Media Literacy: A Scientometric Study Based on Web of Science during 1989-2020

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ABSTRACT

The study aims to do the scientometric analysis of global research output of media literacy during last 30 years. These 30 years produced 1038 documents on media literacy which have been cited 15.37 per cent citation per item. Most of the articles were published during the block 2017-2020. Multiple co-authorship has been the trend in media literacy research. Primack, B (18), Austin, E. W. (17) and Hobbs, K. (14) are identified as the most prolific authors. *Communicar* with 96 publications is the most productive journal. Korea, South Africa and Norway registered the highest multiple collaboration ratio (MCR). USA, United Kingdom and Australia are the leading countries in terms of citations received. The co-authorship network reflects 175 clusters about the authors who came together to contribute on media literacy. Further co-occurrence of keywords is given on the basis of author keywords in which media literacy had the total link strength (TLS) of 729 with 329 documents.

Keywords: Media literacy; Scientometrics; Web of science; Bibliometrix R package; VoSviewer

1. INTRODUCTION

The Media Literacy (ML) encompasses the practice that allows people to access, critically evaluate, and create and manipulate media. The term media denotes the outlets used to store and deliver information and data[1]. The term media literacy is comprises of information literacy, visual literacy, and new-mass media literacy[2]. It is an interdisciplinary concept and thus forms a part of and taught in Social Studies, Health, Math, Science, Arts and Technology[3]. ML is important in that it enriches one's ability to understand the trustworthiness of particular media. As such, this is not the subject in isolation, but has relation with all and librarianship is not an exception. UNESCO has asked national government to embed ML in their policies. Nijoboer, J and Hammelburg, E[2] tried to answer how the library can position and make a way for itself in the field of media literacy and how reasonable it is. They also tried to reinforce as to how media literacy by librarians fit a new approach by running pilot project 'journalistic' media literacy in which librarians worked as coaches.

Of late, ML has caught the attention of academicians and thinkers due to its pervasive nature. The authors from the various fields are contributing to put forth the different aspects in this field. Hence it is necessary to trace the literature available in the realm of ML which is the core reason to undertake the current study. This can be useful to those who are working in this area. Scientometric has been a very popular method to assess quantitatively the research output of any subject area[4, 5] and as such the present work attempts to use the same technique to measure the scientific output in ML.

2. LITERATURE REVIEW

The literature review indicated the various authors have attempted to map the research output of various types of literacy by using the scientometric and bibliometric methods. Bapte, Vishal pointed out[6] that though the information literacy research is visible from 1975, yet it got impetus from 2001 onwards. He also revealed how information literacy has been dominating area of research compared with other types of literacy. Onyancha, Omwoyo revealed[7] that media literacy along health literacy, business information literacy, metaliteracy, content literacy, workplace information literacy have emerged after 2000. The author concluded that the forms of information literacy has become dynamic and interdisciplinary and required collaborative approaches for its effective delivery in today's learning environments. Kondilis, B. K. *et al.* mapped[8] the health literacy research output of 25 European countries. The authors found a lot of inequalities existed in research publishing among Europe, Norway, Switzerland and US. Park, H; Kim, H. S. & Park, H. W. analysed[9] keywords, co-authorship and cited documents from WoS to do scientometric assessment of digital literacy, ICT literacy and media literacy. 'Media literacy' (108) was the most frequently used author keyword while co-occurrence of keyword revealed 'information literacy' to be dominant keyword. Valke, M; Clarco, M and San, Martin were ahead in co-authorship analysis. *Communicator* (108) has been highly productive journal. The select reviews made the author realise that there is no study which wholly endeavoured to study the scientometric assessment of literature on media literacy which justifies the significance of the study.

3. OBJECTIVES

The study has been conducted with following objectives.

- To trace the growth of the literature on media literacy.
- To take authorship preview and find out most prolific authors.
- To find out most relevant sources.
- To study the collaboration ratio of the contributing countries.
- To undertake a co-authorship study.
- To study the co-occurrence of keywords.

4. METHODOLOGY

The data for the present study was retrieved from Web of Science (WoS) by making search on 'media literacy' which yielded 1038 documents. These records represented the period between 1989 to 2020. The frozen phrase with quotation marks helped to eliminate results especially related to other forms of literacy i.e. digital literacy or information literacy. This search was carried out on 21 July, 2020. The retrieved records were analysed using R-studio using 'bibliomatrix'[10] package. The co-authorship network analysis was conducted using VoSviewer.

5. DATA ANALYSIS AND INTERPRETATION

5.1 Year wise Global Research Output on ML

Altogether 1038 documents have been published on media literacy which have been cited for 15958 times with 15.37 per cent an average citation per item. These 1038 documents can further be categorised as 854 articles, 1 book chapter, 38 early access articles, 18 proceeding papers, 27 book reviews, 2 corrections, 38 editorial materials, 1 early access editorial material, 1 letter, 14 meeting abstracts, 41 reviews and 3 early access reviews. All the research output has again been divided into 8 blocks of 4 years which revealed that the years between 2017-2020 have been highly productive that yielded 33.33 per cent literature. Nevertheless, 200 documents appeared during 2009-2012 have got 31.19 per cent citations and have highest h-index of 38. At the same time, 69 papers in the block 2001-2004 showed highest (34.07) average citation per paper. The average citation per item is calculated as 15.37 during the whole study period. There seemed to be a continuous growth in the literature on ML during the study period. It is indicative of the broaden area of this field wherein the authors are trying to study multitude angles of ML, media education, digital literacy and social media as shown in Table 1.

Table 1. Global research output on ML during 1989-2020

Year	TP	TC	ACPI	CWSC	H-index
1989-1992	5	20	4	20	3
1993-1996	6	81	13.5	81	4
1997-2000	40	1328	33.2	1318	18
2001-2004	69	2351	34.07	2346	21
2005-2008	107	2629	24.57	2602	32
2009-2012	200	4978	24.89	4911	38
2013-2016	265	3284	12.39	3194	29
2017-2020	346	1287	3.72	1150	16
1989-2020	1038	15958	15.37	13886	60

TP=Total Publication; TC=Total citations; ACPI= Average citation per item; CWSC=Citation without self-citations

Table 2. Prolific authors

| Author	Affiliation	TP	TC	ACPI	CWSC	h-index
Primack, B. A.	University of Pittsburgh, Pittsburgh, PA, USA	18	407	22.61	371	12
Austin, E. W.	Washington State University, Dept Strateg Commun, Pullman, WA, USA	17	633	37.24	571	11
Hobbs, R.	University of Rhode Island, Media Educ Lab, Kingston, RI, USA	14	447	31.93	437	8
Paxton, S. J.	La Trobe University, Melbourne, VIC, Australia	11	259	23.55	239	8
Scull, T. M.	Innovat Res & Training, SUITE, NC,USA	10	160	16	136	5
Jones, S. C.	ACU Engagement,Melborne, UIC, Australia	9	32	3.56	20	3
Mclean, S. A.	Victoria University, Melbourne, VIC, Australia	9	204	22.67	189	7
Pinkleton, B. E.	Washington State University, Pullman, WA,USA	9	332	36.89	309	8
Vraga, E. K.	University of Minnesota System, Minneapolis, MN, USA	9	57	6.33	36	5
Wilksch, S. M.	Flinders University, South Australia, Australia	9	345	38.33	320	7
Gordon, C. S.	ACU Engagement,Melborne, UIC, Australia	9	14	1.75	7	3
Greene, K.	University of Kentucky, Lexington KY, USA	8	101	12.63	84	5
Kupersmidt, J. B.	Innovat Res Training, Durham, NC, USA	8	159	19.88	139	5
Tully, M.	University of Lowa, Iowa City, IA, USA	8	50	6.25	31	4
Wade, T. D.	Flinders University, Adelaide, SA, Australia	8	402	50.25	384	8
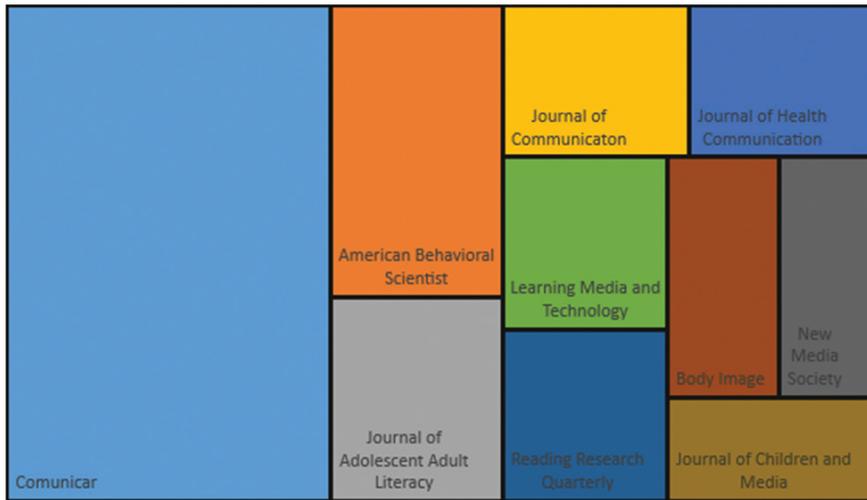
Figure 1. Tree map of most productive journals.

Table 3. Country wise output with MCP ratio

Country	Articles	Freq	SCP	MCP	MCP Ratio
USA	448	0.45390	410	38	0.0848
Spain	98	0.09929	83	15	0.1531
Australia	61	0.06180	52	9	0.1475
United Kingdom	60	0.06079	55	5	0.0833
Canada	37	0.03749	34	3	0.0811
Germany	35	0.03546	26	9	0.2571
China	28	0.02837	20	8	0.2857
Belgium	25	0.02533	21	4	0.1600
Turkey	24	0.02432	24	0	0.0000
Netherlands	15	0.01520	14	1	0.0667
Portugal	11	0.01114	10	1	0.0909
South Africa	11	0.01114	7	4	0.3636
Korea	10	0.01013	6	4	0.4000
Norway	9	0.00912	6	3	0.3333
Sweden	9	0.00912	7	2	0.2222

5.2 Authorship Preview and Prolific Authors

Writing through combinations of multitude of authors stimulates greater innovation and creativity. As such, collaboration serves as catalyst to scientific minds to produce research output[11].Overall 2065 authors have been found. They have been represented through 2656 appearances. The authors of single authored documents are 307; but 348 documents are single authored. In this case, some authors have appeared multiple times. The authors of multi-authored documents are 1758. The document per author is 0.503 and the author per document is 1.99. The co-authors per document are 2.56. The collaborative index has been calculated as 2.55. The writing in collaboration has been the trend amongst the authors writing on ML.

Table 2 reflects top 15 most productive authors contributing towards the content of ML. Here productivity is assumed in the sense 'the capacity of rendering efforts to produce publications'[12]. Primack, B. A leads with 18 publications, 407 citations and h-index of 12. He is followed by Austin, E.W (17), Hobbs, R (14), Paxton, S. J. (11), Scull, T. M. (10). Mclean, S. A., Pinkleton, B. E., Vraga, E. K., Wilksch, S. and Gordon C each have 9 publications to their credit. Austin, E. W. has received maximum (633) citations even though he is second in terms of publication output. Wade, T. D. and Wilksch, S. M are remarkable in that they have 50.25 and 38.33 average citation per item consecutively.

5.3 Most Relevant Sources

Figure 1 gives the tree map of the most productive journals in ML. The large portion in the left gives an idea that *Comunicar* is ahead with 96 publications output. It has been cited for 1336 times with an average citation of 13.92 per cent and h-index of 21. The second productive title is *American Behavioural Scientist* (TP=30, TC=465, h-index=12). It is followed by *Journal of Adolescent Adult Literacy* (TP=21, TC=190, h-index=6), *Journal of Communication* (TP=17, TC=887, h-index=13),*Journal of Health Communication* (TP=17, TC=296, h-index=7), *Learning Media and Technology* (TP=17, TC=76, h-index=6), *Reading Research Quarterly* (TP=17, TC=131, h-index=4), *Body Image* (TP=16, TC=388, h-index=11), *New Media Literacy* (TP=14, TC=903 and h-index=8) and *Journal of Children and Media* (TP=13, TC=13, h-index=2). New Media Society is noteworthy in respect of annual citation per item (64.5 %).

5.4 Country wise Publication and Collaboration Ratio

Out of 52 countries contributing for media literacy research, USA has been at the front with 448 publications which are the highest publications compared with any other country. In it, there are 410 written with the researchers from USA and 38 documents contain authorship from other countries with multiple collaboration ratio (MCP) ratio of 0.0848. USA has similarly been leading country in respect of information literacy research and collaborative research associated with it[13]. Next to USA are Spain (98), Australia (61), United Kingdom (60) and Canada (37) which have 15, 9, 5 and 3 MCP publications consecutively. However, Korea, South Africa and Norway have the highest collaboration ratio, though they do not have many publications in country wise output. Germany, China, Belgium, Turkey, Netherlands, Portugal, South Africa, Korea, Norway and Sweden are noteworthy for single country

Table 4. Most cited countries

| Country	Total citation	Average article citation
USA	9228	20.60
United Kingdom	1261	21.02
Australia	1249	20.48
Spain	1236	12.61
Canada	466	12.59
Switzerland	289	36.12
Germany	218	6.23
China	208	7.43
Belgium	181	7.24
Netherlands	165	11.00
Korea	159	15.90
France	157	39.25
Hungary	110	110.00
Croatia	102	51.00
Sweden	97	10.78
Portugal	65	5.91
Australia	54	13.50
Norway	48	5.33
Turkey	44	1.83
Israel	39	4.88

publications as shown in Table 3. India is 45th in the publication rank with MCP ratio of 1.

5.5 Most Cited Countries

In all, 49 countries have contributed for the proliferation of ML research and they have received 15663 citations for their contributed documents. USA is ahead in terms of citations (9228) with 20.68 average article citation. It is followed by United Kingdom (1261), Australia (1249), Spain (1236), Canada (466), and Switzerland (289). Remaining countries' received citations can be viewed through Table 4.

5.6 Co-authorship Analysis

Co-authorship study is one of the types of social network analysis which explore proliferation of collaboration among the researchers[14]. Figure 2 depicts the co-authorship network based on bibliographical data created through VOS-viewer with full counting method. The articles having 25 or more than 25 authors have been ignored. The authors having minimum 1 publication have been taken into account. 2132 authors met the threshold. 1000 authors with greatest total links have been calculated. The network contained 175 clusters in which initial largest clusters consist of 35, 32 and 23 items consecutively. Primack, B. A. seemed to have highest total link strength (TLS) of 52 who has produced 16 documents
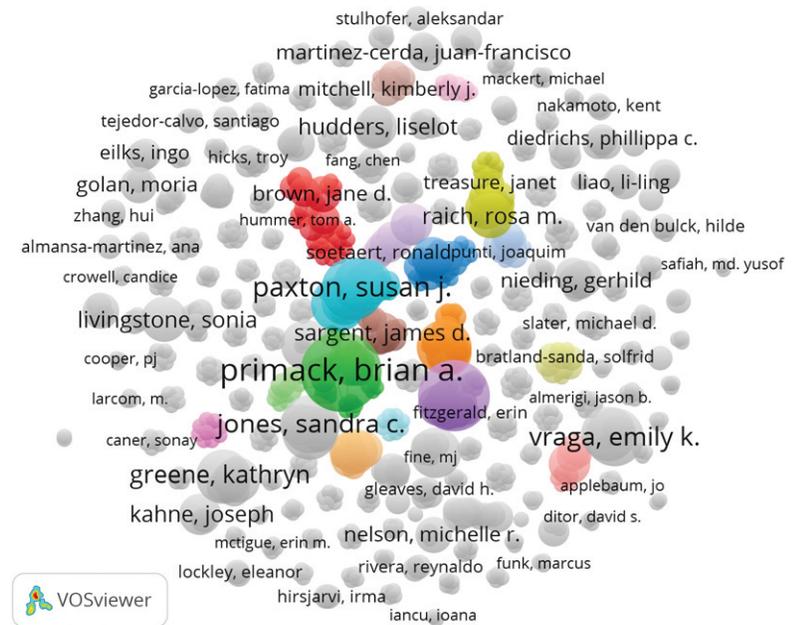
Figure 2. Co-authorship network.

in collaboration with 354 citations to them. Next to follow him are Austin, E. W. (TLS-33, documents-13, citation-318), Porter, K. J. (TLS-28, documents-5, ciations-57), Raich, R. M. (TLS-25, documents-6, citations-66), Strasburger, V. C. (TLS-23, documents-3, citatons-190), Anderson, C. A. (TLS-22, documents-2, citations-133), Jones, S. (TLS-22, documents-9, citations-32), Gordon, C. S. (TLS-21, documents-8, citatons-14), Penelo, E (TLS-21, documents-5, citations-52) and Pinkleton, B. E. (TLS-21, documents-7, citations-247). These authors are followed by Banerjee, S, Green, K., Zoellner, J. M, Chen, Yvonnes, and Paxton, S. J. The co-authorship network confirmed that the authors who tried to write in collaboration yielded greater productivity.

5.7 Keyword Co-occurrence

WoS science provides two type of keywords-Author Keyword and Keyword Plus. The former type of keywords is chosen by authors prudently thinking them fit to represent content of the document while the latter are generated by automatic computer algorithm[15]. Figure 3 shows the co-occurrence of author keywords having minimum 5 occurrences. Of the 2124 keywords, 119 met the threshold. As such, 119 keywords having greatest total link strength (TLS) have been selected. TLS denotes the total strength of the co-authorship links of a given researcher with other researchers'[16]. Figure 3 consists of 3 clusters. The red colour represents the keywords that have greatest total link strength and include 70 keywords. The second cluster is indicated through green colour containing 25 keywords. The last cluster comprises 24 keywords in blue colour. The prominent keywords are media literacy (occurences-379, TLS-729), media education (occurences-63, TLS-156), digital (occurences-23, TLS-151), media (occurences-45, TLS-107), adolescents (occurences-45, TLS-96), prevention (occurences-41, TLS-93), children (occurences-42, TLS-92), information

Figure 3. Co-occurrence of keywords.

literacy (occurences-29, TLS-88), social media (occurences-42, TLS-88), 4-adolescence (occurences-11, TLS-87), new literacies (occurences-13, TLS-86) and digital literacy (occurences-10, TLS-73).

6. CONCLUSIONS

The scientometric assessment of global research output on media literacy has been the central theme of the paper. The analysis was carried out on basis of 1038 records retrieved from WoS. The average citation per document registered as 15.37. The collaborative index has been calculated as 2.55. The top 15 authors contributed around 15 per cent documents. India is at 45th position in respect of country wise publication output with MCP of 1. Primack, B. A, Austin E. W. and Portal E. J. ahead with regard to collaborative publications. 'Media literacy' and 'Media education have come forward as the prominent keywords.

Considering the importance of ML, American Library Association (ALA) initiated a project 'Media Literacy at Your Library' in collaboration with the Center for News Literacy at Stoney Brook University (CNL) wherein librarians are designing the programs to enlighten the elder patrons about ML[17]. Although the present study does not attempt to have a reflection on such kind of projects or initiatives, yet the library professionals are expected to search additional avenues to sustain their position and make it effective by exploring the sphere of ML.

The study is limited in that the documents available only from WoS were considered for the scientometric analysis. Many journals containing literature on ML may not have been covered by this database. There is scope for the researcher to conduct more in-depth study by taking the data from Scopus or also the databases representing the content in regional language.

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