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Authors' Productivity in Information Literacy Literature during 2011-2020

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Abstract

This study will analyze the decadal growth of Information literacy literature from 2011-2020. The limit of the analysis is restricted to the field of Social Science and Arts. Based on quantitative analysis about AGR (Annual Growth Rate), RGR (Relative Growth Rate), degree of collaboration, popular sources and productive affiliations, results have been formulated about the growth in information literacy literature. Elsevier's abstract and citation database Scopus is exclusively used for bibliometric analysis of information literacy publications. Tracing the evolution of information literacy publications over the decade (2011-2020) does not explains an exponential growth as expected from past studies, but rather shows ups and downs in the production. The document wise analysis shows that 81.07% of literature is in the form of articles. Total publications over the decade stands at 3064 i.e., on an average of 306 publications are published annually. Also, the citations count is 17,177 for 3064 publications which give an average of 5.606070 for each paper. The study also reveals that the highly prolific authors of the field. The study shows that Pinto, M. from the University de Grande is the most prominent author in the information literacy field.

Keywords: Information Literacy, Social Science, Arts, Author's Productivity, Bibliometric analysis.

1. Introduction

Since the provenance of information literacy in 1974 by Paul Zurkowski, the subject area was exponentially growing till 2011 but the further study of available content on Elsevier's abstract and citation database Scopus reveals the dip during 2011-2012 and then a remarkable growth during 2012-2017 after which certain ups and downs till 2020 and therefore a random zigzag growth line traced over the decade not stating any particular trend over these years. However, the advent of WWW and internet took place in 90's which was supposed to ensure an upward slope in information literacy publications nonetheless the bibliometric observations of the decade have not shown an upward approach in information literacy publications. According to Shukla (2021), "In today's era, there is a huge overload of the information, which makes it difficult for the users to get the right information at the right time and in the right amount, in that case, the information literacy skill is considered to be a helpful tool for them. Information competency is the ability to gather, filter, evaluate and organize information effectively."

The reason behind such a peculiar observation is that the specification of the domains of the different literacies i.e., library user education, information literacy, computer literacy, internet literacy, must not be confused with information literacy literature quantify other emerging literacies do not find spaces to imbricate.

2. Scope of the study

The timeline of this present study considers the information literacy publications as a principal domain of research from 2011-2020. Potentially published resources are taken from countries like US, Canada, Australia, China, Spain, Germany, Brazil, Nigeria, and Taiwan. Hence, the publication does not belong to a distinct geographical location but are shrewd worldwide. The study thus apprises the respondents about bibliometric modules of information literacy domain using calculus, Statistics, etc.

The data thus obtained depicts the clear analysis of information literacy publications. The study also brings up the research output in the field of information literacy literature and most productive author in the subject of study.

3. Literature review

The bulk publication in information literacy field is laborious to explain since its inception in 1974. However, efforts have been made to quantify the publications in the field.

Pinto, Escalona-Fernadez, and Pulgarin (2013) explains the production of information literacy literature till 2011 which was exponentially growing. They bibliometrically analyzed the international scientific productivity in information literacy field covering social sciences and health sciences. The data was obtained from two databases namely WOS (Web OF Science) and Scopus database. They used Kolmogorov-Smirnov test, Bradford confirmation to authenticate the calculations and the finding of their research revealed the publications in information literacy following exponential growth having major considerations of information and documentation, education, management, etc. Prakasan and others (2014) evaluated the scientrometrism on global collaborative Indian publications and observed an upward slope because of the emergence and invasion of information and communication technology. The study also did a critical relative analysis on benefits and shortcomings for collaborative research potential. The domains covered were countries of collaborations, quality of literature, specificity of collaborations, chronological observations, etc. The detailed analysis has been done to calculate increasing collaborative Indian publication. Shettappanavar and Krishnamurthy (2020) noted that majority 51.23% post-graduate students of Gulbarga University can differentiate primary, secondary and tertiary sources of information and their importance. The study depicts that 61.98% respondents have the basic knowledge of computer applications and 96.69% respondents opine the requirement of training on information literacy, whereas 52.89% respondents agreed that information literacy must be integrated in their curriculum.

Velmurugan and Natarajan (2016) put forth their scientrometric study on information literacy research publications. Their work deciphered year wise and volume wise authorship, single and multiple authorship, author publication counts, etc. Total analyzed articles were 61, out of which 32 were single author and 29 were multi authored. The degree of collaboration calculated was 0.47. Maximum (36) of articles were published in 2012 and 16.39% research output was the lowest count calculated in the year 2011. Verma and Shukla (2020) mapped

the trends on information literacy of some specific countries from 2008-2017. Their prerogative was to calculate the growth rate and compound, relative and annual growth rate of information literacy publications. Scopus was the soul tool used for data collection, and the results of their study showed that there were 9496 contributions from the 10 sample countries where major productions were from US and UK. Park, Kim, and Park (2020) scientometrically scrutinized different literacies namely digital literacy, ICT Literacy, information literacy and media literacy. These subject areas were the centre of research in the past two decades. The study specifies its timeline from 2000-2020, especially in the field of education. Pinto and others (2020) mapped the evolution of research in the field of mobile information literacy for the duration (2006-2019). Methodology spoofs the usage of particular databases i.e., ERIC, LISTA, LISA, Scopus, WOS. Statistical tool included fractional counting using VOS Viewer software. The study concluded an ascending interdisciplinary trend in scientific literature on mobile information literacy. Study leaves a peculiar relationship between information studies and digital literacy against e- learning and mobile technologies. Another study conducted by (Gaud, Shukla, and Verma 2018; Shukla 2021) was found the same results for using the statistical tools which is used in this study and found that the annual growth rate and compound annual growth rate was in fluctuating trends which degree of collaboration was recorded more than 0.5. however relative growth rate has been found in decreasing trends while doubling time was found in increasing trends as found in this study, the researchers also found top authors, sources, keywords and funding agencies.

4. Objectives of the study

1) To track, analyze and visualize research evolution in information literacy literature.
2) To decipher about publication institutes/Affiliated institutes.
3) To determine distribution of publications in collaboration.
4) To calculate average annual growth rate of production and forecasting it for 2021.
5) To have a look on productive author's profile.
6) To identify the publication type by source titles to consider analytical approach and quantitatively formulizing publication details.

5. Methodology

Methodology consists of a set of methods applied to achieve a particular purpose. To achieve the objectives of this research, certain statistical approaches has been done, calculating the quantity of information literacy literature published in a renowned worldly abstract and citation database "Scopus" which is owned by Elsevier's since 2004.

It consists of a peer reviewed journals in varied subject domains. Certain search strings were used to obtain the desired data. (TITLE-ABS-KEY (INFORMATION LITERACY)), Boolean operator 'AND' was used for publication years i.e. (LIMIT- TO (PUB YEAR, 2011-2020)). Another important search specification were some selected countries as- United States, United Kingdom, Canada, Australia, China, Spain, Germany, Brazil, Nigeria and Taiwan with Boolean operator 'OR' between them.

6. Data analysis

6.1 Annual growth rate of Information Literacy publications

AGR = ((ending value/first value)/ first value) *100

Table 1: Annual Growth of Information Literacy Publications

Year	Number of publications	Number of citations	AGR
2011	267	3076	0.00
2012	257	2721	-3.75
2013	301	2338	17.12
2014	307	2497	1.99
2015	347	2394	13.03
2016	357	1755	2.88
2017	370	1257	3.64
2018	338	762	-8.65
2019	347	316	2.66
2020	173	61	-50.14
Total	3064	17177	

Figure 1: Annual Growth of Information Literacy Publications

Table 1 and figure 1 tell us about the annual growth of information literacy publications which means 'The year wise substitution in the values of a computation and it ranges from 17.12 (2012) to -50.14 (2020). The table also reveals the number of publications over the decade which accounts up to 3064 over the span of 10 years i.e., from 2011-2020. Observing the citation count for 3064 publications is 17177 which mean an average of 5 citations per writing. Year 2017 accounts for maximum number of publications (370) over the decade and 257 was the lowest count recorded in the year 2012. The average annual growth rate accounts to -2.122.

6.2 Document wise distribution of publications

Table 2: Document wise distribution of Publications

Types of Documents	Number of Publications	Percentage of Publications
Article	2484	81.07
Book Chapter	199	6.49
Review	156	5.09
Conference Paper	116	3.79
Note	46	1.50

Book	35	1.14
Editorial	22	0.72
Short Survey	4	0.13
Erratum	1	0.03
Letter	1	0.03
Total	**3064**	**100.00**

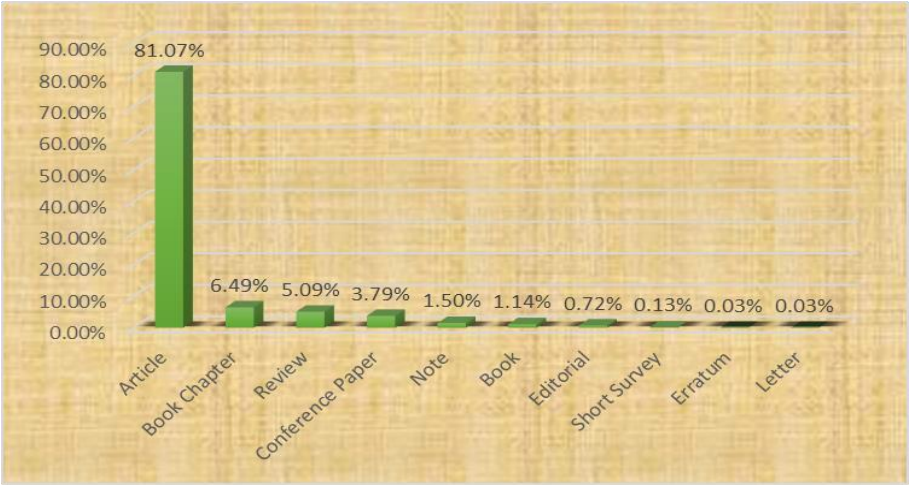

Figure 2: Document wise distribution of Publications

Table 2 and figure 2 describe the types of documents where information literacy literature has been published. Table 6.2 clearly depicts that 80.07% (2484) writings are in the article form, book chapters hold the second position with 6.49% (199). Erratum and letter contribute to almost negligible amount i.e., only 1 publication each and that took over the decade.

6.3 Authors'- wise distribution of publications

Table 3: Author wise distribution of publications

Year	1 Author	2 Authors	3 Authors	More than 3 Authors	Total
2011	111	93	39	24	267
2012	104	84	46	23	257
2013	129	94	39	39	301
2014	134	94	45	34	307
2015	142	119	42	44	347
2016	149	118	48	42	357
2017	131	117	72	50	370
2018	128	91	74	45	338
2019	122	104	66	55	347
2020	54	49	42	28	173

Figure 3: Authors'-wise distribution of Publications

Table 3 and figure 3 displays author wise distribution of publications where a particular trend is observed that is:

Single author publications> two author publications> three author publications> more than three author publications.

6.4 Top 10 Most Productive Authors' Profiles

Table 4: Top 10 Most Productive Author Profiles

Name of Author	No. of Publications	h-index	Total Citations
Pinto, M. from Universidad de Granada, Faculty of Science, Granada, Spain	36	16	764
Bruce, C. from James Cook University, Australia, Townsville, Australia	19	20	1187
Lloyd, A. from University College London, London, United Kingdom	17	23	1619
Julien, H. from University at Buffalo, The State University of New York, Buffalo, United States	16	24	1370
Sales, D. from Universidad Jaume I, Castellon de la Plana, Spain	15	8	181
Fosmire, M. from Purdue University Libraries and School of Information Studies, West Lafayette, United States	14	8	305
Maybee, C. from Purdue University, New Albany, United States	14	8	249
Hicks, A. from University College London, London, United Kingdom	13	7	131
Walton, G. from Manchester Metropolitan University, Manchester, United Kingdom	13	6	180
Scott, R.E. from University of Memphis, Memphis, United States	12	4	46

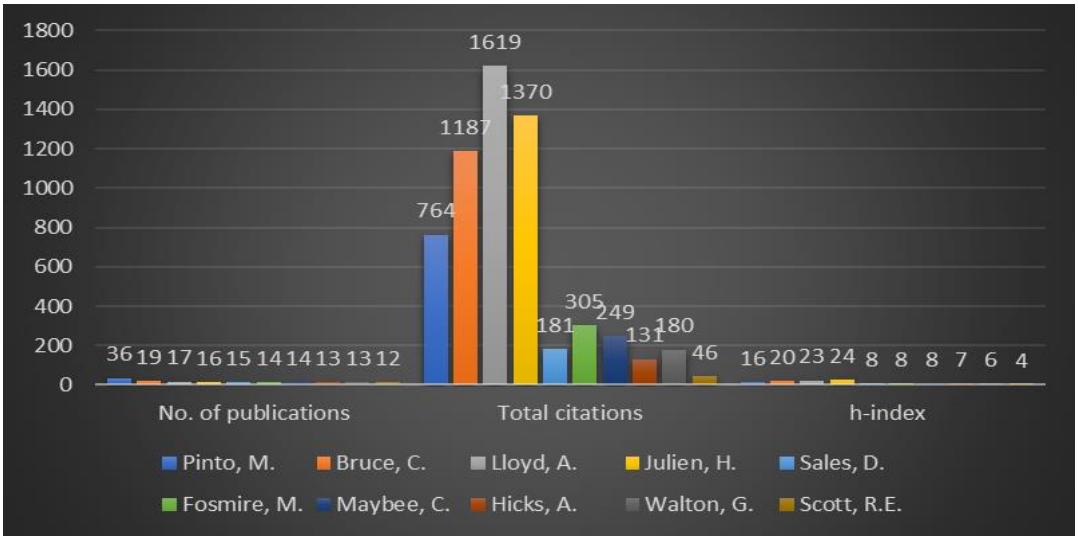

Figure 4: Top 10 Most Productive Author Profiles

Table 4 and figure 4 shares with us the profile of most productive authors in information literacy field with their h- indexes. Pinto, M. from University de Granada owns 36 publications having h- index 16 and Bruce, C, from James Cook University published 19 publications having h- index as 20. It is clear from the table that h- index of top 10 most productive authors is always> 3. Also, Julien, H. from University of Buffalo has an h- index of 24 which is maximum of all whereas author Lloyd, A. from University College London owns 1619 citations which is remarkable count compared to others.

6.5 Relative growth rate and doubling time of publications

Relative growth rate also known as "effective index" by V.H. Blackman. It can be defined as the actual growth relative to the rate of increase in per unit of computation. Relative growth rate and doubling is calculated by applying the following formula based on a model provided by Mahapatra in 1985.

RGR =W2-W1/T2-T1

Where,

RGR= Growth Rate over the specific period of interval,
W1= Log_e (natural log of the initial number of publications)
W2= Log_e (natural log of the final number of contributions)
T1= the unit of the initial time
T2= the unit of the final time

Doubling time of publication

It is to be stated that double time is directly related to the calculated RGR value. If publication count doubles, during the time period of research, then the difference of initial logarithm and final logarithm must be equivalent to 2. Natural logarithm, when taken; value corresponds to 0.693.

The doubling time for contributions can be measured by using the following formula:

Doubling Time (Dt) = 0.693/R

Table 5: Relative Growth Rate and Doubling Time of Publications

Year	No. of Publications	Cumulative Sum	W1	W2	RGR	Dt
2011	267	267	0	5.59	0	0
2012	257	524	4.74	6.26	1.52	0.46
2013	301	825	5.67	6.72	1.05	0.66
2014	307	1132	6.22	7.03	0.81	0.85
2015	347	1479	6.68	7.30	0.62	1.11
2016	357	1836	7.05	7.52	0.47	1.48
2017	370	2206	7.35	7.70	0.35	1.96
2018	338	2544	7.67	7.84	0.17	4.13
2019	347	2891	7.94	7.97	0.02	28.27
2020	173	3064	8.20	8.03	-0.17	-4.14

From table 5, it can be analyzed that doubling time ranges from +4 (2018) to -4 (2020), whereas relative growth rate ranges from -0.17 in 2020 that is lowest of the decade and 1.52 in 2012 that is highest of the decade. Talking about doubling time of publications, it showed an ascending trend from 2011-2019, but a negative count of -4.14 was seen in 2020.

6.6 Degree of Collaborations

DC = N_m/N_m+N_s

Table 6: Degree of Collaborations

Year	Single Authored Publications (N_s)	Multiple Authored Publications (N_m)	Degree of Collaborations (DC) = N_m/N_m+N_s
2011	111	156	0.58
2012	104	153	0.60
2013	129	172	0.57
2014	134	173	0.56
2015	142	205	0.59
2016	149	208	0.58
2017	131	239	0.65
2018	128	210	0.62
2019	122	225	0.65
2020	54	119	0.69

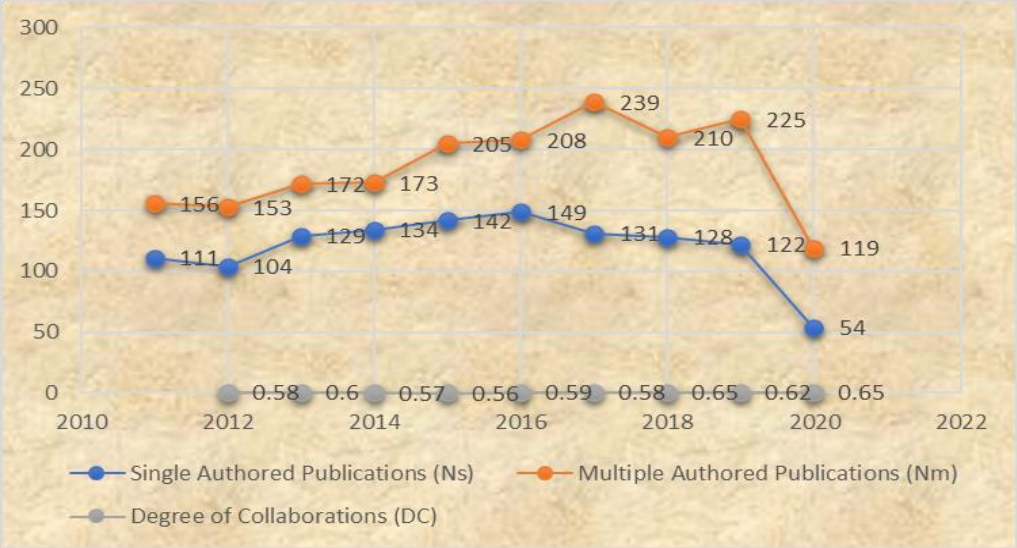

Figure 5: Degree of Collaborations

Table 6 and figure 5 illustrates about degree of collaboration which refers to the ratio of collaborative research papers to that of total publications in that particular fields in a particular time. The table also states that degree of collaboration over the decade was always > 0.55 where average degree of collaboration was 0.69 and multiple author writings were also preferred. Talking about single author publication, it was maximum in 2016 (149) and minimum in 2020 (54) and for multiple authorship, year 2017 (239) outshined and minimum publication count in the year 2020 (119).

6.7 Top 10 Most Popular Source Title and Keyword in Information literacy Publications

Table 7: Top 10 Most Popular Source Title and Keyword in IL Publications

Source	No. of Publications	Keyword	No. of times used
Reference Services Review	168	Information Literacy	1667
Communications in Information Literacy	140	Human	264
Journal of Academic Librarianship	140	Academic Libraries	248
Evidence Based Library and Information Practice	100	Library Instruction	208
Journal of Information Literacy	95	Students	169
College and Undergraduate Libraries	81	Education	162
Journal of Library and Information Services in Distance Learning	73	Humans	159
portal	72	Assessment	150
College and Research Libraries	61	Article	143
College and Research Libraries News	53	Teaching	142

Table 7 speaks about the keywords that can help in finding information literacy literature. Précised keywords are Information Literacy, Human, Academic Library, Library Instruction, etc. most common source title is ‘Reference Services Review’ with 168 publications and the least popular source title was ‘College and Research Libraries News’ (53).

6.8 Top 15 Most Productive Affiliations in Information Literacy Publications

Table 8: Top 15 Most Productive Affiliations in Information Literacy Publications

Affiliations	No. of Publications
Purdue University	60
University de Granada	49
City University of New York	46
Queensland University of Technology	41
Purdue University Libraries and School of Information Studies	33
McGill University	30
Oakland University	29
The University of Sheffield	25
Long Island University	25
Universidad Carlos III de Madrid	23
University at Albany	23
Indiana University- Purdue University Indianapolis	23
University of Colorado Boulder	22
The Ohio State University	21
Charles Sturt University	21

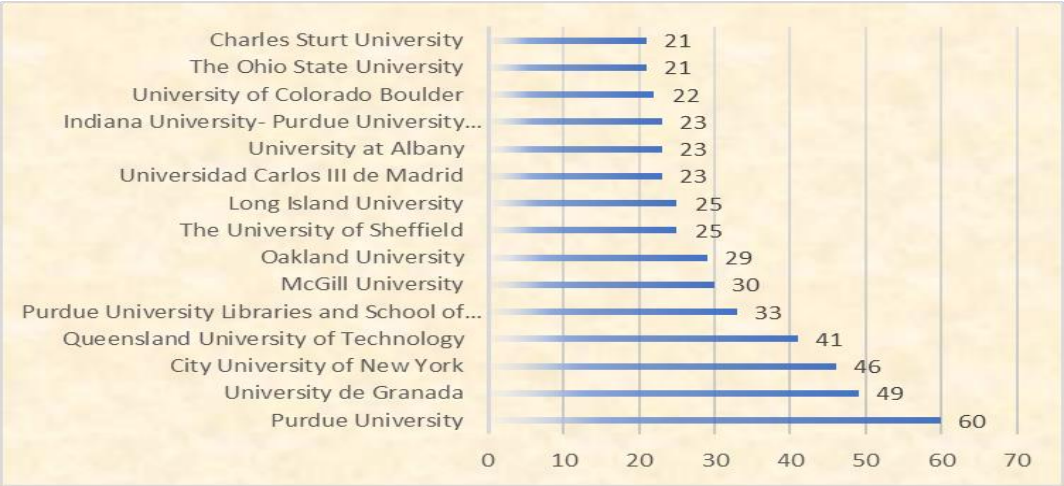

Figure 6: Top 15 Most Productive Affiliations in Information Literacy Publications

From table 8 and figure 6, it is clear that Purdue University is the highly productive institute in case of information literacy publications i.e., total of 60 publications were from this University. 2nd rank goes to University de Granada with 49 publications, whereas The Ohio State University and Charles Sturt University, Wagga contributed only 21 publications in the field of information literacy.

7. Major findings

The publication count in the field of information literacy was 2177 till (1974-2011) which shoots up to 3064 till the year (2011-2020). Hence, the growth observed is 140.27%. The yearly observations of publication count can be clearly depicted in the following graph:

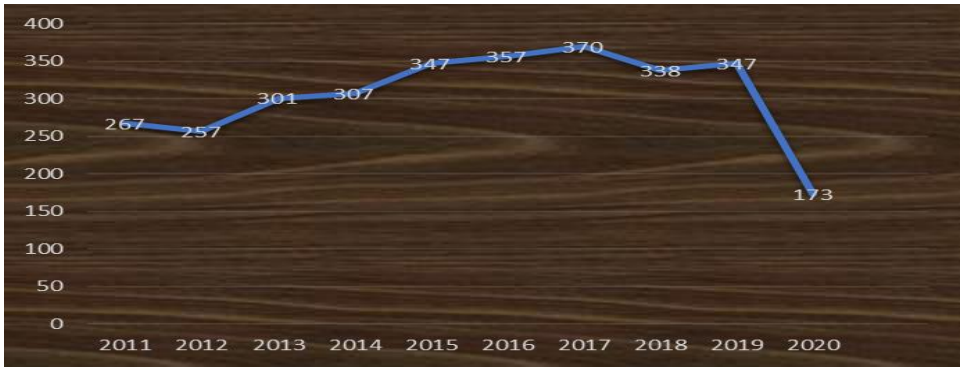

Figure 7: Year wise publication count in the field of information literacy

This type of pattern does not truly correspond to a particular growing or declining trend but shows uncertain growth, however somewhat certainty in growth from 2012-2017 can be observed.

Here, from 2013 to 2019, the annual publications were > 300.
The trend so observed shows negative growth for three non-consecutive years i.e.
For 2012= -3.75; For 2018= -8.65; For 2020= -50.14

Considering this negative growth significant in deciding average annual growth obtained is -2.122.
Statistically predicting the publication count in 2021 taking average as deciding factor, count forecasted can be 169.
Analysis for degree of collaboration states clear announcement that publication count (relative) according to number of Author is: A1>A2>A3.
Where, A1 represents, publications by single author; A2 represents, publications by two authors; A3 represents, publications by three authors.

In case of multiple authors except 2015, all other years observed less count of publications with respect to single author, two authors and three authors.

Also, talking about the degree of collaboration (DC), where DC = N_m/N_m+N_s is always >0.55. Moreover, pointing towards productive affiliations, the top 10 institutions have > 22 publications at minimum, which is quite a good amount of production and every author with significant quality content has a h-index of >4. Publications are predominantly in article form i.e., 81.07% and document like letter, erratum counts to only 1 each over the complete decade.

8. Conclusion

Summing up analytical approaches and quantitative formulations the real time bibliometric evaluation of information literacy literature from (2011-2020) demarcates an uncertain zigzag graphical trend which is peculiar to notice after introspecting the pre studies following timeline from 1974-2011, which delivers an exponential growth in information literacy field. If the scope of IL was porous than exponential growth, no doubt it'd have raised and an upward slope could have been observed but Internet Literacy, User Education Studies, Computer Literacy being altogether distinctive fields, Information Literacy literature was non exponential giving a way to emergence of later ones.

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