

Scholarly Publications on Information Literacy (1989-2020): A Bibliometric Study

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ABSTRACT: *Information Literacy is one of the focus areas of research conducted by researchers from different cross-sections of disciplines. The present bibliometric study conducted based on scholarly communications on the subject within 31 years during 1989-2020 has revealed many clues. For the study, from the Web of Science database, bibliometrix R-package Biblioshiny and VOSviewer could generate 1764 documents from different 357 sources having a total of 35558 references. The study's findings indicate that 2016 is the most contributing year for Information Literacy related publications. The USA tops in the aspects of most productive country and most cited country of the publication. At the same time, M. Pinto is found to contribute a maximum of 37 publications. Of the top 20 scholarly journals, 'Journal of Academic Librarianship' is the highest in communicating such articles with 166 numbers.*

Keywords: Information Literacy, Scholarly Communications, Bibliometrics, Web of Science, Biblioshiny, VOSviewer

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1. Introduction

The concept of information literacy (IL) was first introduced by Paul G. Zurkowski, the President of the Information Industry Association, in 1974. The National Forum on Information Literacy defined the phrase as *'the ability to know when there is a need for information and to be able to identify, locate, evaluate and effectively use that information for the issue or problem that at hand'* (Kolle, 2017). Zurkowski pointed out that *'people trained in the application of information resources to their work can be called information literates'* (Behrens, 1994). The American Library Association (ALA) defines information literacy *'as a set of abilities requiring individuals to recognise when information is needed and have the ability to locate, evaluate, and use effectively the needed information'* (Information literacy, 2019). After 2000, new concepts of literacies appeared, such as digital literacy, media literacy, business information literacy, health literacy, meta-literacy, content literacy, workplace information literacy, scientific literacy, and science literacy (Onyanacha, 2020).

Even though many authors (Pinto *et al.*, 2020; Karisiddappa *et al.*, 2020; Goyal & Kumar, 2020; Pinto *et al.*, 2012; Stopar & Ba, 2018) have already conducted studies to understand IL research trends in various aspects by employing bibliometric methods. In this study, an attempt to analyse published works on information literacy for more than 30 years from 1989 to 2020 to understand IL's research trends.

2. Review of Literature

Bibliometric studies dedicated to IL and its related areas occupy a significant place in Library and Information Science research globally, as understood from the following review. The study conducted by Onyancha (2020) analysed 6,662 articles on the literature of information literacy between 1975 and 2018 using knowledge visualisation and mapping from the Scopus database. While Pinto *et al.* (2020) analysed research publication on the trends of mobile information literacy in higher education that were indexed in the five databases, i.e. ERIC, LISA, LISTA, Scopus and WoS, between 2006 and 2019, found that there was growth in the scientific publications on mobile information literacy during the study period. The same study conducted again by Pinto *et al.* (2019) on mobile information literacy in higher education published between 2006 and 2017 had identified the most relevant journals, productive authors and average productivity, co-occurrence word analyses of keywords. Stopar and Bartol (2018) worked on mapping and visualising the digital literature competences, computer skills, and information literacy by using the Web of Science (WoS) and Scopus databases. Also, Bapte (2020) measured the global research output on information literacy (IL) from the Scopus database. He analysed the different parameters, i.e. most significant sources with the highest citations, document types, the most prolific author, affiliation, country and keywords. Different researchers conducted a Bibliometrics study on "Information Literacy" (Kolle, 2017; Bhardwaj, 2017; Pinto, 2015). A bibliometric analysis of the European Union's health literacy research during 1991-2005 was studied by Kondilis *et al.* (2008). A study on different digital literacy topics, ICT literacy and media literacy, was conducted by different researcher (Park *et al.*, 2020; Alagu & Thanuskodi, 2019).

3. Objectives of the Study

The present study has been taken up with the objectives to:

1. Assess the characteristics and trends of research in information literacy and its related aspects;
2. Understand with the highly cited paper, most relevant sources, contributing researchers/authors and most cited references;
3. Know the contributing institutions and countries associated with such studies; and
4. Aware of the research productivity and use of IL as a keyword, among other terms.

4. Scope, Sample and Methods

The present study's data has been searched, identified and downloaded from the Clarivate Analytics Web of Science (WoS) Core Collection Database. The keywords "Information literacy" with its narrower terms "media literacy", "internet literacy", and "electronic information resource literacy" provided by the Library of Congress Subject Headings (LCSH) to identify literature has been searched by using a Title (TI) search such as $TI = ("information\ literacy" OR "media\ literacy" OR "internet\ literacy" OR "electronic\ information\ resource\ literacy")$ to locate publications brought out from 1989 to 06th of August 2020.

By conducting such a search strategy, a total of 1,764 publications were retrieved from the WoS. The data sources imported using Biblioshiny include 1,764 different documents from 357 sources, having 35558 references contributed by 2626 authors. However, the appearances of these authors are found to be 3625. The retrieved data exported in plaintext (.txt) file format from the database is used as the data source. For data analysis and visualisation, the *bibliometrix* R-package Biblioshiny (Aria & Cuccurullo, 2017) and VOSviewer software (Van Eck & Waltman, 2009) were used.

5. The Bibliometric Profile

The bibliometric profile of the studies concerning Information Literacy constitutes the primary data source for the present study found in different types of documents. Table 1 represents the bibliometric profile on *information literacy* literature

Description	Results	Description	Results
Main Information About Data		Authors	
Timespan	1989-2020	Authors	2626
Sources (Journals, Books, etc.)	357	Author Appearances	3625
Documents	1764	Authors of single-authored documents	641
Average years from publication	8.93	Authors of multi-authored documents	1985
Average citations per documents	10.99		
Average citations per year per doc	1.104	Authors Collaboration	
References	35558	Single-authored documents	829
Document Contents		Documents per Author	0.672
Keywords Plus (ID)	1096	Authors per Document	1.49
Author's Keywords (DE)	1962	Co-Authors per Documents	2.05
		Collaboration Index	2.12

Table 1. Bibliometric profile on Information Literacy literature

research conducted worldwide during 1989-2020. As described, of the 1764 documents considered for the study, there are 641 single-authored and 1985 multi-authored documents. On the other hand, there are 829 single-authored documents and 0.672 documents per author in author collaboration. The authors per document constitute 1.49. Again, the co-authors' rate per document is 2.05, while the collaborative index of all the 1764 papers being 2.12, as Table 1 highlights.

5.1. Documents Types

Regarding the document types, the following figure 1 shows among the total 1,764 documents, 15 document types were retrieved by the Biblioshiny tool. The highest number of document types available is Article, i.e. 1190 accounting for 67.46% of the total publications, followed by Book Review 282 (15.99%), Meeting Abstract 65 (3.68%) so on. Letter and News Item has 4 (0.23%) publications. The lowest publications were from Article; Book Chapter, Article; Retracted Publication and Note with 1 (0.06%).

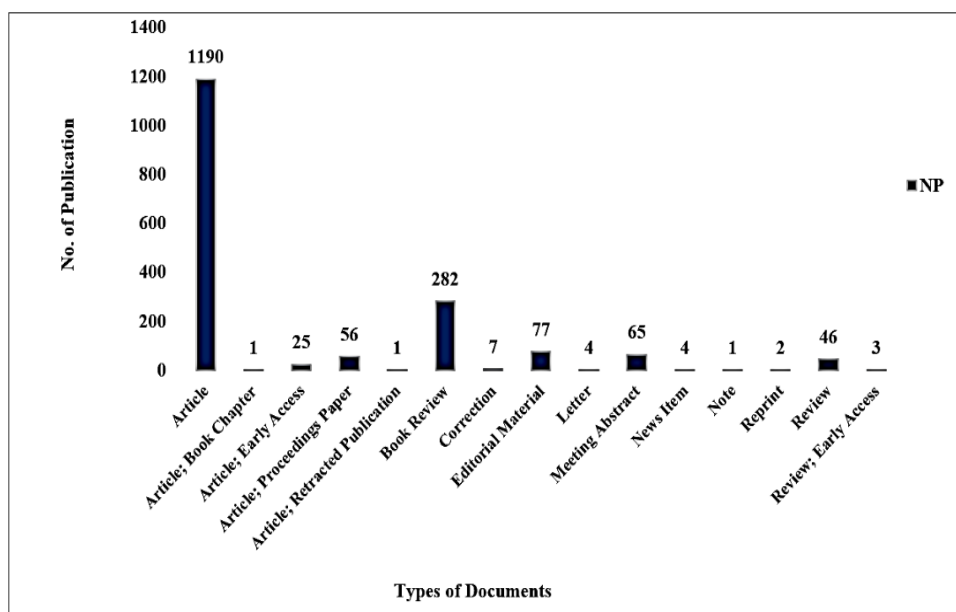


Figure 1. Types of Document

6. Growth Pattern

Table 2 and figure 2 have illustrated the publication trends in information literacy for 1989-2020. The articles published in 2016 have received the highest publication with NP (132). The lowest rate (2) each was recorded for the articles published in 1989 and 1997.

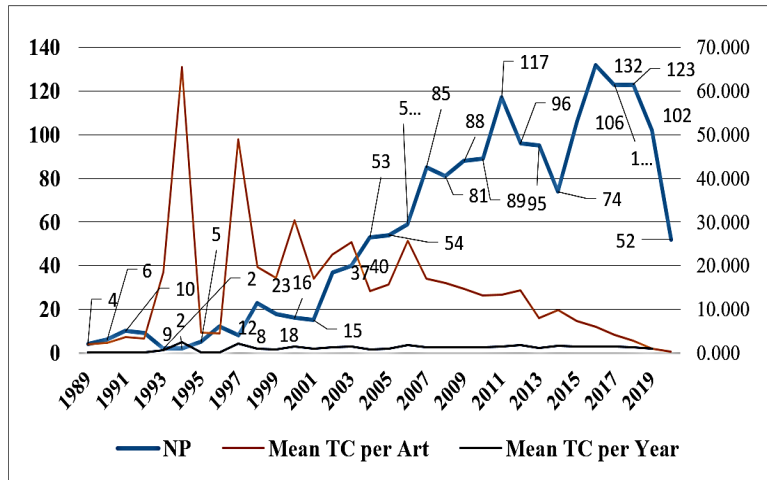


Figure 2. Growth Pattern on Literature publications (1989-2020)

Year	NP	Mean TC per Art	Mean TC per Year	Citable Years	Year	NP	Mean TC per Art	Mean TC per Year	Citable Years
1989	4	2.000	0.065	31	2005	54	15.648	1.043	15
1990	6	2.333	0.078	30	2006	59	25.695	1.835	14
1991	10	3.700	0.128	29	2007	85	16.976	1.306	13
1992	9	3.333	0.119	28	2008	81	16.012	1.334	12
1993	2	18.500	0.685	27	2009	88	14.682	1.335	11
1994	2	65.500	2.519	26	2010	89	13.225	1.322	10
1995	5	4.600	0.184	25	2011	117	13.427	1.492	9
1996	12	4.417	0.184	24	2012	96	14.313	1.789	8
1997	8	49.000	2.130	23	2013	95	7.947	1.135	7
1998	23	19.783	0.899	22	2014	74	9.878	1.646	6
1999	18	17.167	0.817	21	2015	106	7.330	1.466	5
2000	16	30.375	1.519	20	2016	132	5.992	1.498	4
2001	15	17.000	0.895	19	2017	123	4.187	1.396	3
2002	37	22.595	1.255	18	2018	123	2.756	1.378	2
2003	40	25.425	1.496	17	2019	102	0.941	0.941	1
2004	53	14.151	0.884	16	2020	52	0.327	0.327	0

*NP = Number Publications; TC = Total Citation

Table 2. Growth pattern of publication from 1989-2020

7. Highly-Cited Papers

Table 3 shows the characteristics of the most highly cited and productive papers whose Global Citation Score (GCS) ranging from 123-192 and Local Citation Score (LCS) ranging from 61-4 which received during the study period. Four articles were contributed by a single author, three articles by two authors, and three authors' articles. As seen, the article entitled '*Critical information literacy: Implications for instructional practice*' authored by Elmborg (2006) has received 192 GCS with 60 LCS making the most highly-cited article with 12.800 Total Citation per Year (TCPY), followed by the paper '*Conceptions of information literacy: new perspectives and implications*' of the Authors Webber and Johnston (2000) has received 160 GCS and 61 LCS. The third highly-cited article, '*Information literacy as a sociotechnical practice*', on the other hand, got 151 GCS and 54 LCS. However, the Local Citation Score (LCS) is lowest in the case of the article of Kong (2014), i.e. '*Developing information literacy and critical thinking skills through domain knowledge learning in digital classrooms: An experience of practicing flipped classroom strategy*' has a score 4 LCS only but TCPY is highest among the other articles with 18.286 as seen in the table.

Title of the Paper	Author (s);Year; &Source	LCS	GCS	TCPY
Critical information literacy: Implications for instructional practice (Elmborg, 2006)	Elmborg J; 2006 & J AcadLibr	60	192	12.800
Conceptions of information literacy: new perspectives and implications (Webber & Johnston, 2000)	Webber S & Johnston B;2000 & J Inform Sci	61	160	7.619
Information literacy as a sociotechnical practice (Tuominen <i>et al.</i> , 2005)	Tuominen K, Savolainen R & Talja S;2005 & Libr Quart	54	151	9.438
Effects of general and alcohol-specific media literacy training on children's decision making about alcohol (Austin & Johnson, 1997)	Austin EW & Johnson KK;1997 & J Health Commun	54	151	9.438
The seven great debates in the media literacy movement (Hobbs, 1998)	Hobbs R; 1998 & J Commun	40	142	5.917
Reframing Information Literacy as a Meta literacy (Mackey & Jacobson, 2011)	Mackey TP & Jacobson TE;2011 & Coll Res Libr	41	135	5.870
Developing information literacy and critical thinking skills through domain knowledge learning in digital classrooms: An experience of practicing flipped classroom strategy (Kong, 2014)	Kong SC; 2014 & Comput Educ	21	133	13.300
A Conceptual Analysis and Historical Overview of Information Literacy (Behrens, 1994)	Behrens S; 1994 & Coll Res Libr	4	128	18.286
Information literacy in higher education: a review and case study (Johnston & Webber, 2003)	Johnston B & Webber S; 2003 & Stud High Educ	43	127	4.704
Health information literacy and competencies of information age students: Results from the interactive online Research Readiness Self-Assessment (RRSA) (Ivanitskaya <i>et al.</i> , 2006)	Ivanitskaya L, O'Boyle I & Casey AM; 2006 & J Med Internet Res	36	126	7.000
		22	123	8.200

*LCS=Local Citation Score; GCS=Global Citation Score; TCPY=Total Citation Per Year

Table 3. Most highly cited papers

8. Research Productivity

The 20 most productive and influential author, country, and affiliation published papers on information literacy, and its related aspects were presented in table 4 and figure 3. A total of 2,626 authors had contributed 1,764 articles on information literacy. Pinto, M was the most productive author with 37 articles and took the first rank in total articles. Bruce, Ch emerged as the second most productive author with 15 articles. Similarly, Lloyd, A and Sales, D has contributed 14 articles each and placed in the third rank in total articles. A total of 76 countries had contributed to information literacy research for the period. The USA is ranked first in NP of 845. Australia is the second most productive country in the case of NP (126), followed by England (102), Spain (79), Canada (71) and so on. A total of 1,162 affiliations had contributed their publication towards information literacy. Table 4 presents the top 20 most productive affiliation with 14 or more articles. The University of Granada is the most productive institution with 55 number of publication (NP). The *Washington State University* had occupied in second highest with 48 NP, followed by Queensland University of Technology (32), University of Pittsburgh (31), and University of Illinois (25) and so on.

Author	NP	Country	NP	Affiliation	NP
Pinto, M	37	USA	845	Univ Granada	55
Bruce, Ch	15	Australia	126	Washington State Univ	48
Lloyd, A	14	England	102	Queensland Univ Technol	32
Sales, D	14	Spain	79	Univ Pittsburgh	31
Julien, H	13	Canada	71	Univ Illinois	25
Austin, EW	12	Peoples R China	41	Charles Sturt Univ	23
Majid, S	10	Brazil	32	Nanyang Technol Univ	23
Majid, S	10	Brazil	32	Nanyang Technol Univ	23
Saunders, L	10	Taiwan	28	Purdue Univ	20
Badke, W	9	Germany	27	Univ Maryland	19
Fernandez-Pascual, R	9	Sweden	27	Univ Ljubljana	18
Foo, S	9	Singapore	24	Univ Nevada	17
Paxton, SJ	9	Turkey	24	Univ Oulu	17
Gordon, CS	8	Scotland	23	Univ Sheffield	17
Gross, M	8	South Africa	23	Simmons Coll	15
Jones, SC	8	Finland	19	Univ Alberta	15
Latham, D	8	New Zealand	17	Univ Estadual Paulista	15
Mclean, SA	8	Colombia	16	La Trobe Univ	14
Oakleaf, M	8	Malaysia	14	Temple Univ	14
Primack, Brian A.	8	Slovenia	13	Trinity Univ	14
Uribe-Tirado, A	8	Netherlands	12	Univ Malaya	14

*NP = Number of Publication

Table 4. Productivity by Authors, Countries and Affiliations

frequency of occurrences 406 with TLS 522, 139 with TLS 199 and 36 with TLS 100, respectively. Author keywords such as 'higher education', 'media education', and 'library instruction' with a frequency of occurrences 35, 33 and 30, respectively, also have a good performance with their respective TLS. Further, 1096 sets of KeyWords Plus have appeared, out of which 144 meet the threshold, from this KeyWords Plus such as 'education' with 120, 'skills' with 109 and 'students' with 89 were top three.

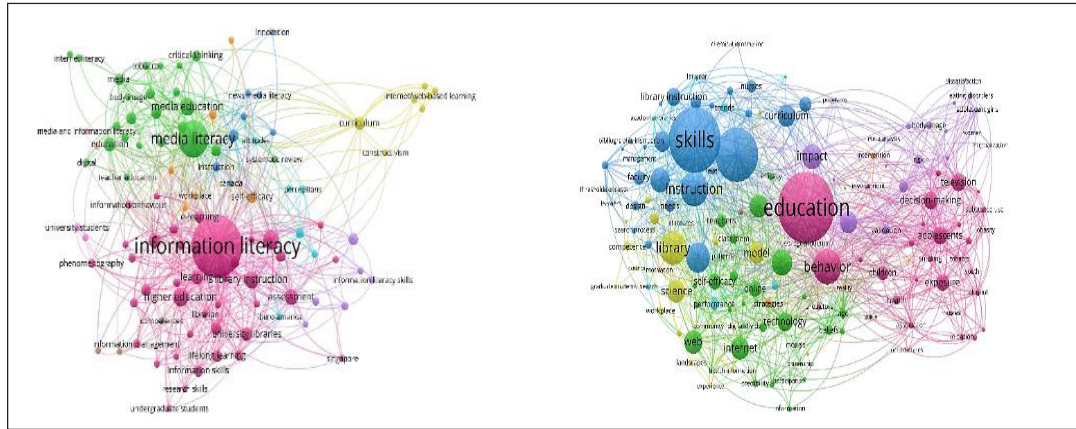
Author keywords	Occurrences	TLS	KeyWordsPlus	Occurrences	TLS
information literacy	406	522	education	120	343
media literacy	139	199	skills	109	284
academic libraries	36	100	students	89	253
higher education	35	71	behavior	56	216
media education	33	71	instruction	55	159
library instruction	30	73	library	54	142
assessment	25	64	seeking	47	130
literacy	22	47	knowledge	41	118
learning	21	48	impact	39	171
education	19	42	higher-education	37	111
university libraries	18	44	web	36	80
curriculum	17	38	internet	35	101
students	17	49	perceptions	35	121
adolescents	16	30	science	35	91
digital literacy	15	39	curriculum	34	100
e-learning	15	30	attitudes	33	146
pedagogy	15	42	model	32	108
information	14	35	university	31	116
social media	14	26	technology	29	99
information skills	12	35	adolescents	27	127

*TLS = Total Link Strength

Table 5. Top 20 most representative Author keywords and KeyWords Plus

10. Most Relevant Sources

The literature on information literacy had published in 357 journals. The top 20 most productive journals are presented in table 6 and figure 5, with the number of publications (NP) with their Total Citation (TC) and Journal Citation Report-Impact Factor (JCR-IF) of 2018 that these journals received for the articles. The 'Journal of Academic Librarianship' has published 166 articles on the information literacy topic takes the first rank with TC (2230) and impact factor (IF) is 1.608. 'College & Research Libraries' is the second most productive journal with 86 articles with TC (1340) and its IF (1.946) is highest among the journal under study followed by 'Portal-Libraries and the Academy' (79), 'Reference & User Services Quarterly' (63),



Author Keywords

KeyWords Plus

Figure 4. Showing keywords analysis (Author keywords & KeyWords Plus)

Source	NP	JCR-IF (2018)	TC	TLS
Journal of Academic Librarianship	166	1.608	2230	736
College & Research Libraries	86	1.946	1340	479
Portal-Libraries and the Academy	79	1.037	988	380
Reference & User Services Quarterly	63	0.444	393	147
Journal of Librarianship and Information Science	62	1.203	652	395
Information Research-An International Electronic Journal	56	0.799	535	208
Journal of Documentation	40	1.573	930	355
Library & Information Science Research	39	1.425	607	296
Comunicar	36	3.338	573	25
Reference Services Review	34	1.250	101	160
Australian Library Journal	31	0.348	68	28
Library Journal	31	0.438	22	13
Libri	31	0.553	319	160
Electronic Library	27	0.886	184	75
Canadian Journal of Information and Library Science	25	0.258	148	69
Library Trends	25	0.627	416	175
Journal of the Medical Library Association	24	2.420	153	73
Health Information and Libraries Journal	22	1.179	156	78
Library Quarterly	22	1.240	382	160
Health Information and Libraries Journal	22	1.179	156	78

*NP= Number of Publications; TC = Total Citations; TLS = Total Link Strength; JCR-IF = Journal Citation Report-Impact Factor

Table 6. Most Relevant Sources

'Journal of Librarianship and Information Science' (62), 'Information Research-An International Electronic Journal' (56), and so on. The 'Library Journal' is the only journal which has only 22 TC citation among all.

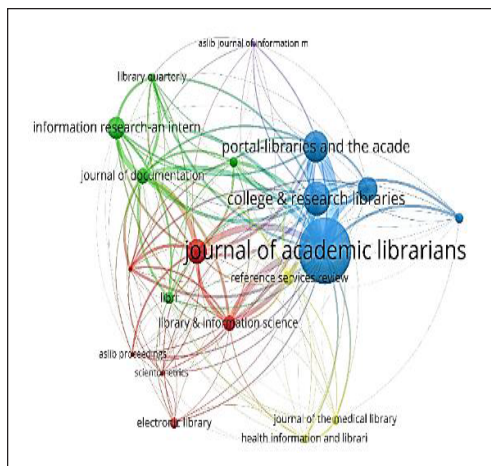


Figure 5. Visualization of relevant sources

11. Corresponding Author's Country and Most Cited Countries

Concerning the corresponding author's contributions, as Table 7 shows, the *USA* has the highest corresponding authors with 860 articles, 831 SCP and 29 MCP. *UK* occupied second with 113 articles, 110 SCP and 3 MCP, followed by *Australia* with 112 articles, 102 SCP and 10 MCP. *Germany* has the lowest corresponding authors, with 20 articles, 20 SCP and 0 MCP. In highly cited countries, the *USA* is the most cited country of the top 10 countries in research productivity. The total citations and the average citations are 9572 and 11.13, respectively, as Table 7 shows. *Australia* has followed the *USA* with 2050 citations, the *UK* with 1582 citations. The other cited countries include *Canada*, *China*, *Spain* and *Finland* with 945, 852, 813 and 329, respectively. Among the top 10 most productive countries, the highest Average Article Citations (AAC) (18.304) is received by *Australia*, followed by *Finland* (18.278), *Canada* (15.242), *Turkey* (14.476), and so on.

Corresponding Author's Country						Most Cited Countries		
Country	NP	Freq	SCP	MCP	MCP Ratio	Country	TC	AAC
USA	860	0.5196	831	29	0.0337	USA	9572	11.13
UK	113	0.0683	110	3	0.0265	Australia	2050	18.304
Australia	112	0.0677	102	10	0.0893	UK	1582	14
Spain	71	0.0429	57	14	0.1972	Canada	945	15.242
Canada	62	0.0375	59	3	0.0484	China	852	13.967
China	61	0.0369	50	11	0.1803	Spain	813	11.451
Brazil	28	0.0169	25	3	0.1071	Finland	329	18.278
Sweden	22	0.0133	21	1	0.0455	Turkey	304	14.476
Turkey	21	0.0127	21	0	0.0000	South Africa	269	13.45
Germany	20	0.0121	20	0	0.0000	Sweden	249	11.318

*NP = Number of Publication; SCP = Single Country Publications; MCP = Multiple Country Publications; AAC= Average Article Citations

Table 7. Top ten Corresponding Author's Countries and Most Cited Countries

12. Most Cited References

The twenty most cited references are shown in table 8 and its corresponding figure 6. For this purpose, the first author or the name of the Organisation, the publication year, the source journal, volume, page number and doi of cited references were considered. 'Association of College and Research Libraries 2000 Inf Lit Comp Stand H' has topped the list and became the highest cited reference having 136 times citations by the papers published in the area. It has become the highest most local cited reference during the first five months of 2020. The lowest cited article in this regard is 'Pawley C 2003 Libr Quart V73 P422', which cited 35 times.

Cited References	Citations
Association of College and Research Libraries 2000 Inf Lit Comp Stand H	136
ACRL 2000 Inf Lit Comp Stand H	95
Bruce C. 1997 7 Faces Inform Liter	86
Webber S 2000 J Inform Sci V26 P381 Doi 10.1177/0165551004233401	61
Elmborg J 2006 J AcadLibr V32 P192 Doi 10.1016/J.Acalib.2005.12.004	60
Bawden D 2001 J Doc V57 P218 Doi 10.1108/Eum0000000007083	60
American Library Association 1989 PresCommInf Lit Fi	60
Kuhlthau C. C. 2004 Seeking Meaning Proc	59
Tuominen K 2005 Libr Quart V75 P329 Doi 10.1086/497311	54
Behrens Sj 1994 Coll Res Libr V55 P309 Doi 10.5860/Crl_55_04_309	43
Bundy A. 2004 AustrNz Inform Lite	42
Hobbs R 1998 J Commun V48 P16 Doi 10.1111/J.1460-2466.1998.Tb02734.X	41
Lloyd A 2006 J Doc V62 P570 Doi 10.1108/00220410610688723	40
Austin Ew 1997 J Health Commun V2 P17	40
Boon S 2007 J Doc V63 P204 Doi 10.1108/00220410710737187	37
Simmons Mh 2005 Portal-LibrAcad V5 P297 Doi 10.1353/Pla.2005.0041	36
Johnston B 2003 Stud High Educ V28 P335 Doi 10.1080/03075070309295	36
Grafstein A 2002 J AcadLibr V28 P197 Doi 10.1016/S0099-1333(02)	36
Pawley C 2003 Libr Quart V73 P422	35

Table 8. Top 20 most cited references in the area of Information Literacy (IL)

The visualisation of the above table is also understood from the following figures.

13. Summary of Findings and Conclusion

IL is an area of highly preferred research, the phenomenon being global. Covering 1764 publications of varied nature contributed by 2626 authors retrieved from 357 different sources. The present study could retrieve 35558 references, which provide us with clues for researchers' interest in the field. During a time span of 31 years, the year 2016 marks as highest in contributing research articles by the researchers. The article '*Critical information literacy: Implications for instructional practice*' has got the highest global citations to score, whereas '*Health information literacy and competencies of information age students: Results from the interactive online Research Readiness Self-Assessment (RRSA)*' is the lowest during the period under study.

On the other hand, '*Developing information literacy and critical thinking skills through domain knowledge learning in digital classrooms: An experience of practicing flipped classroom strategy*' is found to be the highest (18.286) in total

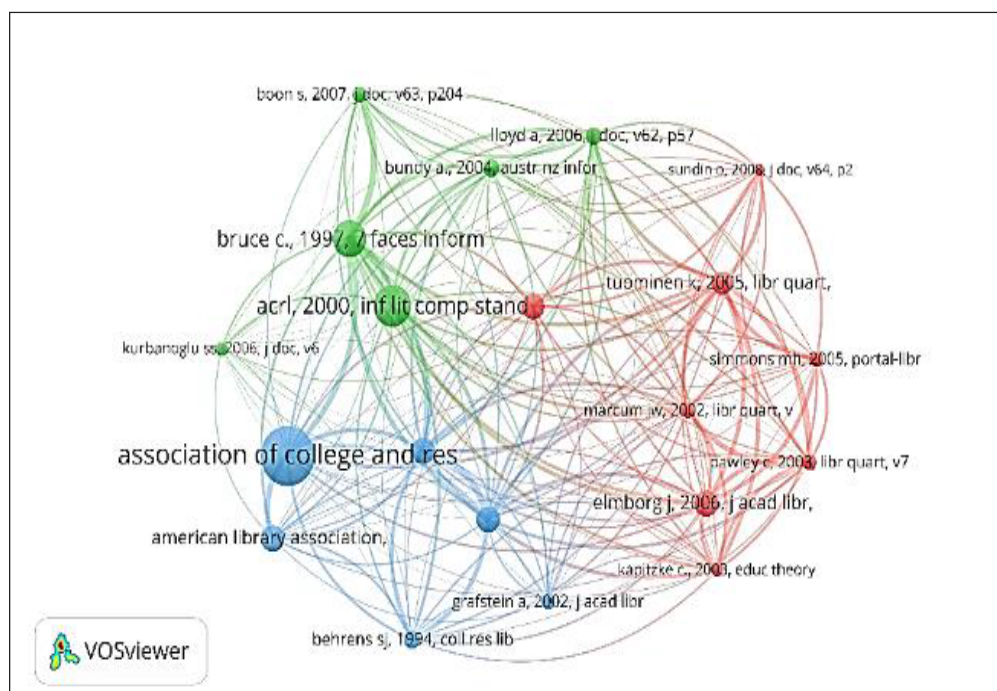


Figure 6. Visualization of mostly cited references on IL

citation per year (TCPY), followed by “*Reframing Information Literacy as a Meta literacy*” (13.300). Among the contributing countries in the field, the USA tops the list having 845 publication in the count. The ‘*University of Granada*’ tops the list in affiliation, having 55 number of publication (NP). Concerning the most contributing author, M. Pinto is found to be in the top with 37 papers on IL during the period.

Concerning the analysis of authors keywords used in the articles understudy, “*Information Literacy*” is the highest, with 406 occurrences having total link strength (TLS) of 522. Of the 20 shortlisted top journals, the findings have revealed that the ‘*Journal of Academic Librarianship*’ has published the maximum number of articles related to IL from 1989 to 2020 with 166 publications, 1.608 JCR-IF, getting 2230 citations having 736 total link strength. Again the USA tops the top ten countries globally regarding the corresponding author’s country and most cited country. The pattern of citation of the top 20 most cited references in the field of IL lies within the range of 37-136 references.

It is evident from the present study that Information Literacy is a thrust area of study on which researchers from across the world had given importance since 1989. There has been remarkable growth in this research area, since 1998 onwards as all have accepted its significance. In every field of human life, being information literate has become an important aspect. The present study pertinently provides a glance of major source titles, most prolific authors, country-wise contributions, and most prolific institutions that have been influential in promoting IL research. Such a study is helpful to have a bird’s eye view of the research undertaken in the field from across the globe. The IL, as understood, is expected to be dealt with different dimensions and aspects in various areas as an important research area in the future.

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