

Research Contributions of KUK and MDU: A Bibliometric Study

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Abstract

Education plays a vital role in every individual's life. The responsibility of imparting education lies on the shoulders of educational institutions. The role of various educational institutions differ according to the level of education they impart. Universities in India have been assigned the responsibility of higher education. In addition to teaching, universities also carry out research. The results of these are published in the form of research contributions. The present study is aimed to analyse the research contributions of KUK and MDU from the bibliometric point of view. It is found that 4255 research contributions have been contributed during the last ten years by these two universities. The degree of collaboration is 0.95. Foreign research collaboration has also been noticed. More than seventy five percent of the contributions are in the form of research articles.

Keywords: Bibliometrics; Research Contributions; Scientometrics.

Introduction

"The destiny of India is now being shaped in her classrooms. This, we believe, is no mere rhetoric. In a world based on science and technology, it is education that determines the level of prosperity, welfare and security of the people. On the quality and number of persons coming out of our schools and colleges will depend our success in the great enterprise of national reconstruction whose principal objective is to raise the standard of living of our people" [1]. Education system of a country is primarily responsible for the growth and development of its citizens. University Grants Commission is responsible for the promotion and co-ordination of University education and for the determination and maintenance of standards of teaching, examination and research in Universities. The teaching faculty in the university are not limited to the classroom teaching but they are actively

engaged in research work. The number of contributions from the faculty of a university is one of the core indicators for the quality assessment of a university.

The foundation stone of Kurukshetra University was laid by Dr. Rajendra Prasad, the first President of India, on 11th January 1957. The University which started with a focus on Sanskrit and Indic Studies took a big leap forward in 1961 by transforming its initial unitary character into a multi-faculty university. Presently, the University comprises of 10 faculties on the campus with 47 departments and institutes. Since its inception the University has pursued excellence in teaching and research. Today, it is widely acknowledged as a premier institution in key areas of higher education like science & technology, humanities, social sciences, commerce and management, law, Indological studies, education, fine arts and sports. With a highly qualified and motivated teaching faculty, Kurukshetra University offers students from throughout the country a world-class education by providing learning experience. The university has more than four hundred faculty members to achieve its goal of quality education [2].

Maharshi Dayanand University (MDU), *ab initio* established as Rohtak University, Rohtak, came into existence by an Act No. 25 of 1975 of the Haryana Legislative Assembly in 1976 with the objective to

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promote inter-disciplinary higher education and research in the fields of environmental, ecological and life sciences. It was rechristened as Maharshi Dayanand University in 1977 after the name of a great visionary and social reformer, Maharshi Dayanand. The University campus, spread over an area of over 665.44 acres, is well laid with state-of-the-art buildings and magnificent road network, and presents a spectacle of harmony in architecture and natural beauty. Educational and research programmes are offered through its 36 departments [3].

Objectives

The aim of the present study is to identify and compare the various bibliometric aspects of the scientific contributions of the researchers and faculty of Kurukshetra University, Kurukshetra and M D University Rohtak. The specific objectives can be mentioned as under:

- To know the authorship pattern.
- To identify the proportion of single versus multi authored contributions.
- To compare the degree of collaboration.
- To analyse the trend in the average number of authors per paper.
- To analyse the year-wise growth pattern of contributions.
- To know the most preferred journals.

Table 1: Showing year-wise contributions

Year	KUK	MDU
2016	258	293
2015	274	216
2014	264	246
2013	297	258
2012	332	226
2011	332	168
2010	238	119
2009	200	71
2008	154	97
2007	135	77

Authorship Pattern

The authorship characteristic of the contributions reveals that the pattern of single authorship is not predominant as mere 219 contributions out of 4255 are single authored which is almost double of that of CCSHAU, Hisar contributions [4]. The majority of contributions (53.68%) are either double authored or triple authored. As many as twenty one contributions were contributed by involving ten and more authors.

Methodology

The study is conducted by attempting an advanced search on Scopus database. The search is restricted to Kurukshetra University, Kurukshetra and Maharshi Dayanand University, Rohtak and time period from 2007 to 2016. After importing the data, it was codified. To get results in tabular form SPSS has also been used. The analysis facility of Scopus has also been utilized.

Results

The analysis of the results is being presented in tabular form along with description of the same under different sub-headings:

Year Wise Distribution

The total number of contributions made by KUK faculty is 2484 and MDU faculty is 1771. The contributions of KUK faculty are 40.26% more than those of MDU faculty during these ten years. The maximum number of contributions by KUK faculty were 332 (2011 & 2012 both) and the maximum number of contributions by MDU faculty were 293 (2016). During the last five years MDU faculty has contributed about 70% of its total contributions whereas KUK faculty has contributed about 57% of its total contributions during the last five years. The growth trend of MDU is seen little sharper than that of KUK.

The average number of authors per contribution is 3.27. There is no significant difference between average number of authors per contribution on the basis of university. The highest number of authors in a single contribution were thirty nine for KUK and twenty three for MDU.

Degree of Collaboration

To measure the collaboration in research formula

designed by K Subramanyam [5] is used. The formula is:

$$C = \text{NM} / (\text{NM} + \text{NS})$$

Where C is the degree of collaboration, NM is number of multi-authored contributions and NS is number of single-authored contributions. In other words it is the ratio of the number of multi-authored contributions to total contributions.

The degree of collaboration in the contributions under study is found to be 0.95 which support the

results of Raja Ramanna Centre for Advanced Technology contributions [6]. The faculty of both the universities also have foreign collaborations with more than fifty countries. The top ten foreign collaborative countries have been listed in the below table along with the number of contributions. Both universities has the most foreign collaboration with United States. The second foreign collaborative country for KUK is Denmark whereas for MDU it is South Korea.

Table 2: Showing year-wise contributions

	KUK	MDU	Total
Single	142	77	219
Double	756	466	1122
Triple	699	463	1162
Four	369	389	758
Five	279	211	490
Six	146	90	236
Seven	45	40	85
Eight	33	20	53
Nine	9	0	9
Ten and More	6	15	21
Total	2484	1771	4255

Table 3: Showing Country-wise collaboration

KUK	No. of Contributions	COUNTRY/TERRITORY	MDU
United States	37	United States	55
Denmark	28	South Korea	41
Saudi Arabia	27	Spain	33
Egypt	23	Saudi Arabia	29
Malaysia	20	Portugal	25
Czech Republic	14	Malaysia	16
South Korea	14	Belgium	13
Italy	13	Japan	10
Germany	11	Bangladesh	9
Greece	11	Israel	8

Subject-wise Distributions of Contributions

The major area of research contributions by KUK is Chemistry and Engineering whereas for MDU the major subject area of research contributions is Biochemistry, Genetics and Molecular Biology, and

Pharmacology, Toxicology and Pharmaceutics in addition to Chemistry. A perusal of table 4 provides a picture of top ten subjects of contributions made by the faculty of both the universities.

Table 4: Showing Subject-wise contributions

Subject Area	MDU	KUK
Biochemistry, Genetics and Molecular Biology	436	327
Chemistry	386	504
Pharmacology, Toxicology and Pharmaceutics	377	333
Engineering	253	547
Agricultural and Biological Sciences	249	262
Medicine	222	186
Physics and Astronomy	198	608
Materials Science	159	416
Chemical Engineering	144	154
Computer Science	141	197

Document type wise distribution of contributions

An analysis of type of document of contributions indicates that 78.87% contributions were published in the form of research articles and 10.38% in the form of conference papers. Rest of the contributions were reviews, book chapters, editorial, letter, and short survey etc.

Preferred Journals

The contributions of both the universities were published in various journals. To observe the preferred or popular journal, the list of source titles

was analysed. There is no single journal which has attracted more than even four percent of total contributions. However, KUK faculty has the highest number of publications (81) in AIP Conference Proceedings followed by Medical Chemistry Research and further followed by Journal of Molecular Liquids. The MDU faculty has the highest number of contributions in International Journal of Pharmacy and Pharmaceutical Sciences (34) followed by Medicinal Chemistry Research (30) and further followed by AIP Conference Proceedings (24). Table 6 lists the top ten source publications of both universities.

Table 5: Showing Document type-wise contributions

Document Type	KUK	MDU
Article	1997	1359
Conference Paper	296	140
Review	85	138
Book Chapter	44	69
Article in Press	29	25
Erratum	9	3
Book	7	13
Editorial	6	14
Letter	5	5
Note	5	3
Short Survey	1	2

Table 6: Showing Top Ten Source publication of contributions

Source Title (MDU)	No. of Contributions	SOURCE TITLE (KUK)	No. of contributions
International Journal Of Pharmacy And Pharmaceutical Sciences	34	AIP Conference Proceedings	81
Medicinal Chemistry Research	30	Medicinal Chemistry Research	36
AIP Conference Proceedings	24	Journal Of Molecular Liquids	33
Der Pharma Chemica	19	Annals Of Biology	32
Research Journal Of Pharmaceutical Biological And Chemical Sciences	19	European Journal Of Medicinal Chemistry	27
Arabian Journal Of Chemistry	17	International Journal Of Pharmacy And Pharmaceutical Sciences	23
Indian Journal Of Heterocyclic Chemistry	17	Multidiscipline Modeling In Materials And Structures	22
International Journal Of Pure And Applied Mathematics	17	Journal Of Chemical And Engineering Data	21
International Journal Of Biological Macromolecules	16	Journal Of Chemical Thermodynamics	21
Journal Of Solution Chemistry	16	Journal Of Solid Mechanics	21

Top Performers

While analysing the individual contributions, it is found that in Kurukshetra University, Kurukshetra, R. Kumar is the top performer with 227 contributions. Other significant contributors of KUK are D. Kumar (120), A. Pal (76), O. Parkash (72), C. Sharma (63), P. K. Sharma (61), K. R. Aneja (59), S. Kumar (53), N. Singh (53) and J. Sharma (51). In MDU C. S. Pundir is the top performer with 140 contributions. The other

significant contributors of MDU are B. Narsimhan (90), S. P. Khatkar (60), S. S. Gill (59), V. K. Sharma (58), P. Shukla (50), V. B. Taxak (49), R. Parkash (46) N. Chauhan (45) and H. Dureja (45).

Conclusions

It was expected that due to the requirement of APIs

for direct recruitment and promotions under Career Advancement Scheme in the colleges and universities, the single authorship pattern will rise as single authored contribution fetches more points. But contrary to this, the results clearly reflect that still the trend of multi-authorship prevails. Arora and Pawan [7] emphasized that increase in multi authorship and collaboration between researchers is an indication of growing professionalism in different fields. Hence it can be viewed that team research is predominant over solo research. As more than 75% of the contributions are in the form of Research articles, this highlights the academic and research interest of the faculty of both universities.

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