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Research Article

Mapping the Scholarly Content on Information Literacy through Bibliometric and Altmetric Lenses

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ABSTRACT

Purpose: The exponential growth in information as well as in its means and sources featured Information Literacy (IL) as vital skill in current period. Thus, purpose of the current study is to examine the literature published on IL and also analyze the correlation between altmetrics and the citation count of these published articles. **Design/Methodology/Approach:** The study employed the Web of Science (WoS) database as the source for literature published on IL and used the required bibliometric measures to analyze the specific aspects of publishing trends. This study uses various bibliometric indicators to provide some insightful findings about the most productive authors, countries, and articles (using software SPSS and R). In addition, VOSviewer tools were used to create a graphical representation of the bibliometric data. **Findings:** The findings reveal that the study covered articles from 1989-2022, i.e., a period of 33 years, and the most productive year was 2016. Further, the USA is the highest contributing country, and most articles published are multi-authored. The average number of citations received per document is 19.19. IL is the most frequent keyword with highest link strength with library instruction. A low positive correlation was observed between citation count and altmetric score. **Originality:** The outcomes obtained will help researchers to encompass the literature published on IL, assess the trends, nature and types of research patterns being published. This analysis also reflects about the knowledge evolution of IL research domains and future trends.

Keywords: Information literacy, Meta-literacy, Digital literacy, Bibliometrics, Altmetrics.

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INTRODUCTION

Information literacy (IL) is the ability to effectively access and efficiently evaluate information to fulfill the given information need. It comprises of cluster of competencies like research strategy, evaluation and knowledge of tools and resources (Behrens, 1994; Rader, 1991). Lenox and Walker (1993) characterized the information literate person with analytical and critical skills to formulate research questions and evaluate results and endorsed with the skills to search for and access a variety of information types in order to realize their information requirements. Zurkowski was the first to use the concept of IL in 1974 and since then the field has received a vast amount of attention from both practical and research perspectives. As the IL has the potential to transform lives and societies, its importance is appreciated globally (Rader, 2002; Zurkowski, 1974). IL is a multifaceted dimensional concept, and as such its scope range from everyday life to education and workplace settings and it covers all age groups ranging from infants to the elderly. Thus, one can conclude that IL is common to all disciplines, to all learning environments, and to all levels of education. IL certainly forms the basis for lifelong learning in present information society scenario (Pinto, Fernandez-Pascual, *et al.*, 2019). Various new literacies have been included for IL after 2000. These include terms like lifelong literacy, self-directed learning, visual literacy, digital literacy, media literacy, health literacy, business information literacy, meta-literacy, content literacy, workplace information literacy, scientific literacy and science literacy. IL helps the learners to acquire skills which help them to become self-sufficient and have greater control over their self-learning. Thus, learners become independent, critical thinkers and life-long learner (Swapna & Biradar, 2017). Lloyd and Williamson (2008) expressed the IL as a core literacy of the information society in 21st century to achieve educational, occupational, economic and personal goals in the knowledge society. IL is vital for every profession that covers students, teachers, doctors, engineers, lawyers, judges, politicians, scientists, administrative officers, school children, businessman, industrial workers, and common citizens to perform their duties in more productive way. Thus, importance of delivering IL knowledge in current learning environments have been highlighted by many studies (Onyancha, 2020; Maybee & Flierl,

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2016; Schachter, 2020; Walsh, 2009; Mulla, 2014; Parvathamma & Pattar, 2013; Sevukan & Gomathy, 2015; Shoeb, 2011; Ubogu, 2011; Wang, 2011).

The word bibliometrics has been derived from the Latin and Greek words "biblio" and "metrics", which denotes the application of mathematics to the study of bibliography. This term was coined by Alan Pritchard and defined it as "application of mathematical and statistical methods to the entire scientific literature, books and other materials" (Pritchard, 1969). Since then, various definitions of bibliometrics has been put forward by various authors from time to time though application of mathematical and statistical methods have been the core of each of them (Durieux & Gevenois, 2010; Sengupta, 1985). Bibliometric analysis serves as a useful tool in assessing the quality and promoting scientific productivity (McBurney & Novak, 2002; Thanuskodi, 2010). In the current era, bibliometric studies are increasingly being used for the research assessment to identify the pattern of publication, publishing country, authorship, citations, journal coverage and other related items (Singh, *et al*., 2007; Maharana, 2013; Zhu & Willet, 2011). For this purpose, several indicators are used that are broadly classified into three groups:

Quantity indicators: It measures the productivity of a particular researcher.

Quality indicators: It measure the quality (or "performance") of a researcher's output; and

Structural indicators: It measures connections between publications, authors and areas of research (Durieux & Gevenois, 2010).

With advent of different social online platforms that have been extensively used by researchers for scholarly communication, an alternative metrics - Altmetrics came into use that is determined by the count of article views, saves, downloads, cites, mentions etc. in social media (Poplasen & Zrnic, 2014), with a main aim of measuring the scholar interaction from the online social media tools which are used to share the research out-put (like bookmarking, blog post, twitter, facebook post, etc.) (Jabur, 2016). Usually, the altmetrics score assigned to a particular attention indicator, which the research output has gained on different sites, is given as a weighted count in order to reflect the relative reach of each type of site or source (How is the altmetric, 2019). Since, Altmetrics measure diverse impacts and accumulate faster than citations; it is usually regarded as being complementary to citations. According to Priem, *et al*., (2012, p. 3) "citation and Altmetrics indicators track related but distinct impacts, with neither able to describe the complete picture of scholarly use alone." Therefore, comparing the altmetric scores of publications with the citation counts would help to gauge the degree of association between the two.

This study is an attempt to study the literature published on IL and it is different from previous studies in objectives, period covered, and approach adopted. The study also examines the correlation between altmetrics and citation count of these articles.

LITERATURE REVIEW

Over the period, numerous bibliometric analysis studies have been carried out by researchers. Only a few relevant past bibliometric studies have been reviewed in this article pertaining to the IL. Uribe-Tirado and Alhuay Quispe (2017) in their study found three trends in international bibliometric studies pertaining to IL that are published in the past decade. These can be distinguished into:

Studies on general production (like countries, authors and journals),

Studies focused on subject areas, and Specific studies on a particular publication or context.

Various scholars have performed the bibliometric studies regarding general production that identify the highest publishing countries, the most contributing and highly cited authors, the most commonly used keywords, funding organizations and similar items (Aharony, 2010; Bhardwaj, 2017; Hsieh *et al*., 2013; Kolle, 2017; Majid *et al*., 2015; Mulla, 2012; Sproles *et al*., 2013; Taskin *et al*., 2013; Park & Kim, 2011).

The metric studies concerning the subject area have also been conducted that observed the production in recent years of IL in different subject areas. The major topics are assessment, information competencies, e-learning, libraries, and research (Alagu & Thanuskodi, 2018; Pinto *et al*., 2019, Pinto, *et al*., 2013; Urs, *et al*., 2013; Pinto 2015).

The trend of specific studies on a particular publication or context has also received attention. Numerous scholars examined specific journals to have insight about the authorship pattern, citations received per article, types of articles published (research or review based), etc. (Lipetz, 1999; Tiew, Abdullah & Kaur, 2002; Bakri & Willett, 2008). Panda *et al*., (2013) analyzed the Journal of Information Literacy from 2007 to 2012. They observed that the maximum articles published were single authored and highest contribution were from United Kingdom. Tallolli and Mulla (2016) also examined the same journal for time period 2011-2015 and thus acted as update of the previous study. They found that during this period about 155 papers has been published by 220 authors which oftenly belonged from USA, United Kingdom and Canada.

The studies evaluating the relationship between altmetrics and traditionally used bibliometrics for the IL literature is very less. But recently Uribe-Tirado and Alhuay Quispe (2017) performed similar type of research work and tried to analyze the impact and subsequent use of scholarly works about IL on social and

scientific platforms using different bibliometric and altmetric indicators. They observed that there is a positive two-way impact from bibliometric to altmetric, in terms of both the productivity and the impact-visibility center on specific authors writing about IL.

Problem

Several indicators have been used to evaluate research for the past many decades. The traditional indicators gauge the research based on citations and other bibliometric whereas Altmetrics analyze the attention, use and dissemination of scientific articles from online social platforms.

Therefore, the current study aims to study the literature indexed on IL in WoS database and use the various bibliometric measures to analyze the specific aspects of publishing trends. The study also gauges the association between Altmetrics with citation score of the corresponding publications.

Scope

The scope of this study was limited to the literature on IL in WoS database. Further, the study was limited to WoS category - information science library science, document type - journal articles and published in English language only.

Objectives

The objectives of the study are:

To measure the nation wise contribution on IL.

To determine the type of publications.

To analyze the distribution of citations during different periods.

To analyze the authorship pattern.

To analyze the top keywords used.

To find out the 20 topmost cited articles with their characteristics.

To gauge the relation between Altmetrics and citation count of the selected articles.

Thus, study attempts to bring forth the quantitative growth of IL publications through various bibliometric indicators.

METHODOLOGY

The descriptive research methodology was employed for the study. For the collection of data for the current study official websites of WoS database (webofscience.com) were browsed and explored on 10-12-2023 and the relevant data on IL was harvested. The overall data collection comprised the following steps:

Search strategy

The official website of WoS was explored and total of 13 keywords were inserted *under title in the advanced search box* with *"or" Boolean operator* inserted between them. The keywords used include information literacy, digital literacy, media literacy, health literacy, business information literacy, meta-literacy, content literacy, workplace information literacy, scientific literacy, science literacy, lifelong literacy, self-directed learning and visual literacy. As of 10-6-2022, a total of 11,094 publications were found. These were further limited by document type - article, WoS categories - information science library science and language - English, that restricted the count to 1,155. From among these, all bibliometric data of each article is selected for the explorations were probed individually.

Data Extraction

The bibliometric data of each article was extracted from WoS database and the file was downloaded. Further, DOI (Digital Object Identifier) of each article was identified. DOI of top 100 highly cited articles were browsed to extract the altmetrics attention score of each article from official website of Altmetrics (altmetrics.com).

Analysis techniques

Finally, the collected data was tabulated, analyzed and interpreted in accordance with the objectives set with the help of Excel, VOSViewer, R and SPSS software tools. Further, Spearman's rho was calculated for determining the association between the altmetrics score with citation count which is a non-parametric test that is used to measure the degree of association between two variables. The Spearman rank correlation test does not carry any assumptions about the distribution of the data and is the appropriate correlation analysis when the variables are measured on a scale that is at least ordinal. Spearman's correlation determines the strength and direction of the monotonic relationship between two variables (Laerd statistics, 2018). The following formula is used to calculate the Spearman rank correlation:

$$\rho = 1 - \frac{6\Sigma\, d_i^2}{n(n^2-1)}$$

ρ = Spearman's rank correlation coefficient

di = Difference between the two ranks of each observation

n = Number of observations

Usually, Spearman instead of Pearson correlation is used because metrics data is typically too skewed for the assumption of normal distribution of a Pearson test and has too many zero values to be transformed into a normal distribution (Li, *et al.*, 2012; Sud & Thelwall, 2014).

Data Interpretation

Country wise Publication

A total of 1,155 articles were selected for the study about IL and these were published in 28 different countries. Most publications belonged to USA (61.40%) followed by UK (4.88%). Australia (4.42%) and Spain (4.42%) have the same contribution followed by Canada (3.26%) and China (3.02%). It is evident from the data that USA is at par in publishing literature on IL in comparison to all other contributing nations. Table 1 presents a detailed view of all contributing nations.

Types of documents published during the period

Most documents published on IL are in the form of articles (93.18%) while few are in form of conference proceeding papers (4.46%) and scarce amount of early access papers (1.93%) were also present. Table 2 provides detailed view.

Distribution of citations during period

The data included the articles of 33 years from 1989-2022 and it was observed that the articles of year 2016 (106) received highest number of citations followed by year 2011 (91) and 2015 (77). But mean total citations per article is highest for year 1997 (70.5) and 2000 (67.75) while mean total citations per year is highest for year 2012 (3.65) and 2010 (3.61). The detailed view picture is provided in Table 3.

Authorship Pattern and degree of collaboration

There were a total of 2340 authors that contributed to 1,155 papers under study. Among these majority of authors (87.77%) engaged in a collaborative manner for publishing their work while only 12.22% of authors have solo author publications. Further, the majority (68.79%) of multi author publications was traced during the study and the single author's contributions were found to be

Table 1: Country wise Publication.

Sl. No.	Country	Number	Percentage
1	USA	264	61.40
2	UK	21	4.88
3	Australia	19	4.42
4	Spain	19	4.42
5	Canada	14	3.26
6	China	13	3.02
7	Nigeria	9	2.09
8	New Zealand	7	1.63
9	Sweden	7	1.63
10	Finland	6	1.40
11	Pakistan	6	1.40
12	South Korea	6	1.40
13	Japan	5	1.16
14	Greece	4	0.93
15	Ireland	4	0.93
16	Netherlands	4	0.93
17	Portugal	4	0.93
18	Malaysia	3	0.70
19	Tanzania	3	0.70
20	Germany	2	0.47
21	South Africa	2	0.47
22	Thailand	2	0.47
23	Czech Republic	1	0.23
24	Latvia	1	0.23
25	Poland	1	0.23
26	Singapore	1	0.23
27	Slovenia	1	0.23
28	Uganda	1	0.23

31.2%. It depicts that article publication trend in IL is towards the multi author's approach. Further, the collaboration index 2.51 has been calculated for the publications under study (Table 4).

A collaboration index is introduced to measure the level of collaborative practices. The Collaboration Index (CI) is counted by the formula which is suggested by the Lawani (1980) as:

$$CI = \frac{\sum A\, j = 1\, jfj}{N}$$

Where, j=The number authors in an article i.e. 1, 2, 3 ……

fj=The number of j authored articles,

N=The total number of articles published in a year, and

A=The total number of authors per articles,

The greater the collaborative index of a set of papers, the higher its proportion of quality papers is.

Top 20 highly cited articles

The study found that the most highly cited 20 articles belonged mostly (11) to the Journal of Health Communication and are generally multi-authored (15). Five articles were contributed by a single author, five by joint authors, three by three authors, two by four authors, two by five authors, one by six authors and two by seven authors respectively. One article published in 1994, one in 1997, one in 2000, one in 2002, two in 2005, three in 2006, one in 2009, three in 2010, two in 2011, three in 2012, one in 2013, and the remaining one in 2014, respectively. The article entitled "Health Literacy: What Is It?" was the most cited article with 429 citations published in journal of Health Communication during 2010. Berkman, *Davis and McCormack* have authored the paper, and all three authors belong to the USA. Interestingly, the top three highly cited papers were all published in the Journal of health communication i.e., they belonged to the USA. The article with the highest citation score has also highest total citations per year but it has achieved only 13 altmetric score. The highest altmetric score is achieved by article which has 8th rank in citation score. It was also noticed that there are few articles (4) that has not attained any social attention and thus have not score any altmetric attention. Table 5 provides detailed picture of data.

Keyword occurrence

The strengths of word association may shed more light on the independence and the rise and development of the new and emerging literacies. The analysis of the keywords chosen by the authors to index the content of their papers is also of great interest. There were 2176 keywords that co-appeared with IL in the literature. Figure 1 provides the keywords mentioned as the author supplied keywords and keyword plus in the IL literature.

Table 2: Types of documents published during the period.

Type of documents	Number	Percentage
Article	1108	93.18
Proceedings papers	58	4.46
Early access papers	23	1.93

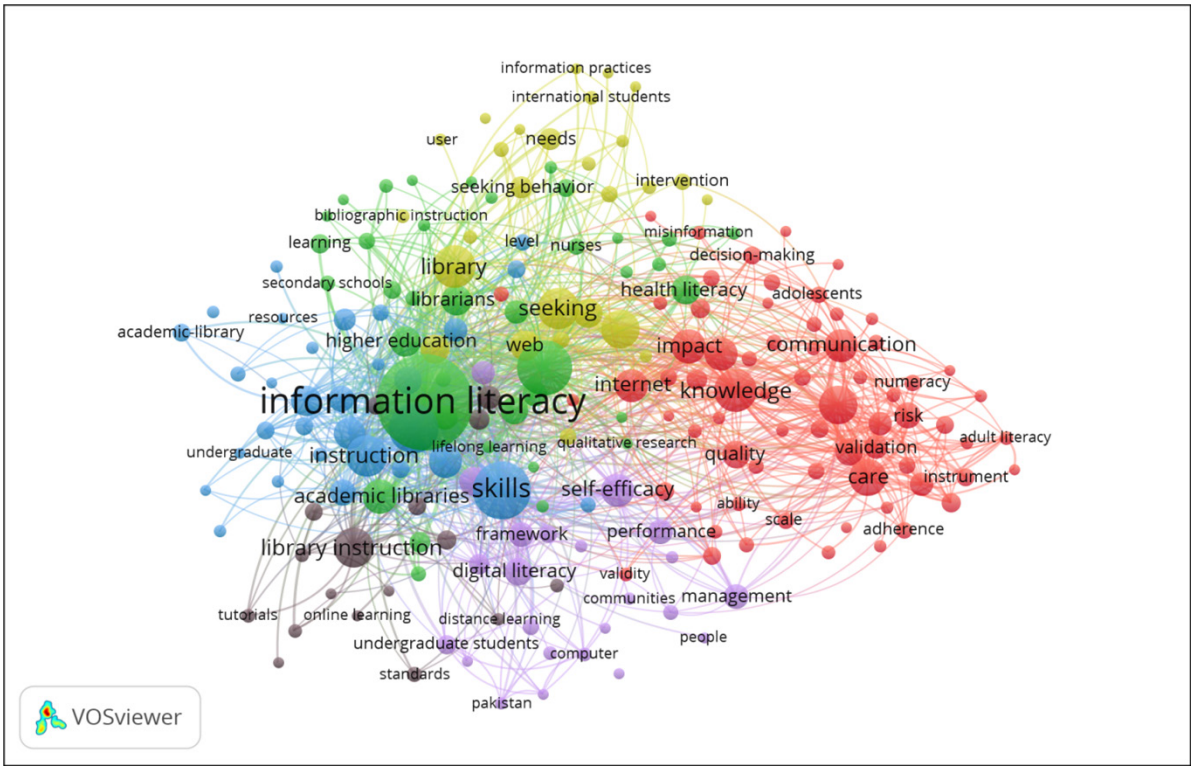

Figure 1: Keyword Occurrence.

Table 3: Distribution of citations during period.

Year	No. of citations	Mean TC per article	Mean TC per Year	Citable years
1989	1	0	0.00	33
1990	2	8	0.25	32
1991	2	14.5	0.47	31
1992	1	11	0.37	30
1993	1	33	1.14	29
1994	2	70.5	2.52	28
1995	2	10.5	0.39	27
1996	2	20	0.77	26
1997	8	37.13	1.49	25
1998	6	3.17	0.13	24
1999	5	50.40	2.19	23
2000	4	67.75	3.08	22
2001	10	19.70	0.94	21
2002	19	30.11	1.51	20
2003	20	30.85	1.62	19
2004	14	20.57	1.14	18
2005	29	34.34	2.02	17
2006	31	40.61	2.54	16
2007	43	29.28	1.95	15
2008	34	26.03	1.86	14
2009	36	31.17	2.40	13
2010	57	43.28	3.61	12
2011	91	25.57	2.32	11
2012	57	36.49	3.65	10
2013	69	26.38	2.93	9
2014	58	20.98	2.62	8
2015	77	14.91	2.13	7
2016	103	13.54	2.26	6
2017	73	8.40	1.68	5
2018	73	8.01	2.00	4
2019	70	6.20	2.07	3
2020	62	4.00	2.00	2
2021	74	1.74	1.74	1
2022	30	0.40		0

The most frequent terms in keywords were selected, excluding those whose frequency was less than 5 occurrences, as these are considered as being not relevant to the research. This leads to a decrease in number of keywords to 205. Among these, *Information literacy* is the most popular term among scholars, and it appeared 313 times. In second position, but far behind in terms of the number is term *skills*, which appeared 115 times, followed by *education* (102) and *students* (85). It indicates that major works are pertaining to assessment of information literacy among students in higher education. Media literacy is the burning issue in the computer science subject since the last decade; it may be due to advancements in information and communication technologies.

The network view is created using the VOS clustering technique, where VOS stands for the visualization of similarities (Van Eck & Waltman, 2010). VOSViewer software provides distance-based maps and identifies the clusters of co-occurring words, which

allows us to identify the main terms and the relationships between those terms. We have considered the "total link strength attribute", which indicates the total strength of the links of an item with other items. Colors indicate the cluster to which a term was assigned. To facilitate interpretation, the links in the keywords network are displayed using curved lines (Figure 1).

The figure consists of six clusters

Cluster 1: It consists of 69 items depicted by red color. Most occurring words among them are *knowledge, outcomes, care, impact, information, communication and internet.*

Cluster 2: It consists of 38 items depicted by green color. Most occurring words among them are *information literacy, education, academic libraries, librarians, higher education, health literacy and libraries.*

Cluster 3: It consists of 31 items depicted by blue color. Most occurring words among them are *skills, students, instruction, perceptions, university, curriculum and faculty.*

Cluster 4: It consists of 27 items depicted by yellow color. Most occurring words among them are *library, seeking, behavior, web, attitudes, science and seeking behavior.*

Cluster 5: It consists of 23 items depicted by purple color. Most occurring words among them are *self-efficacy, model, digital literacy, framework, model, performance and management.*

Cluster 6: It consists of 17 items depicted by brown color. Most occurring words among them are *library instruction, online, motivation, trends, e-learning, pedagogy and critical thinking.*

Spearman correlation for Top 100 highly cited papers on IL

An analysis of top 100 highly cited papers indicated that only 5 of them do not possessed DOI and about 64% (95) of the DOI manuscripts, had at least one altmetric activity. Using Spearman's

Table 4: Authorship Pattern and degree of collaboration.

Total no. of Authors	2340
Authors of single-authored documents	286 (12.22%)
Authors of multi-authored documents	2054 (87.77%)
Single-authored documents	371 (31.2%)
Multi-authored documents	818 (68.79%)
Documents per Author	0.508
Authors per Document	1.97
Collaboration Index	2.51

Table 5: Top 20 highly cited articles.

Title of paper and name of journal	Name of contributing Author	Total Citations	TC per Year	Normalized TC	Altmetric Score
Health Literacy: What Is It? Journal of Health Communication.	Berkman, N. D., Davis, T. C., and McCormack, L. (2010).	429	33	9.912	13
The relationship between health, education, and health literacy: results from the Dutch Adult Literacy and Life Skills Survey. Journal of health communication.	Van Der Heide, I., Wang, J., Droomers, M., Spreeuwenberg, P., Rademakers, J., & Uiters, E. (2013).	298	29.8	11.2978	10
The literacy divide: health literacy and the use of an internet-based patient portal in an integrated health system-results from the Diabetes Study of Northern California (DISTANCE). Journal of health communication.	Sarkar, U., Karter, A. J., Liu, J. Y., Adler, N. E., Nguyen, R., Lopez, A., & Schillinger, D. (2010).	221	17	5.1062	23
Critical information literacy: Implications for instructional practice. The journal of academic librarianship.	Elmborg, J. (2006).	218	12.8235	5.3678	23
Low health literacy, limited English proficiency, and health status in Asians, Latinos, and other racial/ethnic groups in California. Journal of health communication.	Sentell, T., & Braun, K. L. (2012).	215	19.5455	5.8918	10
Health literacy measurement: an inventory and descriptive summary of 51 instruments. Journal of health communication.	Haun, J. N., Valerio, M. A., McCormack, L. A., Sørensen, K., & Paasche-Orlow, M. K. (2014).	203	22.5556	9.6746	34

Title of paper and name of journal	Name of contributing Author	Total Citations	TC per Year	Normalized TC	Altmetric Score
Survey measures of web-oriented digital literacy. Social science computer review.	Hargittai, E. (2005).	202	11.2222	5.8815	4
Reframing information literacy as a metaliteracy. College & research libraries.	Mackey, T. P., & Jacobson, T. E. (2011).	184	15.3333	7.1955	44
Information literacy as a sociotechnical practice. The Library Quarterly.	Tuominen, K., Savolainen, R., & Talja, S. (2005).	177	9.8333	5.1536	7
Conceptions of information literacy: new perspectives and implications. Journal of information science.	Webber, S., & Johnston, B. (2000).	171	7.4348	2.524	0
Health literacy explains racial disparities in diabetes medication adherence. Journal of health communication.	Osborn, C. Y., Cavanaugh, K., Wallston, K. A., Kripalani, S., Elasy, T. A., Rothman, R. L., & White, R. O. (2011).	145	12.0833	5.6704	16
Immediate and delayed effects of media literacy training on third grader's decision making for alcohol. Journal of health communication.	Austin, E. W., & Johnson, K. K. (1997).	145	5.5769	3.9057	3
A conceptual analysis and historical overview of information literacy. College & Research Libraries.	Behrens, S. J. (1994).	141	4.8621	2	3
The health literacy skills framework. Journal of health communication.	Squiers, L., Peinado, S., Berkman, N., Boudewyns, V., & McCormack, L. (2012).	139	12.6364	3.8091	5
Developing the information literacy self-efficacy scale. Journal of documentation.	Kurbanoglu, S. S., Akkoyunlu, B., & Umay, A. (2006).	137	8.0588	3.3733	0
A discipline-based approach to information literacy. The Journal of Academic Librarianship.	Grafstein, A. (2002).	134	6.381	4.451	0
Information literacy landscapes: an emerging picture. Journal of documentation.	Lloyd, A. (2006).	133	7.8235	3.2748	0
Health literacy and 30-day post discharge hospital utilization. Journal of health communication.	Mitchell, S. E., Sadikova, E., Jack, B. W., & Paasche-Orlow, M. K. (2012).	131	11.9091	3.5899	8
How high-school students find and evaluate scientific information: A basis for information literacy skills development. Library & Information Science Research.	Julien, H., & Barker, S. (2009).	130	9.2857	4.1711	1
Self-efficacy links health literacy and numeracy to glycemic control. Journal of health communication.	Osborn, C. Y., Cavanaugh, K., Wallston, K. A., & Rothman, R. L. (2010).	126	9.6923	2.9112	7

Table 6: Spearman correlation for Top 100 highly cited papers on IL.

Spearman's rho for citation and altmetric score	Number	r_s
	100	.248

*Significant at the 0.013 level.

rho, it was also evidenced that there is a low positive correlation between the number of citations received and altmetric score of top highly cited papers (r_s=0.248) as depicted in Table 6. Uribe-Tirado and Alhuay Quispe (2017) in their study also observed positive two-way impact from bibliometric to altmetric, in terms of both the productivity and the impact-visibility center on specific authors writing about IL.

But there is need for further investigation in this domain to find direct relationships between different sources and platforms of altmetrics and bibliometrics to get better understanding of their correlations. Alperin (2015); Kuchner (2012); Uribe-Tirado and Alhuay Quispe (2017) proposed that two processes are crucial for gaining online attention which include formation of digital identity by authors or researchers for the creation and management and that the publications must possess DOI.

CONCLUSION

The study is based on the contributions made in the field of IL, a total of 11,094 articles has been published in the period of 33 years. For the purpose of study, the number was limited to 1,155 articles by restricting the scope through document type, WoS categories and language. The major contribution found during the study was USA (61.40%) and UK (4.88%). These are consistent with findings of Kolle (2017) and Aharony (2010) where they found that most of the documents on IL, were published in the US with UK at second position and other countries very far behind. Other studies also highlighted the same trend of US appear as leading publishing nation on IL (Nazim & Ahmad, 2007; Johnson *et al*., 2012; Kondilis *et al*., 2008, Kumari *et al*., 2015) also found the same trend of US appear as leading publishing nation. The overall 19.19 average citations per document have been found. It was observed that the articles of year 2016 (106) received highest number of citations but mean total citations per article is highest for year 1997 (70.5) while mean total citations per year is highest for year 2012 (3.65). 93.18% of documents are in the form of articles and 4.46% are available in form of conference proceeding papers during the period. 87.77% of authors engaged in collaborative manners for publishing their work while only 12.22% of authors have solo publications. The collaboration index value is 2.51 that shows that there is encouraging multiple author's contributions in the field of IL. From the study, the majority of joint authorship and high collaboration index reveals that team research is predominant during the study. These findings consist with previous studies that there is encouraging the multiple author's contributions in field of IL (Alagu, & Thanuskodi, 2018; Tallolli, & Mulla, 2016). *Information literacy* is the most popular keyword followed by *skills, education* and *students*. This indicates that major works in IL are related to assessment of information literacy among students in higher education which is consistent with findings of Kolle (2017). The study also observed low positive correlation between the number of citations received and altmetric score of top highly cited papers which is supported by previous studies also (Araujo, *et al*. (2018); Eysenbach, 2011; Rosenkrantz *et al*., 2017; Uribe-Tirado, & Alhuay Quispe, 2017). Utilizing online social tools by researchers such as ORCID ID, Researcher ID, Research Gate profile, or LinkedIn and link to their profiles on university webpages, CVs, and/or within email signatures can enhance visibility of their publications (Brown, 2016; Schilhan *et al*., 2021). This will lead to increase in altmetric score progressively.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

IL: Information Literacy; **WoS:** Web of Science; **DOI:** Digital Object Identifier.

SUMMARY

This paper presents a bibliometric and altmetric analysis of scholarly literature on Information Literacy (IL) indexed in the Web of Science (WoS) database from 1989-2022. The study identifies trends in IL research, including productive countries, authorship patterns, frequently used keywords, and highly cited articles. The authors also analyze the correlation between altmetric scores, and citation counts. The study reveals that the USA is the highest contributing country, most articles are multi-authored, and there is a low positive correlation between citation count and altmetric score. The findings are valuable for researchers, librarians, and educators in understanding the evolution and current state of IL research.

REFERENCES

Aharony, N. (2010). Information literacy in the professional literature: An exploratory analysis. Aslib Proceedings, 62(3), 261–282. https://doi.org/10.1108/00012531011046907

Alagu, A., & Thanuskodi, S. (2018). Information literacy research publications in India: A bibliometric analysis. Journal of Advances in Library and Information Science, 7(2), 201–207.

Alperin, J. P. (2013). Ask not what altmetrics can do for you, but what altmetrics can do for developing countries. Bulletin of the American Society for Information Science and Technology, 39(4), 18–21. https://doi.org/10.1002/bult.2013.1720390407

How is the Altmetric Attention Score calculated? (2019). https://help.altmetric.com/support/solutions/articles/6000060969-how-is-the-altmetric-score calculated Retrieved April 14, 2023.

Araujo, A. C., Nascimento, D. P., Gonzalez, G. Z., Maher, C. G., & Costa, L. O. P. (2018). Impact of low back pain clinical trials measured by the Altmetric score: Cross-sectional study. Journal of Medical Internet Research, 20(4), e86. https://doi.org/10.2196/jmir.9368

Bakri, A., & Willett, P. (2008). 2001–2006: A bibliometric study, Malaysian Journal of Library and Information Science. Malaysian Journal of Library and Information Science, 13(1), 103–116.

Baro, E. E., Endouware, B. C., & Ubogu, J. O. (2011). Information literacy among medical students in the College of Health Sciences in Niger Delta University, Nigeria [Program], 45(1) (pp. 107–120).

Behrens, S. J. (1994). A conceptual analysis and historical overview of information literacy. College and Research Libraries, 55(4), 309–322. https://doi.org/10.5860/crl_55_04_309

Bhardwaj, R. K. (2017). Information literacy literature in the Social Sciences and Humanities: A bibliometric study. Information and Learning Science, 118 (1/2), 67–89. https://doi.org/10.1108/ILS-09-2016-0068

Brown, A., Cowan, J., & Green, T. (2016). Faculty productivity: Using social media and measuring its impact. Educause Review, 2.

Durieux, V., & Gevenois, P. A. (2010). Bibliometric indicators: Quality Measurements of scientific publication. Radiology, 255(2), 342–351. https://doi.org/10.1148/radiol.09090626

Eysenbach, G. (2011). Can tweets predict citations? Metrics of social impact based on Twitter and correlation with traditional metrics of scientific impact. Journal of Medical Internet Research, 13(4), e123. https://doi.org/10.2196/jmir.2012

Hossain Shoeb, Z. H. (2011). Information literacy competency of freshman business students of a private university in Bangladesh. Library Review, 60(9), 762–772. https://doi.org/10.1108/00242531111176781

Hsieh, P.-N., Chuang, T.-M., & Wang, M.-L. (2013). A bibliometric analysis of the theses and dissertations on information literacy published in the United States and Taiwan. In R.-S. Chang, L. C. Jain, S.-L. Peng (Eds.),1 (pp. 337–348). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-35452-6_35

Jabur, N. H. (2016). Altmetrics as alternative tool for measuring the impact of scholarly documents based on readers attention: A Comparative Study. Qualitative and Quantitative Methods in Libraries (QQML), 5, 335–346. http://www.qqml-journal.net/index.php/qqml/article/view/344/342

Johnson, A. M., Sproles, C., Detmering, R., & English, J. (2012). Library instruction and information literacy 2011. Reference Services Review, 40(4), 601–703. https://doi.org/10.1108/00907321211277396

Kolle, S. R. (2017). Global research on information literacy: A bibliometric analysis from 2005 to 2014. The Electronic Library, 35(2), 283–298. https://doi.org/10.1108/EL-08-2015-0160

Kondilis, B. K., Kiriaze, I. J., Athanasoulia, A. P., & Falagas, M. E. (2008). Mapping health literacy research in the European Union: A bibliometric analysis. PLOS One, 3(6), Article e2519. https://doi.org/10.1371/journal.pone.0002519

Kuchner, M. (2012). Marketing for scientists. Washington [DC]: Island press.

Kumari, A., Madhusudhan, C. M., & Ali, H. (2015). A bibliometric study of world research output on information literacy in the field of library and information science during 1999–2013. e-Library Science Research Journal, 3(9), 1–10.

Lawani, S. M. (1980). Quality, collaboration and citations in cancer research: A bibliometric study. Florida State University.

Lenox, M. F., & Walker, M. L. (1993, September). Information literacy in the educational process. In The Educational Forum. Taylor & Francis Group, 57(3), 312–324. https://doi.org/10.1080/00131729309335431

Li, X., Thelwall, M., & Giustini, D. (2012). Validating online reference managers for scholarly impact measurement. Scientometrics, 91(2), 461–471.

Lipetz, B. A. (1999). Aspects of JASIS authorship through five decades. Journal of the American Society for Information Science, 50(11), 994–1003.

Lloyd, A., & Williamson, K. (2008). Towards an understanding of information literacy in context: Implications for research. Journal of Librarianship and Information Science, 40(1), 3–12. https://doi.org/10.1177/0961000607086616

Maharana, R. K. (2013). Bibliometric analysis of Orissa University of Agricultural Technology's research output as indexed in Scopus in 2008–2012. Chinese Librarianship: An International Electronic Journal, 36, 25–34. http://www.iclc.us/cliej/cl36maharana.pdf

Majid, S., Chang, Y. K., Hnin, N. A., Ma, M. W. K., & San, Y. W. (2015). Analyzing publishing trends in information literacy literature: A bibliometric study. Malaysian Journal of Library and Information Science, 20(2), 51–66.

Maybee, C., & Flierl, M. (2016, October). Motivating learners through information literacy. In European Conference on Information Literacy (pp. 698–707). Springer.

McBurney, M. K., & Novak, P. L. (2002, September). What is bibliometrics and why should you care? In Proceedings. IEEE International Professional Communication Conference. IEEE, (108–114).

Mulla, K. R. (2012). Identifying and mapping the information science and scientometrics analysis studies in India (2005–2009): A bibliometric study. Library Philosophy and Practice, 12, 1–16.

Mulla, K. R. (2014). Information literacy for students and teachers in Indian context. Pearl: A Journal of Library and Information Science, 8(2), 88–96.

Nazim, M., & Ahmad, M. (2007). Research trends in information literacy: A bibliometric study. SRELS Journal of Information Management, 44(1), 53–62.

Onyancha, O. B. (2020). Knowledge visualization and mapping of information literacy, 1975–2018. IFLA Journal, 46(2), 107–123.

Panda, I., Maharana, B., & Chhatar, D. C. (2013). The journal of information literacy: A bibliometric study. International Journal of Scientific and Research Publications, 3(3), 1–7.

Park, M. K., & Kim, H. J. (2011). A bibliometric analysis of the literature on information literacy. Journal of the Korean Society for Information Management, 28(2), 53–63.

Parvathamma, N., & Pattar, D. (2013). Digital literacy among student community in management institutes in Davanagere District, Karnataka State, India. Annals of Library and Information Studies (ALIS), 60(3), 159–166.

Pinto, M. (2015). Viewing and exploring the subject area of information literacy assessment in higher education (2000–2011). Scientometrics, 102, 227–245.

Pinto, M., Escalona, M. I., & Pulgarin, A. (2013). Information literacy in social sciences and health sciences: A bibliometric study (1974–2011). Scientometrics, 95(3), 1071–1094.

Pinto, M., Fernández-Pascual, R., Caballero-Mariscal, D., Sales, D., Guerrero, D., & Uribe, A. (2019). Scientific production on mobile information literacy in higher education: A bibliometric analysis (2006–2017). Scientometrics, 120(1), 57–85. https://doi.org/10.1007/s11192-019-03115-x

Poplasen, L. M., & Zrnic, L. (2014). Altmetrics-new metrics and its application in Croatia. Libraries in the digital age (LIDA) proceedings, 13. http://ozk.unizd.hr/proceedings/index.php/lida/article/view/132

Priem, J., Piwowar, H. A., & Hemminger, B. M. (2012). Altmetrics in the wild: Using social media to explore scholarly impact. arXiv preprint arXiv:1203.4745. http://arxiv.org/abs/1203.4745

Pritchard, A. (1969). Statistical bibliography or bibliometrics. Journal of Documentation, 25, 348.

Rader, H. B. (1991). Information literacy: A revolution in the library. RQ, 31(1), 25–30.

Rader, H. B. (2002). Information literacy 1973–2002: A Selected Literature Review.

Rosenkrantz, A. B., Ayoola, A., Singh, K., & Duszak, R. (2017). Alternative metrics ('altmetrics') for assessing article impact in popular General Radiology Journals. Academic Radiology, 24(7), 891–897. https://doi.org/10.1016/j.acra.2016.11.019

Schachter, D. (2020). Theory into practice: Challenges and implications for information literacy teaching. IFLA Journal, 46(2), 133–142. https://doi.org/10.1177/0340035219886600

Schilhan, L., Kaier, C., & Lackner, K. (2021). Increasing visibility and discoverability of scholarly publications with academic search engine optimization. Insights The UKSG Journal, 34(1). https://doi.org/10.1629/uksg.534

SenGupta, I. N. (1985). Bibliometrics: A bird's eye view. Iaslic Bulletin, 30(4), 167–174.

Sevukan, R., & Gomathy, V. (2015). Digital literacy of postgraduate students in management institutions of Puducherry: A survey. Pearl: A Journal of Library and Information Science, 9(1), 66–74. https://doi.org/10.5958/0975-6922.2015.00009.1

Singh, G., Mittal, R., & Ahmad, M. (2007). A bibliometric study of literature on digital libraries. The Electronic Library, 25(3), 342–348. https://doi.org/10.1108/02640470710754841

Sproles, C., Detmering, R., & Johnson, A. M. (2013). Trends in the literature on library instruction and information literacy, 2001–2010. Reference Services Review, 41(3), 395–412. https://doi.org/10.1108/RSR-03-2013-0014

Sud, P., & Thelwall, M. (2014). Evaluating altmetrics. Scientometrics, 98(2), 1131–1143. https://doi.org/10.1007/s11192-013-1117-2

Swapna, G., & Biradar, B. S. (2017). Information literacy model for higher education institutions in India. International Journal of Digital Library Services, 7(3), 31–50.

Tallolli, S. B., & Mulla, K. R. (2016). A bibliometric analysis of journal of information literacy (2011–2015). ISST Journal of Advances in Librarianship, 7(2), 44–51.

Taskin, Z., Dogan, G., & Sencan, I. (2013, October). Analyzing the intellectual structure of world information literacy literature through citations and co-citations. In European Conference on Information Literacy (pp. 54–60). Springer.

Thanuskodi, S. (2010). Bibliometric analysis of the journal Library Philosophy and Practice from 2005–2009. Library Philosophy and Practice, 1(7). https://core.ac.uk/download/pdf/17239788.pdf.

Tiew, W. S., Abdullah, A., & Kaur, K. (2001). 1996–2000: A bibliometric study. Malaysian Journal of Library & Information Science. Malaysian Journal of Library and Information Science, 6(1), 43–56.

Uribe-Tirado, A., & Alhuay-Quispe, J. (2017). Estudio métrico de ALFIN en Iberoamérica: De la bibliometría a las altmetrics [Metric study of information literacy in Latin America: From bibliometrics to altmetrics]. Revista Española de Documentación Científica, 40(3). https://doi.org/10.3989/redc.2017.3.1414

Urs, S., Raghavan, K. S., Anuradha, K. T., & Harinarayana, N. S. (2013). A bibliometric study of world research output on information literacy in the field of library and information science during 1999–2013. In H. P. Shekar, H. R. Babu, V. Sunitha, & T. A. Mohan (Eds.),National conference on inspiring library services (NCILS-2013), 1. Sree Siddharta Education Society.

Van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. Scientometrics, 84(2), 523–538. https://doi.org/10.1007/s11192-009-0146-3

Vijayakumar, M., & Naqvi, S. H. (2002). Authorship tends in Azadirachta indica literature: A bibliometric study. SERLS Journal of Information Management, 39(4), 445–455.

Walsh, A. (2009). Information literacy assessment: Where do we start? Journal of Librarianship and Information Science, 41(1), 19–28. https://doi.org/10.1177/0961000608099896

Wang, L. (2011). An information literacy integration model and its application in higher education. Reference Services Review, 39(4), 703–720. https://doi.org/10.1108/00907321111186703

Zhu, Q., & Willett, P. (2011). Bibliometric analysis of Chinese Superconductivity Research, 1986–2007. Aslib Proceedings, 63(1), 101–119. https://doi.org/10.1108/00012531111103803

Zurkowski, P. G. (1974). The information service environment relationships and priorities. Related Paper no. 5. https://files.eric.ed.gov/fulltext/ED100391.pdf

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