MAPPING THE RESEARCH PRODUCTIVITY IN THE DISCIPLINE OF EDUCATION : A QUANTITATIVE STUDY

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Abstract

The study has been conducted with 4,09,511 original contributions published in the highly reputed scholarly journals in the discipline of Education during 1989-2018. In this paper the author aims to examine the growth of literature in the field of Education. Quantitative methods of research was employed which involves variables such as total research output, citations received reflecting the impact, country level contribution, language distribution, Open Access literature, etc. The objectives of the study have been framed considering these aspects. Findings of the study will help in understanding the current status and trends of research productivity of the world as-well-as of India. The parameters studied include the global research productivity in the discipline of Education in terms of Open Access (OA) literature. It identifies the highly productive authors, top contributing countries, preferred languages and highly cited papers in the discipline of Education. The paper also highlights the current status of research productivity in the discipline of Education in India. The major findings of the study reveal that 2016 has witnessed the highest research productivity in the discipline of Education at global level. The contribution of USA in terms of research productivity in Education is highest followed by England; Australia and Canada respectively.

Keywords: Research Productivity, Education, Citation analysis; highly Cited Authors; Bibliometrics, Scientometrics, Publication Productivity, Author Productivity

Introduction:

In scientometrics and bibliometrics approaches scientific literature itself becomes the subject of analysis. These are considered as a science of science. Scientometrics and bibliometrics often involve the monitoring of research, the assessment of the scientific contribution of authors, journals or specific works, as well as the analysis of the dissemination process of scientific knowledge(Analytics, 2016). These fields of study enable gathering of information produced by the activity of researchers' communications, and involve techniques such as citation analysis, social network analysis, co-word and content analysis, as well as text-mining to achieve quantitative analysis of research output. Bibliometric studies focus on authorship, measure the contribution of journal and research organizations, content analysis of words in titles, abstracts, the full text of books, journal articles or conference proceedings, or keywords assigned to published articles by editors or librarians. Scientometrics aims to measure the evolution of a scientific domain, the impact of scholarly publications, the

patterns of authorship, and the

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process of scientific knowledge production. The present paper applies relevant bibliometric and scientometric techniques to evaluate the research productivity in the field of Education at global level and in India.

Research Design :

Statement of the Problem :

It is quite significant to measure and analyse the growth of literature in any discipline through quantitative methods involving variables like total research output, citations received reflecting the impact, country level contribution, language distribution, Open Access literature, etc. It is in the light of these dimensions that the study "Mapping the Research Productivity in the Discipline of Education: A Quantitative Study" has been undertaken and the objectives of the study have been framed.

Objectives of the Study :

The main objectives of the study are as follows :

1. To analyse the global research productivity and its growth trend in the discipline of Education in terms of publications and citations received.
2. To analyse the global research productivity in the discipline of Education in terms of Open Access (OA) literature.
3. To identify the highly productive authors and highly cited papers in the discipline of Education.
4. To identify the top contributing countries and preferred languages in the field of Education.
5. To assess the current status of research productivity in the discipline of Education in India.

Scope & Limitation of Study

This Study is limited to search results on the subject "Education" in the premium database Web of Science (WoS) during 1989 to 2018.

Methods and Materials :

For extracting the primary data, Web of Science has been used. Web of Science is an online subscription-based scientific citation indexing service originally produced by the Institute for Scientific Information, now maintained by Clarivate Analytics that provides a comprehensive citation search. Author has used the advanced search feature of the database Web of Science (WoS) for obtaining the data. The results obtained were refined to get the desired level of relevant data. For extracting the data query run was - WC= ("Education & Educational Research" OR "Education, Scientific Disciplines" OR "Education, Special") OR SU=(Education & Educational Research). Total number of results obtained initially after executing the above said query was 4,09,511. The records retrieved were recorded and tabulated. Finally, the collected data was analysed for generating information.

Results and Discussion :

Year-wise Growth of Publications

Figure 1

Figure above reflects the Research Productivity of the last 10 years (2008-2017).The year 2016 has witnessed the highest research productivity with 35,538 research papers very closely followed by 35,306 papers in 2017. It is quite evident that by and large there is rise in the publications in the discipline of Education. It is also evident from the above figure that during the year 2008 to 2014 the growth rate in the research productivity is almost constant without any noticeable rise or decline. The global research productivity picked the momentum from the year 2015.

Country-wise Distribution of Publications

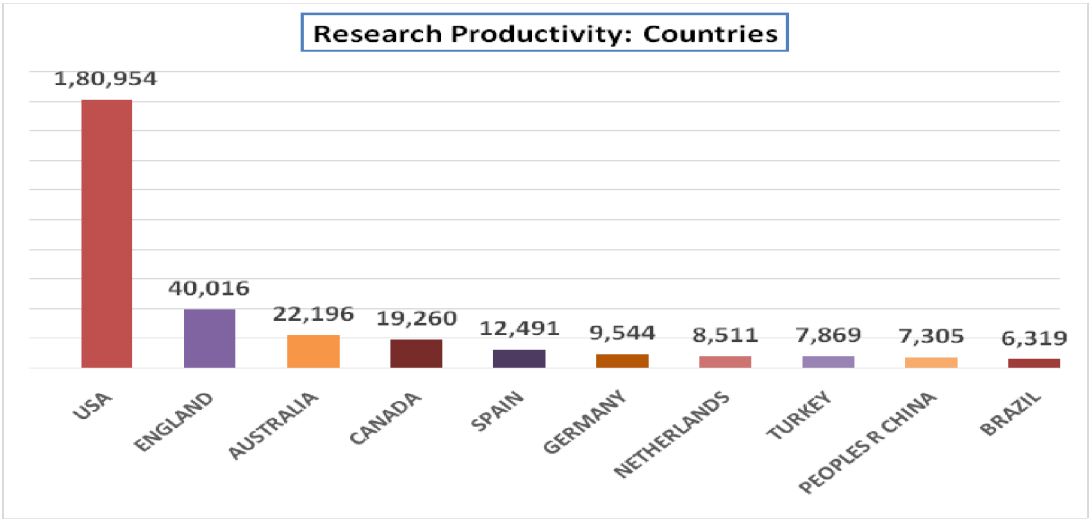

Figure 2

Figure above presents the global ranking of top 10 countries with respect to research productivity in Education. The contribution of USA in terms of research productivity in Education is highest (1,80,954) followed by England (40,016); Australia (22,196) and Canada (19,260) respectively. It is worth noting that USA is leading with quite a high margin as the difference between the number of publications by USA and England (1st and 2nd position in the top 10 countries) is quite significant (1,76,9524).

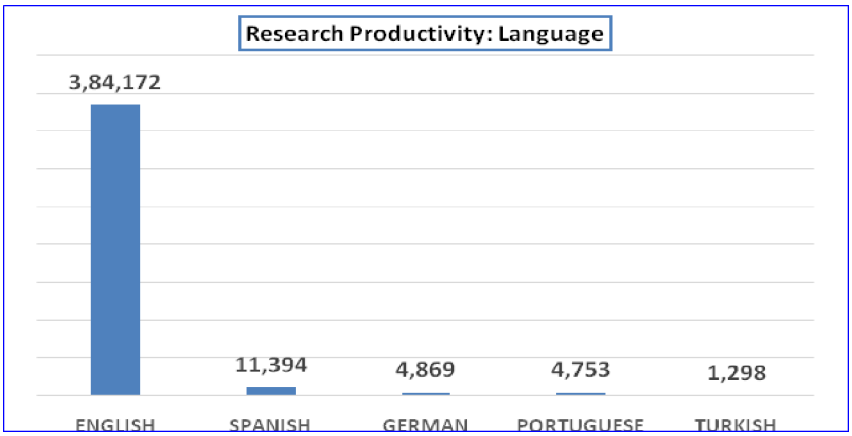

Figure 3

The primary language in which the global research productivity has been reported was found to be English (3,84,172) followed by Spanish (11,394), German (4869), Portuguese (4753) and Turkish (1298) respectively.

Highly Cited Articles: Highly productive authors

SN	Title	Author	Journal	Publication Year	Citations
1.	Computational Tools for Probing Interactions in Multiple Linear Regression, Multilevel Modeling, and Latent Curve Analysis	Preacher, KJ; Curran, PJ; Bauer, DJ	Journal of Educational and Behavioral Statistics	2006	1965
2.	Teachers beliefs and educational-research - cleaning up a messy construct	Pajares, MF	Review of Educational Research	1992	1942

13:	The power of feedback	Hattie, J; Timperley, H	Review of Educational Research	2007	1931
14:	Using SAS PROC MIXED to fit multilevel models, hierarchical models, and individual growth models	Singer, JD	Journal of Educational and Behavioral Statistics	1998	1719
15:	School engagement: Potential of the concept, state of the evidence	Fredricks, JA; Blumenfeld, PC; Paris, AH	Review of Educational Research	2004	1629
16:	Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching	Kirschner, PA; Sweller, J; Clark,RE	Educational Psychologist	2006	1624
17:	Perceived self-efficacy in cognitive-development and functioning	Bandura, A	Educational Psychologist	1993	1503
18:	Technological pedagogical content knowledge: A framework for teacher knowledge	Mishra, P; Koehler, MJ	Teachers College Record	2006	1459

9.	The teacher's soul and the terrors of performativity	Ball, SJ	Journal of Education Policy	2003	1248
10.	What makes professional development effective? Results from a national sample of teachers	Garet, MS; Porter, AC; Desimone, L; et al.	American Educational Research Journal	2001	1239

The paper which has received highest citation (1965) globally was found to be "Computational Tools for Probing Interactions in Multiple Linear Regression, Multilevel Modeling, and Latent Curve Analysis". This paper is authored by Preacher, KJ; Curran, PJ and Bauer, DJ and was published in the Journal of Educational and Behavioral Statistics in 2006. This paper has been cited 3048 times in Google Scholar. It is pertinent to note that the journal Review of Educational Research appears twice in terms of high citations. One of its articles titled Teachers beliefs and educational-research - cleaning up a messy construct (1992) has been cited 1942 times while the article "The Power of Feedback (2007) has been cited 1931 times. These two articles occupy 2nd and 3rd position in the top 10 highly cited papers in the discipline of Education. Two of the articles published in Journal of Educational and Behavioral Statistics have occupied 1st and 4th position in this list. Similarity, the journal Educational Psychologist appears twice in the list of top 10 highly cited articles at 6th and 7th positions with 1624 citations 1503 citations respectively.

Open Access Scholarly Literature in Education:

Open access (OA) is precisely meant for free access to scholarly literature without any barrier of price and copyright. It responds to free distribution and free access to scholarly research articles without any knowledge divide that helps to create a more equitable world. Upon analysing the data extracted from the abstracting & indexing database Web of Science (WoS), it was noted that there are 56,468 OA articles in the discipline of Education. These OA documents can be broadly categorized into:

Fully published articles that are available freely from the publisher are identified as Gold open access.

Green open access are either final published articles or peer-reviewed accepted manuscripts available without charge from a repository.A freely accessible version of an article located in a subject-based repository such as PubMed Central or in an institutional repository. This version of the article may vary from a peer-reviewed accepted manuscript to the final published version based on the journal's policies. Because the accepted manuscript may vary from the final published version, they are labelled distinctly as Green Accepted and Green Published respectively.

i. Freely available final, peer-reviewed manuscripts available from a repository fall under Green Accepted open access category.

ii. Published articles freely available from a repository are considered as Green Published open access category

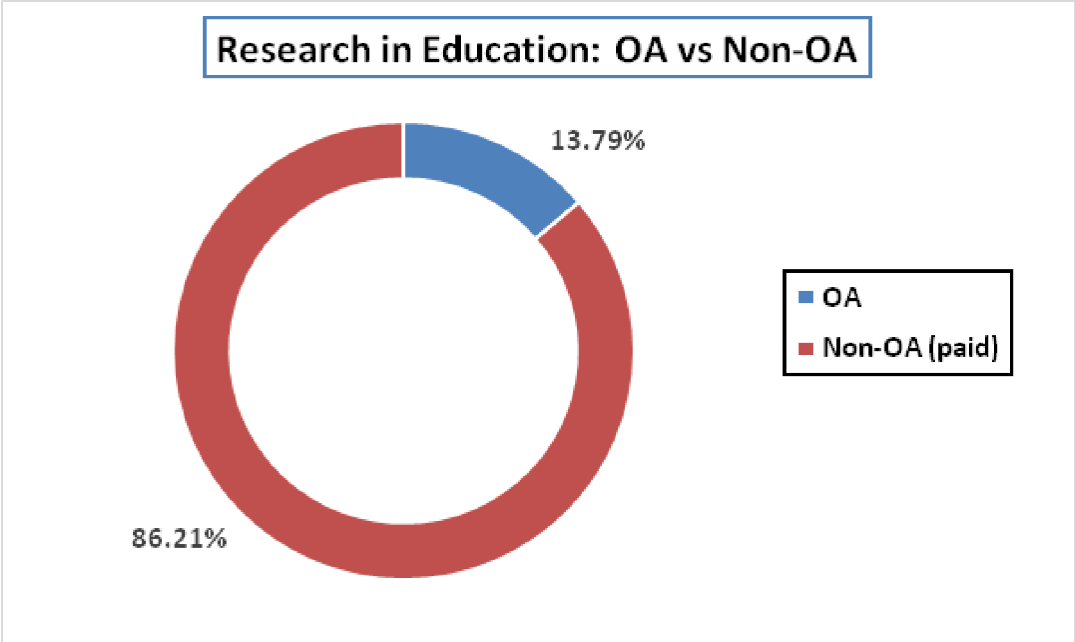

Figure 4

Total number of publications authored by the researchers and scholars of the world as reported by the database Web of Science (WoS) are 4,09,511 out of which 56,468 (13.79%) have been published in Open Access journals while 86.21% have been published in subscription based journals.

The status of OA research in Education has been presented below -

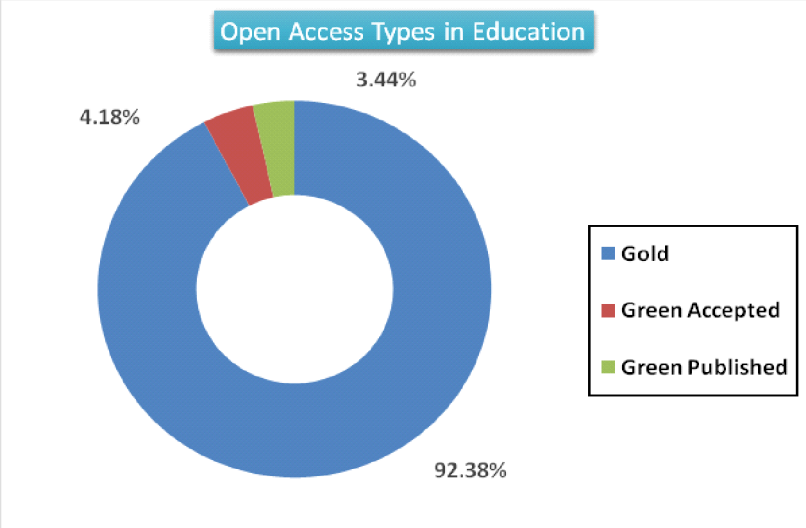

Figure 5

Total number of research papers in the discipline of Education accessible freely under gold OA is significantly high (52,164; 92.38%) than green accepted (2,363; 4.18%) and green published (1,941; 3.44%). This implies that OA journals are the major carriers for the dissemination of OA research in the subject of Education than the digital repositories.

Research Productivity in Education: India

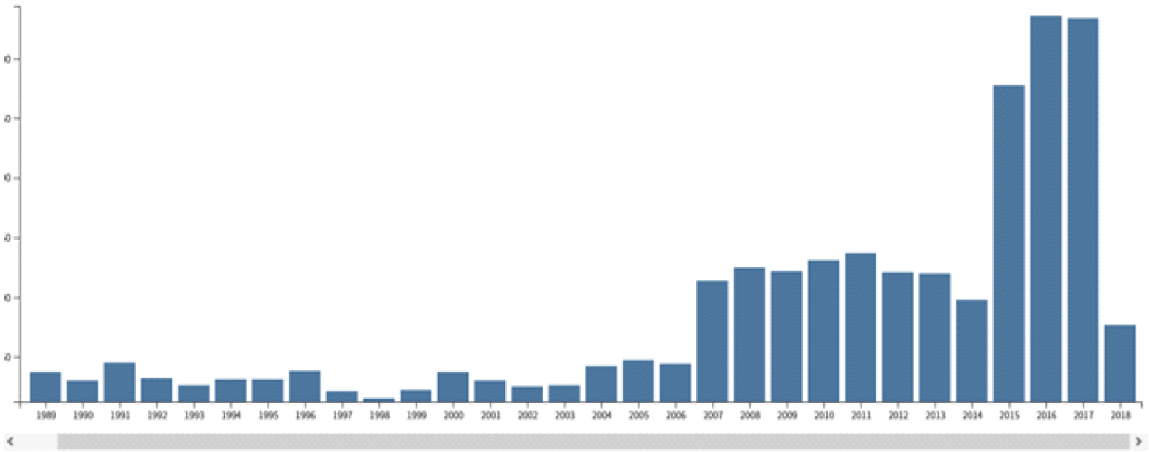

Figure 6

Total number of publications authored by Indian researchers and scholars as reported by the database Web of Science (WoS) is 2,572. The number of publications in the discipline of Education from 1989 till 2006 is quite insignificant. However, the research productivity is considerable during 2007 to 2014. A noticeable growth in the research productivity is visible from 2015 to 2017 and is expected to rise further in 2018.

The h-index of total research output by Indian authors in Education was found to be 35. The average citations per item of the same came out to be 3.38. The total no of citation received by the Indian researcher in domain of Education is 8,681 (Without self citations = 8,287).

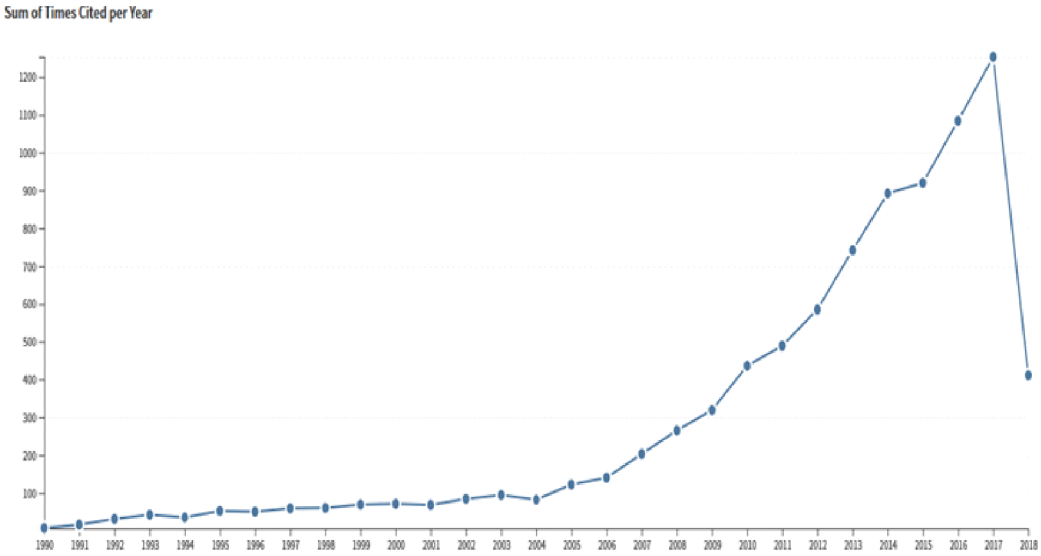

Figure 7

Above graph indicates consistent and continuous rise of citation received by the Indian authors in the discipline of Education. It can be inferred that the growth rate of citations is quite satisfactory.

SN	Title	Author	Journal	Publication Year	Citations
1.	Prevalence of intellectual disability: A meta-analysis of population-based studies	Maulik, PK; Mascarenhas, MN ; Mathers, CD ; Dua, T ; Saxena, S	Research in Developmental Disabilities	2011	282

1. 2.	The Sonagachi Project: A sustainable community intervention program	Jana, S ; Basu, I ; Rotheram-Borus, MJ ; Newman, PA	Aids Education and Prevention	2004	217
2. 3.	A review of rubric use in higher education	Reddy, YM; Andrade, H	Assessment & Evaluation in Higher Education	2010	138
3. 4.	How Do Corporations Embed Sustainability Across the Organization?	Haugh, HM; Talwar, A	Academy of Management Learning & Education	2010	86
4. 5.	Misconceptions of students and teachers in chemical-equilibrium	Banerjee, AC	International Journal of Science Education	1991	69

The paper which has received highest citation (282) was found to be "Prevalence of intellectual disability: A meta-analysis of population-based studies". This paper is authored by Maulik, PK; Mascarenhas, MN ;Mathers, CD ; Dua, T ; Saxena, S and was published in the journal Research in Developmental Disabilities in 2011. The article entitled "The Sonagachi Project: A sustainable community intervention program" (2004) has been cited 217 times while the article "A review of rubric use in higher education"(2010) has been cited 138 times. These two articles occupy 2nd and 3rd position in the top 5 highly cited papers by the Indian authors in the discipline of Education. The other two articles " How to corporation Embed Sustainability across the Organization?" and "Misconceptions of students and teachers in chemical-equilibrium" are in 4th and 5th position with 86 and 69 citations respectively.

Open Access Publication :

Out of the total no of publication in Education originating from India (2572), the number of research papers published under Open Access is 455.

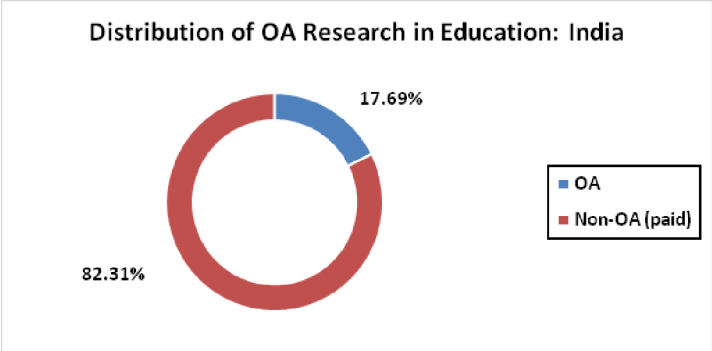

Figure 8

It can be observed from the above figure that 17.69% of the published literature in the field of education can be freely accessed as they belong to the category of Open Access (OA) while 82.31% of the research publications are paid. Out of this 17.69% of the OA literature in the field of Education 97.14% are covered under Gold OA, 1.54% belongs to Green Published OA while 1.32% belongs to Green Accepted OA (Fig.9).

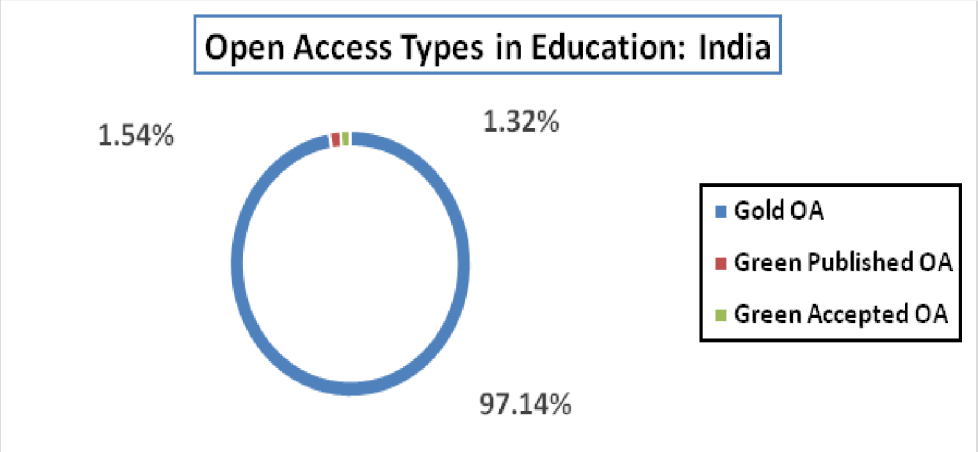

Figure 9

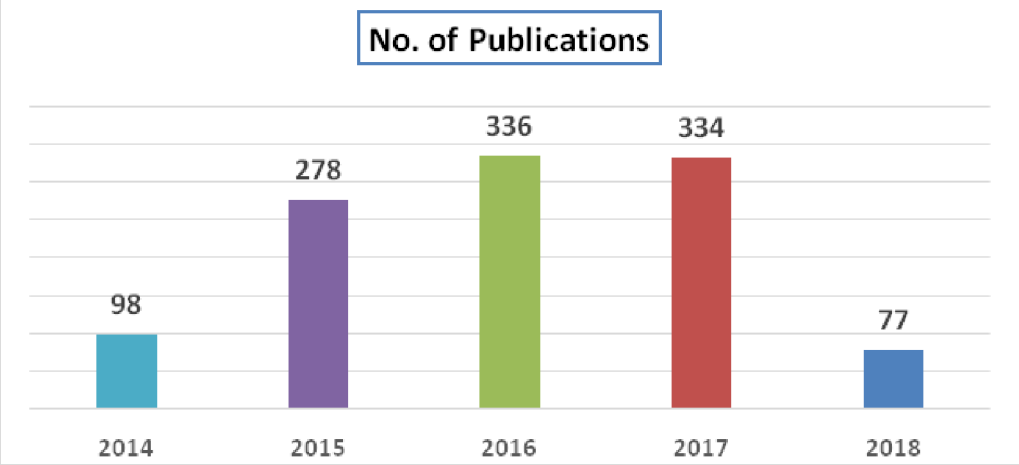

Figure 10

Figure no. 10, depicts the current status of research productivity in the discipline of Education during the last five years (2014-2018). Maximum no of publications (336) were reported in the year 2016, closely followed by 334 publications in the year 2017 and 278 publications in the

year 2015. There is a sharp rise in research productivity from 2014 to 2015. As on May 2018, 77 papers were published, it can be expected that many more publications can be there during the remaining part of this year (June -December 2018).

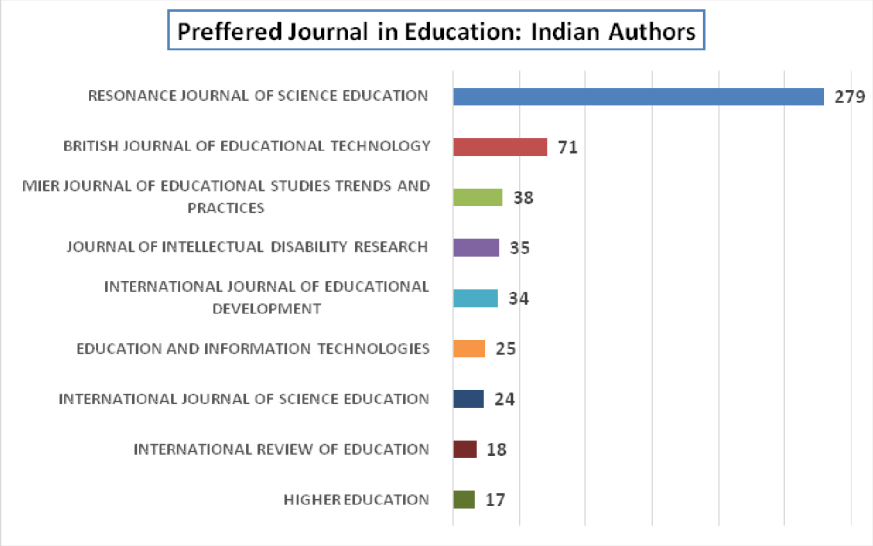

Figure 11

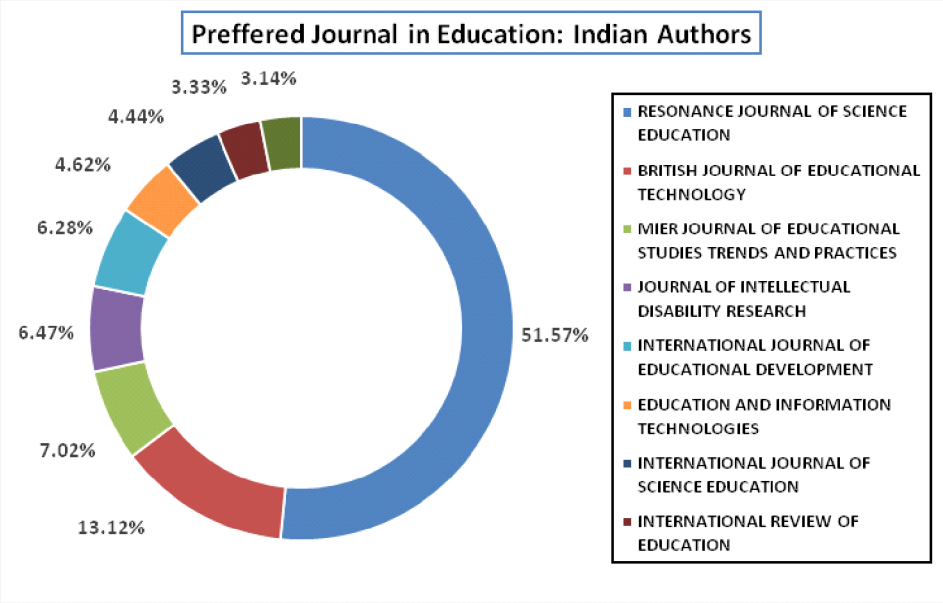

Figure 12

The figure above represents the most preferred journals in education by the Indian author. Indian authors published maximum number of articles in The "Resonance Journal of Science Education" having 279 (52%) articles, followed by "British Journal of Educational Technology"
(71) (13%); "MIER Journal of Educational Studies Trends and Practices" (38) (7%) and Journal of Intellectual Disability Research (35) (7%) publications by the students, research scholars and teachers of education in India. It is to be noted that "Resonance Journal of Science Education" is a very popular and well recognised Indian Journal in the field of Education published by the Indian Academy of Sciences, Bengaluru, India.

Major Findings :

1. The highest research productivity has been witnessed with 35,538 research papers in the year 2016
2. The contribution of USA in terms of research productivity in Education is the highest
3. The highest citation received globally is 1965 in the discipline of Education in 2006.
4. English is the primary language in which the global research productivity has been reported the highest.
5. (92.38%) research papers in the discipline of Education can be accessed freely under gold OA.
6. Total no. of publications authored by Indian researchers and scholars as reported by the database Web of Science (WoS) is 2,572.
7. Out of the total no of publication in Education originating from India (2572), no of research papers published under Open Access is 455
8. The h-index of total research output by Indian authors in Education was found to be 35.
9. The highest citation received by Indian author is 282 in the discipline of Education.
10. Maximum no of publications (336) were reported in the year 2016
11. "Resonance Journal of Science Education" having 279 (52%) articles is the most preferred journals in education by the Indian author.

Conclusion: The present study has provided a clear insight about the Research productivity in the discipline of Education by Indian scholars, researchers and teachers as well as on a global level. Results of the present study show that India has no rank in the global ranking of top 10 countries with respect to research productivity in Education. However, results are on

the basis of data retrieved from the premium database Web of Science (WoS), it can be inferred that

Indian authors published their articles that are not indexed by the database. Therefore, it is suggested to all the Indian students, researchers and academicians to publish articles in those enriched journals which are approved by the UGC (University Grant Commission).

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