

Ranking Research Productivity of the Arts and Science Colleges in Kerala

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Abstract

Rankings have become a powerful phenomenon in higher education and in spite of several criticisms, they are to stay. Policy makers can make use of rankings to assess the performance of institutions or individuals. This study attempts to analyze the research productivity of the Arts and Science colleges in the State of Kerala which has not been attempted so far. The study also identifies the colleges in Kerala which have collaborated with the institutions ranked in Times Higher Education Rankings (THE) 2016 and the two regional league tables -Asian University Rankings 2016 and BRICS & Emerging Economies Rankings. This study can provide the policy makers understand the role of rankings, assess the performance of the higher education institutions in the State of Kerala and reinforce higher education and research output.

Keywords: : Research Productivity, Scientometrics, Higher Education, Kerala, Rankings

1. Introduction

Changes in higher education worldwide have also had an impact on Indian Higher Education and this has been furthered by the emergence of the several academic ranking systems. The international academic ranking systems have increasingly brought changes in the government policies worldwide with the governments framing their own rankings or evaluation measures to assess the performance of their institutions. Rankings of higher educational institutions have been structured around a combination of several parameters and are conducted at global, regional and national levels mainly by media, government, institutions etc. Different rankings employ different combination of parameters such as research excellence, institutional output, citations, academic reputation,

internationalization, admissions, industry income, awards etc. and therefore the subject has evoked several criticisms on the lack of consensus over the methodology adopted by the different rankings. At the global level the main ranking systems are the Times Higher Education World University (THE) Rankings, Academic Ranking of World Universities (ARWU) and QS World University Rankings etc. India has the third largest higher education system in the world after the U.S and China (World Bank, 2007) but has failed to make its presence felt in the top in the several global rankings and the league tables such as THE, BRICS and Emerging Economies Rankings, Asia University Rankings etc. The states in India are often not able to assess the research performance of their institutions and the Government of India has now brought in the National Institutional Ranking Framework (NIRF) since September 2015 to assess the performance of institutions in the country. The parameters include “Teaching, Learning and Resources,” “Research and



Professional Practices,” “Graduation Outcomes,” “Outreach and Inclusivity,” and “Perception” for 6 categories of institutions i.e., Engineering, Management, Pharmacy, Architecture, Universities and Colleges. Though the frameworks are similar, the methodologies are domain specific.

The ranking systems, despite being subjected to several criticisms are staying, as the rankings of the higher educational institutions provide a picture of the overall performance of the individual universities or its departments and help the policy makers formulate administrative decisions.

The different ranking systems and evaluation measures employ bibliometric measures to assess the research productivity of the researcher/ institution. The number of papers and citations are the two main bibliometric indicators used to assess research productivity and impact. Research publishes data which form the basis of bibliometric measures are drawn mainly from two major databases, Web of Science (WoS) of Thomson Reuters and Scopus (Elsevier). This study is based on the publication data of the Arts and Science colleges of the state of Kerala from the Web of Science and besides assessing the research productivity of the arts and science colleges in the State of Kerala, also attempts to find out the collaboration of the Arts and Science colleges of

the State with the Times Higher Education (THE) 2016 ranked institutions and the NIRF ranked institutions.

2. Higher Educational System in Kerala

There are four categories of higher education institutions in India-Centrally funded institutions, State Funded Institutions, Deemed institutions and Private institutions. Central institutions have generous funding, but limited enrollment. The State Higher Education system accounts for 48% of total enrolment (XII Five Year Plan, Planning Commission of India, New Delhi, 2012) but is underfunded. Shortage of funds has led to deterioration in the quality of teaching, faculty recruitment and research output. The State of Kerala has 13 state universities, one central university and two deemed universities (MHRD, 2017.). Table 1 shows that there are 58 government colleges and 164 aided Arts and Science Colleges in Kerala (Government of Kerala, 2016) and these colleges are affiliated to these four universities- Kannur University (KU), University of Calicut (UoC), Mahatma Gandhi University (MG) and University of Kerala (UoK). The Arts and Science colleges are differentiated according to management- Government, Private Aided and Private Unaided. The Private aided commonly known as “Aided colleges” are publicly funded and the Government pays the teachers. These colleges also receive funds from the State and Central Government agencies.

Table 1: Government and aided colleges affiliated to the universities in Kerala

Type of College	Kannur University	Mahatma Gandhi University	University of Calicut	University of Kerala	Total
Aided	12	64	57	31	164
Govt	9	8	29	12	58
Grand Total	21	72	86	43	222

The University of Kerala is the oldest university in the state. Mahatma Gandhi University has the largest number of aided colleges. University of Calicut however has the largest number of government arts and science colleges. Of the four universities, Kannur University is the youngest which was formed in 1996 and several colleges under University of Calicut were transferred to Kannur University during formation. As on August 2016, there are 19 autonomous colleges in Kerala. The MG University has 9 autonomous colleges, University of Calicut 7 autonomous colleges, and the University of Kerala has 2 autonomous colleges.

3. Objectives

The present study aims to investigate the performance and visibility of the Arts and Science Colleges in the State of Kerala and attempts to achieve the following objectives:

- ❖ Yearwise and the type of publications,
- ❖ Main domains of research in the state
- ❖ Ranking productive authors
- ❖ Ranking the arts and science colleges in terms of research productivity
- ❖ Identify colleges collaborating with THE ranked institutions

4. Literature Review

Bibliometric studies have been used to evaluate and assess institutions, individuals and academic disciplines and rank individuals and institutions based on research productivity. Several studies were conducted on the research productivity of universities based on bibliometric studies: Savithribhai Phule University (Nagarkar, Veer, & Kumbhar, 2015); Gujarat University (Kumar, Dora, & Desai, 2015); Alagappa University (Baskaran,

2013); Banaras Hindu University (Gautam & Mishra, 2015) University of Pune (Nagarkar, 2014); University of Mysore (Kumbar, Gupta, & Dhawan, 2008) and the selected four universities of Delhi and Uttarpradesh (Mukherjee, 2008) attempted to identify the most prolific authors, the preferred journals of publishing, the nature of collaboration etc. at the national level. Similar bibliometric studies were conducted on the research productivity of the universities in Kerala (Sudhier, 1997; Gopikuttan & Aswathy, 2014; Sheeja & Susan, 2014; Sheeja, Surendran, & Mohamed Sageer. T. K., 2015).

Williams, Slagle, & Wilson, (2014) developed a ranking system of national and international universities and departments at institutional level in the field of public administration from the publications of the faculty in journal in the field. Publication counts were used to measure an institution's productivity and rank them accordingly. Toutkoushian, Porter, Danielson, & Hollis (2003). Lahiri & Kumar (2012) attempted to analyze and rank various institutions and faculty members in International Business based on faculty publications appearing in the top three International Business journals.

Even though higher educational institutions constitute the universities and their affiliated colleges, studies are mainly confined to the research output of universities and a study on the research output and rankings of the arts and science colleges in the state has not been carried out. Therefore this study is an attempt to analyze the research activity of the colleges in the State, rank them and identify their collaborations with the worldwide ranked institutions.

5. Methodology

Data was sourced from the Web of Science Database (WoS) for the period 1989- 2015. A list of the Arts

and Science colleges was first prepared for the website of Directorate of Collegiate Education, Government of Kerala and the name variants of the colleges were also identified. A search with the names of the colleges and their variant names in Kerala was conducted. The data obtained was analysed using Bibexcel and Microsoft Excel Software. Maximum efforts were taken to standardize the names of institutions, and authors. Normal count method was used wherein equal weightage was given to the collaborators.

6. Findings

6.1 Year Wise Distribution

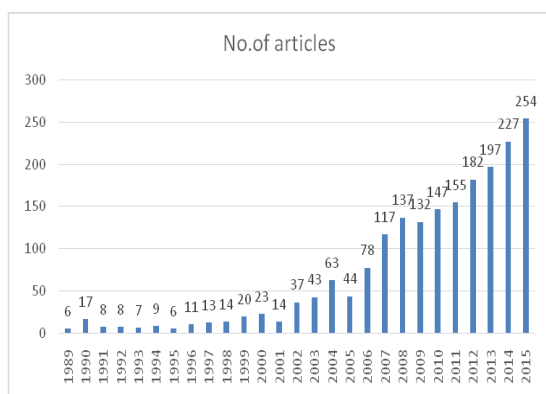


Figure 1: Year wise distribution of publication

1969 articles were published during the period 1989-2015 by the Arts & Science Colleges in Kerala. Fig 1 shows the year wise productivity. There has not been a sizeable increase in the number of publications in the initial years, but from 2010 onwards, there has been a steady increase with 254 publications in 2015. The increase may be attributed to the implementation of UGC regulations where the faculty have to achieve the target of the points prescribed for further promotion.

6.2 Type of Publications

Articles were the most predominant form of publication 96%(1852) followed by Article-

Proceeding Paper 1.5%(29), Note 1.24%(24), Review 19(0.98%)meeting abstract 17(0.88%) and other forms-biographical item, book review correction, editorial material, letter made up for the remaining 1.45%

6.3 Subject Wise Distribution of Papers

Analysis of the subject wise distribution of the papers was based on the schema of classification of Web of Science Subject Areas which is denoted as “SC” in the Web of Science download. The 1969 publications of the Arts and Science Colleges in Kerala fall under 92 subject categories. Fig 2 shows the subject wise breakup of the research output of colleges from the State. Highest number of publications are in the field of chemistry (422) followed by Materials Science (359), Physics (350), Spectroscopy (256). “Others”(359) include a further 68 disciplines with publications less than 20. In the case of Chemistry, the research output seems to toe the line of overall output of the country where the maximum contribution to the country’s output has been from the field of chemistry as indicated in Nature Index 2016(“All Countries, great and small,” 2016). There has been very little contribution from arts and humanities.

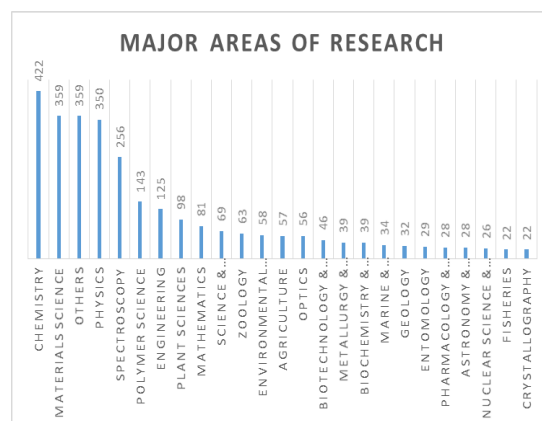


Figure 2: Subject wise distribution of publications

6.4 Authorship Analysis

6.4.1 Authorship Pattern

The present study explores the authorship pattern in Arts and Science Colleges. The number of authors who have contributed to a paper vary from one to 46. Multiple authorship was the prominent form of collaboration. Fig 3 shows the authorship pattern where two authorship is highest with 473 papers, followed by three authors(433), four authors(413). There are 15 publications with mega-authors, a term coined by Sen ie wherein ten or more authors collaborate in a publication.

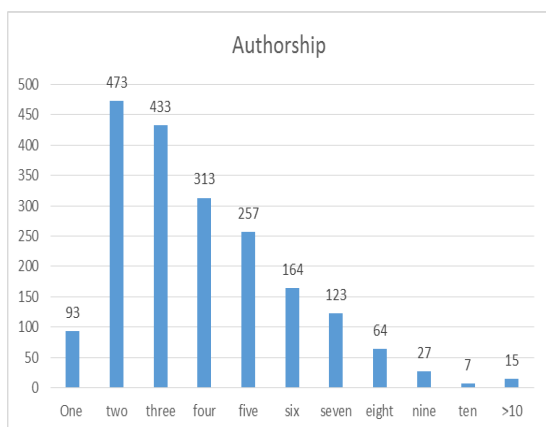


Figure 3: Authorship pattern

6.4.2 Productive Authors

Table 3 lists the most productive authors of the arts and science colleges with more than 25 Publication who are found to belong to the colleges of the aided sector.

6.5 Productive Colleges

Arts and Science Colleges numbering 142 constituting 64% of the total colleges have contributed to the research output of the state and aided colleges were found to be more productive. 76.74% of colleges affiliated to University of Kerala

Table 3: Ranking Productive Authors

	Name	Total publications	Total citations
1.	Panicker, CY	111	1128
2.	Joe, IH	101	2012
3.	Varghese, HT	88	1054
4.	Thomas, JK	67	392
5.	Solomon, S	64	338
6.	Mary, YS	60	441
7.	Philip, D	59	2030
8.	Sajan, D	55	786
9.	Jayakumar, VS	44	1543
10.	Pothan, LA	40	1259
11.	Thomas, T D	37	358
12.	Joy, K	35	260
13.	Wariar, PRS	30	160
14.	Kumar, HP	29	247
15.	Raghavan, R	27	110
16.	Koshy, J	27	164
17.	Thomas, PV	26	240
		900	12522

were involved in research activities followed by MG University(73.61%), Kannur University(62%) and University of Calicut(50%). Table 4 shows the top 10 ranked colleges of the state in terms of research productivity where Mar Ivanios College, Thiruvananthapuram and the University College, Thiruvananthapuram in the aided and government sector respectively occupied the 1st and 2nd positions among the colleges.

Table 4: Top Productive Colleges in the State

Rankings Colleges in the State	Name of college	University Affiliated to	Total contributions
1.	Mar Ivanios College (Autonomous) Thiruvananthapuram	UoK	756
2.	University College, Thiruvananthapuram	UoK	346
3.	St Thomas College, Pala	MG	233
4.	Fatima Mata National College, Kollam	UoK	188
5.	Bishop Moore College, Alappuzha	UoK	181
6.	TKM Arts & Sci College, Kollam	UoK	150
7.	Maharajas College, Cochin	MG	78
8.	Sree Neelakanta Govt Sanskrit College Pattambi	UoC	49
9.	Govt College Women, Thiruvananthapuram	UoK	47
10.	Govt College, Kasaragod	KU	21

6.6 Collaborating Countries and Institutions

An attempt has been made to identify the collaborating countries and THE 2016, BRICS & Emerging Economies 2016 and Asia University 2016 ranked institutions which the colleges have been collaborated with. It was observed that the largest number of citations -253 was received for the article published in 2011 but it has not been with any of the THE 2016 ranked institutions. In fact, none the papers which received more than 100 citations have been in collaboration with THE 2016 ranked institutions.

6.6.1 Collaborating Countries

The colleges have collaborated with 54 countries, where the United States tops the list with 109 individual collaborators from 54 institutes. The United Kingdom comes second with 20 institutes

collaborating with the colleges of the State. Table 5 indicates the collaborating countries.

Table 5: Collaborating Countries

Country	No. of individual collaborators	No. of collaborating institutes
USA	109	54
United Kingdom	44	20
South Korea	35	18
Germany	28	18
France	25	16
Japan	30	15
Poland	28	13
Peoples R China	28	13
Belgium	83	11

11th International CALIBER-2017

Country	No. of individual collaborators	No. of collaborating institutes
Malaysia	66	11
Canada	19	10
Portugal	33	9
Turkey	39	8
South Africa	12	8
Australia	11	8
Netherlands	10	8
Saudi Arabia	50	7
Czech Republic	32	6
Italy	9	6
Switzerland	6	6
Sweden	11	5
Brazil	10	5
Hungary	9	5
Russia	5	4
U Arab Emirates	13	3
Spain	9	3
Scotland	7	3
Mexico	5	3
Taiwan	3	3
Thailand	3	3
Austria	3	3
Slovenia	9	2
Singapore	8	2
Serbia	5	2
Finland	4	2

Ranking Research Productivity of the Arts...

Country	No. of individual collaborators	No. of collaborating institutes
Morocco	3	2
Egypt	2	2
Israel	2	2
Croatia	2	2
New Zealand	2	2
Oman	15	1
Denmark	7	1
Bulgaria	2	1
Eritrea	2	1
Macedonia	2	1
Venezuela	1	1
Qatar	1	1
Romania	1	1
Ireland	1	1
Vietnam	1	1
Byelarus	1	1
Chile	1	1
Pakistan	1	1
Sri Lanka	1	1

6.6.2 Collaboration with THE Ranked Institutions

The Arts and Science colleges have collaborated with 339 institutions worldwide of which many have been ranked in the Times Higher Education World University (THE) ranking 2016. The collaboration of the colleges with the top 100 THE 2016 ranked universities along with the two regional league tables- Asia University Rankings 2016 and BRICS & Emerging Economies 2016 is indicated in Appendix A

❖ Times Higher Education (THE) 2016 Ranked Institutions

The colleges have collaborated with the top ranked institutions of THE Rankings 2016 like California University of Technology (CALTECH), the University of Oxford, Stanford University, University of Cambridge, Harvard University which have been ranked 1st, 2nd, 3rd, 4th and 6th in the THE 2016 rankings but with fewer collaborations-1, 6, 3, 1 and 4 respectively. Collaborations with universities ranked as far as 800 in the THE 2016 rankings have been observed and Appendix A shows the list of THE institutions ranked upto 100 with whom the colleges of the state have collaborated. The colleges have also collaborated with other 214 institutions not ranked in the THE 2016 rankings.

❖ Asia University Rankings

The Times Higher Education Asia University Rankings follow the same parameters as that of the THE World University rankings but have been modified to suit the Asian institutions. Of the 22 countries in the Asia University rankings, the colleges have collaborated with 17 countries and with the top two universities in Asia-National University Singapore and Nanyang Technological University. The top ranked universities in Asia with whom the colleges have collaborated are given in Appendix A.

❖ BRICS & Emerging Economies Ranked Institutions

Brazil, Russia, India, China and South Africa, commonly known as BRICS are the five major emerging national economies and have agreed on collaboration in research and teaching and co-publishing. The BRICS & Emerging Economies rankings consist of 35 countries of which, maximum collaboration has been with China. However, none of the institutions from China which have been collaborated with are ranked. The colleges in the state collaborated with 17 ranked institutions listed in the BRICS & Emerging Countries Rankings. Such institutions stand ranked at 188.

6.6.3 Collaborating Institutions-National

The colleges in the state have collaborated with institutions within and outside the state. The main collaboration at the national level has been with Cochin University of Science and Technology followed by the MG University and the University of Kerala. The main collaborations have been with the institutions within the state. However most of the institutions have not been ranked in the NIRF ranking. Table 6 lists the main collaborators with more than 20 collaborations.

Table 6: Colleges in the State in collaboration with National Institutions

Name of the Collaborating Institute	NIRF Ranking overall 2016	NIRF Rankings overall 2017	No. of collaborations
Cochin Univ Sci & Technol, Kochi	30	86	207
Mahatma Gandhi Univ, Kottayam	NR	67	183
Univ Kerala, Kariyavattom	NR	47	109
Univ Calicut, Malappuram	NR	93	88

Name of the Collaborating Institute	NIRF Ranking overall 2016	NIRF Rankings overall 2017	No. of collaborations
Natl Inst Interdisciplinary Sci & Technol,Thiruvananthapuram	NR	NR	85
Mangalore Univ, Mangalagangothri	NR	NR	37
Bharathiar Univ,Coimbatore	14	45	26
National Institute of Technology,Calicut	NR	NR	25
Womens Christian Coll, Nagercoil	NR	NR	24
IISER,Pune			23
Bhabha Atom Res Ctr,Mumbai	NR	NR	20
Cent Univ Kerala,Kasargod	NR	NR	20

NR- Not Ranked

7 Conclusion

The bibliometric analysis of the research output of the publications of the Arts and Science Colleges identified 1969 publications. Multiple authorship was predominant. Aided colleges affiliated to the universities had greater research output when compared to government colleges. Chemistry was identified as the subject which contributed the most to the output of the state. The United States is the main collaborating country. The Colleges were found to collaborate with the top ranking institutes identified in THE ranking 2016. However, the Cochin University of Science and Technology was the overall collaborator at the national level.

Though this paper shows a picture on the research output of the Arts and Science Colleges which has so far not been attempted, the study has its limitations. The books published and the patents obtained by the faculty of the colleges were not taken into consideration. Moreover the study does not include the private or “Unaided sector”.

The research output of the colleges shows an upward trend, but efforts need to be made in encouraging collaboration with the top institutions

of the world, initiate training programs to promote publishing in prestigious journals and methods to increase the research impact, the importance of open access journals.

The results of this study could be used to by the government and policy makers in the State to frame guidelines regarding the improvement of the research output of the State.

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