DOI: https://doi.org/10.46925//rdluz.41.09

The Impact of Digitization of Libraries on the Educational Process in the Context of Distance Learning

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ABSTRACT

The aim of this work is to determine the effectiveness of the impact of digitization of libraries on the educational process in the context of distance learning. The aim was achieved through the use of the Likert scale, the coefficients of the sample value, effectiveness, and correlation. In most cases, students visit websites and blogs of the library to find materials for writing research papers (0.92), which contributes to the deepening of knowledge. A total of 81% of students were found to have a positive attitude towards using the benefits of digitization of educational libraries to support learning. During training, students obtained a high level of knowledge for understanding theoretical material (0.29) and writing research papers (0.28). The prospects of the study are related to the comparison of the effectiveness of the distance and traditional learning with the involvement of the possibilities of the digitization process of educational libraries.

KEYWORDS: Digital libraries, information sources, digital literacy, learning processes, online information systems, educational environment.

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Recibido: 16/03/2023 Aceptado: 10/05/2023

DOI: https://doi.org/10.46925//rdluz.41.09

El impacto de la digitalización de las bibliotecas en el proceso educativo desde el contexto de la educación a distancia

RESUMEN

El objetivo de este trabajo es determinar la efectividad del impacto de la digitalización de las bibliotecas en el proceso educativo en el contexto de la educación a distancia. El objetivo se logró mediante el uso de la escala de Likert, los coeficientes del valor de la muestra, la efectividad y la correlación. En la mayoría de los casos, los estudiantes visitan los sitios web y blogs de la biblioteca para encontrar materiales para la redacción de trabajos de investigación (0,92), lo que contribuye a la profundización del conocimiento. Se encontró que un total del 81% de los estudiantes tenían una actitud positiva hacia el uso de los beneficios de la digitalización de las bibliotecas educativas para apoyar el aprendizaje. Durante la formación, los estudiantes obtuvieron un alto nivel de conocimientos para la comprensión de material teórico (0,29) y redacción de trabajos de investigación (0,28). Las perspectivas del estudio están relacionadas con la comparación de la efectividad del aprendizaje a distancia y tradicional con la participación de las posibilidades del proceso de digitalización de las bibliotecas educativas.

PALABRAS CLAVE: Biblioteca digital, fuente de información, iniciación a la informática, proceso de aprendizaje, sistema de información en línea, entorno educacional.

Introduction

The introduction of digital technologies in libraries helps to expand the possibilities of the educational process, which is manifested in the creation of new services, improving the quality of service (Attar, 2022). Digitization of educational libraries also facilitates distance learning enabling access to a variety of information. The established data confirm the relevance of this research.

The process of digitalization of educational libraries facilitates the processing, transfer, synchronization, and visualization of information, thereby promoting the perception of the necessary materials. Digitization contributes to the expansion of literacy and educational culture as a result of the automation of library processes.

The network of educational libraries of the Ministry of Education and Science of Ukraine and the National Academy of Pedagogical Sciences of Ukraine unites more than 15,000 libraries that have a common goal and objectives, being an integrated structured macrosystem. The development of information technologies and changes in the priorities of users' information needs encourage educational libraries to generate their own branch

DOI: https://doi.org/10.46925//rdluz.41.09

resources, to modernize the forms of research and informational activity. Their sites provide remote users with free access to electronic catalogues, electronic libraries and depositories, bibliographic and factual databases, virtual book exhibitions, full-text documents, seminar materials, contests, photo and video materials, etc. At the same time, domestic libraries lag behind foreign ones in terms of computerization and internetization of information activities and librarianship (Kremen et al., 2021). Ensuring interactivity of libraries will reduce the digital gap, create special digital hubs, and expand the level of digital competence. The digitization process is more widespread in educational libraries of the United States. For example, the James B. Hunt Jr. Library of the University of North Carolina has an electronic storage of up to 2-3 million books. Besides, the library provides automatic book delivery using the BookBot system (Palumbo, 2022). Digitization of the library is provided with the help of an original bar code, which facilitates virtual searching. In Kitchener Public Library in Canada, the librARi application has been developed to digitize access to materials for book searching (Adeleke, 2019). The spread of the digitization process of libraries was launched in Japan in 2003 through the creation of the electronic librarian (Kempf, 2022).

Digitization of libraries contributes to the improvement of the quality of new services, expands the possibilities of distance learning. Digitization of educational libraries contributes to the implementation of the new library model, the creation of a fund of information resources, the development of digital services, and the training of specialists with a high level of competence (Jiang et al., 2022). The digitization process in educational libraries helps to meet the users' needs, which facilitates computerized access to materials from different countries. This helps to use libraries for various functions, such as conducting classes, preparing for classes or creating research papers. The functions of educational libraries can consist not only of cognitive, but also cultural and educational, informational, and communicative activity (Zhao, 2021). Educational libraries contribute to the creation of various digital resources to support distance learning. They also contribute to the provision of services that may be related to electronic catalogues, electronic ordering of documents from the library. They can also provide access to electronic archives, journals, educational platforms, databases of primary research results. The process of digitization of libraries also facilitates online consultations of librarians, which helps to find the necessary information. Educational libraries are divided into three types. The first is related to use by

students and teachers (school libraries); the second — by students and teachers (libraries of higher educational institutions). The third type is related to the use of academic pedagogical libraries by academic teachers of the National Academy of Pedagogical Sciences. Digital resources can be created by the teachers and libraries. It is also possible to access digital resources via the Internet using the link provided by the library. Examples of digital library resources can be E-bookua, Knigogo, Gallica, British Library, Trusted Digital Repository, etc. As a result of digitalization, integrated resources (archives) and services (offline visits, interaction with visitors) can be formed to expand the capabilities of libraries. The advantages of the digitization process of libraries also include the possibility of providing uninterrupted access, which contributes to the possibility of active work with materials. The use of library chats and blogs facilitates the formation of feedback to obtain the necessary information (Sharif et al., 2021). The transition of educational libraries to digitalization is connected with the needs of society, as well as the expansion of educational opportunities (Dzandza, 2020). Digitization of libraries contributes to the solution of information problems in the period of transformation and the possibility of transition to distance learning.

The study of the theoretical material made it possible to determine that most of the materials are aimed at studying the advantages of digitalization, excluding ways of its development in the librarianship. The aim of the work is to determine the effectiveness of the digitalization of educational libraries on the educational process in the context of distance learning.

The aim involved the fulfilment of the following research objectives:

- determining the purpose of using educational libraries by students by calculating the coefficient of the sample value;

- development of recommendations for students regarding the possibility of using digital resources of educational libraries for distance learning;

- determining the effectiveness of distance learning of students using digital resources (collections) of educational libraries.

1. Literature review

Educational libraries can contribute to the organization of the educational process with the help of modern technologies, which, with the help of the digitalization process, contributes to the expansion of modern services. New processes in distance learning may consist of the use of the PDC Place Nordic application, which facilitates the automation of information search (De Götzen et al., 2022). Educational libraries can facilitate the learning process as a result of the use of digital innovations, providing a change in educational approaches. For example, Business Model Canvas promotes the digitization process of educational libraries, thereby contributing to the development of new strategic processes of higher education. With the help of the Business Model Canvas, it is possible to develop specialized lessons that help to deepen research knowledge (Teffo et al., 2022). The COVID-19 pandemic has accelerated the digitization process of educational libraries, which also affected the transformation of the learning process. In particular, 34 new projects for the improvement of educational libraries were united with the help of the Digitalisation Project. The Digitalisation Project aims at a network approach to ensure a combination of centralized and decentralized services. The survey of respondents revealed that information is easier to perceive in electronic format, as it facilitates detailed theoretical substantiation. The process also affects the creation of digital content that combines different fields of knowledge (Maier & von der Linden, 2021).

Educational libraries ensure communication in the educational process through the use of digital platforms. Digital libraries in Sweden are aimed at expanding theoretical knowledge, which is reflected in the transformation of the educational processes. The learning process is based on a hierarchical and instrumental approach created as a result of orientation towards the development of cognitive and intellectual abilities. The psychological component of students is also taken into account during training (Lund & Nybacka, 2021). Digitization of university libraries also contributes to changing the learning process as a result of orientation towards new knowledge. Digital educational libraries facilitate access to various sources that promote the exchange of scientific data and improve the level of information literacy. Digital libraries facilitate the search for valuable scientific information, which is distributed in various fields. Improving the librarianship affects the automation of the educational process and promotes the educational progress (Pavlovic, 2021; Ishchenko et al., 2022). Digitization of research using the capabilities of educational libraries contributes to the development of the potential of humanities and

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technical sciences as a result of their interaction. Digitization can manifest itself in research projects as a result of combining different sciences. It was established that the digital humanitarian project is a component of the innovation of science as a result of the variations in academic publications. This is explained by the provision of intellectual and innovative interaction as a result of the focus on an interdisciplinary approach. Digital technologies facilitate processing, management of scientific data, and their publication (Dubrovina et al., 2021).

Digitization of educational libraries is a method of virtual consolidation that promotes the joint use of scientific materials. A digital approach to library development promotes the combination of materials that are relevant to the research of an individual country. Innovative technologies make it possible to increase the efficiency of working with various materials as a result of ensuring uninterrupted access to them (Nowakowski, 2022; Humenchuk et al., 2020). Educational libraries use various technological tools that contribute to the expansion of information services in different countries. Library resources can be digitized by leveraging the expertise of the Oyo State Academic Libraries (OYSALs), which create a network of global libraries. It is established that the electronic application Library Plus provides access to electronic books, magazines that can be accessed using the Internet (Bello & Ezeri, 2020; Matviychuk, 2023). Digitization of information resources affects the formation of new steps in the educational process. However, a high-quality educational process can be ensured as a result of joint activities and communication between students and teachers. The creation of appropriate tools within the framework of the digitalization of educational libraries helps to find the necessary resources for preparing for seminars and educational reports. Additional tools are used to search for new information, which is reflected in its analytical processing (Skulan, 2018).

The analysis of studies gave grounds to state that the directions of research are mostly aimed at identifying the advantages of the process of digitalization of educational libraries. The advantages of information technologies used in the distance learning and related to the process of digitalization of educational libraries are also established.

2. Methods

2.1. Research design

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The first stage of the research involved determining the purpose of using educational libraries by students. The obtained data are necessary to determine the level of students' understanding of the need for library resources and the possibility of their use during distance learning. Data were obtained directly from students using a Likert scale. The second stage of the study included the development of recommendations for students and teachers who can use the capabilities of digital educational libraries to provide distance learning. The process of developing the recommendations involved using one's own experience, as well as studying the possibilities of the digitization of libraries. The development of the guidelines also provided for the involvement of digital technologies.

The third stage of the research provided for determining the students' attitude to using the possibilities of the digitalization of educational libraries for distance learning. Data were collected from students using a Likert scale, which enabled presentation of the results as a percentage. The third stage of the research also involved developing recommendations for improving the process of digitalization of educational libraries, which helps to attract more students. The development of recommendations consisted in increasing the value of library publications and ensuring their digitization.

The fourth stage of the study provided for determining the effectiveness of students' knowledge acquired during distance learning (the studies covered the period from September 2022 to November 2022) using digitalization of educational libraries. The results were obtained by receiving answers to random questions in order to determine theoretical knowledge and grades for writing research papers. The teachers confirmed the level of students' acquired theoretical knowledge by using digital resources during practical and laboratory work. The obtained results were divided into high, medium, and low levels.

2.2. Sampling

The aim was achieved by involving 121 students of the 3rd-4th years of study of pedagogical majors. Students who are users of the Sukhomlynskyi State Scientific and Pedagogical Library of Ukraine were involved in the research. The students majoring in Information, Library and Archival Studies in the separate structural unit Nadvirna College of the National Transport University were also involved. The selection of respondents was not tied to individual educational institutions or libraries, they were chosen randomly. The

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respondents were involved in the study as a result of submitted applications. The limitation of respondents was related to the major and year of study to ensure equal conditions between all research participants. Library users who did not meet the said requirements were not included in the study.

2.3. Methods

The indicators that are most important for students when using digital resources of educational libraries were determined by using a Likert scale. The data collected from students contributed to the calculation of the coefficient of sampling value, which was aimed at determining the benefits of individual services of educational libraries for each student (Sussmeier & Perez, 2021).

$$k_{sam} = \frac{j^2}{j(m-1)}. \quad (1)$$

j – the value received from students according to the selected value using a Likert scale;

m – the number of the indicators before the study.

The development of recommendations for students provided for the use of general scientific methods of observation and analysis. The authors studied the possibilities of the process of digitalization of libraries and the features of the distance learning process in order to provide the necessary recommendations. The recommendations were aimed at expanding approaches to distance learning as a result of digitalization of educational libraries. Similar general scientific methods were used to develop recommendations for making the digitization process of educational libraries more effective.

The students' performance indicators in the process of distance learning, were divided into three categories. Categories of knowledge included understanding theoretical material, the possibility of using knowledge in practice, writing research papers. The level of acquired knowledge in accordance with the presented categories was determined by calculating the coefficient of effectiveness:

$$k_{eff} = \frac{y_{sep.el,}}{b_{pos}} \times d, \quad (2)$$

$y_{sep.el.}$ – students' points scored for separate educational elements;

b_{pos} – the number of possible admissible points (in this case equal to 100);

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d – coefficient for diligence in completing assignments (the maximum value is 0.3).

A high level of knowledge is obtained if the calculation is within 0.27 - 0.3; medium — 0.22 - 0.26; low — less than 0.21.

2.4. Data analysis

Statistical calculations were used to compare the obtained data, which are aimed at determining the need for students to use the educational library. Statistical calculations were also carried out to compare the effectiveness of the students' knowledge. The correlation coefficient was used for statistical calculations (Babalola et al., 2023). It should be taken into account that the indicators have a high interrelationship if the calculated data are in the range of 0.9 - 1.

$$k_s = \frac{\sum_{i=1}^{n}(p_i - p_{\text{cep}})^{1/2}}{m-1}, \quad (3)$$

m – the number of parameters for the research;

p_i – the relative value of the studied indicator;

p_{cep} – the arithmetic mean.

2.5. Data collection

The data were obtained from students using a Likert scale, which provided for assigning points from 0 to 1. Intermediate points were not assigned, as the work provided for setting the results to the answers of an individual student. A Likert scale reflects students' agreement or disagreement with certain criteria. The advantage of the selected scale is in determining the polar features of the parameters by different respondents. The advantage of the scale is the possibility of displaying different answer options that are characterized by advantages for individual students or do not meet the criteria of students. The results were obtained from students via the Telegram messenger, which enables conducting surveys among respondents. The results of the answers had to be presented within 3 hours.

2.6. Ethical criteria

Ethical compliance was ensured by using the Guidelines for Research Ethics in Science and Technology (The Norwegian National Committee for Research Ethics in Science and Technology, 2016). Ethical issues in the research paper were aimed at ensuring

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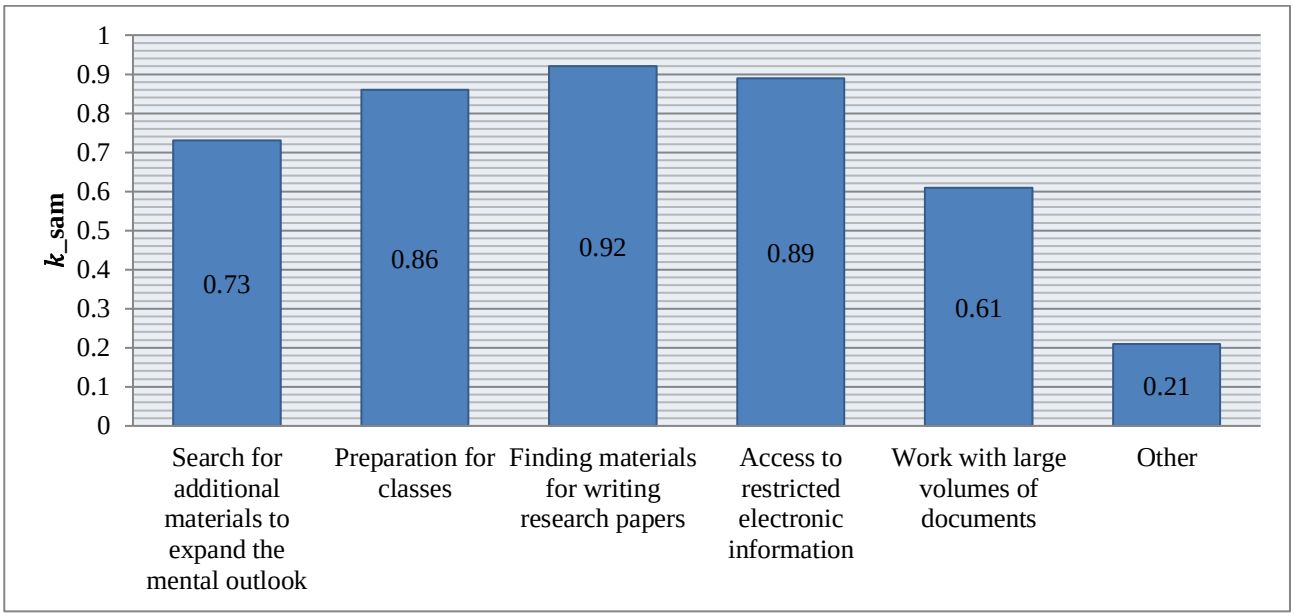
the novelty of the conducted research, which involved a description of the obtained results. The results were supported by appropriate methodology, which excluded the use of previously published data. Ethical norms reflect the relevance of the presented results.

3. Results

Digitization of educational libraries contributes to providing access to the information, which is associated with the expansion of evaluative, indicative, and analytical capabilities. The primary task of the research was to determine the reason why students use digital resources of educational libraries. The results were obtained using a Likert scale and the calculation of the coefficient of the sample value (Figure 1).

Figure 1. Use of educational libraries according to students' answers, k_s=0.371



The results of students' answers showed that searching for materials for writing research papers is the most common approach to visiting educational libraries. This is explained by the fact that writing theses (diploma projects, essays) requires access to new information that differs from guidance materials. This helps to write unique works, as well as identify gaps that can help to establish the novelty of the research paper. Access to restricted electronic information is also important because it allows information to be viewed digitally. This information may not be available in printed books. It can be materials related to the conduct of relevant experiments or training programmes on the subjects for students in other countries. Preparation for classes is the next purpose of visiting

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educational libraries, which can be aimed at expanding knowledge on the topic. The results of digitalization of educational libraries enable studying the issues in detail, preparing for distance learning, etc. Finding additional materials to expand the mental outlook is a less common element of visiting educational libraries. But it facilitates access to interesting scientific materials, research that contributes to deeper knowledge of the issue. Working with large volumes of documents facilitates access to different dissertations, conference materials. The process contributes to a detailed study of only the necessary elements that can be found by searching electronically. A small number of students use educational libraries for another purpose — distance learning, familiarization with new arrivals.

The established indicators gave grounds to conclude that the use of libraries for distance learning is quite limited. In view of the data, recommendations were developed in this work to ensure the distance learning in the course of digitalization of educational libraries:

1. It is important to use electronic technologies of educational libraries, which can be directed to the transfer of theoretical information to ensure distance learning. This can help to create presentations, graphs, charts to make the perception of theoretical material easier. For example, using the free application Library for All will help continue studies regardless of the location. The use of the Udemy digital platform enables developing a training programme for studying theoretical information for its easier perception and exchange of opinions. Udemy also promotes the use of existing lessons to organize the learning process. Using the platform will also enable expanding existing knowledge as a result of more detailed study. The benefits of using an online learning platform are the provision of feedback, which can be implemented through the Q&A feature.

2. The digitalization of educational libraries also ensures the systematization of educational materials that can be found electronically. The teacher's preparation for classes in this way will help to expand specialized knowledge of students, as it will provide access to various materials globally. Digitization of educational libraries makes it possible to deepen knowledge and facilitate the process of searching for information as a result of the use of digital resources. The automation process will help to select the most necessary materials. The capabilities of E-bookua, JavaLibre can be used during distance learning for this purpose.

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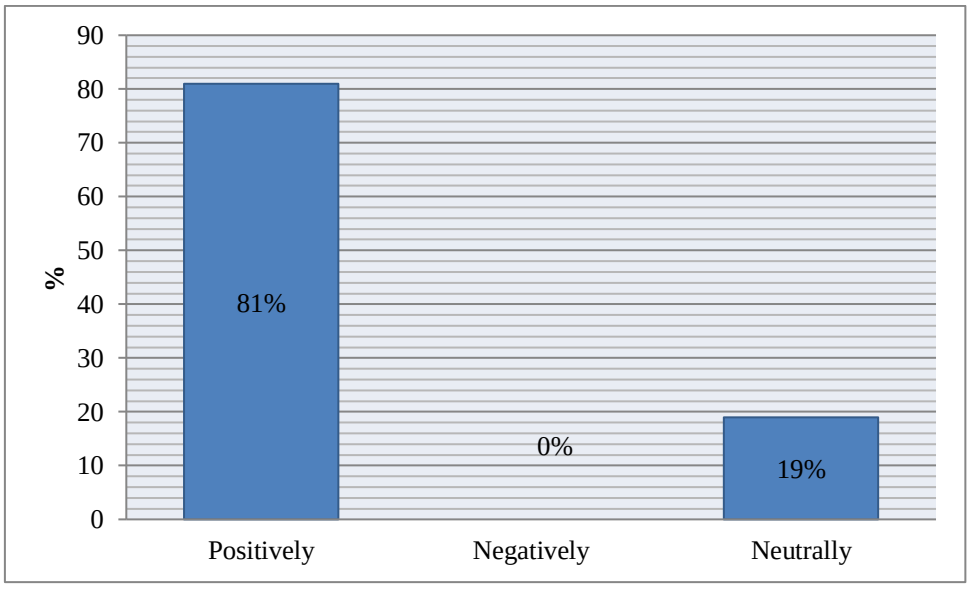
3. Using the space of educational libraries for conducting classes will ensure uninterrupted access to online classes. This is explained by high-quality access to the Internet, the availability of an organized space, and creation of a learning atmosphere. The level of digital competence can be improved as a result of reliance on studies, information materials that can be found in the librarian space. The search for information can also be immediately checked for its relevance to the topic of classes and the need for expanding professional competences.

4. Holding discussion of the material with other students can contribute to the expansion of knowledge, exchange of opinions during preparation for classes, writing research papers. The process can be supported with the help of a blog (for example, using the Udemy platform) or the use of library forums. This approach contributes to the digitization of education as a result of the use of digital network approaches, which facilitates the easier perception of information.

The use of opportunities for distance learning provided by the digitalization of educational libraries revealed the students' attitude to this approach. The results were obtained after three months of training, which was reflected in the presented answers — positively, negatively, neutrally (Figure 2).

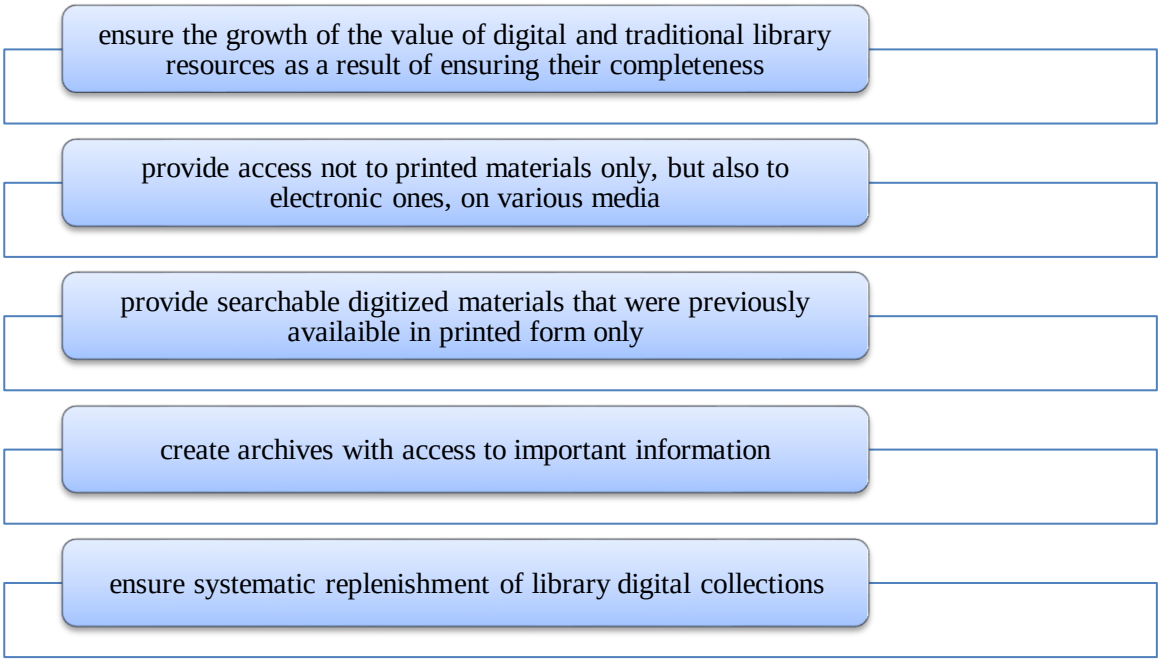
Figure 2. Attitudes of students to the provision of distance learning through digitalization of educational libraries



It was established that the vast majority of students believe that digitalization of educational libraries positively contributes to distance learning. This is explained by the possibility of providing uninterrupted access to classes and various information. The positive value is also associated with the principles of promptness, no fee, and general availability. Digitization also contributes to the expansion of access to printed and digital editions, unique educational materials. A fifth of students showed a neutral attitude, as they believe that it is possible to use access to Internet resources for the needs of distance learning. Students believe that the use of digital resources of libraries contributes to a more in-depth study of information, which is necessary to ensure learning.

In order to enhance students' interest in the learning process, the authors also developed recommendations for improving digitalization of educational libraries (Figure 3).

Figure 3. The authors' recommendations are aimed at improving the digitization process of educational libraries



The students' performance achieved after using the capabilities of digitization of libraries for distance learning was studied. The study established how interactive experience affects the development of professional knowledge as a result of providing virtual interaction (Table 1).

It was established that ensuring the process of digitalization of educational libraries had a positive effect on the acquisition of a high level of knowledge among the majority of

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students in the course of distance learning. This was reflected in the understanding of the theoretical material, as well as in the process of writing research papers. The assimilation of theoretical material became possible as a result of providing access to different materials of varying complexity and completeness. The visualization of materials contributed to the assimilation of the necessary information. The high level of knowledge obtained as a result of writing research papers was reflected in the novelty of the information. It also contributed to the presentation of materials that are not widely available, but reveal the students' competence. The novelty of the prepared research papers consisted in the combination of available materials with those that are not widely distributed. The high level of research papers was associated with the provision of detailed information search, which became possible through digitalization of educational libraries. The medium level of knowledge was obtained as a result of using theoretical material in practice. This is explained by the large amount of work to be done. However, the use of the library forum facilitated communication between students, which resulted in obtaining the necessary answers when completing practical assignments. A comparison of the students' results revealed the absence of correlations between the parameters. The difference in parameters is related to the different number of students who acquired a high or medium level of knowledge.

Table 1. Students' performance during distance learning as a result of using the capabilities of digitization of educational libraries

Indicator of the educational process	**Level of acquired knowledge**		
	High	**Medium**	**Low**
Understanding of theoretical material	0.29 (83%)	0.24 (17%)	-
Ability to use knowledge in practice	0.27 (27%)	0.25 (71%)	0.19 (2%)
Writing research papers	0.28 (69%)	0.22 (31%)	-
Comparison of acquired knowledge using the correlation coefficient	0.514	0.852	-

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4. Discussion

The development of the digital educational environment of educational institutions facilitates the organization of distance learning, digital educational environment, and education management. Digitization in education affects the development of students' self-determination, concentration on learning material, increased mobility, the choice of individual approaches, and the creation of a comfortable environment. It was established that the digitalization process, including and educational libraries, contributes to the development of uniqueness, a flexible study schedule, individual approaches in a distance format. Disadvantages may be related to the lack of a sufficient level of digital literacy, ensuring a low level of integration of the digital learning environment. A digital learning model can be created as a result of the development of a scientific and technical module, which is related to open access to publications, digitization of the library stock. The educational module provides for the selection of modern systems for organizing training, testing knowledge; the administrative module is aimed at managing education, creating a digital archive. The information module is more individualized and aimed at creating teacher pages, 3D courses, and the university website (Vasyliuk et al., 2021). Digitization of educational and academic libraries contributes to the development of the relationship between technical sciences and the humanities, which affects the support of humanitarian research. Digitization provided the possibility of creating electronic databases, which entailed the possibility of achieving a new intellectual result. The integration of methods of developing technical sciences contributed to the creation of digital projects, which was reflected in the tasks, a unique modelling for the purpose of detailing information (Dubrovina et al., 2020). On the contrary, this research does now focus on the interrelationship of different sciences. However, it was established that library resources contribute to the transfer of theoretical information, ensuring the systematization of data, and the use of the space of educational libraries for holding classes and forums.

The development of distance learning in higher education institutions in Serbia during the COVID-19 pandemic was ensured by digitalization of educational libraries. The digitalization process made it possible to provide adequate support for students in accessing the necessary educational materials. Modelling the education system helped to achieve in-depth theoretical knowledge, which affects the quality completion of practical

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assignments (Marković et al., 2021). Students' assimilation of the research methodology course can be realized as a result of having access to scientific information. The learning process should be based on in-depth study of materials that contribute to the expansion of ideas about research methods. The research competence can be developed during the preparation of literature reviews, the development of an understanding of research methodology, data analysis, and the preparation of final reports (Motjolopane, 2021). Digitization of educational (school, university, scientific and pedagogical) libraries is aimed at preserving printed resources of information. In particular, the digitization of materials through cooperation between the State Library of Darmstadt and the Institute of Linguistics and Literary Studies of the Technical University of Darmstadt took place in several stages. Digitization is based on creating images from the original, providing full text processing with the inclusion of language annotations (Stegmeier et al., 2022). The creation of high-quality digital educational resources (collections) fully meets the information needs of students and teachers, which ultimately affects their attitude to the digitization of libraries. At the same time, this study established that 81% of students have a positive attitude towards providing distance learning through digitization of educational libraries.

The creation of an electronic educational library is based on a system of digital resources, which are based on the use of modern technologies, new generation information resource management models. This process affects the digitization of library stock. This helps to quickly search for books in university libraries through created algorithms. This approach contributes to the accuracy of classification of library resources up to 86% - 94% (Xiao, 2022). Ensuring the process of digitalization of educational libraries can be based on the formation of the general architecture of the model, the creation of a functional system, and the provision of a system of personalized information service of educational libraries. The service platform is based on accurate identification of user needs, personalization of artificial intelligence service settings, academic research based on integrated materials (Wang & Sha, 2021).

The results of the discussion of the published articles gave grounds to determine that the COVID-19 pandemic accelerated digitalization of educational libraries to a greater extent. The results are based on determining the impact of digitalization of libraries on the educational process in the context of distance learning. The analysis of previous studies showed that digitalization of educational libraries for providing distance learning has not

DOI: https://doi.org/10.46925//rdluz.41.09

been studied enough, which proves the novelty of this research. This work focuses on the use of digital resources of educational libraries for distance learning. The authors of this article developed recommendations for providing distance learning by using opportunities from digitalization of educational libraries. The results of the study are also aimed at determining the effectiveness of the knowledge acquired by students during the educational process in the context of distance learning.

Conclusions

The aim of the study was achieved as a result of determining the students' performance during distance learning. The results confirm the effectiveness of digitalization of educational libraries, which contributes to simplified access to the necessary information. The research established that the majority of students (25%) use educational libraries in order to find materials for writing research papers. The obtained data revealed that digital resources contribute to the deepening of existing knowledge, the study of information that considers other aspects of professional activity. The authors came to the conclusion that recommendations should be developed for students regarding the use of educational library resources that will facilitate distance learning. At the same time, it is necessary to ensure orientation towards digitalization of educational libraries. Using the opportunities of electronic technologies of educational libraries can contribute to the study of theoretical information, which can be implemented with the help of various software applications, platforms, in particular, the Udemy platform. The distance learning process can also be improved as a result of systematization of educational materials, use of resources of educational libraries for conducting classes. Digitization of libraries can contribute to the discussion of educational materials between students using forums.

The study found that 81% of students have a positive attitude towards this approach to distance learning, but 19% have a neutral attitude. Relevant recommendations, which contribute to the formation of a more complete database of materials of traditional and digital resources were developed in order to popularize the opportunities of digitalization of educational libraries. It was established that a larger proportion of achieved a high level of understanding of theoretical material (0.29) and writing of research papers (0.24). The results confirm the positive value of the digitization educational libraries.

The research findings can be useful for students of pedagogical majors, as well as teachers for the organization of the educational process in the context of distance learning. Research materials can be useful for expanding the professional experience of librarians, using an innovative and interactive approach in the digitization of educational libraries. Further research will be aimed at studying the possibilities of using digital resources of educational libraries to support the traditional educational process. The authors also plan to identify the effectiveness of the acquired knowledge among students and teachers as a result of distance learning, studying the opportunities obtained from digitalization of libraries.

References

Adeleke, A. (2019). Resolving staff-patron conflicts with digitization: One library's experience. *Library Hi Tech News*, *36*(2), 17-20. https://doi.org/10.1108/LHTN-09-2018-0060

Attar, K. (2022). 'More product, less process' (MPLP): An early printed book project. *Journal of Librarianship and Information Science*, *54*(3), 532-540. https://doi.org/10.1177/09610006211026739

Babalola, F. E., Fakoyede, S. J., Ojobola, F. B., & Abiona, F. G. (2023). Fostering library usage among science students towards sustainable development goals. *The Reference Librarian*, *64*(1), 51-67. https://doi.org/10.1080/02763877.2023.2170949

Bello, S. A., & Ezeri, C. N. (2020). Globalisation of library and information services: An assessment of the level of ICT deployment in academic libraries in Oyo state, Nigeria. *Library Philosophy and Practice*, *2020*, *3881*. *https://digitalcommons.unl.edu/libphilprac/3881*

De Götzen, A., Starostka, J., Saad-Sulonen, J., Ehrenberg, N., & Linde, P. (2022). PDC place Nordic: Participatory design in/for the digitalization of public services. *Proceedings of the Participatory Design Conference*, *2*, 286-287. https://doi.org/10.1145/3537797.3537885

Dubrovina, L., Lobuzina, K., Onyschenko, O., & Boriak, H. (2020). Digital humanities and databases of cultural heritage in libraries of Ukraine. *Manuscript and Book Heritage of Ukraine*, *2020*(25), 290-309. https://doi.org/10.15407/rksu.25.290

Dubrovina, L., Lobuzina, K., Onyshchenko, O., & Boriak, H. (2021). Digital humanitarian project as a component of digital humanities. *Science and Innovation*, *17*(1), 54-63. https://doi.org/10.15407/scine17.01.054

Dzandza, P. E. (2020). Digitizing the intellectual output of Ghanaian universities. *Collection and Curation*, *39*(3), 69-75. https://doi.org/10.1108/CC-05-2019-0012

Humenchuk, A., Michanyn, N., Novalska, T., & Trach, O. (2020). Strategy of the Scientific Educational Libraries of Ukraine Network Digitalization. In *Proceedings of the COAPSN Conference* (pp. 237-246). https://ceur-ws.org/Vol-2616/paper20.pdf

Ishchenko, Y., Vdovenko O., Nych, T., Moroz-Rekotova, L., & Arystova, L. (2022). Effectiveness of distance learning in higher educational institutions under martial law. *Apuntes Universitarios*, 13(1), 348–364. https://doi.org/10.17162/au.v13i1.1332

Jiang, M., D'Souza, J., Auer, S., & Downie, J. S. (2022). Evaluating BERT-based scientific relation classifiers for scholarly knowledge graph construction on digital library collections. *International Journal on Digital Libraries*, *23*(2), 197-215. https://doi.org/10.1007/s00799-021-00313-y

Kempf, K. (2022). The german university library system between digital transformations and the "Corona-shutdown". *Societa e Storia*, *2022*(175), 157-165. https://doi.org/10.3280/SS2022-175010

Kremen, V.H., Lugovyi, V.I., Topuzov, O.M., Sysoieva, S.O., Liashenko, O.I., Maksymenko, S.D., ..., & Reheilo, I.Yu. (Ed.). (2021). National Report on the State and Prospects of Education Development in Ukraine: A Monograph. *To the 30th Anniversary of Ukraine's Independence. National Academy of Educational Sciences of Ukraine*. Kyiv: KONVI PRINT. https://doi.org/10.37472/NAES-2021-en

Lund, A., & Nybacka, P. S. (2021). Digital library platforms' democracy building between instrumental education and web 2.0 sharing: A Swedish case study. *TripleC*, *19*(2), 392-423. https://doi.org/10.31269/TRIPLEC.V19I2.1275

Maier, R., & von der Linden, C. (2021). Digital transformation and innovation for universities – Contribution of the representatives of the forum digitalisation of universities Austria. *Communications of the Association of Austrian Librarians*, *74*(2), 95-101. https://doi.org/10.31263/voebm.v74i2.6380

Marković, M., Pavlović, D., & Mamutović, A. (2021). Students' experiences and acceptance of emergency online learning due to COVID-19. *Australasian Journal of Educational Technology*, *37*(5), 1-16. https://doi.org/10.14742/ajet.7138

Matviychuk, O. Y. (2023). Information and library services of educational libraries in the context of digitalization. In *Proceedings of the X International Scientific and Practical Conference "The Evolution of Philosophy of Science in Recent Decades"* (pp. 63-66). Copenhagen, Denmark: InterSci. https://intersci.eu/wp-content/uploads/2023/03/The-evolution-of-philosophy-of-science-in-recent-decades.pdf

Motjolopane, I. (2021). Teaching research methodology: Student-centered approach computing education undergraduate course. *Emerging Science Journal*, *5*(1), 34-43. https://doi.org/10.28991/esj-2021-01255

Nowakowski, R. (2022). Proces of digital consolidation of the collection of the Polish press (1801-1939) of National Ossoliński Institute splited after world war II. *Z Badan Nad Ksiazka i Ksiegozbiorami Historycznymi*, *16*(2), 269-296. https://doi.org/10.33077/uw.25448730.zbkh.2022.705

Palumbo, R. (2022). Thriving in the post-covid-19 era: A new normality for libraries' service offering. *Library Management*, *43*(8-9), 536-562. https://doi.org/10.1108/LM-05-2022-0051

Pavlovic, D. (2021). Students' opinions on digital libraries in education-literature review. *ELearning and Software for Education Conference*, 232-238. https://doi.org/10.12753/2066-026X-21-098

Sharif, S., Iqbal, K., Munir, M. A., Saeed, K., & Ali, S. (2021). Librarian behaviors, students' personality and academic performance: A case of public libraries. *Library Philosophy and Practice*, *6235*, 1-20. https://digitalcommons.unl.edu/libphilprac/6235/

Skulan, N. (2018). Staffing with students: Digitizing campus newspapers with student volunteers at the university of Minnesota, Morris. *Digital Library Perspectives*, *34*(1), 32-44. https://doi.org/10.1108/DLP-07-2017-0024

Stegmeier, J., Günther, A., Hammer, A., Müller, M., & Stäcker, T. (2022). A newspaper over three centuries: Digitizing the Darmstädter Tagblatt. *Information-Wissenschaft Und Praxis*, *73*(2-3), 89-96. https://doi.org/10.1515/iwp-2022-2210

Sussmeier, S., & Perez, H. (2021). Digital decisions: User-driven digitization. *Library Hi Tech News*, *38*(3), 6-9. https://doi.org/10.1108/LHTN-02-2021-0007

Teffo, M. C., Motjolopane, I., & Masenya, T. M. (2022). Academic library innovation through a business model canvas lens: A case of South African higher education institutions. *Innovative Technologies for Enhancing Knowledge Access in Academic Libraries* (pp. 22-39) https://doi.org/10.4018/978-1-6684-3364-5.ch002

The Norwegian National Committee for Research Ethics in Science and Technology (2016). Guidelines for Research Ethics in Science and Technology. https://www.forskningsetikk.no/en/guidelines/science-and-technology/guidelines-for-research-ethics-in-science-and-technology/

Vasyliuk, T. G., Lysokon, I. O., & Shimko, I. M. (2021). Digital educational environment of a modern university: Theory, practice and administration. In *Digital Humanities Workshop (DHW 2021)*. New York, NY, USA: Association for Computing Machinery, (pp. 161-168). https://doi.org/10.1145/3526242.3526260

Wang, C., & Sha, Z. (2021). Research on intelligent information system of library under big data and digitization technology. *Journal of Physics: Conference Series*, *2083*(4), 042063. https://doi.org/10.1088/1742-6596/2083/4/042063

Xiao, H. (2022). Application of digital information technology in book classification and quick search in university libraries. *Computational Intelligence and Neuroscience*, *2022*, 4543467. https://doi.org/10.1155/2022/4543467

Zhao, L. (2021). Personalized recommendation by using fused user preference to construct smart library. *Internet Technology Letters*, *4*(3). https://doi.org/10.1002/itl2.273