

Identifying and Navigating the Current Trends in Business Librarianship and Data Librarianship

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Abstract

These trends in business librarianship and data librarianship matter for the management of today's academic libraries and this topic is important to discuss because librarians must respond to the developments in data science and big data. Industry leaders such as Yuanqing Yango, CEO of Lenovo refer to "new IT" and the coming revolution stemming from the usage of smart devices, edge and cloud computing, 5G networks, and (AI) Artificial Intelligence (Lenovo, 2022). Lenovo (2022) researchers undertook a study of 500 Chief Technology Officers (CTOs) from diverse industries to ascertain their perceptions about the future of technology. Both scholars and industry leaders alike agree that the technologies that will dominate will be forged so that humanity can meet the challenges of the future and the control of information will be at the forefront of these changes. Information professionals must learn about and master the technologies that industry leaders are reimagining as innovations that will try to improve our lives because librarianship is becoming increasingly data-driven. Faculty, staff, and students rely on information professionals to help them to understand the role of "new IT" and the opportunities that it creates. We also need more informed professionals because research is data-driven. More decision makers are using big data to make effective organizational decisions. Librarians must be cognizant of the trends that are governing innovations in technology to effectively provide information services to key stakeholders.

Keywords: data librarianship, big data, open source, CBIR, Open AI's ChatGPT, "new IT"

1. Introduction

1.1 Identifying Trends

The contributions of this paper are summarized as follows: Section 1 identifies the trends, there are six key trends in Business Librarianship and Data Librarianship that are impacting these fields now and hypothesizes that the field will continue to be more data-driven: (1) increased research in open science; (2) increased trend in the use of digital scholarship ecosystems; (3) open access processes lead to the capacities for powerful search and retrieval globally; (4) more data science training for librarians to respond to what industry leaders call "new IT;" (5) libraries seek and explore commercial partnerships for bigger data options; and (6) continued progress in analytic computational tools (e.g. deep learning and neural net). The first trend is the increase of Open AI (Artificial Intelligence)'s ChatGPT which allows for increased research in Open Science, agile IT management methodologies, and metadata. According to Panda & Kaur (2023), ChatGPT-based chatbot systems may provide different forms of knowledge base-based chatbot systems in Library Information Centers (LIC)s that may be more user friendly and would ultimately reduce work pressures on reference librarians. The question becomes whether its limitations will prove to be too burdensome and if the staff training in its usage will be cost effective. The use of Artificial Intelligence and the subsequent chatbot technology has also resulted in questions about its usage in higher education and in sustainability education (Deng & Yu, 2023). Deng and Yu (2023) advise that, "chatbots have caught the attention of stakeholders in the educational context" (p. 1). These conversational programs mimic human intelligence to process input. Some school officials have banned their use and there is a growing fear that students can use the technology to cheat. Yet, other officials see an opportunity with the technology to free up a teacher's time by using chatbots to answer questions from students. The scholarly literature tracks these developments as it assesses the role of chatbots in achieving measurable learning outcomes. Chatbots may be used to help students to learn as well as to find sources for research projects. Their role will likely increase within libraries and in all schools in the near future. The remainder of this paper is organized as

follows: Section 2 outlines the methods employed in the article. Section 3 discusses the results and Section 4 contains the principles to navigate the trends. Finally, section 5 concludes the research.

1.2 CBIR

The second trend is the increase in the form of a marked shift from cultural and language to data and research data repositories for Open Science using digital scholarship ecosystems. According to Sanjeevaiah, Reddy, Karthik, Kumar, & Vivek (2023), changes in data management center around (CBIR) technology which is content-based image retrieval systems that allow the researcher to search a database to “retrieve the most visually comparable photos to a query image” (Sanjeevaiah et al. 2023, p. 1). The authors advise that this technology is pivotal due to the increase in digital images on the internet. Artificial intelligence in the form of CBIR technology is being used to enhance image recognition that do not rely on the textual description for the image alone. This technology will aid librarians as they continue to process video and digital albums because CBIR automatically indexes them based on color which is commonly used for most image retrieval processes.

1.3 Data Repositories

The third trend relates to open access processes that lead to the capacities for powerful search and retrieval globally because networked information equals faster processing power in libraries’ online data repositories. For Kadhim, Aljazaery, & Alrikabi (2023), “the functionality and productivity of educational institutions have been significantly impacted by the emergence of technology” (p. 177). Global computing technologies are designed to increase university students’ academic engagement with their programs and this is the primary goal of cloud computing and IoT innovation as they relate to educational contexts.

1.3.1 Programming Languages

A fourth trend is that more librarians will focus their continuing education on training in data science which includes learning programming languages. Semeler, Pinto, & Rozados (2023), muse that “data librarians need not become a programmer, statistician, or database manager, but should be interested in learning about the languages and programming logic” (p. 771). It is entirely possible that this key trend may converge the disciplines of Library Information Science with Information Technology.

1.3.2 Analytical Tools

The fifth trend is the continued exploration by large university libraries to expand their use of analytical tools.

1.3.3 Deep Learning

Finally, trend six relates to the stronger than average gains in analytic computational tools that are particularly associated with deep learning and neural net research.

1.3.4 Information Sharing

A goal for all academic librarians is to remove obstacles relative to the dissemination of research and information worldwide. Open access increases visibility and the impact of specific research using the platform of institutional repositories (Bashir, Gul, Bashir, Nisa, & Ganaie, 2022). Scholars describe this evolutionary trend as the history changes associated with the prolific uses of institutional repositories and the changes caused by open access and OpenDOAR (Directory of Open Access Repositories). Figure 1 below shows the easier path from idea conception to actual publication and dissemination of the scholarly work because of these innovative changes. Figure 1 also highlights the progression of sharing information since publishing scholarly research has become even more streamlined. In fact, one goal of “new IT” is to push forward transformations in education and other key industries, according to Dr. Yong Riu, Lenovo’s Chief Technology Officer (MIT Technology Review Insights, 2023).

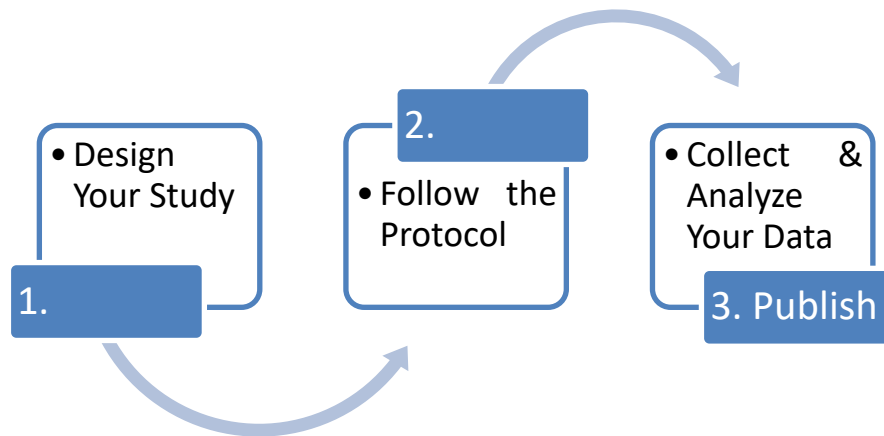


Figure 1. Ease of Sharing Information

1.3.5 Aim

Due to the monumental changes in the field of library science, this new matrix of information science and information technology have placed new demands on the profession to meet the challenges associated with technological innovations and what some industry leaders refer to as “new IT.” Therefore, new articles continue to be published and training programs are being offered to assist librarians to make the transformation into data librarians and research design consultants. The demand for additional education based on typical the Master of Science curriculum reveals that it is important to highlight the new research in the field which is the key goal of this article.

2. Method

This article uses the literature research review as its methodology to test the hypothesis that the field of librarianship will become increasingly data-driven. present the state-of-the-art technologies and to assess the collective evidence in data librarianship. According to Synder (2019), the literature review is an effective methodology to showcase knowledge production. The six trends are explored and defined. The results revealed that there is a lack of knowledge about how to identify and to navigate the current trends in business and data librarianship.

2.1 Search Procedure

The keywords used in the search for scholarly journal articles were “data librarianship,” big data,” “open source,” and “Open AI.” The search strategy included using Google Scholar and limiting the search parameter to 2022 and 2023.

2.2 Narrowing the Scope

It is important to narrow down the list of keywords to return a manageable amount of scholarly journal articles to review. The search returned 1,234 articles and additional keywords such as “open access training” also helped to find specialized knowledge of these topics. The articles that discussed machine learning were filtered out since they were too technical for the scope of this article and did not directly relate to the training of librarians. The final results using the limiting keywords revealed twenty articles that were published within the last few years.

2.2.1 Literature Methodology

The methodology referred to as Literature research methodology allows social scientists to actively read, review, and chronicle literature reviews from scholars within their respective fields. In accordance with this methodology, the scholar will group each literature review into specific categories or topologies. Next, the scholar eliminates the literature reviews that are not applicable to the particular research problem. The literature research methodology is a valid and reliable research method because literature reviews are generally accepted ways to conduct academic queries. They also serve as a basis for planning research.

3. Results

The results reveal that open access and digitization have led to increased collaboration among researchers and scholars worldwide. As we consider shifts in technology within society, the current literature shows that Open Access has been the single biggest impacting the way that knowledge is shared. The potential for technological, social, and organizational innovations is on the rise because of new opportunities in collaborative research.

According to Dall-Orsoletta, Romero, & Ferreira (2022), innovation is being used today as a tool to enhance competition and collaboration provides organizations with an edge in volatile markets. As Thomson & Berriman (2023) advised, the role of archivists in safekeeping data continues to draw increased attention. The creation of the open access public archive provides for even more opportunities to store qualitative longitudinal research.

3.1 Other Innovations

The scholarly literature also reveals that there continues to be other innovations including collaborative robots (cobots) that are being utilized in the manufacturing industries to increase productivity (Prassida & Asfari, 2022). We are seeing the increased acceptance of robotic technologies in various fields and it is only a matter of time before these innovations breach the information sciences discipline. Bilawar (2022) advises that the pandemic has resulted in the use of cobots (collaborative robots) to carry out jobs that humans did. Cobots provide rapid deployment along with the necessary automation and the ability to meet users' academic needs (Bilawar, 2022). There is also an aspect of friendliness that copies human personable skills as cobots help people to finish their work duties. The aim of these cobots is not to replace human workers but to serve as "industrial assista devices that reduce manpower requirements" (Bilawar, 2022, p. 1).

The fact is we are living in a new industrial stage which is referred to as Industry 5.0 "will bring synergistic relationships between technological and social systems" (Prassida & Asfari, 2022). Scholars argue that a new collaborative Digital Library Model is beginning to emerge (Owusu & Rodrigues, 2023). Library services will continue to be rooted in methods that increase collaboratively implemented digital library services. Still other experts argue that Metaverse platforms will continue to dominate and allow for more collaboration within virtual worlds (Jovanovic & Milosavijevic, 2022). Digital avatars, they say, will enhance the use of several technologies on one platform to make education and information searching into a more personalized experience (Jovanovic & Milosavijevic, 2022). In fact, the convergence of these various technologies that facilitate gaming will have further reaching applications within information science. Convergence of technologies is one important aspect of the emerging concept called, "new IT."



Figure 2. More Options in Data Storage

3.2 More Strategic Partnerships

Figure 2 above shows the many tasks that Amazon Web Services offers to the user. University libraries have resources that can aid in global economic development. As Gupta & Rubalcaba (2022) advise, these libraries can assist start-ups with their data-driven strategic decisions via strategic partnerships. Corporations and libraries are both facing increased pressures to pursue continuous technological innovation to innovate all services. Libraries continue to explore bigger data options using partnerships with Amazon Web Services in response to increases for big data storage needs. Libraries and corporations are searching for enhancements in data storage as they seek out corporations that have a larger capacity to store data in the cloud.

4. Discussion

4.1 Principles to Navigate These Trends

The first navigating principle is that Big Data and AI are highly interrelated. Wang and Zhang (2023) lament that data assumptions may not relate to models as much as previously thought when using topic modelling methods. The experts propose a deep learning method that brings forth the latent hierarchal structures of documents which they call a deep model that promotes the "discriminant topic words to improve efficacy by reducing the computational complexity" (Wang & Zang, 2023, p. 157).

Further, topic Modelling allows researchers to use Python programming software to find groups of words in a text. Librarians are learning programming languages such as R and Python. This trend must be increased and become more widespread to target academic libraries in rural areas. The second navigating principle is that research data repositories for open science promote greater diversity. Data repositories are based on fairness bridging international collaboration possibilities among scholars as shown in Figure 3 below. Researchers in so-called developing countries can connect with and collaborate on future projects with scholars around the world. It is expected that open access will increase citation rates as more scholars gain access to articles that used to be too cost prohibitive to obtain. The free public access to scholarly information will facilitate the expansion of knowledge.

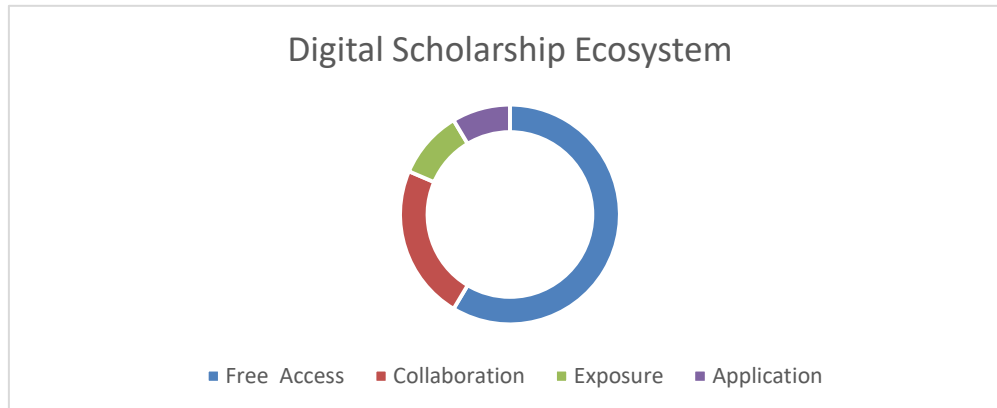


Figure 3. The New Digital Scholarship Ecosystem

The third navigating principle is that we must take steps toward building digital scholarship ecosystems. As mentioned by Uzwyshyn (2022), artificial intelligence, Deep Learning, neural nets and natural language processing are slowly “being integrated into traditional academic library infrastructures” (p. 1). Students and faculty will have to learn about AI using YouTube videos and brief lectures. The fourth navigating principle is related to the increased training for librarians. Librarians will need training about neural nets and Machine Learning since these are concepts that are not being taught with great regularity in graduate programs. Libraries will have to focus on scholarly communications and digital scholarship initiatives to meet the challenges of their stakeholders’ information needs (Kennedy, 2018).

5. Conclusion

The biggest challenges that we face as data librarians will continue to relate to AI, data storage, and the safeguarding of data. We must consider that data comes in all sizes and that the future perception by industry leaders reveal that there is a “new IT” which is emerging. We must anticipate that under this new framework “old IT” will morph and information services will be based in edge and cloud computing, more artificial intelligence, and increased collaborative structures using all of these to formulate a new architecture. As information professionals, it is vital that we listen to these global CTOs’ voices and viewpoints. It is important to consider that natural language processing datasets or image/video modelling datasets are being used in Google’s DeepMind. These group of researchers are working collaboratively to solve the world’s problems.

It will be interesting to see what happens to cloud computing as society increasingly returns to normal following the pandemic. We know that people utilized the cloud during the pandemic to stay connected in an uncertain world. Also, there are still ramifications from the pandemic since some workers have hybrid work arrangements. These pressures will propel 5G multiaccess edge computing (MAC) as the next generation in data communication technology. The “new IT” architecture will likely require the advancements of 5G technology as these innovations spill over into research fields. AI tools will increasingly be used to address problems that require the intelligence to process algorithms. Our research will be impacted by statistical methods and research will be even more data-driven which may undermine the use of qualitative studies in favor of mixed methods research designs.

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