

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Library Philosophy and Practice (e-journal)

Libraries at University of Nebraska-Lincoln

---

June 2021

## Top 100 Cited Publications in Education: A bibliometric analysis

Poornima Devi

C.R. College of Education, Hisar, Haryana (India), poornimalohan11@gmail.com

Follow this and additional works at: <https://digitalcommons.unl.edu/libphilprac>



Part of the [Education Commons](#)

---

Devi, Poornima, "Top 100 Cited Publications in Education: A bibliometric analysis" (2021). *Library Philosophy and Practice (e-journal)*. 5630.

<https://digitalcommons.unl.edu/libphilprac/5630>

# **Top 100 Cited Publications in Education: A bibliometric analysis**

**Dr. Poornima Devi**

Assistant Professor,  
C.R. College of Education,  
Hisar, Haryana (India)

## **ABSTRACT**

The focus of the present study is to analyse the top 100 cited papers in the field of Education. The study is aimed to provide insight into the citation pattern, authorship pattern, year, journals, countries, etc. of these top cited papers with the help of bibliometric analysis. The data for the study was extracted from the Web of Science database. The results of the study indicate that the majority of these 100 top papers were published from 2002 to 2006. Educational Psychologist, Academic Medicine and Review of Educational Research were the foremost journals while Taylor and Francis and Sage Publications were the major publishers. . The majority of the research papers are multi-authored and S.B. Issenberg, W.C. Mcgaghie and J Sweller are the most productive authors. USA is the dominating country in these top 100 papers and Northwstern University was the top institution.

**Keywords:** Bibliometrics, Education, Citations, Highly Cited, Top Cited

## **1. INTRODUCTION**

Research in all disciplines have grown rapidly in the past few decades. It is estimated that the production of scientific publications doubles every 15-20 years.<sup>1</sup> Research is conducted on numerous topics by various authors from different institutions and knowledge is being advanced through research publications in the form of journal articles, conference proceedings and other media of scholarly communication.<sup>2</sup> However, it is difficult for a reader to access the good quality of research. It is difficult to access the most impactful studies<sup>3</sup> and trending research topics in any field.<sup>4</sup>

Bibliometric studies are helpful to identify the research trend and the impactful studies.<sup>5,6</sup> Citation analysis in bibliometric studies is considered as a measure of scientific metric<sup>7</sup> and useful to identify the most impactful research in a field. Citation analysis in bibliometrics is an important tool to measure the impact or influence of that research on the other papers published<sup>8</sup> at relatively low cost.<sup>9</sup> Some other indirect indicators of quality publication like Impact Factor (IF), h-index, etc.<sup>10,11</sup> are also based on the citation count. Moreover, the number of citations received by a paper makes a vast network, by connecting to a large number of scholarly articles.<sup>11</sup> Thus the papers receiving more citations are

expected to have a good quality of research and influence the knowledge domain in a particular field.<sup>12</sup> Although a paper can receive citations for a positive reason,<sup>13</sup> a paper could also get high citations whenever the study is criticized.<sup>14</sup> So, the number of citations received by a paper is generally considered as an indicator of the impactful study of a field. According to Heldwein et al<sup>15</sup> any paper receiving 100 citations can be considered a classic paper.

## **2. OBJECTIVES OF THE STUDY**

The main objective of the study is to explore the top 100 cited papers in the field of Education during the time span from 2001 to 2020. The specific objectives of the study are as below:

- To know the types of publications of the top 100 cited papers
- To study the year-wise distribution of these papers
- To identify the sources publishing these top cited papers
- To study the authorship pattern and prolific authors of these top cited papers
- To identify the institution producing these papers
- To know the country of origin of the papers and collaboration among them
- To study the time span of references of these top cited papers

## **3. METHODOLOGY**

For obtaining the data for the present study, Web of Science database was used. The database was searched for the Subject Category “Education” using the string given below:

SU= (Education)

The obtained results were then sorted according to ‘Times Cited’ from highest cited to lowest cited. Then the data for the top 100 cited papers was extracted from the database. The data was analyzed with the help of MS-Excel and using the Biblioshiny App of Bibliometrix.<sup>16</sup>

## **4. DATA ANALYSIS**

### **4.1 Publication Type**

The document types of top 100 publications that have been published in Education from 2001 to 2020 are shown in Table 1. Among these 100 papers, 63 are in the form of articles, 26 are reviews, 6 are editorial material and 5 are proceeding papers. The average citation per document in each category is nearly equal. But the standard deviation for research articles and review papers is high. Meanwhile the mean citation count and the

median for the proceeding papers, and editorial material is almost equal with lesser standard deviation, that means that the documents under these two categories are relatively more consistent than the other type of publications.

**Table 1: Document types of top cited papers**

Document Type	Frequency	Total Citation	Mean	Median	S.D.
Article	63	74675	1185	850	982
Review	26	32305	1243	938	762
Editorial material	6	6888	1148	1011	394
Proceedings paper	5	5241	1048	969	274
<b>Total</b>	<b>100</b>	<b>119109</b>	<b>1191</b>	<b>-</b>	<b>-</b>

#### 4.2 Year-wise distribution of top 100 papers

The top 100 cited articles of Education have been published during the date range from 2001 to 2015. Maximum among these have been published in the year 2003 and 2016 (13 each), followed by the years 2002 (11 articles), 2004, 2005 and 2008 (10 articles each).

These top 100 articles received a total of 119109 citations with an average of 1191 citations. The average citation per paper was highest (1929.50) for the year 2004 while the average citation per paper per year was maximum (137.86) during the year 2014.

**Table 2: Year-wise distribution of papers**

Year	Articles	Citations	ACPP	ACPPY	Citable Years
2001	9	9219	1024.33	51.22	20
2002	11	10751	977.36	51.44	19
2003	13	12518	962.92	53.50	18
2004	10	19295	1929.50	113.50	17
2005	10	12955	1295.50	80.97	16
2006	13	20808	1600.62	106.71	15
2007	4	5848	1462.00	104.43	14
2008	10	11126	1112.60	85.58	13
2009	6	5130	855.00	71.25	12
2010	6	4794	799.00	72.64	11
2011	3	2340	780.00	78.00	10
2012	2	1737	868.50	96.50	9
2014	2	1930	965.00	137.86	7
2015	1	658	658.00	109.67	6
<b>Total</b>	<b>100</b>	<b>119109</b>	<b>1191.09</b>	<b>-</b>	<b>-</b>

*ACPP= Average Citation Per Paper, ACPPY= Average Citation Per Paper Per Year*

### 4.3 Sources of Publication

Table 3 shows the list of sources that have published the top 100 cited papers in Education. These top 100 papers have been published in 45 different sources. The journals “Academic Medicine” and “Educational Psychologist” are the leading sources publishing 8 papers each. 7 papers were published in the journal “Review of Educational Research” while 6 papers were published in “American Educational Research Journal”. As regards to the publishers of these 45 sources, 11 are published by Taylor and Francis, 7 by SAGE Publications, 5 by Wiley and 4 by Springer.

**Table 3: Sources of top cited papers**

Sources	Publisher	Articles	Citations	ACPP
Academic Medicine	Lippincott Williams and Wilkins	8	7418	927
Educational Psychologist	Routledge	8	10287	1286
Review of Educational Research	SAGE Publications	7	11683	1669
American Educational Research Journal	SAGE Publications	6	6213	1036
Journal of Teacher Education	SAGE Publications	5	4507	901
Medical Education	Wiley-Blackwell	4	3433	858
Teaching and Teacher Education	Elsevier Ltd.	4	4144	1036
Academy of Management Learning & Education	George Washington University	3	4365	1455
Computers & Education	Elsevier	3	2648	883
Health Education Research	Oxford University Press	3	2299	766
Journal of Engineering Education	Wiley-Blackwell	3	4240	1413
Medical Teacher	Informa Healthcare	3	3154	1051
Advances in Health Sciences Education	Springer Netherlands	2	2127	1064
American Journal of Physics	American Association of Physics Teachers	2	1685	843
Educational Researcher	SAGE Publications	2	1967	984
ETR&D - Educational Technology Research and Development	Springer Boston	2	1534	767
Exceptional Children	SAGE Publications	2	2221	1111
Journal of Education Policy	Routledge	2	2785	1393
Journal of Educational Research	Routledge	2	3136	1568
Journal of the Learning Sciences	Routledge	2	1437	719
Teachers College Record	Teachers College Record	2	3442	1721
Theory into Practice	Routledge	2	3145	1573
Other Sources (with 1 paper each)	-	23	31239	1358
<b>Total</b>	<b>-</b>	<b>100</b>	<b>119109</b>	1191

Figure 1 shows that “Educational Psychologist”, “Academic Medicine” and “Review of Educational Research” are the foremost sources that contribute the most in top-cited papers. The paper published in “Educational Psychologist” has exponential growth, all the papers published in the source are from the duration of 2001 to 2008. “Academic Medicine” and “Review of Educational Research” have linear growth in their publishing the high impact papers. 2008 “Computer and Education” is a newly emerged source. Maximum numbers of most influencing papers in education are published from 2001 to 2008.

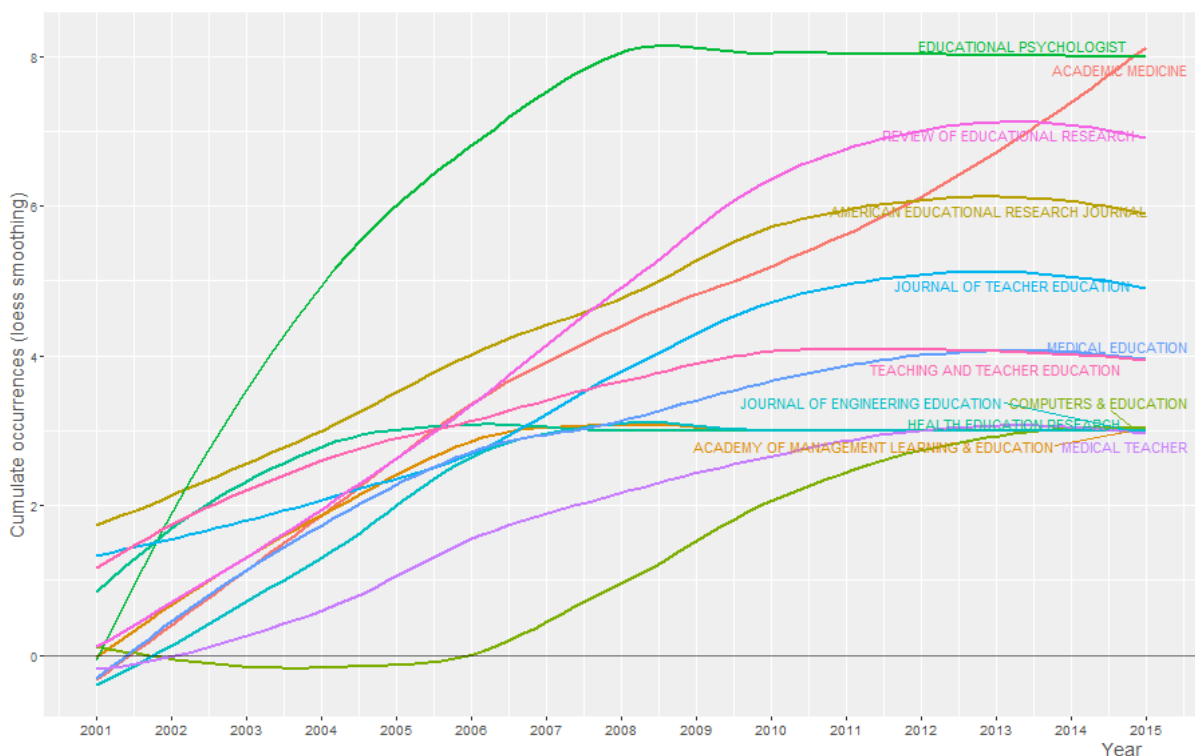


Figure 1: Source Growth

#### 4.4 Authors of top 100 papers

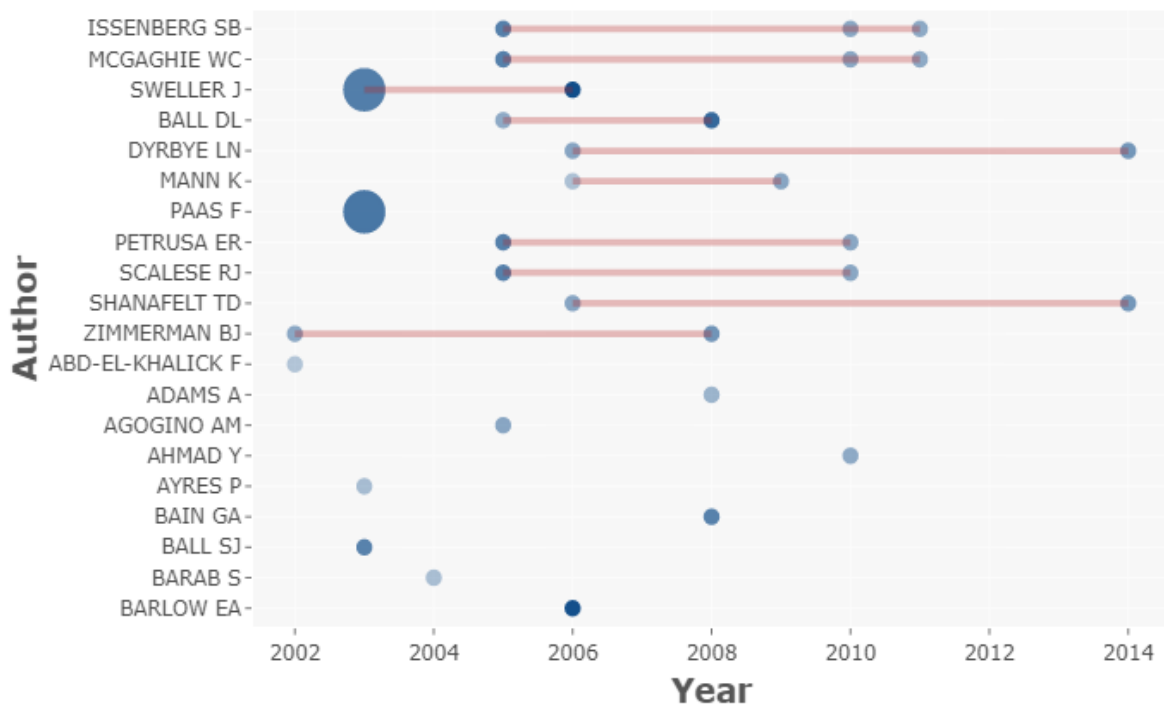
Total 275 authors are associated with these 100 top-cited papers in education. Table 4 lists the most prolific authors alongwith their papers and and citations. There are 11 such authors who have published more than one top-cited paper, and these authors have contributed in 11 articles as the first author. 7 authors in the list have atleast one paper as the first author.

S.B. Issenberg, W.C. Mcgaghie and J. Sweller are recognized as the most productive authors publishing 3 papers each. As shown in Figure 2, S.B. Issenberg and W.C. Mcgaghie are very consistent with their article production and both have three articles in the list and were produced in 2005, 2010 and 2011. Whereas J. Sweller received the most number of

citations (4427) and most numbers of papers (n=3), two of those papers were published in 2003 and one in 2006.

**Table 4: Author Profiles**

Authors	Total Articles	Total Citations
Issenberg SB	3	3207
McGaghie WC	3	3207
Sweller J	3	4427
Ball DL	2	2812
Dyrbye LN	2	1734
Mann K	2	1521
Paas F	2	2123
Petrusa ER	2	2525
Scalese RJ	2	2525
Shanafelt TD	2	1734
Zimmerman BJ	2	2446
Other authors with 1 paper each	264	301266



**Figure 2: Author production over time**

#### 4.5 Most Relevant Affiliations and Countries

The top cited papers in the present study are affiliated to 145 institutions from 12 different countries. Figure 3 shows that North-Western University and University of

Michigan are at the top with 8 papers each, followed by University of Illinois (7 papers) and University of Ottawa (6 papers).

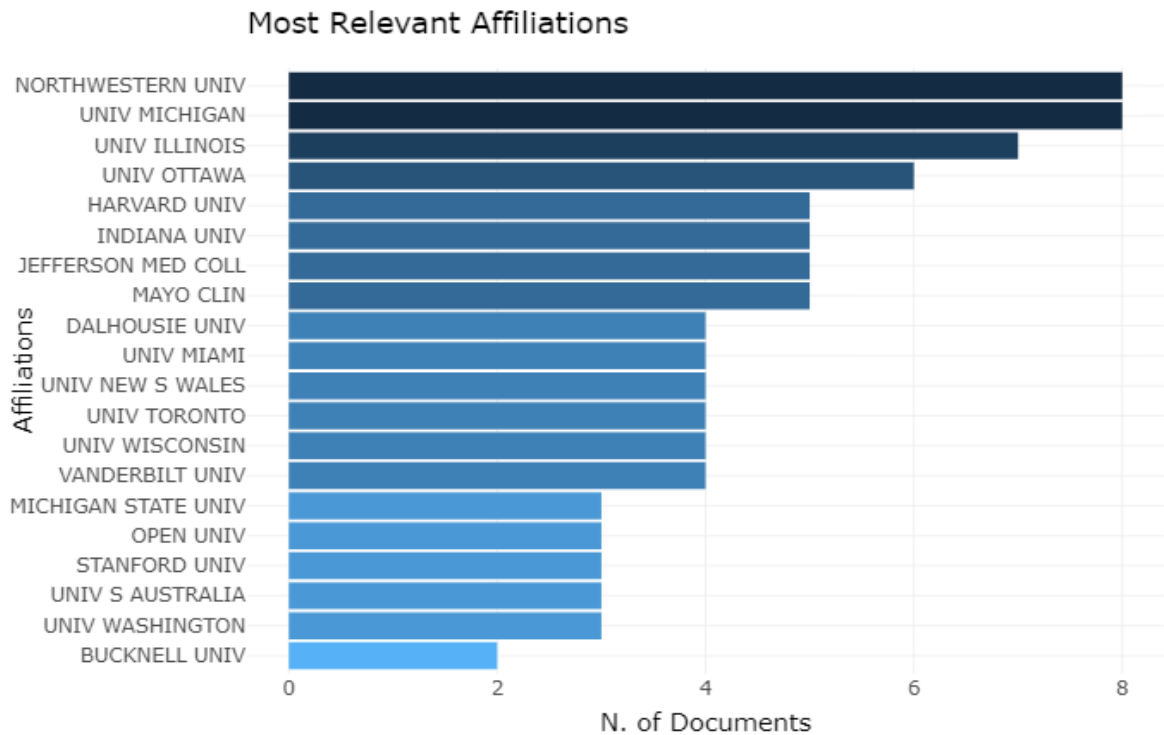


Figure 3: Most relevant affiliations

Table 5: Country of Publication

Country	Articles	Total Citations	Average Article Citations
USA	64	72562	1134
United Kingdom	9	10196	1133
Canada	7	6920	989
Australia	6	5510	918
Netherlands	4	5136	1284
Germany	2	2035	1018
New Zealand	2	4243	2122
Belgium	1	717	717
China	1	931	931
Greece	1	682	682
Singapore	1	684	684
Sweden	1	7686	7686

For calculating the country of publications, only the first author was considered. Table 5 indicates that the top 100 papers have been produced by 12 different countries. USA has predominance over the production of highly cited papers with 64 papers followed by United Kingdom (9 papers), Canada (7 papers) and Australia (6 papers).



Among all the countries producing highly cited papers, the articles from the USA have received the highest number of citations (72562) with an average citation per paper of 1134. The highest average citation (7686) is received by Sweden but produced only a single article in the list. The average citation received by each country is around 1000 citations per document.

#### 4.6 References

Table 6 illustrates the time span of the references of the top-cited papers. The references used in these papers range from 1891 to 2015. Out of the total references, 90% falls within the time range from 1981 to 2010. The maximum numbers of references (44.04%) belong to the 1990s. It was observed these papers were produced from 2001 to 2015, and the reference used in this literature is mostly newly emerged within the recent 30 years. Old literature have also been cited, but that amounts for very less percent of the total references.

**Table 6: References time span of top papers**

<b>Year of References</b>	<b>No. of References</b>	<b>%age</b>
1891-1900	3	0.04
1901-1910	13	0.18
1911-1920	5	0.07
1921-1930	5	0.07
1931-1940	27	0.37
1941-1950	13	0.18
1951-1960	57	0.78
1961-1970	138	1.88
1971-1980	384	5.23
1981-1990	1268	17.28
1991-2000	3231	44.04
2001-2010	2121	28.91
2011-2015	71	0.97
<b>Total</b>	<b>7336</b>	<b>100.00</b>

#### 4.7 Keywords of the papers

The most frequently used keywords are indicated graphically in figure 4. The font size of the text in the figure represents the frequency of the words used in these papers. The words used more frequently are students, education, instructions, science, skills, technology, curriculum, quality, psychology, attitude and beliefs, etc.



Figure 4: Keywords

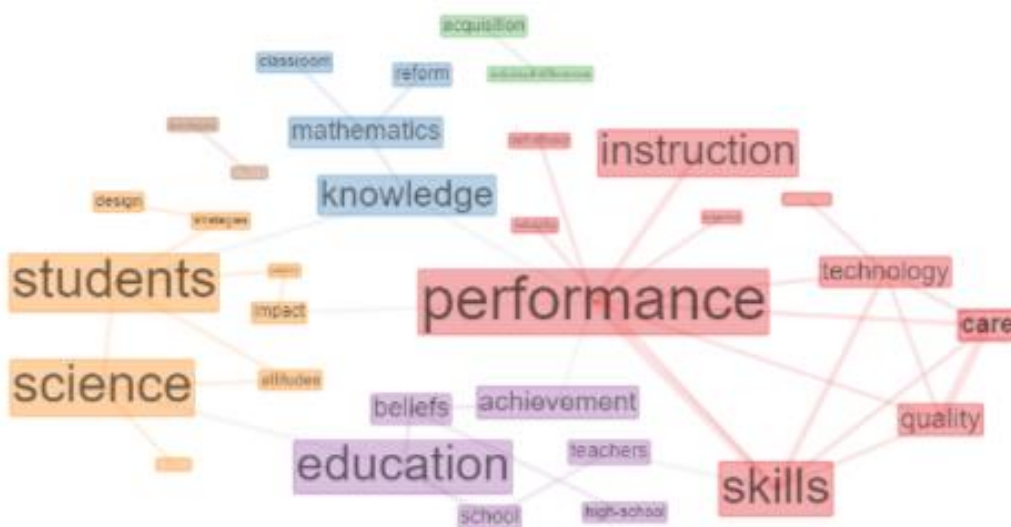


Figure 5: Keyword co-occurrence

#### 4.8 Keyword Co-occurrence

The keyword co-occurrence network in figure 5 is based on the most frequently occurred keyword-plus words with a minimum of 2-edge points. 37 such keywords are identified. This keyword co-occurrence network provides a brief insight into the areas/topics on which the research has been conducted.<sup>17</sup> The map identified 6 such clusters with some words are common among these clusters are performance, students, skill, knowledge etc. the size of the text represents the more frequently used words. The major cluster among all these clusters has 6 keywords; the clusters suggest that many researchers have conducted on

“impact”, “instructions”, “self-confidence”, “performance”, “achievements”. Some other clusters have main focus on curricula, reform, science, mathematics, knowledge etc.

## 5. SUMMARY AND CONCLUSION

This is the first of its kind bibliometric study of 100 top-cited papers in the “Education” discipline. The study data consisted of top 100 publications in Education during 2001 to 2020 obtained from Web of Science database. It was found that among these top 100 papers maximum were in the form of research articles, followed by reviews and few were editorial material and proceedings papers. Majority of these top cited papers were published during the 5 years from 2002 to 2006. The average citation per paper was calculated to be 1191 citations per paper. Educational Psychologist, Academic Medicine and Review of Educational Research are the foremost sources of publication and Taylor and Francis and Sage Publications has a dominance in publishing most impactful research in Education. The majority of the research papers are multi-authored. S.B. Issenberg, W.C. McGaghie and J Sweller are the most productive authors. The institutions whose authors have contributed the most included Northwestern University and the University of Michigan. USA dominates the production of top-cited articles. Maximum works cited in these top 100 papers have been published within the 30 years span from 1981 to 2010. The research areas in these papers are mainly emphasized on technology, skill, instructions, science, performance, quality, curriculum, etc.

## REFERENCES

1. Celeste, R. K., Broadbent, J. M., & Moyses, S. J. (2016). Half-century of dental public health research: Bibliometric analysis of world scientific trends. *Community Dentistry and Oral Epidemiology*, 44(6), 557-563. doi:10.1111/cdoe.12249.
2. Siwach, A. K. & Kumar, S. (2015). Bibliometric analysis of research publications of Maharshi Dayanand University (Rohtak) during 2000-2013. *DESIDOC Journal of Library and Information Technology*, 35(1), 17-24. doi: 10.14429/djlit.35.1.7789
3. Martelli, A. J., Martelli, R. A. M., Martelli, D. R. B., das Neves, L. T., & Martelli Junior, H. (2021). The 100 most-cited papers in oral medicine and pathology. *Brazilian Oral Research*, 35, 1-14. doi:10.1590/1807-3107BOR-2021.VOL35.0020.

4. Yeung, A. W. K., Goto, T. K., & Leung, W. K. (2017). At the leading front of neuroscience: A bibliometric study of the 100 most-cited articles. *Frontiers in Human Neuroscience*, 11 doi:10.3389/fnhum.2017.00363.
5. Kim, E. S., Yoon, D. Y., Kim, H. J., Jeon, H. J., Lee, J. Y., Cho, B. -, & Lee, K. (2017). Citation classics in neurointerventional research: A bibliometric analysis of the 100 most cited articles. *Journal of NeuroInterventional Surgery*, 9(5), 508-511. doi:10.1136/neurintsurg-2016-012399.
6. Parmar, S., Siwach, A. K., & Kumar, A. (2020). Fifty years research output in oral submucous fibrosis: A bibliometric analysis of publications from 1967 to 2016. *DESIDOC Journal of Library and Information Technology*, 40(2), 470-478. doi:10.14429/djlit.40.02.14727.
7. Shekhani, H. N., Shariff, S., Bhulani, N., Khosa, F., & Hanna, T. N. (2017). Bibliometric analysis of manuscript characteristics that influence citations: A comparison of six major radiology journals. *American Journal of Roentgenology*, 209(6), 1191-1196. doi:10.2214/AJR.17.18077.
8. Sengupta, N., Sarode, S. C., Sarode, G. S., Gadbail, A. R., Gondivkar, S., Patil, S., & Patil, S. (2020). Analysis of 100 most cited articles on forensic odontology. *Saudi Dental Journal*, 32(7), 321-329. doi:10.1016/j.sdentj.2020.04.005.
9. Garfield, E. (1979). Is citation analysis a legitimate evaluation tool? *Scientometrics*, 1, 359-375.
10. Hirsch, J. E. (2005). An index to quantify an individual's scientific research output. *Proceedings of the National Academy of Sciences of the United States of America*, 102(46), 16569-16572. doi:10.1073/pnas.0507655102.
11. Roldan-Valadez, E., Salazar-Ruiz, S. Y., Ibarra-Contreras, R., & Rios, C. (2019). Current concepts on bibliometrics: A brief review about impact factor, eigenfactor score, CiteScore, SCImago journal rank, source-normalised impact per paper, H-index, and alternative metrics. *Irish Journal of Medical Science*, 188(3), 939-951. doi:10.1007/s11845-018-1936-5.
12. Molléri, J. S., Petersen, K., & Mendes, E. (2018). Towards understanding the relation between citations and research quality in software engineering studies. *Scientometrics*, 117(3), 1453-1478. doi:10.1007/s11192-018-2907-3.
13. Tahim, A., Patel, K., Bridle, C., & Holmes, S. (2016). The 100 most cited articles in facial trauma: A bibliometric analysis. *Journal of Oral and Maxillofacial Surgery*, 74(11), 2240.e1-2240.e14. doi:10.1016/j.joms.2016.06.175.

14. Perazzo, M. F., Otoni, A. L. C., Costa, M. S., Granville-Granville, A. F., Paiva, S. M., & Martins-Júnior, P. A. (2019). The top 100 most-cited papers in paediatric dentistry journals: A bibliometric analysis. *International Journal of Paediatric Dentistry*, 29(6), 692-711. doi:10.1111/ipd.12563.
15. Heldwein, F.L., Rhoden, E. L., & Morgentaler, A.,(2010). Classics of urology: a half century history of the most frequently cited articles (1955-2009). *Urology*, 75, 1261-1268.
16. Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, 11(4), 959-975. doi:10.1016/j.joi.2017.08.007.
17. Laudano, M.C., Marzi, G. & Caputo, A.L. (2018). A decade of the international journal of entrepreneurship and small business: a bibliometric analysis. *International Journal of Entrepreneurship and Small Business*, 15(6), 411-432.