecturers/professors and teachers are able to achieve the goal of visiting the library. Students and pupils are less familiar with the tools needed for this. All of them do not spend much time to meet their information needs. Students often seek help from groupmates as well as librarians when problems arise. In most cases, pupils seek help from a library employee. Students and pupils still need to learn how to use library resources to get the information they need. This indicates a different degree of information literacy of the representatives of different target groups.

A separate survey was conducted among 50 parents of pupils of vocational schools and secondary schools, which showed that 87% of parents believe that the information resources available in the libraries of educational institutions where their children study are sufficient to prepare for classes. There were 13% of parents who consider the supply of information resources of libraries to be insufficient for their children's education and they are forced to buy books or search for the necessary information on the Internet.

The survey also found out the opinion of users of educational libraries regarding the effectiveness and the quality of information resources available to them. Its results are presented in Table 4.

The assessment was conducted on a 6-point scale, where 0 — there is no such resource in the library, 1 — very inefficient, 2 — inefficient, 3 — not efficient enough, 4 — efficient, 5 — highly efficient. The confidence interval was 0.95,  $p \leq 0.05$ . The survey results once again confirmed that currently not all libraries have the necessary resources to effectively meet the information needs of users, or their condition is unsatisfactory. For example, not all educational libraries have electronic libraries and electronic catalogues, in particular school libraries and vocational school libraries. This was confirmed by more than 50% of surveyed

users of educational libraries. The same number of respondents did not find electronic search in libraries, perhaps that is why many users consider the traditional search in catalogues is still considered effective. Many libraries are not represented on the Internet, which also negatively affects the information support of users.

As for the traditional ways to meet the information needs of users of educational libraries, they are popular and considered effective.

Table 4. Opinion of users about the effectiveness of library and information resources

Score	0	1	2	3	4	5
Scientific periodicals online	54 %	0.1 %	0.3 %	12 %	19.1 %	24.5 %
E-books	54 %	0.5 %	1.2 %	23.1 %	14.2 %	7 %
Electronic catalogues	51 %	0.2 %	0.3 %	21.8 %	14.7 %	12 %
Electronic search	51 %	1 %	1.7 %	18.5 %	17.1 %	10.7 %
Monographs	48.3 %	0.8 %	2.5 %	10.3 %	26.7 %	11.4 %
Author's abstracts of dissertations	61 %	2.1 %	3.4 %	8.9 %	19.3 %	5.3 %
Collections of scientific works	39 %	1.7 %	2.9 %	12.5 %	26.3 %	17.6 %
Patents / standards	27 %	0.4 %	1.1 %	37.6 %	26 %	7.9 %
Proceedings of conferences / seminars	32 %	1 %	1.5 %	53.2 %	10.3 %	2 %
Circulation	25 %	1 %	1.5 %	28.3 %	31 %	13.2 %
Booking of materials	7 %	2 %	2 %	46.7 %	31.5 %	10.8 %
Email	27 %	0.5 %	1.1 %	48 %	17.6 %	5.8 %
Newsletter of new arrivals	2 %	3 %	5 %	68 %	20 %	2 %
Library card catalogue	3 %	0.5 %	12.1 %	20.6 %	47.3 %	16.5 %
Thematic card indexes	34 %	0.8 %	7.4 %	13 %	26 %	9.8 %
Systemic card index of articles	38.1 %	0.4	5.3	9.6 %	31.9 %	14.7 %
Interlibrary loan	60 %	0.3 %	0.7 %	7 %	21	11 %
Bibliographic manuals	50 %	0.1 %	0.8 %	23 %	15.1 %	11 %
Recommended editions	50 %	0.3 %	1.0 %	29 %	13.1 %	6.9 %
Abstract resources	50 %	0.7 %	0.9 %	18 %	17 %	23.4 %
Information and analytical resources	50 %	0.1 %	0.3 %	15 %	29 %	5.6 %
Databases of scientific information	50 %	0.2 %	0.8 %	8 %	26 %	15 %
Printed media	0 %	3 %	18 %	57.3 %	16.7 %	5 %

#### 4. Discussion

The growing demand for quality socially significant information and the expansion of consumer opportunities in the prompt receipt of information from the holdings of the modern library is an urgent challenge today. There are corresponding changes in the development of library resources under the influence of electronic technologies. Along with the traditional resources of libraries on paper (books, newspapers, magazines, etc.), electronic information resources (electronic catalogues, electronic full-text documents, analytical information, etc.) increase their capacity. Therefore, there is a need to orient in the information field of librarians themselves and meet the information needs of users. In order to reduce the time spent on finding the necessary sources of information, scientific and analytical processing and dissemination of information in the field of education is carried out through the preparation, creation and dissemination of analytical materials.

The information needs of library users are regularly studied in order to optimise their work. For this purpose, modern means of communication are introduced, electronic databases are created and regularly filled in (Seletskiy, 2018). Today, librarians' professional role has expanded from simply providing navigation in the information space of users to a mediator between the available information and the creation of new one (Abolikhina et al., 2018). Employees of educational libraries, in particular, Sukhomlynskyi State Scientific and Pedagogical Library of Ukraine, who process and structure significant amounts of primary information on education, pedagogy and psychology, create analytical thematic, bibliographic and abstract reviews (Zozulia, 2015), monitor information resources (Matviichuk, 2020).

In order to increase the efficiency of information resources, it is important to study the experience of other countries. Foreign libraries mainly have electronic resources and electronic libraries available from mobile technologies. At the same time, they provide web-sites with relevant, meaningful content, easy navigation, links to Internet resources for professional communication, etc. (Mishchanin, 2018). It is also possible to increase the efficiency of information resources by the following measures: creation of navigation tools on all library and information resources and network services on the web-sites of educational libraries, expansion of information resources, for example, presentations, videos of lectures,

seminars, etc.; creation of online platforms for professional communication on the basis of libraries.

However, a number of states have problems with providing libraries with the necessary resources. For example, a survey of 175 users of educational libraries (Corpuz, 2020) shows that library services are useful and important. However, the provision of libraries is average. The reasons are the lack of new revenues, as well as proper technical support.

As this study showed, the fund of libraries included in the sample is replenished every year.

There is also a difference between the services provided by libraries and the services expected by their users (Khan & Ameen, 2020).

The availability of high-quality electronic catalogues in libraries, which make the search for the necessary information fast and convenient, also helps to increase the efficiency of information resources (Okoye, 2019).

As this study showed, only every second library has an electronic catalog. However, 14.7% of surveyed library users consider it an effective resource, and 12% - highly effective.

Besides, to improve the efficiency of information resources, work has recently been done to create a single information space, which provides for the unification, mutual use of information resources of collections, libraries and other information and cultural institutions with further integration into the European and world information space (Kovalenko & Zorina, 2017).

Information literacy is one of the criteria for the effective use of information resources. Information literacy is a set of abilities that allow a person to determine what information is needed, find, assess and use it. The work of librarians should be aimed at teaching users to use the information contained in libraries (Kanyengo & Kamau, 2020; Wang, 2019). Studies (Kannan, 2020; Kanyengo & Kamau, 2020) showed that the following obstacles may arise on the way to obtaining information: time constraints due to user-inconvenient library work schedule, insufficient number of library staff, lack of sufficient jobs for users and relevant modern equipment, insufficient qualification of library staff, lack of cooperation of libraries with other departments of the structure, lack of Internet access, etc.

The survey (Lewis & Mallaiah, 2014; Veeramallu et al., 2021) found that most pupils and students need the help of library staff in finding the necessary information resources, as well as special information literacy training that will help use libraries more effectively.

According to this study, only 28% of surveyed library users can cope with finding the necessary library resources on their own. The remaining 72% need the help of library staff. Under such conditions, librarians act as providers of information. They promote their resources through blog web-sites, teach users to work with electronic libraries, repositories. This requires employees of educational libraries to be competent to provide quality information services, to understand information resources themselves, to assess them.

In this paper, only 10 libraries limited themselves to assessing the effectiveness of the quality of information resources, and did not cover all categories included in the network of educational libraries.

In future research, it is important to include periodic evaluation of the effectiveness of the quality of information resources in order to study the information needs of users, improve the services of educational libraries and create appropriate conditions for them to obtain the necessary information. It is important to recurrently evaluate the effectiveness and quality of information resources in order to study the information needs of users, improve the services of educational libraries and create appropriate conditions for them to obtain the necessary information.

## Conclusion

The issue of rapid orientation in the information space is urgent in the era of rapid growth in the information volumes. Libraries, in particular educational ones, facilitate this task. However, the necessary conditions for their effective use are the information literacy of users and high-quality information resources in libraries. The effectiveness and the quality of information resources were assessed through a survey in this work. The results of the survey showed that users of educational libraries consider highly effective such information resources that do not require much time to obtain, including electronic, although respondents assess printed information resources as effective. The availability of electronic catalogues, electronic search and well-established communication between the libraries of the network, in particular, the availability of interlibrary loan, as well as abstract and

information-analytical resources play an important role in meeting the information needs of users of educational libraries.

The results of this study can be useful to specialists in the field of information activities of educational libraries, as well as librarians and bibliographers who study information resources, in particular, to assess their effectiveness and quality.

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