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Zhahirah Indrawati Zainuddin

Universitas Gadjah Mada, Indonesia, zhahirahindrawati@mail.ugm.ac.id

Safirotu Khoir

Universitas Gadjah Mada, Indonesia, safirotu@ugm.ac.id

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A Scientometric Analysis of Scientific Publications related to COVID-19 in Library and Information Science Research

ABSTRACT

Purpose: As part of social sciences, Library and Information Science (LIS) has experienced development in COVID-19 discussions through the academic lens. The increasing number of research related to COVID-19 across subject areas is a response by researchers to overcome this crisis, including research in the LIS field. This research aims to describe the characteristics and trends of the keywords. It also aims to describe the most productive journals, institutions, and countries related to COVID-19 in LIS research.

Methods: We analysed 250 documents related to “COVID-19” in LIS research area indexed in Scopus during 2020-2022. VOSviewer was used to analyse the thematic trends and hotspot of the literature.

Results: Two hundred and fifty articles were found in 77 journals. The analysis showed that the COVID-19 publications have increased in around 30 months. In terms of the journal, *Library Philosophy and Practice* published articles in a significant number. Meanwhile, the University of South Africa is the most productive institution. The content analysis found 5 themes dealing with academic libraries (n=56), public libraries (=22), library services (n=18), digital libraries (=12), and social media (n=12). LIS is an interdisciplinary field that has been dealing with various research areas such as social science, arts and humanities, and computer sciences.

Conclusion: This study provides an overview of trends based on the most popular keywords. The results provide further information for both LIS researchers and other researchers in other areas. Future research should discuss the trend of combining non-LIS areas

Keywords:

COVID-19, Library and information science, Publications, Articles, Scientometric.

Introduction

Background/rationale: In March 2020, the World Health Organization (WHO) officially declared Coronavirus Disease 2019 (COVID-19) as a global pandemic (WHO, 2020). It has severely affected the health of all age groups, including infants, adults and elderly. In the face of the emergency situation, government agencies and communities around the world are struggling to respond quickly and are trying to flatten the positive case curve such as practicing social distancing, preventing overcrowding, and working from home have been implemented (Deressa et al., 2021). This situation has not only caused an extensive damage to the public health, but also has a great impact on society, academics, and research activities, so that the researchers from different fields attempt to provide their expertise to support the implementation of programs, in the context of preventing the spread of COVID-19 (Pal, 2021).

It is now widely recognised that the pandemic crisis is also information crisis. Several initiatives have been taken by public, private, and non-profit organizations to share COVID-19-related scientific research as openly as possible. For example, the World Health Organization maintains a daily updated list of related research results in a portal (WHO COVID-19 database) to provide information to the public (Aviv-Reuven & Rosenfeld, 2021; Colavizza et al., 2021). The reason for releasing this portal is to mobilize researchers to make it easier to find the latest research.

According to the increase of papers, measuring the performance of COVID-19 research in specific fields has been published (Grammes et al., 2020). Some of them are in economics and business fields (Handoko, 2020), and social sciences (Baji & Jowkar, 2022), and includes the research from LIS field also contributed to it. The library and information science always played an important role in providing information to society for learning and knowledge needs, so that during the pandemic some researchers took the initiative to collect the research data related to LIS-COVID to analysis of its contents. For example, there here has been some previous about LIS research in international publications.

The paper presents 696 documents related to COVID-19 extracted from publications in visualization whose journal is categorized as “information science & library science” by Web of Science. The findings indicate that according to a keyword clustering map produced by semantic network analysis, bibliometrics and health communications were

the two most active areas for the publication of research on COVID-19. Furthermore, the most productive journals were library and informatics journals with a focus on health informatics. Compared to non-COVID-19-related studies, COVID-19-related studies have significantly reduced the “time for acceptance” of papers. In light of the global COVID-19 crisis, the library and informatics sector has also struggled to cope with late peer reviews, delayed publications, and high paywalls, which have been identified as “chronic diseases” of the scientific publishing ecosystem (Shin & Lee, 2022).

Another study measured the impact of published literature on digital libraries during the pandemic COVID-19 era. The paper uses a bibliometric method to collect data from 66 publications in the Scopus database. The authors simultaneously identified publications from January 2020 to June 2021 using search terms such as “digital library”, “electronic library” and “Covid-19”. Pandemics are highly relevant to digital libraries, with 74% being articles in academic journals. The country with the greatest contribution is the United States, with its largest publisher Emerald, with only 35% of its published publications. The central themes of this research map include “pandemic”, “Covid”, “libraries” and “services” (Pambayun, 2021), but there is no scientometric analysis currently available that particularly focuses on global publications (Scopus indexed) relate to COVID-19 in LIS research, to the best of our knowledge.

Objectives: This study aims to fill a small part of this gap by analysing the subfields of social sciences subject areas and highlighting the recent status of the COVID-19 documents published in the LIS field. To achieve this goal, this study focused on explaining indicators that are relevant for understanding the characteristics and trends of the keywords and describing the most productive journals, institutions, and countries. In addition, this study visualized the co-occurrence and citation network of keywords, analysed the research stream, explored new directions for future research, and found solutions to current problems.

Methods

Ethics statement: This study did not involve human subjects, so the approval of the institutional review board and informed consent were not required.

Study design: This study was a descriptive and scientometric analysis based on a literature database.

Data collection methods: The data in this study were retrieved on July 17, 2021 from the Scopus database. To obtain the necessary data, The Library of Congress Subject Headings is used as a guide in determining the selected keywords to suit the research focus. The strategy used the following advanced search option “TITLE("COVID-19" OR "2019-nCoV disease" OR "2019 novel coronavirus disease" OR "Coronavirus disease-19" OR "Coronavirus disease 2019" OR "COVID-19 virus disease" OR "COVID19 (Disease)" OR "Novel coronavirus disease, 2019" OR "SARS coronavirus 2 disease" OR "SARS-CoV-2 disease") AND TITLE("library" OR "libraries" OR "librarian" OR "librarianship)”. This result search identified 250 articles written in English. The details of each article were exported into a CSV dataset format. The information about the author’s name were excluded from the analysis, but the author’s affiliations are still under consideration.

Visualization and statistical methods: The data obtained from the Scopus database was analysed using VOSviewer application, and simple statistics to conduct a frequency analysis have been calculated and tabulated using Microsoft Excel.

Results

The 320 publications consisted of five different types (Table 1): 298 journals (93.1%), 11 books (2.8%), seven conference proceedings (2.2%), five book series (1.6%), and one trade journal (0.9%). In order to type of documents, this study only processes data in the type of journal articles written in English.

Table 1 Publications volume according to source types

Types	Journals	Books	Conference Proceeding	Books Series	Trade Journal	Total
Number of Papers	298	9	7	5	1	320
%	93.1	2.8	2.2	1.6	0.3	100.0

Table 2 The volume of LIS research related to COVID-19

Years	2020	2021	until July 2022	Total
Number of Papers	51	134	65	250

Table 2 presents the volume of papers relate to COVID-19 on the LIS research. Of the total 250 papers, 51 were published in 2020. In 2021, the number of publications increased significantly, reaching 83. In addition, the data were retrieved on July, 2022 showed approximately 65 papers.

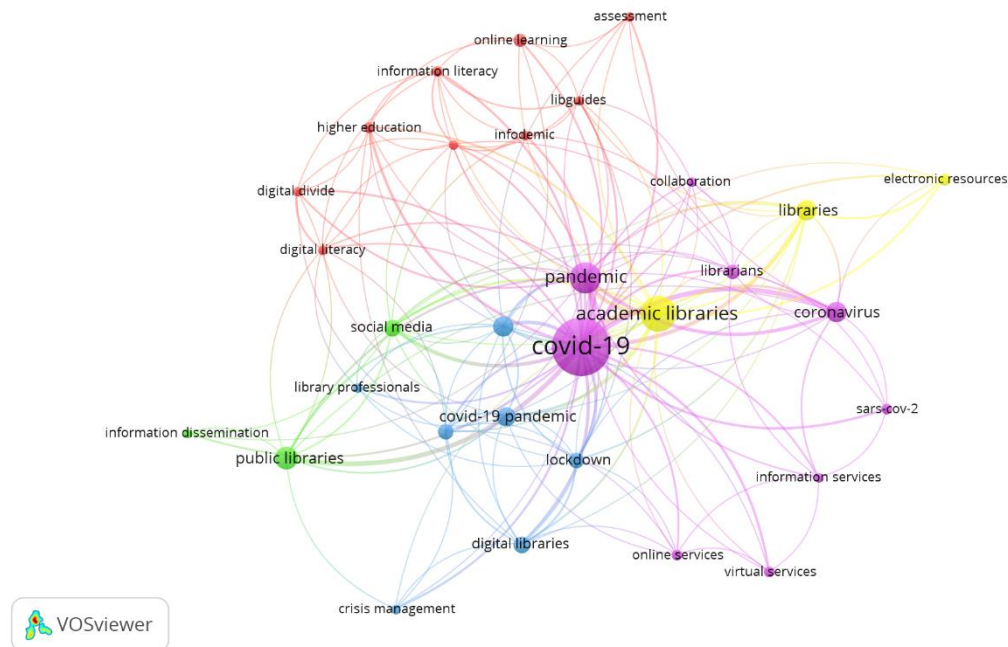


Figure 1 The Visualization of Author's Keywords

Table 3 Emerging themes from the author keywords in LIS research related to COVID-19

	Keywords	Occurrence
Cluster 1	Assessment	4
	Digital divide	4
	Digital literacy	4
	Fake news	4
	Higher education	6
	Infodemic	4
	Information literacy	6

	Libguides	4
	Online learning	8
	Collaboration	4
	Coronavirus	18
	Covid-19	149
	Information services	4
Cluster 2	Librarians	9
	Online services	6
	Pandemic	42
	Sars-cov-2	6
	Virtual services	5
	Covid-19 pandemic	17
	Crisis management	4
	Digital libraries	12
Cluster 3	Library professionals	4
	Library services	18
	Lockdown	11
	University libraries	11
	Academic libraries	56
Cluster 4	Electronic resources	7
	Libraries	18
	Information dissemination	4
Cluster 5	Public libraries	22
	Social media	12

According to the data in Table 3, there were 5 clusters and 31 sub-categories in auto-analysis. A team of our researchers discussed and performed manual data cleaning and duplication removal. After cleaning the data, we analysed the clusters and skim read full text when got confused. At the end, we selected the main themes raised in the research: academic libraries; public libraries; library services, digital libraries; social media; librarians; online learning; electronic resources; higher education; information literacy; online services; and virtual services as the most significant and central clusters of COVID-19 literature in the LIS field.

On the other hand, themes such as crisis management, digital divide, digital literacy, fake news, infodemic, information dissemination, information services, libguides, and library professionals are not central but are still developed. To identify the

central of themes by the author keywords with the highest frequencies and link strength mapped in VOSviewer (Figure 1).

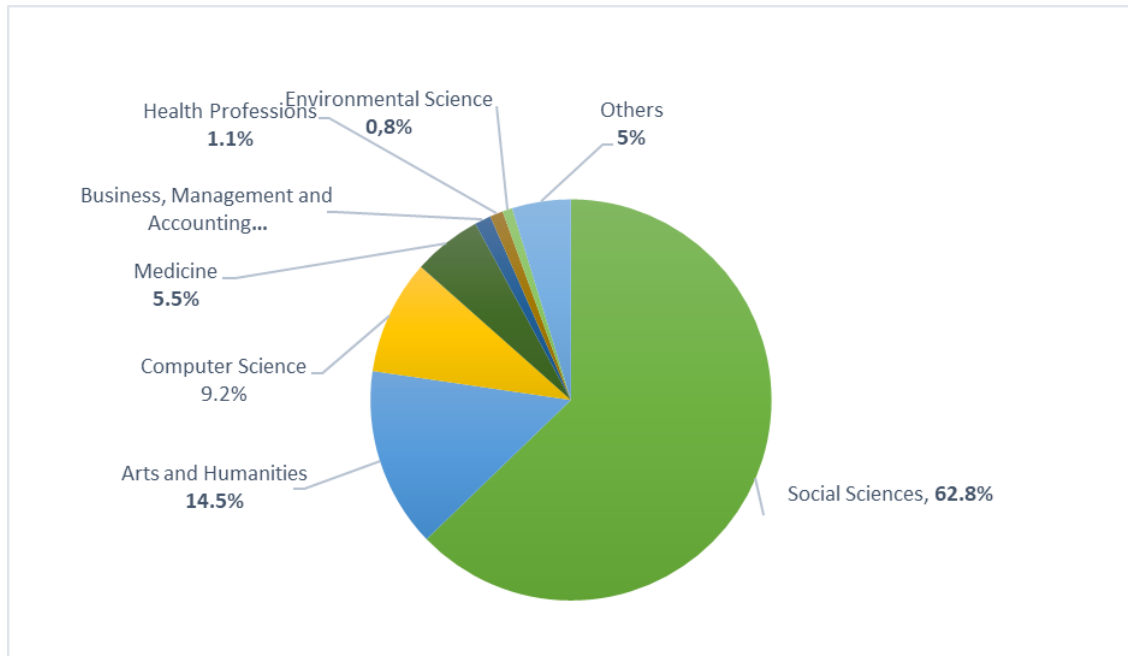


Figure 2 The publication output of subject areas of COVID-19 in LIS research

The field of LIS is interdisciplinary, and it has been dealing with various research areas, but the major subject contributors remain unidentified. Our analysis revealed that the publications are distributed among 18 subject areas. The analysis reveals that social science (238 publications, accounting for 62.8% of the total), arts and humanities (55 articles, 14.5%), and computer science (35 articles, 9.2%) are the major contributors to research areas. These are followed by medicine (5.5%); business, management and accounting (1.3%); and health professions (1.1%); mechanics (6.6%). More details are provided in the Figure 2. The frequency of publications in different areas of research reveals two important aspects, the first being the direction of COVID-19 with LIS research, and the second the extent to which this topic is considered interdisciplinary.

Table 4 Distribution of papers according to impact factored quartiles.

Quartile	Q1	Q2	Q3	Q4	Total
Number of Journals	18	34	17	8	77
Number of Papers	66	94	82	8	250
%	26.4	37.6	32.8	3.2	100.0

Table 4 displays the impact factor quartiles of journals that have produced COVID-19-related research. Most articles were in Q2 journals, accounting for 37.6%. In other words, about half of the research outputs were published in Q2. Combining Q1, Q2 and Q3, this accounts for 96.8%.

Table 5 Most productive journals with categories

Rank	Journal name	Papers	Scopus categories		Quartile
			1	2	
1	Library Philosophy and Practice	51	Philosophy	LIS	Q3
2	Journal of Academic Librarianship	16	Education	LIS	Q1
3	International Information and Library Review	11	E-learning	LIS	Q2
4	Journal of Library Administration	11	LIS	Public Administration	Q1
5	Library Management	10	LIS		Q2
6	Digital Library Perspectives	9	Information Systems	LIS	Q2
7	Medical Reference Services Quarterly	9	Health Informatics	LIS	Q1
8	Ifla Journal	7	LIS		Q2
9	Public Library Quarterly	7	LIS		Q2
10	College and Research Libraries News	6	Education	LIS	Q3
11	Journal of The Australian Library and Information Association	6	LIS		Q2

Table 5 shows the top 11 academic journals that have energetically published articles related to COVID-19. A total of 143 articles related to COVID-19 (57.2%) were published on the top 11 journals. In other words, more than half of the articles were published on the top 11 journals. The most productive journals were *Library Philosophy and Practice* with 51 articles, *Journal of Academic Librarianship* with 16 articles, *International Information and Library Review* and *Journal of Library Administration*

with 11 articles, and *Library Management* with 10 articles. Among the top journals, three journals were in Q1. There were six journals positioned to Q1 and two journals were in Q3, respectively. Under the common category “library and information science,” the most common Scopus categories were philosophy, education, e-learning, public administration, information system, and health informatics.

Table 6 Most productive institutions and countries

Rank	Country	Fr	Rank	Institution	Fr
1	United States	83	1	University of South Africa	6
2	India	30	2	The University of North Carolina at Greensboro	5
3	Nigeria	27	3	University of Nigeria	5
4	Pakistan	14	4	University of Ibadan	4
5	South Africa	13	5	University of the Punjab	4
6	United Kingdom	10	6	University of Gujrat	4

Table 6 shows the institutions and countries with excellent productivity. The results indicate that the most-active research countries are concentrated in United States, India, and Nigeria. University of South Africa is the most productive institutions, followed by The University of North Carolina at Greensboro, and University of Nigeria.

Discussion & Conclusion

This study explores a scientometric analysis, conducted using the VOSviewer app, of journal articles with a digital object identifier on the theme of COVID-19 in LIS research indexed by the Scopus database. Since its global spread, COVID-19 has become a major focus of researchers’ interest (Pal, 2021; Colavizza et al., 2021), including those in the field of LIS. Based on the results above, it appears that research on COVID-19 and LIS has been widely published by various journals with a broad range of specific topics, which is in line the result of other studies of scientific publication related to COVID-19 (Shin & Lee, 2022). The three fields plot, which visualized three parameters; (1) the distribution of subject areas of COVID-19 in LIS research, (2) the journals with the most publications on the relevant topics, and (3) the most productive institution and allowed their relationships to be analysed.

Overall, the findings of this study indicated that the COVID-19 pandemic could affect certain aspects of human social and personal life, as reflected in the LIS research on COVID-19. The trend has the potential to continue growing, given the ongoing spread of the pandemic and the increasing importance of library and information science (Park, 2020). In addition, the attention to non-health scientific disciplines in research on COVID-19 has also increased. The results of this scientometrics analysis are able to answer questions related to developing topics collected from author keywords based on co-occurrence. Our results revealed that emerging thematic clusters contain topics such as *academic libraries; public libraries; library services, digital libraries; social media; librarians; online learning; electronic resources; higher education; information literacy; online services; and virtual services.*

According to the resulting themes, one of the aspects of the information society is the accessibility of digital information. Libraries play their role in the information society as a point of access to information, advocating for digital rights and the contribution that librarians are making to improving health literacy and enabling citizens to be active participants in the management of their own health (Dalrymple & Galvin, 2021). During the pandemic, tracking apps and maintaining a log of mobility became essential to prevent or reduce the spread of virus.

Library Philosophy and Practice (Q3 impact factored quartiles) becomes the most productive journal among the three fields with COVID-19 and LIS. Several subject areas took a significant role in conducting research of the COVID-19. These include Social Sciences, Arts and Humanities, and Computer Science become the major contributors in the discussions which means that research progressed rapidly and has been viewed from multiple perspectives or is referred to as an interdisciplinary concept. This implies that interdisciplinary research engagement plays a key role in navigating the global crisis (Wen et al., 2020).

This increase is evidence of the concern of scientists who want to be involved and try to adapt, synergize by offering approaches that can give new hope in helping and saving the world from the dangers of COVID-19 (Cunningham et al., 2021) even though there are still few in terms of the number of publications, but in terms of substance there are many parties who called and feel responsible. The findings of the study suggest that separate research should examine a more complete analysis using scientometric or other

metrics of LIS methods in order to produce more comprehensive results (Björneborn & Ingwersen, 2004; Sahoo & Pandey, 2020).

Future researchers can focus on authorship patterns or on research collaborations collected through other databases such as WoS, PubMed, Dimensions, and Google Scholar. We believe that the information related to the findings produced will be different. This is also, to provide recommendations not only to the scientific communities but also to government policymakers as part of the effort to properly respond to the COVID-19 pandemic. The present study also predicted that at the end of the COVID-19 pandemic, its social effects on societies could be consistent. It is advisable to reconsider research on the effects of COVID-19 in the social sciences of universities and research institutes, especially in LIS research.

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