

## ANNOTATION

of the dissertation for the Doctor of Philosophy (PhD) degree in the educational program “8D03206 – Library Information Systems” by

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### **STUDENTS' PERCEPTION OF DIGITAL LIBRARY SERVICES: ON THE CASE OF AL-FARABI KAZNU**

**General description of work:** This study aimed at assessing Students' Perception of the Services of the Digital Library using Al-Farabi Kazakh National University as a case study.

**Relevance of the topic:** The history of digitization of libraries can be traced back in 1960s, gaining momentum in 1990s and extending into the early 2000s. However, among various types of libraries, academic libraries were pioneers in embracing digitization. Academic libraries took the lead in this transformation, surpassing school and public libraries, primarily due to their collaboration with funding agencies, which facilitated digitization projects more effectively. On a global scale, the United States led the way in digitizing academic libraries. In 1994, a significant milestone was reached when the National Science Foundation, in collaboration with the Department of Defense Advanced Research Projects Agency and the National Aeronautics and Space Administration, allocated \$24.4 million in funding for a digital library project. This initiative supported six universities namely; Carnegie Mellon University, the University of California-Berkeley, the University of Michigan, the University of Illinois, the University of California-Santa Barbara, and Stanford University.

The evolution of academic libraries in providing information access has been remarkable, transitioning from traditional card catalogues to modern Online Public Access Catalogs. Notably, the digitization of academic libraries has empowered students, faculty members, and researchers to access information at their own pace any time and from any location, thus saving valuable time. The benefits stemming from the digitization of academic libraries are noteworthy. These advantages include the preservation of valuable resources by ensuring their longevity and minimizing the risks of physical damage and deterioration. Additionally, digitization enhances the visibility of library resources and transcends geographical boundaries, offering a range of benefits.

Similar to numerous countries globally, Kazakhstan is actively participating in the ongoing transformational shift. A significant number of academic institutions within the country have embraced this change by digitizing their libraries to simplify the accessibility of resources. Among these institutions, KazNU, a leading educational

and research institutions in Kazakhstan and Central Asia, has been a pioneer in digitizing its library, contributing to the evolution of the academic landscape in the region.

Since it's established in 1934, KazNU has played a crucial role in the advancement of education and science in Kazakhstan. Being committed to academic excellence, research, and innovation, the university understands the importance of incorporating digital technologies to improve its library resources and services. It houses an extensive library system, including the Scientific Library of KazNU, which serves as a valuable resource hub for students, faculty, and researchers. Over the years, like many other academic libraries worldwide, KazNU has recognized the significance of digitization in preserving and providing access to its vast collection of scholarly resources. The adoption of digitization technologies is driven by the desire to enhance accessibility, improve preservation, and support research and scholarship within the university community.

**Degree of elaboration of the research topic:** The topic of the study is currently attracting the world of the scholars as the use of emerging technologies dominate in almost all academic libraries in both developed and developing countries. In explaining this in details, three specific studies were conducted. In the first study titled "Digital Literacy Competencies among Higher Learning Students in Kazakhstan" it was reported that most of the students in developing countries such as Kazakhstan lack skills or are not competent in critically evaluating digital information they access and utilize using digital technologies. On the other hand, it is unclear whether students in Kazakhstan possess all the basic competencies of digital literacy, as studies analyzing these competencies among students in Kazakhstan are irretrievable. Therefore, this study aims to fill this gap. Moreover, in the study titled "User Perspectives on Library Digitization and Its Impact on Research Capabilities" despite the widespread implementation of digitization initiatives, it is imperative to understand the multifaceted impact of these changes from the perspective of the end-users, primarily the university's students, and lecturers. Despite several studies articulating the impacts of the digitization of library resources in facilitating teaching, consultation, and research, but no study could be traced which investigated the impacts of digitization of library resources in research capabilities in Kazakhstan. This study therefore fills this gap. More so, in the study titled "Adapting to New Technologies: A Systematic Literature Review of Blockchain Implementation in Academic Libraries" studies show that the implementation and utilization of blockchain technology in libraries is a new concept, resulting in limited studies in this area. Existing studies primarily address the benefits of BT for libraries, potential implementation areas, and the challenges involved. To the best of our knowledge, there is no retrievable study that provides a justification or explaining what extra benefits that BT is providing over the existing technologies or systems used in the libraries. This study aims to fill this gap by demonstrating why BT is a superior fit for academic libraries and should be adopted over existing technologies or systems.

**Purpose and objective of the study:** The first study aims to assess the digital literacy competencies among students in higher learning institutions in Kazakhstan. Specifically, the study aims (i) to identify digital literacy skills to effectively use digital technologies among students, (ii) to describe the purpose and extent of use of digital technologies among students, and (iii.) to explore challenges faced students on the use of digital technologies. Whereas, in the second study it aims to investigate user perspective on library digitization and its impact on research capabilities using Al-Farabi KazNU as a case study. Specifically, it aims to (i) assess the user perspectives awareness on the digitization of library resources, (ii) to analyze the impact of library digitization on the research capabilities and practices of users, and (iii) to identify challenges or barriers faced by users in utilizing digitized library resources for research purposes. The third study aims at providing the justifications of why academic libraries should adopt BT for certain sensitive functions over existing technologies or systems. Specifically, it examines ways in which blockchain technology performs better than the existing technologies or systems used in the academic libraries.

**The object of the study** is the scientific library of Al-Farabi KazNU

**The subject of the study** is all registered students of Al-Farabi KazNU and lecturers who are the main users of scientific library of KazNU.

**The methods of the research:** In the two studies that involve human participation, survey design was employed. In these studies, data were collected using Web/online questionnaires (Google Form) in which structured and semi structured questionnaires were distributed to the respondents. However, with the help of the recommendation by Saunders et al., 2012, sample size were determined using simple random sampling especially lottery method and for that which include interview, purposive techniques was used. On the other hand, in the other study (review), SALSA (Search, Appraisal, Synthesis, and Analysis) framework and PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) guideline were employed to systematically review literature. In this study, data were collected using six authoritative databases.

Furthermore, in two studies, quantitative data were analyzed using Microsoft Excel 2010 while qualitative data were analyzed using thematic method. Whereas, in the other study, the analysis was conducted using both content analysis and Microsoft Excel 2010.

**The main provision to be defended:**

- Digital Literacy Competencies among Higher Learning Students in Kazakhstan, aim to assess if students in higher learning institutions in Kazakhstan possess necessary skills that help them in utilizing digital and emerging technologies.
- User Perspectives on Library Digitization and Its Impact on Research Capabilities, aim to assess how library users' views digitization of library services and how it brings impact on research activities.

- **Adapting to New Technologies: A Systematic Literature Review of Blockchain Implementation in Academic Libraries**, aims at assessing readiness of the academic libraries in adopting new technologies.

**The main research findings obtained:** In the first study, results reveal that students are very competent in using digital technologies to communicate and share their educational digital contents, whereas they indicate moderate competence and incompetence in other essential digital literacy skills crucial for their academic pursuits. Furthermore, this study revealed that students frequently use digital technologies for educational purposes, with statistical analysis [ $t(381) = 4.562$ ,  $p < 0.00001$ , two-tailed] indicating a significant difference between the extent and purpose of their digital usage. Moreover, findings identified health issues, technical issues and the constantly changing of hardware and software as primary challenges faced students when engaging with digital technologies.

In the second study, Findings show that the majority of the respondents utilize library resources frequently with statistical analysis ( $MS = 0.387998$ ,  $t = -1.45939$ ,  $p < 0.146074$ ) indicating there is no significant difference between education level and the frequency of library resources usage. Also, the majority of respondents have positive perceptions towards the use of library resources with t-statistic (6.599663291, is above 1.649982976 for one-tail and 1.967956506 for two-tail) indicating a significant difference between age and perceptions towards the use of library resources. Moreover, findings show capacity of a single document to be used by many users at once and information to be accessed at a fingerprint are major impacts of library digitization. Furthermore, findings reveal issues related to licensing, subscription costs, and copyright and overwhelming volume of information available as the major challenges user face when utilizing digital library resources.

In the third study, the findings indicate that most articles were authored by scholars in Asia and Africa, highlighting a significant interest in adopting new technologies in libraries among researchers in developing countries despite facing challenges such as limited skilled staff, financial constraints, and inadequate technological infrastructure compared to developed countries. The findings reveal a steady increase in the number of published articles on BTeach year, with a significant contribution from authoritative publishers. The study also highlights the many benefits BT can bring to academic libraries, such as enhancing data security, increasing transparency, fostering collaboration both within and between libraries, and facilitating technological innovation and access control.

**Theoretical and scientific significance of the study:** The articles are among the first to study these topics in Kazakhstan, providing timely analysis of digital literacy, user perception of digitization, and potential blockchain implementation. Theoretically, the research enhances understanding of digital transformation in academic libraries. Practically, it offers concrete recommendations to improve digital services and address user challenges, such as offering continuous training and increasing budget allocations. These suggestions are directly relevant for students,

librarians, and policymakers, and can be incorporated into university curricula in “Library and Information Science” and “Computer Science.” While focused on Al-Farabi Kazakh National University, the conclusions are applicable to other Kazakhstani and global academic institutions.

**Scientific novelty:** The aim of the study was to assess Students’ Perception of the Services of the Digital Library using Al-Farabi KazNU as a case study. The research introduces a novel approach by evaluating Kazakhstani students’ digital skills and attitudes toward emerging technologies in academic libraries. The inclusion of blockchain as a case for technological innovation is particularly original in the Kazakhstani context. The findings contribute not only to academic knowledge but also to practical policy-making in library and education sectors. The studies also explore both advantages and challenges of digital technology implementation, including security concerns and practical barriers. Innovative solutions like blockchain and AI are analyzed in terms of their potential to enhance service delivery.

**The reliability and validity of the obtained results:** The validity of a study was tested through a content validity approach whereby 10 questionnaires were distributed to the respondents apart from those who were included in the actual study and requesting them to respond to the questions to see if structured and semi-structured questions are aligned with all the study objectives.

**Publication of research result:** The research results have resulted into publication of six articles into high ranked journals in the field of library and information science. Four articles were published in the international journals indexed in the Scopus (Q1) and Web of Science (Q2). One article was published in the domestic journal recommended by the Committee for Quality Assurance in the Field of Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan, and another article was published as conference proceedings.

**Author's personal contribution:** The formulation of the titles, research problems, and collection of data were carried out by author. However, the analysis and discussion of data were carried out jointly with scientific advisors. Sadykova R., and Kim E., participated in all stages of these works, thus making the main contribution to the preparation of all these scientific works.