Digital curation at the university: Systematic literature review analysis with a bibliometric approach through the scopus database for the period 2012-2022

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Abstract

Background of the study: Universities should manage information digitally. Digital curation is a way to preserve and develop the collection of information so that it can be maintained and accessed in the future.

Purpose: This study aims to determine how many studies have examined digital curation at universities from 2012-2022 and the extent of the research affiliation.

Method: This research is a quantitative research using a descriptive methodology through a systematic literature review. The collection of journal articles uses bibliometric analysis to find the articles studied from the Scopus database and processed with using VosViewer to describe research trend data.

Findings: There are 91 journal articles from the Scopus database on digital curation in universities from 2012 to 2022. Digital curation is the most dominant keyword with 22 events. The trend of the highest number of research shows that there are 16 journal articles in 2012. The Digital Curation keyword shows the highest number of 57 research relationship affiliations.

Conclusion: This research can describe research trends, distribution map and research relationship. It can also help to show clearly that research is still rare or has not been studied to encourage novelty for the development of further research.

Keywords: Digital Curation, Digital Preservation, Systematic Literature Reviews, Bibliometric Approach

Introduction

The development of Information and Communication Technology (ICT) has a major impact on various aspects of life, especially the changes that occur in information media in digital format with various types such as text, images, audio, video or other digital formats. This digital information is a collection asset that needs to be maintained and with the passage of time it has an impact on its growth which is increasingly fast and more numerous. For this reason, it is necessary for organizations to manage digital collections by means of digital curation so that these information assets can be maintained and can be continuously accessed in the future. Harvey (2010), digital curation is the process of continuously managing digital document objects and ensuring that the steps that need to be carried out are sequentially correct so that digital information can be used today and in the future. Then Kurniawan (2018), digital curation is a continuous process for the activities of managing digital document objects (digital documents and created digitally) that must be maintained and allow them to always be available and can be reused by users. Digital curation is an important activity for every organization, especially universities.

Universities as educational and research institutions cannot be separated from the growth of data and information which continuously increases in line with their activities. Data from research results and university operational activities such as the results of thesis research, theses, dissertations, research, and vital archive documents are important information that must be guarded, stored, maintained and are assets for the university. The growth of information assets in various types and formats is also an important issue in today's digital era that requires good management of digital collections and can be accessed until later. Universities need to carry out digital curation activities to preserve their collection of digital information and also in-crease the value of their collection of information. So that the information can be utilized and developed further in the future.

Abioye (2019) research analyzed the selection and application of appropriate initial curation and preservation techniques, understanding behavior and information retrieval strategies, contributions to policy development including evaluation and selection criteria, skill intensity requirements, metadata Knowledge of standards and their application, relationships between managed vocabularies and metadata standards, social and ethical aspects of initial curation, initial curation frameworks, digital object management and preservation guidelines and standards, and curation workflows. These are covered in depth in both programs including digitization, web and social media archiving, open data, civic technology, blockchain, linked data, text coding, and more general knowledge of information science and computing subjects. Benchmarks need to be developed to meet digital curation skills and knowledge needs.

Research on digital curation of online resources among English learners at Chinese universities also conducted by Shuang (2020) analyzed the phenomenon of digital curation in context of a combination of contextual factors. The phenomenon of digital curation is related to the context of students' technological infrastructure, which reflected in the way students curate resources to avoid technological barriers. One of the main reasons for the lack of digital data curation innovation is students' lack of interest in digital curation.

From this discussion, researchers are interested in studying further about digital curation at the University based on the results of research that has been reviewed in various journals. From the observations, there are still few studies that discuss digital curation research in Indonesia. For this reason, this study will try to examine trends in digital curation research that exist in the world through searching the Scopus journal database to see how far the trend of research development occurs with Systematic Literature Review analysis with a Bibliometric analysis approach.

Method

This research is quantitative research using descriptive methodology through a Systematic Literature Review or SLR. Journal searches are carried out by means of bibliometric analysis which aims to identify research trends with the topic of Digital Curation at the University. The journal article is from Scopus database in the period 2012-2022. This period was taken because digital curation is related to the use of technology which is developing rapidly and continuously to find out new trends in the use of digital collection management at universities. Triandini (2019), wrote that SLR is a method used to refer to certain research and development methodologies carried out to collect and evaluate related research on a particular topic focus. The purpose of SLR research is to identify, review, evaluate and interpret the results of available research with certain topic areas of phenomena with certain relevant research questions to minimize bias and error. Meanwhile, the collection of journal articles was carried out using bibliometric analysis to search for the journal articles that you want to study from Scopus database which was then processed using VosViewer software to help describe the research trend data generated. The use of bibliometrics can help visualize research data network which allows a better understanding of the relationships and trends of research publications to be reviewed from research journal databases. Identifying of research publications by bibliometric analysis to find out trends, concepts, and keywords needed.

The stages of SLR research are carried out using a protocol with the steps of Planning, Conducting and Reporting. The Planning phase is a protocol whose structure is based on the research context and identifies the protocol, reviews, and builds a research question (RQ). Conducting stage is a search strategy step through search terms through search terms used, data sources used, formulation of inclusion and exclusion criteria, assessment of the quality of search results and data search results. Then, Reporting is reporting from the data that has been collected to be concluded and discussed.

The implementation of data collection is carried out through steps into two parts, the first is collecting bibliometric data from the Scopus database through the https://www.scopus.com/ site and inputting keywords that have been determined based on the use of inclusion and exclusion criteria in the SLR. After the search data is obtained, save the data by selecting the VSC export format. The second step is processing bibliometric data with VosViewer software. Upload the search data results in VSC export format into VosViewer then adjust the type of calculation method you want to display. After that VosViewer will process a few moments to display data on the distribution of the research trend network that is displayed by keywords, network connecting lines and distinguishing colors.

Figure 1. Stage of Systematic Literature Review

Planning: Research Questions

Research questions were conducted using the PICOC search tool (Population, Intervention, Comparison, Outcome, Context) to identify questions and limitations of the research to be conducted.

Table 1: Identification of PICOC Research Limitation Questions

Criteria	Scope
Population	Digital Curation or Digital Preservation
Intervention	Limitations on Research on digital curation at university or higher education
Comparison	Not applied
Outcomes	The development of digital curation at universities in 2012-2022
Context	Review the findings of the literature on the development trend of digital curation at the University

The research questions include:
1. RQ1: How many research studies have discussed digital curation in universities in 2012-2022?
2. RQ2: What is the trend of digital curation research affiliate relationships in universities in 2012-2022?

Conducting: Search Process Strategy
Search Terms
It is a search strategy with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta Analysis) approach, namely a data search strategy through the search terms used, the data source used comes from online databases, formulates inclusion and exclusion criteria, assesses the quality of search results and search results data. Then do the search terms with Boolean Operations (OR, AND and NOT).

Table 2: Search Terms

Criteria	Synonym Integration
Population	Digital Curation OR Digital Preservation
Intervention	University OR Higher Education
Method	Trend OR Development

Table 3: Search Term Structure

Search Term Structure
[Digital Curation OR Digital Preservation] AND [University OR Higher Education] AND [Trend OR Development]

Literature Source
The literature search process was obtained based on existing research sourced from the Scopus database (https://www.scopus.com) with a search period of 2012 to 2022 using bibliometric analysis searches.

Characteristics of Inclusion and Exclusion
To ensure the relevance of articles that are in accordance with the context of the research study, identification is carried out by implementing inclusion and exclusion criteria in the journal articles being studied.

Table 4: Inclusion and Exclusion

Inclusion	Exclusion
The type of literature is scientific journal articles on the Scopus database	Types of literature other than scientific journal articles on the Scopus database
All scientific journal articles published in English	Scientific journal articles published other than English

| Scientific journal articles focusing on digital curation, digital preservation in universities | Scientific journal articles do not focus on digital curation, digital preservation in universities |
| Time span of scientific journal articles from 2012 to 2022 | Time span of scientific journal articles other than 2012 to 2022 |

Quality Measurement

Quality measurement assessment is needed to evaluate to determine quality or Quality Assessment using the following question instruments:

1. QA1: Are there any journal articles related to digital curation at the university published in the period 2012 to 2022?
2. QA2: What is the research affiliation of Digital Curation in University in the period 2012 to 2022?

Then each scientific journal article will be given a value based on the question above with the assessment criteria Yes = 1 and No = 0

1. Yes: Scientific journal articles that match the questions in the Quality Assessment.
2. No: Scientific journal articles that do not match the questions in the Quality Assessment.

Result and Discussion

RQ1: How many studies have discussed digital curation in universities in 2012-2022?

The results of a search conducted through the Scopus database found 91 journal articles that have research relevance on the keywords Digital Curation in University in 2012-2022.

Table 5: Number of Articles 2012-2022

Year	Number of Articles
2012	16
2013	7
2014	6
2015	9
2016	10
2017	11
2018	5
2019	8
2020	8
2021	8
2022	3
Total	91

From the table data above, it shows that the trend of discussion with the highest digital curation in university keyword was in 2012 with 16 journal articles, then decreased in 2014 with 6 journal articles and experienced a gradual increase in succession from 2015 9 journal articles, in 2016 there were 10 journal articles, and in 2017 there were 11 journal articles. However, in 2018 it decreased to 5 journals and then rose again to 8 journal articles in 2019, 2020 and 2021. Until June 2022, only 3 journal articles were recorded and it is possible that this will increase by the end of December 2022.

Then, after conducting the selection, 15 journal articles were found that were closest to

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the title of digital curation studies at universities, including:

Table 6: Journal Article Data

Code	Author	Title	Journal	Year	QA1	QA2
A1	Sverrisdóttir, I.S., Sigurdsson, K., Hrafnkelsson, O.	Access and curation of digital cultural heritage in the national and University Library of Iceland	Microform and Digitization Review 41(3-4), pp. 97-102	2012	Yes	Yes
A2	Latham, B., Poe, J.W.	The Library as Partner in University Data Curation: A Case Study in Collaboration	Journal of Web Librarianship 6(4), pp. 288-304	2012	Yes	Yes
A3	Kenyon, J., Godfrey, B., Eckwright, G.Z.	Geospatial Data Curation at the University of Idaho	Journal of Web Librarianship 6(4), pp. 251-262	2012	Yes	Yes
A4	Brewer, J., Popp, T., Perrin, J.	REDDNET and digital preservation in the open cloud: Research at Texas Tech University libraries on long-term archival storage	Journal of Digital Information 13(1)	2012	Yes	Yes
A5	Dillon, C.	The Research Library as Digital Curator at Virginia Tech	College and Undergraduate Libraries, 24 (2-4), pp. 322-336.	2013	Yes	Yes
A6	Toups, M., Hughes, M.	When Data Curation Isn't: A Redefinition for Liberal Arts Universities	Journal of Library Administration 53(4), pp. 223-233	2013	Yes	Yes
A7	Noonan, D., Chute, T.	Data curation and the university archives	American Archivist 77(1), pp. 201-240	2014	Yes	Yes
A8	Dearborn, C.C., Barton, A.J., Harmeyer, N.A	The Purdue University Research Repository: HUBzero customization for dataset publication and digital preservation	OCLC Systems and Services 30(1), pp. 15-27	2014	Yes	Yes
A9	Perrin, J.M., Winkler, H.M., Yang, L.	Digital Preservation Challenges with an ETD Collection - A Case Study at Texas Tech University	Journal of Academic Librarianship, 41 (1), pp. 98-104	2015	Yes	Yes
A10	Antonio, A., Tuffley, D.	First year university student engagement using digital curation and career goal setting	Research in Learning Technology, 23, art. no. 28337	2015	Yes	Yes
A11	O'Flaherty, E.	Trinity college archives: A digital curation challenge	New Review of Information Networking, 20 (1), pp. 200-213.	2015	Yes	Yes

A12	McRostie, D.	The only constant is change: Evolving the library support model for research at the University of Melbourne	Library Management, 37 (6-7), pp. 363-372.	2016	Yes	Yes
A13	Robinson, L., Bawden, D.	"The story of data": A socio-technical approach to education for the data librarian role in the CityLIS library school at City, University of London	Library Management, 38 (6-7), pp. 312-322.	2017	Yes	Yes
A14	Earley, K., Livingstone, D., Rea, P.M.	Digital curation and online resources: digital scanning of surgical tools at the royal college of physicians and surgeons of Glasgow for an open university learning resource	Journal of Visual Communication in Medicine, 40 (1), pp. 2-12.	2017	Yes	Yes
A15	Roberts Thompson, A.D., Thompson, V.D., Kappers, M., Schenk, K., Williams, M.	Long-Term Legacies and Their Challenges in the Age of Modern Curation at the University of Georgia	Advances in Archaeological Practice, 7 (3), pp. 274-283.	2019	Yes	Yes

RQ2: What is the trend of digital curation research affiliate relationships in universities in 2012-2022?

Then the findings of 91 journal articles were processed using VosViewer to de-scribe the existing research trends

Table 7: Keyword Research and Affiliate Relationships

No	Keyword	Occurrences	Total Link Strength
1	Digital Curation	22	57
2	Data Curation	15	54
3	Digital Library	12	53
4	Information Management	7	35
5	Institution Repositories	6	35
6	Data Management	7	32
7	Digital Preservation	9	32
8	Information Services	5	32
9	Societies and Institutions	4	32
10	Human	7	31
11	Libraries	4	28
12	Research	5	26
13	Digital Storage	3	24
14	Academic Libraries	6	22
15	Design/Methodology/Approach	3	22

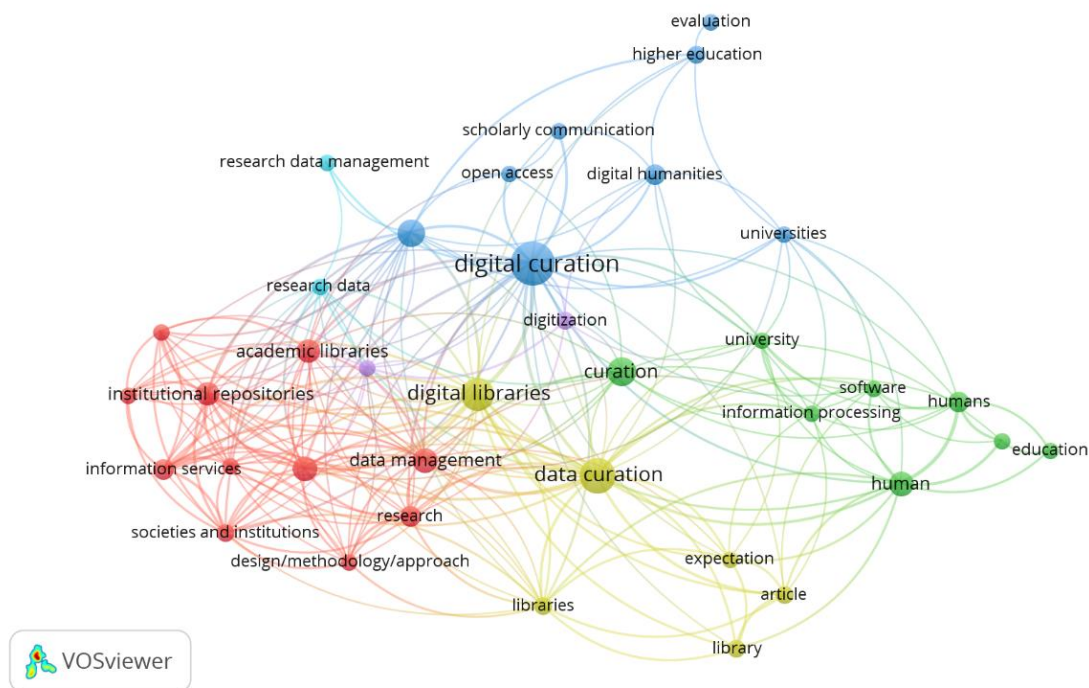| 16	Sustainable Development	3	20
17	Humans	5	18
18	Article	4	17
19	Institution Repository	3	17
20	Expectation	3	16
21	Curation	10	15
22	Collaboration	3	14
23	Library	4	14
24	Research Data	3	14
25	Software	3	14
26	Information Processing	3	13
27	University	3	13
28	Universities	3	11
29	Digital Humanities	5	10
30	Procedures	3	10
31	Digitization	4	9
32	Higher Education	4	7
33	Education	3	6
34	Open Access	3	6
35	Scholarly Communication	3	6
36	Research Data Management	3	4
37	Evaluation	3	1

Figure 2: Map of Affiliate Relationships Keyword Research Digital Curation in University

From the data above Figure 2, it shows the affiliation relationship of the research conducted. Digital curation shows the most studied with 22 studies and 57 research affiliation relationships. Next is Data Curation with 15 studies and 54 affiliate relationships, followed by

digital libraries with 12 studies and 53 affiliate relationships and then Curation with 10 studies and 15 affiliate relationships. From these results, it shows that these three keywords dominate digital curation studies that are rampant from 2012 to 2022. There are still many other topics that have not been widely studied by researchers which are opportunities to produce new research in the future.

Table 8: Digital Curation in University Research Cluster by Keyword

No	Cluster	Keyword
1	Red	Academic Libraries, Data Management, Design/Methodology/Approach Digital Storage, Information Management, Information Services, Institutional Repositories, Institutional Repository, Research, Societies and Institutions, and Sustainable Development
2	Green	Curation, Education, Human, Humans, Information Processing, Procedures, Software, dan University
3	Blue	Digital Curation, Digital Humanities, Digital Preservation, Evaluation, Higher Education, Open Access, Scholarly Communication, and Universities
4	Yellow	Article, Data Curation, Digital Libraries, Expectation, Libraries, and Library
5	Purple	Collaboration, and Digitization
6	Light Blue	Research Data, and Research Data Management

The table above shows that there are 6 clusters that were formed based on the keyword relationship Digital Curation in University based on search results from the Scopus database. The Red cluster shows that there are the most research keywords with a total of 11 keywords, then the Green and Blue clusters have 8 keywords, the Yellow cluster has 6 keywords, and the Purple and Light Blue clusters have 2 keywords.
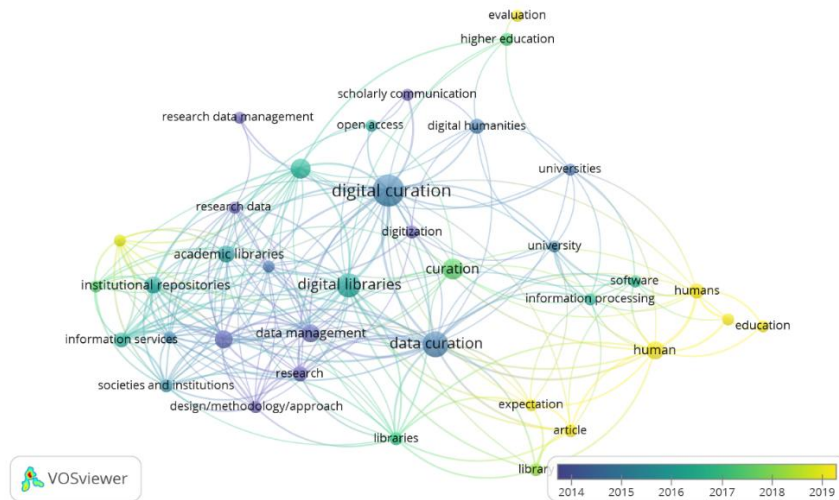

Figure 3: Affiliate Relationship Keyword Research Trends By Years Of Research Digital Curation in University

From the picture above Figure 3, research in 2012 is marked with a dark blue col-or which includes Research Data, Research Data Management, Design/Methodology/Approach with the results of 3 events.
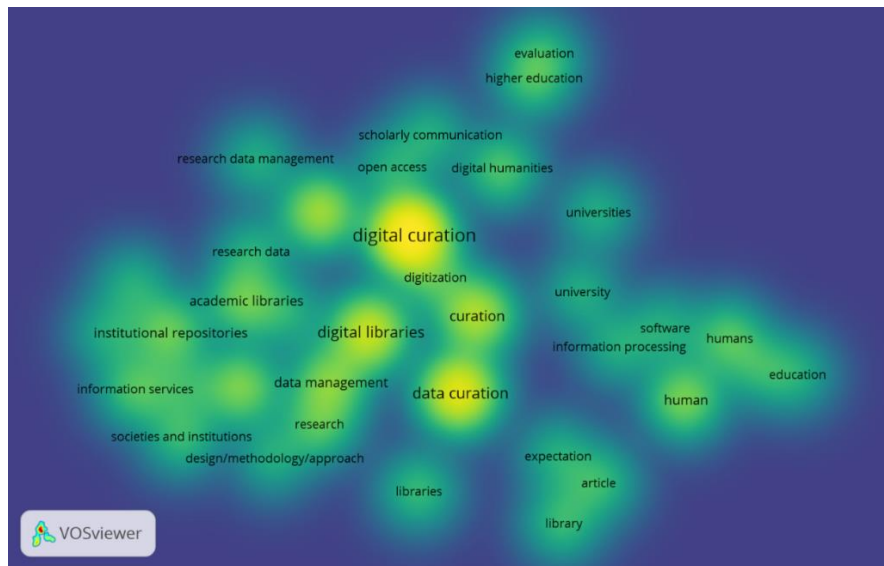
Figure 4: Density Visualization

Based on the image above Figure 4, density visualization can show research topics that are still rarely studied which are marked with dark colors. Meanwhile, re-search topics that are frequently researched are marked with bright colors. Based on the results of density visualization, the most frequently researched topics are the keywords digital curation, data curation, curation, digital library. The results of this analysis can help research to produce novelty through data on research topics that are still rarely studied.

Conclusion

Research with bibliometric analysis can describe research trends regarding digital curation in universities that are easy to understand. The use of VosViewer can also help describe the distribution map and research relationships that occur clearly. So, it can be seen the research trend as a reference that can be taken into consideration for researchers in determining the research to be carried out later. This research was limited to the 2012-2022 period obtained from the Scopus journal. From the results of research from the Scopus database in 2012-2022, it shows that there are 91 articles related to digital curation at universities. Digital curation is the most keyword in research journal articles with 22 research studies and with 57 research relations. The description of the research distribution map can be used to find out the distribution of research and what research is still rarely or not researched so that it can encourage novelty or novelty for further research development. So to obtain novelty, further research is needed taken from various types of journals to obtain more diverse and rich data about digital curation at universities.

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Authors' Contributions

All authors have contributed to the final manuscript. The contribution of all authors: conceptualization, methodology, formal analysis, writing original draft preparation, writing review and editing. All authors have read and agreed to the published version of the manuscript.

Conflict of Interest

All authors have no conflict of interest related to this study.

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