

## Information Literacy: A Scientometric Assessment of Global Research Output

Vishal D. Bapte

*Sant Gadge Baba Amravati University, Amravati - 444 602*

*E-mail: vishal\_bapte@rediffmail.com,*

### ABSTRACT

The paper attempts to measure the global research output on information literacy (IL) on the basis of data retrieved from SCOPUS database during 1975 to 2019. The total output included 7070 record and 50584 citation. The average citation per paper was 7.15 per cent. Among the most significant sources titles used for the publication of IL research, *Communication in Computer and Information Science* was found to be leading journal with 380 papers. However, *Journal of Academic Librarianship* has been recorded for receiving highest citations (6.75 %) and highest (32) h-index. Pinto, M from Universidad de Granada has been observed as the most prolific author with 48 publication. Lloyed, A got maximum 1062 citation and the highest (17) h-index was calculated for him. Out of total output in the entire subject field, the subjects in the Social Sciences have been resulted for highest quantitative yield with h-index 170. With regard to the distribution by the types of documents, 'Article' seemed to be most preferred source over the rest. USA accounted for 46.94 per cent research output in total publications. Purdue University from United States and Queensland University of Technology 'OUT' from Australia have been most prominent institutions in terms of institutional output. 7070 documents produced 22353 keyword in which the phrase 'information literacy' dominated the remaining terms.

**Keywords:** Scientometrics; Information literacy; SCOPUS; VOSviewer.

### 1. INTRODUCTION

The concept of information literacy (IL) has gained very popular acclaim in Librarianship. The American Association of School Librarians' (AASL) defined information literate as one who accesses information efficiently and effectively, critically evaluates the information, and uses it accurately and creatively<sup>1</sup>. It seems to be a buzz word in this decade for library professionals and even today its different aspects are being studied theoretically and practically. Information literacy instruction, models of IL, content of IL, method of instructions, its connection with lifelong learning, IL assessment, critical thinking and specific role of library professionals and other teaching communities are some of the points which can be mentioned as a few facets that have often been discussed. In reality, IL is existent in almost every sector with different taxonomy<sup>2</sup>. The relevance of IL in corporate sector is due to the knowledge based economy and necessity of apt decision making<sup>3</sup>. A study<sup>4</sup> has shown how entrepreneurship and innovative product design in health care resulted in improved performance when received training on IL. Another study<sup>5</sup> in banking sector illustrated how the IL level of bankers in Ogun state in Nigeria influenced their service pattern in positive way. Although library people are ahead in trumpeting it, it is not a domain solely belonging to them. It is a term that has been accepted by all the disciplines. As such, to achieve the goals of

IL is widespread agenda for all of them. On this backdrop, an emergence of literature is bound to be there from every subject discipline. Hence it would be interesting to study the global research output on IL. The present study is initiative in that direction.

### 2. LITERATURE REVIEW

There are varieties of studies available on IL. However, the studies concerning the present viewpoint have been considered over here. A few of them have been discussed as follows.

Kolhe, Shankar Reddy analysed<sup>6</sup> the research output on information literacy retrieved from Web of Science (WoS) during 2005 to 2014. A consecutive growth was observed from 2005 to 2014 in terms of publishing output on IL. The articles published in 2005 have got the maximum citations. Literature published on IL was classified under 35 subject categories recognised by ISI. Most of the 751 article (49.9 %) were published in the field of Library and Information Science. Next educationalist 329 (21.8 %) and Computer professionals and Scientists 178 (11.8 %) were found to leading authors on IL. In all 1,502 article were contributed by 2,694 author. Pinto, M from University of Granada, Spain with 23 article ranked as the most prolific author. Among the most productive institutions in the world, the prominent four were form USA and two were from Australia. In spite of this, University of Granada, Spain contributed (28) most articles on IL. The USA stood first in respect of total publication (575), single institutional articles (508), inter-institutionally collaborative articles (67),

first author articles (527) and corresponding author articles (518). *The Journal of Academic Librarianship* was the most prominent (97) journal to publish variety of articles on IL. Most cited top ten articles had 60 or more citations. An article entitled 'Making Sense of Credibility on the Web: Models for Evaluating Online Information and Recommendations for Future Research' by Metzger (2007) ranked first (156) in case of overall citations.

Bhardwaj, Raj Kumar evaluated<sup>7</sup> the literature on information literacy in social sciences and humanities retrieved from SCOPUS database during 2001-2012. In all, 1990 documents from 79 countries selected for the study. There was great hike in publication output during 2007-2012 as 1512 paper (76 %) were contributed in this period. There were 160 journal that published literature on IL in Humanities and Social Sciences. The 19 most productive journals produced 915 papers (46 %) and got 5369 (53.6 %) citations. Reference Service Review (124, 6.2 %), Journal of Academic Librarianship (76, 3.8 %) and College and Research Libraries (70, 3.5 %) were identified as the most productive journals. English and Spanish languages constituted 96.7 per cent of overall published literature. The developed countries like USA (1035, 52 %), UK (154, 7.7), Canada (102, 5.0 %) were ahead in publishing research on IL. The top 15 countries unanimously produced 84.8 per cent literature. Transformative Activity Index (TAI) was calculated for the two blocks- i.e. 2001-2006 and 2007-2012. Brazil which had lowest TAI in the first block recorded highest TAI in the second block. Brazil was followed by Spain, New Zealand in case of highest TAI in the second block. USA is the leading country (36, 1.8 %) in respect of collaborative publication. The study further revealed that 1990 papers were cited 10025 times till up to December 31, 2013. UK registered highest citation per paper. In all, 160 institutions contributed the literature on IL in Social Sciences and Humanities. Universidad de Granada, from Spain secured 1<sup>st</sup> rank with 24 paper. Of the top 16 institutions, 8 were from USA. University of Strathclyde, Glasgow, UK had the highest Relative Citation Index (RCI). The analysis further highlighted that 211 (10.6 %) papers were published by 24 most prolific authors and secured 1321 (13.2 %) citation. Maria Pinto of Universidad de Granada was the most prolific authors with 18 paper. Annemaree Lloyed of Chales Sturt University School of Information Studies had the highest (8) h-index. A title named "Documents Information and Digital Literacy: A review of concept" published in the Journal of Documentation was the most cited (158) article.

Nazim, Mohd. & Ahmad, Moin (2007) studied<sup>8</sup> 607 articles from 158 journal retrieved from LISA Plus by making a search on 'information literacy'. The results revealed that beginning of 21<sup>st</sup> century saw an increase on publication on information literacy. By applying Bradford's law of scattering, it was found that 'Reference Service Review' and 'College and Research Libraries' were found to be leading journals in terms of publication on information literacy. Single authors produced 63.15 per cent articles. Single authorship dominated the authorship pattern. Radar, H. B (15) was found to be the most prolific author followed by Bereviki, P. and Grassian, E producing 6 articles each. The literature on information literacy was found in 18 language. However, maximum 536

document (88.30 %) were published in English language. In all 32 countries which produced literature on information literacy, USA (311) stood first. Following USA were UK (75) and Germany (51).

Singh, Punit Kumar and Singh Ajay carried out<sup>9</sup> co-occurrence network analysis of the publication on information literacy based on the 27 subject areas given in the SCOPUS. In all search string brought 3859 records, nonetheless 3853 suitable records were used for analysis of this study. Most publications were seen in the field of Social Sciences (2917). Next to it were Computer Science (1042) and Arts and Humanities (299). Remaining 1115 publications were shared by other 23 subject categories. Social Sciences, Computer Science and Engineering have an uppermost tendency of centralities which was called as leader in the network. Most of these subjects were also found on the central position of network. The utmost co-occurrence was seen with Social Sciences as the most leading subject areas. As such, 10 out of 20 co-occurrences were found with Social Sciences. The co-occurrence between Social Sciences and Computer Sciences (509), Social Sciences and Arts and Humanities (265) were quite higher.

Aharony, Noa revived<sup>10</sup> the publications on IL in Web of Science by using the technique of bibliometrics and content analysis. The study revealed that the largest part of publication i.e. 106 (54.06 %) came from USA, followed by England (200; 10.15 %) and Australia (125; 6.34 %). Majority of documents 96.29 per cent were published in English language. Maximum articles (31.82 %) in overall research output were concerned with IL in Library and Information Science. In dataset considered for the study, most of the source titles (4.16 %) were from the *Journal of Academic Librarianship*. The main themes in information literacy were miscellaneous (largest category), medicine and education.

Even though above studies are related to the present one, it differs in respect of time duration and to some extent treatment. The study might be helpful to those who are concerned with designing the IL policy, its implementation and who want to keep abreast with multitude aspect of IL. And here lies the significance of the study.

### 3. OBJECTIVES

The study has been carried out with the following objectives.

- To measure the global research output on information literacy
- To find out the most preferred source titles used for the publications
- To find out the most prolific authors in IL research
- To analyse subject wise distribution of research output
- To study the distribution by the type of documents
- To ascertain the country wise distribution of research output
- To identify most prolific institutions contributing to promote IL research.

### 4. METHODOLOGY

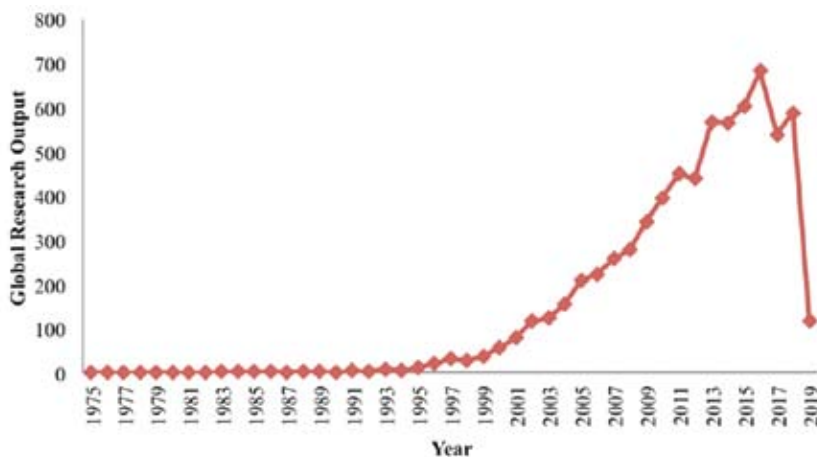
The data for the present study has been derived from SCOPUS database. The author has selected scopus as a data

**Table 1. Global publication output on IL during 1975-2019**

Year	TP	TC	CPP	H-index
1975-1977	1	-	-	-
1978-1980	1	13	13	1
1981-1983	2	2	1	1
1984-1986	7	2	0.29	2
1987-1989	6	33	5.5	4
1990-1992	7	48	6.86	4
1993-1995	24	354	14.75	9
1996-1998	80	873	10.91	28
1999-2001	172	3805	22.12	31
2002-2004	398	6215	15.61	41
2005-2007	692	9361	13.53	43
2008-2010	1013	9897	9.77	42
2011-2013	1455	11448	8.87	42
2014-2016	1859	7390	3.98	28
2017-2019	1353	1143	0.84	12
	7070	50584	7.15	

TP=Total Publication; TC=Total Citations; CPP= Citation per Paper

source because it the largest abstract and citation database of peer-reviewed literature across the globe. In addition it has wider subject coverage and it can provide a better overview of the literature published on IL. In spite of restricting the data to particular year, all the records available from 1975 to 20<sup>th</sup> May 2019 have been considered for the study. But the records showed for 2020 were eliminated from the study. Actual tabular data was collected during 1<sup>st</sup> April to 9<sup>th</sup> April, 2019. Again it was updated on 15<sup>th</sup> to 20<sup>th</sup> May, 2019. The search term “information literacy” in double quotation mark was used in combination with ‘Article title, Abstract and Keywords’ which yielded 7070 record. These records were again filtered as indicated by ‘Year’, ‘Author name’, ‘Subject Area’, ‘Document type’, ‘Source title’, ‘Affiliation’ and ‘Country/territory’. The



**Figure 1. Global research output on IL.**

results derived from each of these search criteria were put in the tabular and graphical form which were further used for analysis and discussion.

**5. DATA ANALYSIS AND ELUCIDATION**

**5.1 Global Research Output on IL**

The first paper on information literacy in SCOPUS is observed in 1975. Then second paper appeared in 1979 which was cited for 13 time which showed that the academic world had began to pay attention to and recognise the importance of IL. From 1983 there seems to be a regular publications on IL, though there were less in numbers. Table 1 shows the whole scenario of research output on IL. Figure 1 depicts how there was a great hike in research output from 1995. The last fifteen years have been phenomenal with regard quantitative output. Till up to 20<sup>th</sup> May 2019, 7070 documents were published on information literacy. The maximum productivity was seen in the year 2016, 2018, 2015, 2013 and 2014 consecutively. Nevertheless, the 449 document published in 2011 were cited for maximum (5022) times followed by 3857 and 3549 documents in 2010 and 2012 respectively. H-index was also high (33) for 2011 and 2010 (31). The average rate of citation per paper was 7.15%.

**5.2 Source Titles Used for the Publication**

Table 2 throws light on the most common source titles used by the authors interested in publishing on IL research. The list consisted of 19 journal titles and one conference proceeding. The top twenty most productive titles published 2418 (34.20 %) papers which have been cited 19015 (37.59 %) times. The remaining source titles published 4652 documents (65.80 %) documents. *Communication in Computer and Information Science* published 380 (5.37 %) papers which is the highest figure in terms of research output and received 455 citations (0.90 %). It is followed by *Reference Service Review* (316, 4.47 %), *Journal of Academic Librarianship* (205, 2.90 %), and *College and Undergraduate Libraries* (146, 2.06 %). However, in terms of citations received *Journal of Academic Librarianship* (3416, 6.75 %) and *Reference Services Review* (3253, 6.43%) stood at the first and second position respectively. *Communications in Computer and Information Science* though published highest papers; it did not seem to be preferred over other popular journals given in the list in quoting viewpoints. The H-index is highest (32) for *Journal of Academic Librarianship*, *College and Research Libraries* (28), *Reference Services Review* (27) and *Journal of Documentation* (23). A very low H-index (2) is calculated for *Communication in Information Literacy*.

The highest CiteScore value (2.32) as per Scopus has been observed for *Journal of Academic Librarianship*. It was examined that *Communication in Information Literacy* and *Journal of Information Literacy* each had the highest SJR value of 1.657. Contrarily, *Communication in Computer and Information Science* had the lowest (0.17) SJR value. The *Journal of Academic Librarianship* accounted for uppermost (2.499) SNIP value as

**Table 2. Source titles used for the publication**

Journal Title	No of Papers	Citations	H-index	CiteScore2017	SJR2017	SNIP2017
Communications in Computer and Information Science	380	455	8	0.39	0.17	0.347
Reference Services Review	316	3253	27	1.20	0.697	1.312
Journal of Academic Librarianship	205	3416	32	2.32	1.224	2.499
College and Undergraduate Libraries	146	766	13	0.57	0.489	0.551
Communications in Information Literacy	140	710	2	1.44	1.657	1.66
Portal	104	1467	19	1.31	1.182	1.938
College and Research Libraries	92	2162	28	1.7	1.389	1.94
Journal of Library and Information Services in Distance Learning	92	380	12	0.42	0.384	0.623
Journal of Library Administration	91	854	15	0.42	0.384	0.623
ASEE Annual and Exposition Conference Proceedings	89	189	7	-	-	-
Journal of Information Literacy	89	204	7	1.44	1.657	1.66
Evidence Based Library and Information Science	88	216	6	0.29	0.257	0.385
Library Review	81	625	14	0.94	0.261	0.807
International Information and Library Review	74	182	7	0.24	0.171	0.218
Reference Librarian	74	436	11	0.58	0.613	0.714
College and Research Library News	73	279	8	0.51	0.587	1.589
Journal of Documentation	73	1811	23	1.44	0.613	1.23
Library Philosophy and Practice	72	197	8	0.33	0.24	0.554
Journal of Librarianship and Information Science	71	891	15	1.2	0.681	1.085
New Library World	68	522	13	0.99	1.0	1.0

against *International Information and Library Review* which had the lowest (0.218) SNIP value.

### 5.3 Prolific Authors in Information Literacy Research

Table 3 denotes most top 15 prolific authors who have published their research on IL. The top twenty authors contributed 429 document (6.06 %) and received 4756 (9.40 %) citations. Pinto, M from Universidad de Granada was found to be most (48) productive author. In this respect the result is consistent with the studies conducted by Shankar Reddy Kolhe<sup>6</sup> (2017) and Bhardwaj Raj Kumar<sup>7</sup> (2017). Lloyd A (35), Julien H (34), Bruce C (29), Forsmire M (25), Majid S (24) and Virkus S (29) took consecutive position in the list. Lloyd A received maximum 1062 citations and his average citations per paper (30.34 %) were found to be high above every author. H-index was calculated for top fifteen leading authors. It gauges the number of citations of researcher's paper<sup>11</sup>. Again Lloyd A was observed as having highest (17) h-index. Among other authors Julien H (16), Bruce C (13), Pinto M (12) and Johnson A M (8)

possessed the h-index above the group average of 7.5.

### 5.4 Co-authorship Network

It is quite natural to have collaborative network of authors while producing any research output. Co-authorship denotes collaboration between at least two authors and formed at the root of learning, sharing and labor division<sup>12</sup>. Figure 2 shows the co-authorship network based on bibliographic data created thorough VOSviewer. The authors producing minimum number of three documents were taken into account. Out of 10857 author, 287 met the threshold. The authors with greatest total links have been selected. Pinto M, Lloyed A, Julien H, Bruce C and Fosmire M are the leading authors who produced maximum paper in collaboration. Co-authorship network is widened with a pattern of lengthy history among amongst the authors, frequent communication, mutual trust and support and shared socialisation<sup>13</sup>.

### 5.5 Subject-Wise Distribution of Research Output

Subject wise distribution of research output is important

**Table 3. Prolific authors in information literacy research**

Author	Affiliation	No of Papers	No. of Citations	ACPP	h-index
Pinto, M	Universidad de Granada, Faculty of Science, Granada, Spain	48	425	8.85	12
Lloyd, A	Hogskolan i Boras, Boras, Sweden	35	1062	30.34	17
Julien, H	University at Buffalo, State University of New York, Buffalo, United States	34	633	18.62	16
Bruce, C	James Cook University, Australia, Graduate Research School, Townsville, Australia	29	460	15.86	13
Forsmire, M	Purdue University Libraries, Wilmeth Active Learning Center, West Lafayette, United States	25	144	5.76	6
Majid, S	Nanyang Technological University, Singapore City, Singapore	24	312	13	7
Virkus, S	Tallinn University, School of Digital Technologies, Tallinn, Estonia	22	156	7.09	4
Foo, S	Nanyang Technological University, Singapore City, Singapore	21	292	13.90	7
Johnson, A. M.	University of Louisville, Louisville, United States	21	118	5.61	8
Koltay, A	Eszterhazy Karoly University, Heves County, Hungary	21	180	8.57	7
Badke, W	Trinity Western University, Langley, Canada	20	125	6.25	7
Spiranec, S	University of Zagreb, Zagreb, Croatia	20	113	5.65	6
Chen, L.C.	National Chiayi University, Department of E-Learning Design and Management, Chiayi, Taiwan	19	51	2.68	5
Partridge, H	University of Southern Queensland, Toowoomba, Australia	18	142	7.88	6
Fourie, I	Universiteit van Pretoria, Department of Information Science, Pretoria, South Africa	17	107	6.29	6



**Figure 2. Co-authorship network.**

**Table 4. Subject wise distribution of research output**

Subject	TP	TC	H
Social Sciences	5336	41295	170
Computer Science	1835	11684	46
Medicine	617	5592	32
Engineering	417	1202	14
Arts and Humanities	412	1542	16
Mathematics	308	278	6
Business Management and Accounting	268	1173	16
Health Profession	147	847	15
Nursing	146	2045	25
Psychology	104	999	16
Decision Sciences	71	227	7
Biochemistry, Genetics and Molecular Biology	70	479	13
Chemistry	55	379	13
Economics, Econometrics and Finance	46	65	5
Agricultural and Biological Sciences	43	201	8

**Table 5. Documents type**

Document Type	Quantity
Article	4838
Conference Paper	1026
Review	502
Book Chapter	376
Book	73
Editorial	70
Note	70
Conference Review	49
Other	66

in this study as it gives an idea as to how particular subject discipline is influenced by IL research. But the subject category provided in the Scopus is different as a single document may fall under various subject categories<sup>14</sup>. So the total documents under all the subject disciplines exceed the actual number of document considered for the study during the period. The same thing can be observed in respect of citations. There is no surprise that 5336 record are found in Social Science with 41295 citation. Even h-index is also high (170) for this subject discipline. Next to it is Computer Science which has 1835 paper with 11684 citation and h-index of 46. It is followed by Medicine (617), Engineering (417) Arts and Humanities (412),

Mathematics (308), Business Management and Accounting (268), Health Profession (147) and Nursing (146). The remaining details can be viewed through table.

**5.6 Distribution by Type of Document**

Scopus has given 13 type of documents. There are number of ways to make scientific communication possible. One may write scholarly article or may contribute in the form of book chapter. In spite of these views are expressed in number of forms, it keep on updating the academic communities in relation to their subjects field. No doubt, Article is the most favored source. In the present study, 4838 (68.42 %) documents have been seen in the form of Articles followed by 1026 (14.51 %) conference papers, 502 (7.10 %) reviews, 376 (5.32 %) book chapters, 73 (1.03 %) books, 70 (0.99 %) editorial, 70 (0.99 %) notes, 49 (0.69 %) conference reviews. The remaining document types have been mentioned under ‘other’ wherein twenty two articles were about to publish. 19 short surveys had been carried out. Letters, erratum, retracted documents though were not in large quantity, were evident as a source types.

**5.7 Distribution of Research Output by Country**

Table 6 country wise research output along with total citations. Citation per paper, international collaborative papers and h-index. The results revealed that most of the papers (46.94 %) resulted from USA which received 27689 citations. The citation share was near about 54.74 per cent in overall citation share. Citation per paper was seen high (11.53 %) for the Canada followed by United Kingdom (10.79 %). Next place to occupy in the list was Spain, China, Germany, Taiwan, South Africa and Brazil. India is not visible in the top ten countries. USA was all over again seen at the top in case of international collaborative papers (242), followed by United Kingdom (141), Spain (78), Australia (77) and Germany (58). It was quite natural to have for USA higher (78) h-index with United Kingdom (35) and Australia (33) following it.

**Table 6. Distribution of research output by country**

Country	TP	TC	CPP	ICP	H
USA	3319	27689	8.34	242	78
United Kingdom	502	5418	10.79	141	35
Australia	363	4188	11.53	77	33
Canada	311	2522	8.10	55	25
Spain	201	961	4.78	78	15
China	194	253	1.30	31	7
Germany	129	613	4.75	58	12
Taiwan	117	551	4.70	17	13
South Africa	100	861	8.61	39	14
Brazil	99	175	1.76	31	7

TP=Total Publication, TC=Total Citations, CPP= Citation per Paper; ICP=International Collaborative Paper

**Table 7. Institutional output**

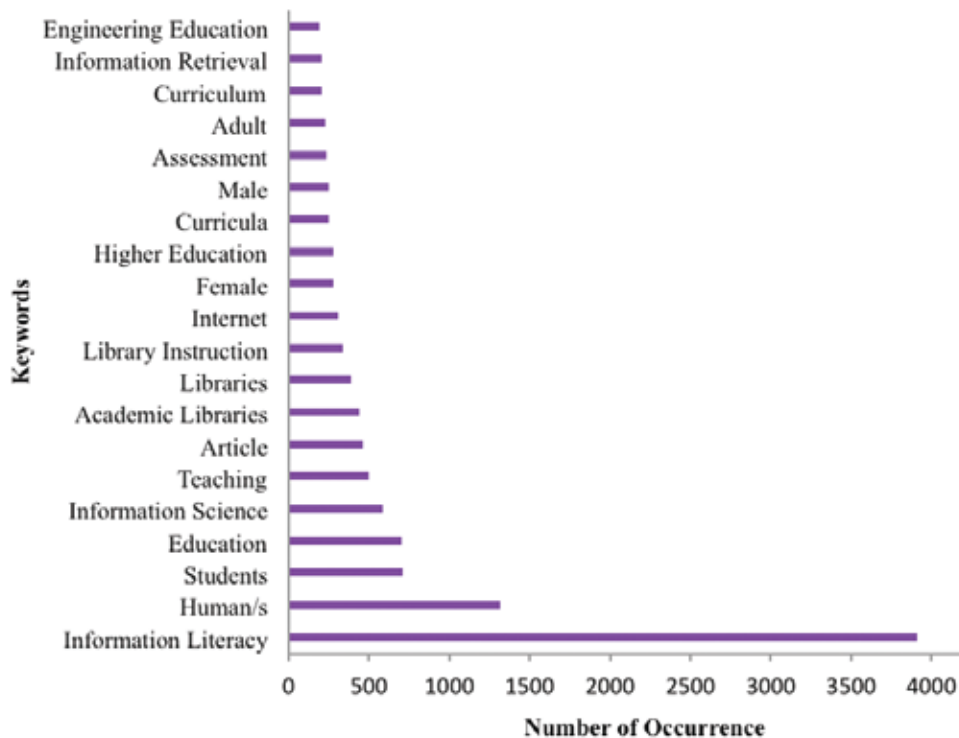
Institution Output	Country	TP	TC	CPP	H
Purdue University	United States	81	348	4.29	10
Queensland University of Technology QUT	Australia	73	1048	14.35	18
City University of New York	United States	65	727	11.18	12
Universidad de Granada	Spain	64	477	7.45	12
Nanyang Technological University	Singapore	58	604	10.41	12
University of Illinois at Urban-Champaign	United States	48	391	8.14	10
Purdue University Libraries	United States	48	274	5.70	9
University of Zagreb	Croatia	47	173	3.68	7
University of Sheffield	Croatia	45	173	3.84	7
University of Alberta	Canada	42	704	16.76	17

**5.8 Institutional Output**

In case of top ten institutional outputs, four organisations are from USA, three organisations are from Croatia, one from Australia, one from Spain, one from Singapore. Purdue University from United States has published maximum 81 document and received almost 348 citation. Queensland University of Technology QUT from Australia has 73 paper to its credit. The total citation received by it is high (1048) compared to other institutes along with higher (18) h-index. University of Alberta from Canada though published 42 paper and at the 10<sup>th</sup> position, it has higher (16.76 %) citation per paper and also has second higher (17) h-index. City University of New York (United States), Universidad de Granada (Spain), Nanyang Technological University from Singapore are at the 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> position consecutively.

**5.9 Most Popular Keywords**

Figure 3 throws light on the top 20 most popular keywords used in the documents considered for the study of global research output on IL. Overall, 22353 keyword were found. It was quite natural “Information Literacy” to be occurring most (3911) time since it is the most significant keyword. “Human/s” is the second keyword which has been found 1316 times. The third word “Students” has been observed 708 time. The word “Education” has appeared 703 time. In point of fact, some keywords may be very significant i.e. critical thinking in that they denote their direct association with IL. Nevertheless, some keywords may not predict such kind of connection; but they provide the backdrop with which IL has been conversed with.



**Figure 3. Most popular keywords.**

**6. CONCLUSIONS**

Though IL research is visible from 1975 in the present study, there has been exceptional growth from 2001 onwards. This is because its significance has been accepted by all. To become information literate has become essential prerequisite on every sphere of human life. Higher education is not exception to that. As such articulation of the meaning of IL as a theory and practice within librarianship and almost every subject discipline was a necessary concern<sup>15</sup>. The growth in IL research is evidence that the concern might have been well spoke about. The study aptly provides a glance at major source titles, most prolific authors, country wise contributions and most prolific institutions that have been influential to promote IL research. Such kind of study is useful to take review and find out current drift of IL research across the globe.

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## CONTRIBUTOR

**Mr. Vishal D. Bapte** is working as Assistant Librarian in Sant Gadge Baba Amravati University, Amravati, Maharashtra since 2012. He is the Head of Acquisition Section, Periodical Section, Reference and Circulation Section of the Knowledge Resource Centre of the university. Previously, he worked as a Librarian in Shankarlal Khandelwal College, Akola.