

**Ph.D. THESES ACCEPTED BY ALIGARH MUSLIM UNIVERSITY
(AMU) IN THE DEPARTMENT OF ZOOLOGY DURING 1954-2018: A
BIBLIOMETRIC STUDY**

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An analysis of 465 theses accepted by the Zoology department of the Aligarh Muslim University (AMU) during 1954-2018 indicates that the number of theses accepted during the period of study has increased steadily. The highest number of theses was accepted during the fiveyears block of 1980-1984. Of the 465 accepted theses, 315 were submitted by male scholars and 150 by female scholars. Highest number of theses submitted by women scholars was in the last two blocks of 2005-2009 and 2010-2014. Only, a miniscule number of theses were submitted under the supervision of female faculty. No women supervisor could find place among the list of most prolific supervisors who supervised eight or more scholars. However, two women supervisors (Dr. Tahseen Qudsia and Dr. Anjum Ara) guided 7 and 6 students respectively.

Keywords: Bibliometrics, Doctoral dissertations, Zoology, Aligarh Muslim University, Shodhganga, India

INTRODUCTION

Research is pursuit of new frontiers of knowledge and wisdom. It is considered as the foundation for any future investigation in any field. Universities and research laboratories contribute a major role in shaping the researchers in their key areas. Globally all governments are investing heavily in research and development facilities as the same provides access to wider range of resource and facilities. Dissertations are an integral part of the research process as a vehicle to transmit the results of research. Doctoral dissertations besides the publication in scholarly journals are considered as parameters to assess the performance of the university or research laboratory in the field of investigation. The quality of research of a thesis or dissertation varies by country or university or programme. In order to be awarded a PhD, a scholar must be able to demonstrate mastery over a given subject.

Aligarh Muslim University (AMU) is a residential academic institution which was established in 1920 and is one of the oldest universities in India. It has recently been awarded grade 'A' by the National Assessment and Accreditation Council (NAAC). The university offers post graduate, Master of Philosophy and doctoral level degree programmes in different disciplines (<https://www.amu.ac.in/>). The present study examines the performance of Aligarh Muslim University (AMU) in terms of doctoral theses accepted during the period of 1954-2018 in the discipline of Zoology. From a small one room offspring, the department has now grown into a well developed centre of teaching and research, with all the essential requisites for the pursuits of advance biology programmes. Master's programme in zoology started in 1930 with Professor Mohammad Babar Mirza as the head of the department. During his tenure of more than 30 years, he transformed the department into a Centre of Excellence in biological sciences. Department at present is a well-known centre for teaching and research in Zoological Sciences. The Department is currently getting grants of more than Rs. 35 million from various national and international R & D agencies. The strengths of the department lies in its highly qualified and devoted teaching staff, diverse research interests in basic and applied sciences, modern teaching aids along with dedicated Post-Docs and research students(<https://www.amu.ac.in/departmentpage.jsp?did=43>).

NEED FOR THE STUDY

Of the more than 100 departments of studies in the university the department of

Zoology is well known worldwide for its research output. The present study, therefore, is an attempt to examine the performance of the research studies, conducted by the department of Zoology of Aligarh Muslim University (AMU) in terms of doctoral theses accepted by it during the period of 1954-2018 (65 years) and how these compares with doctoral theses accepted in the discipline of Chemistry.

PREVIOUS STUDIES

In the past several studies dealing with bibliometric analysis of doctoral dissertations in sciences and social sciences have been reported in literature. The reported studies basically dealt with the number of theses submitted to an institution or university and the nature of citations appended to the theses submitted in different disciplines.

In a series of studies Garg and co-authors have examined theses submitted by different universities in different departments. For instance, Garg and Saini (2015) made a bibliometric assessment of 1763 post doctoral and PhD dissertations submitted in the field of agricultural sciences by the scholars of Indira Gandhi Agricultural University (IGAU) during 1970-2010. The study found that the number of theses submitted increased steadily and reached a peak in the last block of 2006-2010. Most of the theses were submitted by male scholars and only 271 theses were submitted by female scholars. Most of the supervisors were also male. The highest number of theses was submitted in the department of agronomy followed by plant breeding and genetics. In another study, Garg and

Kumari (2018) examined 809 theses accepted by the chemistry department of AMU during 1935-2014. The study found that the number of theses accepted during the period of study has increased steadily. The highest number of theses was accepted during the five year block of 1980-1984. Of the 809 accepted theses, 187 were by female scholars. The highest number of theses submitted by women scholars was in the last two blocks of 2005-2009 and 2010-2014. Only, a miniscule number of theses were supervised by female faculty. The highest number of theses was produced in the sub-discipline of organic chemistry. Only one women supervisor could find place among the list of 27 most prolific supervisors.

Garg and Duggal (2018) analysed 511 theses accepted by Bangalore University, Bangalore in the disciplines of zoology, botany and physics during 1969-2015. The study found that the highest number of theses was accepted during the five year block of 1991-1995 in zoology and botany, while the highest number of theses in physics was accepted in the five year block of 1996-2000. Of the 511 accepted theses, 203 theses were by female scholars and the rest 308 by male scholars. The number of theses accepted by women scholars in botany was almost equal to the number of theses by their male counters. Number of scholars per supervisor for male as well as female supervisors in zoology was equal. No women supervisor could find place in the list of prolific supervisors in physics. In the discipline of zoology and botany, four women supervisors were listed in the list of prolific supervisors. In the study, Garg and Pal (2019) analysed 476 Ph.D.

theses accepted by Indian Agricultural Research Institute (IARI) in different disciplines of agricultural science and technology during 2011-2016. The study found that the number of theses accepted during the study period was inconsistent. The highest number of theses was accepted during 2015. Of the 476 theses accepted 353 were submitted by male scholars and 123 by female scholars. Of the total 206 supervisors, 49 were female and 157 were male supervisors. On an average, male supervisors produced more Ph.D. scholars than female supervisors. Highest number of theses was accepted in the discipline of agronomy closely followed by genetics and plant breeding.

In a recent study Garg and Yadav (2020) analysed 1184 PhD theses accepted during 2005-2012 in different schools/centres of Jawaharlal Nehru University, New Delhi. “The study found that male scholars submitted 733 (61.9%) theses and remaining 451 (38.1%) theses were submitted by female scholars. The highest number of theses was accepted by School of International Studies followed by School of Language Literature & Culture Studies. These 1184 theses were supervised by 373 male and female supervisors. Of these 86 were female supervisors. Like the number of theses produced, highest number of supervisors was also from the School of International Studies. Of the total 373 supervisors, 83 prolific supervisors guided 639 scholars. The number of scholars per supervisor for male as well as female was almost equal. Besides these other studies reported in literature are by Haque and Khan (2020) who examined the

doctoral theses awarded in the Faculty of Agriculture at Bangladesh Agricultural University during 1974-2014. Findings indicate that most of the Ph.D. scholars were male 277 (91.10%) and only 8.9% were female scholars. Kumbhar (2019) examined 41 PhDs awarded by the department of Library and Information Sciences (LIS) at Dr. Babasaheb Ambedkar Marathwada University (BAMU), Aurangabad during 1990-2016. The study indicates that only eight theses were by female scholars and the remaining 33 by male scholars. However, the highest number of students was guided by female supervisors. 'Bibliometrics' and 'Computer (ICT)' are the preferred subjects for research in LIS".

Alemna et al. (2019) analysed 414 Master of Philosophy and the Doctor of Philosophy theses by postgraduate students at the School of Nuclear and Allied Science (SNAS), University of Ghana (2008 - 2016) using the INIS database as the source of data. There was also a big gender gap with male students dominating their female counterparts with (300 or 79.71%) counts.

OBJECTIVES OF THE STUDY

1. To examine the pattern of growth of theses accepted during the period 1954-2018 (65 years) in the discipline of zoology and to compare the pattern of growth with theses accepted in the discipline of chemistry by AMU;
2. To examine the distribution of theses accepted by gender of the scholars who submitted theses and how it has changed during the period of study;

3. To identify the most prolific guides and their gender and to examine how the number of male and female guides have changed over the period of time.

DATA SOURCE AND METHODOLOGY

The data source for the study was Shodhganga, a repository of Indian Electronic Theses and Dissertations. The repository has been set up by the INFLIBNET (Information and Library Network) Centre located at Gandhi Nagar (Gujarat), an autonomous Centre of the University Grants Commission (UGC) of India. It provides a platform for research scholars to deposit their PhD theses in electronic version. It makes them available to the entire scholarly community in open access. The repository has the ability to capture, index, store, disseminate and preserve ETDs (Electronic Theses and Dissertations) submitted by the researchers. Shodhganga replicates academic structure of each university in terms of Departments or Centres or Colleges to facilitate ease of navigation. It also facilitates research scholars from universities to deposit their theses in the respective Departments or Centres or Colleges. Shodhganga only provides the core discipline of the submitted theses and does not provide the sub-discipline of the submitted theses. The gender of the supervisors was identified from the full names and from the website of the zoology department of the AMU. Where there was an uncertainty in the gender of the scholar, the same was identified using the certificate provided in the theses.

RESULTS AND ANALYSIS

Chronological Distribution of Theses Submitted

During the period of 1954 to 2018 (65 years), 465 PhD theses were accepted by the department of Zoology at AMU, while 803 theses were accepted in the department of Chemistry during the same period. The average number of theses accepted per year was 7 in the zoology department, which is more than the average number of theses submitted in the department of zoology by Bangalore University (Garg and Duggal). The number of theses accepted in chemistry was 12. It indicates that the average number of theses produced by scholars in the discipline of zoology is much less than the theses accepted in the discipline of chemistry of AMU

(Garg and Kumari). Further analysis of data indicates that during the first seven years of 1954-1960, only six theses were accepted, less than even the average number of theses accepted per year. Only after 1964 onwards, the number of theses accepted has increased and it reached a peak with 68 theses during the block of 1980-1984 closely, followed by number of theses accepted during the five year block of 2005-2009 with 61 theses. A raw analysis of data on the yearly distribution of theses indicates that highest (17) number of theses were accepted in the year 1980, closely followed by the number of theses in the year 1983 with 15 theses. No thesis was submitted in the year 1959 unlike the discipline of chemistry, where no thesis was submitted during the years of 1937-1941, 1943-1948, 1949-1952, 1955-1956 (Garg and Kumari).

Table 1: Distribution of Theses in Block of Five Years and by Gender

Years	Theses accepted of male scholars	Theses accepted of female scholars	Total theses accepted	Total theses accepted (chemistry)
1954	1	0	1	1
1955-1959	4	0	4	4
1960-1964	9	0	9	24
1965-1969	18	3	21	39
1970-1974	23	3	26	50
1975-1979	30	6	36	89
1980-1984	57	11	68	126
1985-1989	44	5	49	106
1990-1994	23	8	31	67
1995-1999	12	12	24	43
2000-2004	31	20	51	72
2005-2009	31	30	61	97
2010-2014	18	28	46	85
2015-2018	12	21	33	-
Years N.A.	2	3	5	-
Total	315 (67.7%)	150 (32.3%)	465	803

The figure 1 depicts the pattern of growth of PhD theses submitted in the discipline of chemistry and zoology. It indicates that the pattern of theses accepted by the university in both the disciplines follow a similar trend and is inconsistent for both the disciplines. For instance,

theses submitted in both the disciplines reaches the peak during the block years of 1980-1984. After that there is a decline in the number of theses submitted in both the disciplines and started rising after 1995-1999 block.

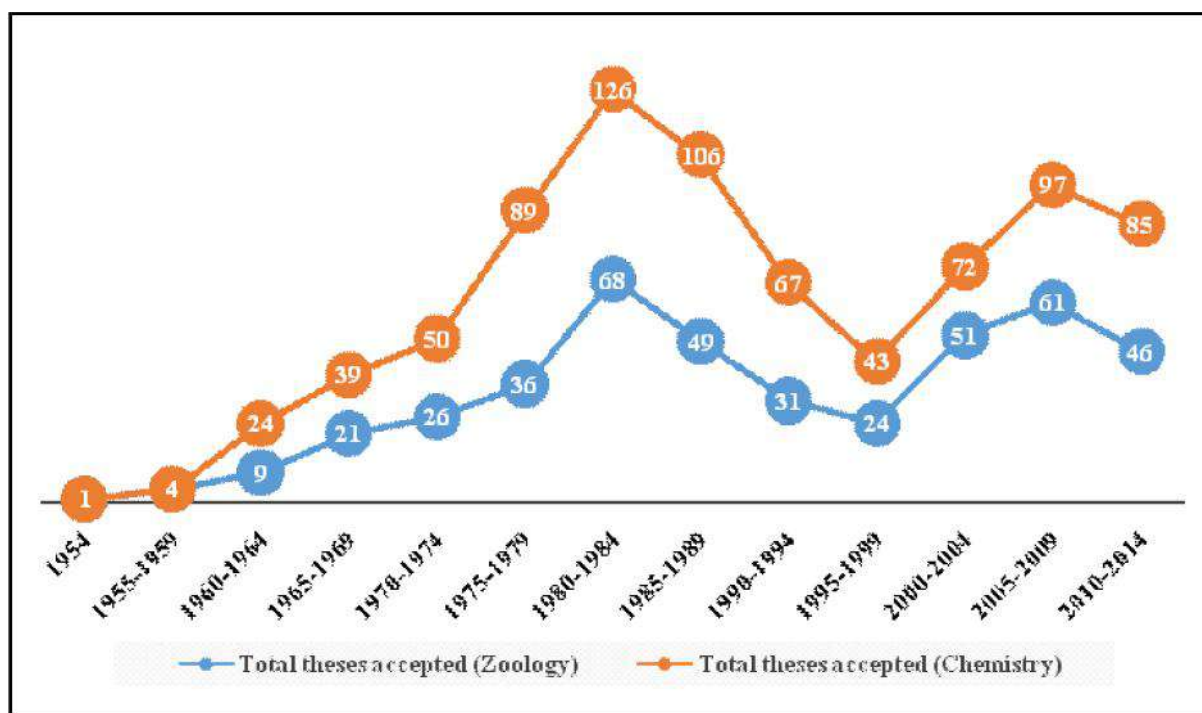


Figure 1: Pattern of growth of theses submitted in zoology and chemistry

Distribution of theses by gender of the scholars

Data on the distribution of theses accepted by gender in blocks of five years has been depicted in the table 1. It indicates that during the period of 65 years, 315 (68%) of the accepted theses were submitted by male scholars and rest 32% (150) by female scholars. Further analysis of data indicates that the first three theses by women scholars were accepted during the block

year of 1965-1969. The number of theses submitted and accepted by women scholars started increasing after the five years block of 1995-1999 and reached a peak in the five-year block of 2005-2009. The number of theses submitted by women scholars during 2005-2009 was equal to the theses accepted of their male counter parts. During the last two blocks of 2010-2014 and 2015-2018, the number of theses accepted of female scholars was more than their male counter parts. Also, of the 150 theses by women scholars,

111 (90%) were accepted during the last five blocks of 1995-1999 to 2014-2018. The findings are similar to the bibliometric study of PhD theses in the discipline of chemistry at AMU during 1935-2014 (Garg and Kumari). This also indicates an increasing interest of female scholars in life sciences.

Productivity of male and female scholars during four different blocks

Since the absolute output of theses varied with the type of gender with the period, the authors have used Transformative Activity Index (TAI) suggested by Guan and Ma (2004) to examine the relative change in the number of theses accepted during the period of study. For this, the period of study has been divided into four blocks (Table 2). The methodology to calculate TAI has been modified according to the requirement of the data. Mathematically $TAI = \{(Ci/Co)/(Wi/Wo)\} * 100$, where Ci denotes the number of theses in the i th block for male and female scholars respectively, Co is the total number of theses during the i th block, Wi the total number of theses of a particular gender for all blocks and Wo is the total number of theses accepted by AMU in zoology during the entire study period. This has been illustrated below for the understanding of the readers for the block of 1955-1969 for male and female scholars.

TAI for 1955-1969 for male scholars, $Ci = 31$, $Co = 34$, $Wi = 315$ and $Wo = 465$. Therefore $TAI = \{(31/34)/(315/465)\} = \{(0.9117)/(0.6774)\} = 1.345 * 100 = 134.588 = 135$ (Rounded off to the nearest whole number)

Similarly, TAI for female scholars $Ci = 3$, $Co = 34$, $Wi = 150$ and $Wo = 465$. Therefore $TAI = \{(3/34)/(150/465)\} = \{(0.0882)/(0.3225)\} = 0.2734 * 100 = 27.34 = 27$ (Rounded off to the nearest whole number. Like this the value for other blocks can also be calculated.

Based on the values of TAI given in the table 2, it is observed that the proportion of theses produced by male scholars has declined from 135 in the block of 1955-1969 to 71 in the last block of 2000-2018. On the contrary, the proportion of theses produced by female scholars increased from 27 in 1955-1969 to 161 in 2000-2018. Thus, the theses produced by female scholars have increased considerably in later period.

Distribution of Supervisors by Year and Gender

The table 3 presents the data on the distribution of supervisors by gender. It indicates that there was no women supervisor in the department of zoology in the first 20 years of existence of the department and the women supervisors appeared only in the year 1975. The data presented in the table 3 indicates that during the total period of 65 years (1954 to 2018) 465 theses were awarded under the guidance of 100 supervisors, of which 87 were male supervisors and only 13 were female supervisors. This indicates that most of the theses were awarded under the supervision of male supervisors. The data presented in the table 3 also indicates that of the 465 theses, only 41 (9%) of theses were submitted under the female supervisors. The number of theses submitted under the female supervisors in zoology is higher than the number

Table 2: Productivity of male and female scholars in four different blocks

Years	Theses accepted of male scholars (TAI)	Theses accepted of female scholars (TAI)	Total theses accepted
1955-1969	31 (135)	3 (27)	34
1970-1984	110 (125)	20 (48)	130
1985-1999	79 (112)	25 (75)	104
2000-2018	92 (71)	99 (161)	191
*Others	3	3	6
Total	315	150	465

Table 3: Distribution of Supervisors by Year and Gender

Year	Theses accepted under the male supervisors	Theses accepted under the female supervisors	Total
1954	1	0	1
1955-1959	4	0	4
1960-1964	9	0	9
1965-1969	21	0	21
1970-1974	26	0	26
1975-1979	35	1	36
1980-1984	67	1	68
1985-1989	49	0	49
1990-1994	30	1	31
1995-1999	23	1	24
2000-2004	48	3	51
2005-2009	48	13	61
2010-2014	37	9	46
2015-2018	23	10	33
Years N.A.	3	2	5
Total	424	41	465

of theses submitted in chemistry (Garg and Kumari). The share of women supervisors is much less in AMU than the share of women supervisors in Bangalore University (Garg and Duggal), which was 28%.

Distribution of supervisors by number of students guided

As mentioned above, 100 supervisors guided 465 researcher scholars. Data on the number of

students supervised by a supervisor is presented in Table 3A and 3B. It indicates that 19 supervisors guided eight or more scholars and produced 258 (55.5%) PhDs. Remaining 207 (44.5%) theses were supervised by 81 supervisors. Of these 41 supervisors guided one

student only. The Table 3B lists 19 supervisors who have guided eight or more scholars in the discipline of zoology of the AMU during the period of study. The maximum numbers of theses (25) have been submitted under the guidance of Professor Nawab Hasan Khan, followed by

Table 3 A: Distribution of Supervisors by Number of Students Guided

Sl. No.	Details	Number of Supervisors	Total
1	Number of supervisors guiding 1 student each	41*1	41
2	Number of supervisors guiding 2 student each	8*2	16
3	Number of supervisors guiding 3 student each	8*3	24
4	Number of supervisors guiding 4 student each	6*4	24
5	Number of supervisors guiding 5 student each	9*5	45
6	Number of supervisors guiding 6 student each	7*6	42
7	Number of supervisors guiding 7 student each	2*7	14
8	Number of supervisors guiding 8 or more students each	19	258
	Total	100	465

Table 3 B: Most prolific supervisors

Sl. No.	Name of the Supervisor	No. of Students guided	Rank	Gender
1	Khan, Nawab Hasan	25	1	M
2	Jafri, A K	24	2	M
3	Jairajpuri, M Shamim	23	3	M
4	Khan, Asif A	18	4	M
5	Mohammad Afzal	17	5	M
6	Alam, S Mashhood	16	6	M
7	Khan, Mumtaz Ahmad	16	6	M
8	Siddiqi, Ather H	15	7	M
9	Shujauddin	13	8	M
10	Ahmad, Irfan	12	9	M
11	Khan, Mukhtar Ahmad	10	10	M
12	Shafee, S Adam	10	10	M
13	Agarwal, Man Mohan	9	11	M
14	Khan, A M	9	11	M
15	Siddiqui, M Shahid	9	11	M
16	Ahmad, Wasim	8	12	M
17	Mustafa, Saleem	8	12	M
18	Parwez, Iqbal	8	12	M
19	Usmani, Mohd Kamil	8	12	M

Professor A K Jafri who supervised 24 research scholars. No female supervisor could find place in the list of most prolific supervisors who guided eight or more scholars. However, Dr. Tahseen Qudsia and Dr. Anjum Ara, two female supervisors guided seven and six students respectively.

FINDINGS AND CONCLUSION

- * The findings of the study may inspire the research scholars' especially female scholars at AMU to pursue PhD and the faculty members should also encourage more and more male scholars to do PhD as the number of male scholars who submitted PhDs has declined in later period.
- * The present study analyzed 465 PhD theses accepted at the department of zoology of the AMU during 65 years of 1954-2018. The study indicates that PhD theses submitted in the zoology department of AMU was low in the beginning, but started increasing after 1965 like the number of theses in the discipline of agriculture at Indira Gandhi Agricultural University (Garg and Saini). The highest number of theses was accepted during 1980-1984 with 65 theses. However, the pattern of theses accepted during the period of study is inconsistent like the number of theses accepted in the discipline of chemistry of AMU (Garg and Kumari).
- * The highest (19) PhD theses were submitted in the year 2009 closely followed by the number of theses (17) accepted in the years 1980 and 1987. Other years in which 10 or more theses were submitted are 1976, 1981-1985, 1994, 2001-2003, 2006, 2008, 2013

and 2014 and in the remaining years the numbers of theses submitted were less than 10.

- * Of the total 465 theses accepted, 315 were by male scholars and 150 by female scholars. In the last 10 years the number of female scholars has gone up in absolute terms as well as in terms of TAI. Maximum numbers of theses accepted of male scholars were 14 in the year 1983 while for female scholars 13 theses were accepted in the year 2009. A big gender gap with male students dominating their female counterparts has been reported in all the studies cited under review of literature.
- * Of the 100 supervisors who guided 465 scholars, 87 were male and only 13 were female supervisors. There was no women supervisor in the university in the first 20 years of the existence of the university and the women supervisors appeared only in 1975. Among the female supervisors Dr. Tahseen Qudsia and Dr. Anjum Ara guided seven and six student respectively. Among the male supervisors Professor Nawab Hasan Khan has guided highest number of PhD scholars, followed by A K Jafri. All studies under review of literature found that the quantum of male supervisors was more than their female counterparts except in the discipline of Library and Information Science at Dr. Babasaheb Ambedkar Marathwada University (BAMU), where female supervisors guided more scholars than their male counterparts.

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REFERENCES

1. Alemna, A.A., Bilson, A.P.K.E., & Badu, E.E. (2019). A bibliometric analysis of theses at the School of Nuclear and Allied Sciences, University of Ghana, Legon. *Library Philosophy and Practice (e Journal)*. 2567. Retrieved January 25, 2021, from <https://digitalcommons.unl.edu/libphilprac/2567>
2. Aligarh Muslim University (Department of Zoology). Retrieved October 25, 2020, from <https://www.amu.ac.in/departmentspage.jsp?did=43>
3. Aligarh Muslim University. Retrieved October 25, 2020, from <https://www.amu.ac.in/>
4. Garg, K. C., & Duggal, M. (2018). Bibliometric study of Ph D Theses accepted by Bangalore University in Disciplines of Zoology, Botany and Physics during 1969-2015. *Library Herald*, 56(3), 318-327. <https://doi.org/10.5958/0976-2469.2018.00030.1>
5. Garg, K. C., & Kumari, P. (2018). PhD Theses accepted by Aligarh Muslim University (AMU) in the discipline of Chemistry: A Bibliometric Study (1935-2014). *Journal of Indian Library Association*, 54(2), 73-78. 25 November 2020. Retrieved from <https://www.ilaindia.net/jila/index.php/jila/article/view/196>
6. Garg, K.C., & Pal, R. (2019). Bibliometrics of Ph. D. theses accepted by Indian Agricultural Research Institute (IARI) during 2011 to 2016. *Library Herald*, 57(2), 222-231. <https://doi.org/10.5958/0976-2469.2019.00013.7>
7. Garg, K.C., & Saini, V. (2015). Bibliometrics of Postgraduate Dissertations and Doctoral Theses submitted to Indira Gandhi Agricultural University (IGAU) during 1971-2010. *Library Herald*, 53(3), 284-292. <https://doi.org/10.5958/0976-2469.2015.00030.5>
8. Garg, K.C., & Yadav, A. (2020). Bibliometrics of PhD Theses accepted by Jawaharlal Nehru University (JNU) in Different Schools/ Centres of Sciences and Social Sciences during 2005-2012. *Library Herald*, 58(2&3), 20-35. <https://doi.org/10.5958/0976-2469.2020.00021.4>
9. Guan, J., & Ma, N. (2004). A comparative study of research performance in computer science. *Scientometrics*, 61(3), 339-359.
10. Haque, Md. E., & Khan, Md. M. (2020). Doctoral theses of agricultural faculty of BAU: A bibliometric analysis from 1974 to 2014. *The Eastern Librarian*, 25(1), 58-71. Retrieved January 25, 2021, from <http://www.lab.org.bd/journal>
11. Kumbhar, K.N. (2019). A Bibliometric study of Ph.D. Awarded Theses in Department of Library and Information Science. *PEARL - A Journal of Library and Information Science*, 13(1), 1-6. <https://doi.org/10.5958/0975-6922.2018.00043.8>

